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THE PACIFIC REGIONAL OCEAN USES ATLAS

Data and tools for understanding ocean space use in Washington, Oregon and Hawaii

Authors:

Mimi D'Iorio
Hugo Selbie
Charles Wahle
Jordan Gass

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National Oceanic and Atmospheric Administration
99 Pacific Street, Suite F
Monterey, CA 93940

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PROUA PROJECT TEAM

Team Member	**Role**	**Agency**
Mimi D'Iorio	Project Lead	NOAA
Hugo Selbie	Project Coordinator	NOAA
Jordan Gass	GIS Specialist	NOAA
Jackie Sommers	Logistical Support	NOAA
Sara Guiltinan	Project Officer	BOEM

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Workshop Staff	**State Partners**
Danielle Molnar – NOAA Coastal Office	Jen Hennessey (WA Dept. Ecology)
Gretchen Chiques – NOAA Coastal Office	Katrina Lassiter (WA Dept. Natural Resources)
Tim Doherty – NOAA Coastal Office	Libby Whiting (WA Dept. Natural Resources)
Jean Tanimoto – NOAA Coastal Office	Leo Asuncion (HI Dept. Planning)
Ross Winans – NOAA Coastal Office	Joan Delos Santos (HI Dept. Planning)
Ben Reder – NOAA Coastal Office	
Kalisi Mausio – NOAA Coastal Office	
Chrissa Waite – NOAA Coastal Office	
Lindsay Goodwin – NOAA Coastal Office	
Chris Ellis – NOAA Coastal Office	
Dawn Chang – Kuiwalu Consulting	

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iii) ABBREVIATIONS, ACRONYMS AND SYMBOLS

BOEM Bureau of Ocean Energy Management
CMSP Coastal and Marine Spatial Planning
EEZ Exclusive Economic Zone
EPAct Energy Policy Act

FACT Fishermen's Advisory Committee of Tillamook County
FGDC Federal Geographic Data Committee
FINE Fishermen Interested in Natural Energy
FISHCRED Fishermen's Information Service for Housing, Confidential Release and Essential Distribution
GIS Geographic Information System
HI Hawaii
MHW Mean High Water
MLW Mean Low Water
MPA Marine Protected Area
NGO Non-Governmental Organization
NM Nautical Mile
NOAA National Oceanic and Atmospheric and Administration
NOP National Ocean Policy
NSAT Depoe Bay Near Shore Action Team
OCS Outer Continental Shelf
OCSLA Outer Continental Shelf Lands Act
OR Oregon
OUIA Ocean Uses Interaction Assessment tool
POCS Pacific Outer Continental Shelf
PROUA Pacific Regional Ocean Uses Atlas
SCUBA Self Contained Underwater Breathing Apparatus
SOORC Southern Oregon Ocean Resource Coalition
UCS Use Components Score
WA Washington

1. EXECUTIVE SUMMARY

In June 2012, the Pacific Outer Continental Shelf (POCS) Region of the Bureau of Ocean Energy Management (BOEM) issued an interagency agreement with the National Oceanic and Atmospheric Administration (NOAA) to conduct the Pacific Regional Ocean Uses Atlas project (PROUA).

The Pacific Regional Ocean Uses Atlas project was designed to document where coastal communities use the ocean across a full range of typical human activities and sectors. Using participatory mapping techniques, the project is designed to inform proactive planning in the U.S. by providing innovative spatial data, products and tools to assist planners, managers and stakeholders to understand patterns and implications of existing and emerging uses of America's oceans. Through engagement with stakeholder groups, the PROUA project provides an opportunity for local individuals to contribute their knowledge, expertise and perspectives about ocean use activities occurring in their communities, helping to portray an accurate picture of human use on a scale appropriate for ocean planning while building relationships with the planning agencies and representatives.

The specific objectives of the PROUA are to enhance ocean planning for offshore renewable energy development in U.S. waters by:

1. Documenting at specific geographies, scales and resolutions, patterns of existing and emerging uses of the ocean off Washington, Oregon and Hawaii; and,
2. Identifying in specific geographies, potential use interaction, and/or potential for conflict between anticipated renewable energy activities and other potentially co-occurring ocean uses.

This report details the activities and associated results from the PROUA project and provides documentation and background on the project deliverables. This report is intended to summarize and complement the project's data deliverables which include geospatial data and maps documenting ocean use patterns, as well as tools and related resources for evaluating space-use interactions and potential use conflict.

2. INTRODUCTION

2.1. Background

The Energy Policy Act of 2005, an amendment to the Outer Continental Shelf Lands Act (OCSLA), grants BOEM lead management authority for marine renewable energy projects on federal offshore lands, and other projects that make alternative use of existing oil and natural gas platforms. The EPAct includes a provision that requires consideration be given to "any other use of the sea or seabed, including use for a fishery, a sea-lane, a potential site of a deep water port, or navigation" [Sec. 388 (a)(4)(J)(ii)] when making decisions about renewable energy leasing and management.

Other amendments to the OCSLA authorize the Secretary of the Interior to conduct studies in areas or regions of potential lease sales to ascertain the environmental impacts on the marine and coastal environment of the Outer Continental Shelf (OCS) and the coastal areas that may be affected by offshore energy development. And the National Environmental Policy Act requires that all Federal agencies use a systematic, interdisciplinary approach that will ensure the integrated use of the natural and social sciences in any planning and decision-making that may have an effect on the human environment.

To comply with the provisions of these laws and meet their regulatory responsibility, BOEM funded the PROUA project to proactively develop data and tools to explore the seascape of ocean uses activities along the U.S. West Coast and Hawaii and help inform decision-making for potential marine renewable energy development. Specifically, the PROUA was designed to collect place-based information on ocean use activities on the OCS using a participatory, stakeholder-engaged process that would yield community expert perspectives on ocean uses, as well as information on ocean use drivers and potential use conflicts with renewable energy.

The PROUA project is intended to provide BOEM with comprehensive, broad-scale baseline ocean uses information that can be considered in conjunction with other data sources like the Coast Guard, Department of Defense, and other studies of the OCS, in its decision making process. As applications for offshore renewable energy projects are received by BOEM, the PROUA data will help BOEM to understand the ocean uses context of the proposals, direct BOEM analysts to the uses they will need to consider and evaluate in more detail, and identify key stakeholders within specific areas of the OCS. Although the data gathered may assist BOEM as it responds to these prospective lease requests, the PROUA is not intended to fully address the potential site-specific impacts of any individual renewable energy project.

The PROUA process is built upon the principles of participatory mapping and stakeholder engagement, merging social and geospatial sciences to offer a new approach to an age-old method for planning. Participatory mapping is an innovative sociological method geared to collect information about a place from the people who know it best. Since 2007, the National Oceanic and Atmospheric Administration (NOAA) has been developing and refining a participatory mapping process to collect community perspectives about place, and specifically ocean space, to inform a wide range of marine planning applications.

Working with various partners, NOAA has led participatory mapping efforts throughout the U.S. to document nearly 30 distinct ocean uses at multiple scales, across different domains, and for a variety of planning purposes. Through these efforts, the NOAA participatory mapping method has evolved to become a means to not only collect community-derived spatial information essential for planning, but also to create a forum to engage communities and stakeholders in the planning process.

2.2. Study Purpose

More than half of the U.S. population lives near the ocean, and millions of Americans and foreign tourists visit the coasts every year. As a result, the oceans are becoming crowded with a growing suite of human uses including recreation, cultural and spiritual renewal, shipping, aquaculture, fishing, national security and energy development. This trend creates a sense of urgency to develop novel and integrated approaches for planning for how specific areas of the nation's oceans are used for the benefit of this and future generations. Example: In 2011, the ocean economy, which includes six economic sectors that depend on the ocean and Great Lakes, contributed more than $282 billion to the U.S. GDP and provided more than 2.8 million jobs[1].

The National Ocean Policy (NOP) of 2010 represents an unprecedented response to that trend of expanding ocean uses. It provides an initial framework for considering how to identify appropriate operating areas for ocean uses that collectively maximize the societal benefits of the activities while minimizing risks of environmental impacts or conflicts with competing uses. As articulated in the NOP's Framework for Effective Coastal and Marine Spatial Planning (CMSP), this approach calls for:

> "harmonizing competing and complementary uses effectively" *through the application of new science and information to* "'investigate, assess, forecast, and analyze … the spatial distribution of, and conflict and compatibilities among, current and emerging ocean uses …".

[1] NOS, http://oceanservice.noaa.gov/facts/oceaneconomy.html

Perhaps nowhere is this national policy need more acutely felt than in the siting and development of energy facilities in the ocean and coastal waters of the US. Driven by economic, environmental, legal and strategic imperatives, the US is moving forward decisively to create and apply new tools for understanding and planning for the appropriate allocation of operating space for renewable energy where appropriate in US waters. As articulated by the National Ocean Council's official website, "marine planning is a science-based tool that regions can use to address specific ocean management challenges and advance their economic development and conservation objectives." To that end, regional planning bodies can employ marine planning to advance the goals of the National Ocean Policy by, among other objectives:

- Developing information that facilitates more effective review and permitting among State, Federal, and tribal authorities for a specific class of activity such as offshore energy infrastructure;
- Characterizing environmental conditions and current and anticipated future uses of marine space to assist in siting offshore renewable energy; or,
- Developing maps and information that inform effective co-location of multiple existing and new ocean uses, such as commercial fishing, military training, and new energy infrastructure development.

To better prepare for emerging ocean uses including renewable energy, the PROUA project was intended to fill critical gaps in knowledge about how and where coastal communities use the ocean for a wide range of activities. Combining contemporary participatory mapping techniques with community expert consultation and engagement, the PROUA provides community perspectives on ocean use activities in a spatially explicit context, ready to use and integrate into spatial management and planning strategies. Additionally, the project delivers data and tools to consider the potential for or nature of use interactions in areas where specific uses co-occur. Collectively, the data and tools derived from the PROUA provide insight to the nature, extent and degree of ocean activities occurring throughout offshore waters, and to the communities that rely on these activities and use of certain ocean spaces.

As traditional uses expand and new uses emerge, ocean use data are becoming increasingly indispensable for a range of applications. These include, but are not limited to, energy siting, emergency response, assessment and restoration, planning for sustainable use, economic valuation, climate change adaptation, and efficient investment and outreach. Increasingly, communities, managers, and planners are realizing that having a better understanding of where and how people use the ocean is foundational for better decision-making.

2.3. Study Scope

The overarching goal of the PROUA is to characterize the nature and extent, as well as the potential for interaction or conflict among ocean uses occurring in the study's target geographies. As such, the PROUA focused on two separate, but complementary components of ocean use information; spatial data documenting the patterns of ocean use activities in the target geographies, and analysis of ocean use interactions and potential for use conflict or compatibility. Spatial ocean uses data were collected through a series of community workshops in the target geographies. The research and analysis of ocean use interactions and potential for conflicts and compatibilities was not location-specific, but rather more of a universal profiling and assessment of use-use interactions that was integrated with the spatial ocean uses data to understand and evaluate place-specific use interactions.

2.3.1. Geography and Scale

At BOEM's direction, the study focused on three discrete geographies having distinct suites of uses and emerging energy issues. These included, to varying extents, the marine waters offshore of the states Washington, Oregon and Hawaii. For each target geographic area, data resolutions were predetermined to ensure that the resulting information would best meet the planning needs. For all target geographies and all use sectors, coarse grained ocean use patterns data were sought at a broad scale throughout the entire geographic range of the project. Fine grained, or finer scale data were sought for targeted locations where more detailed mapping of specific uses and their local variants was relevant to renewable energy activities.

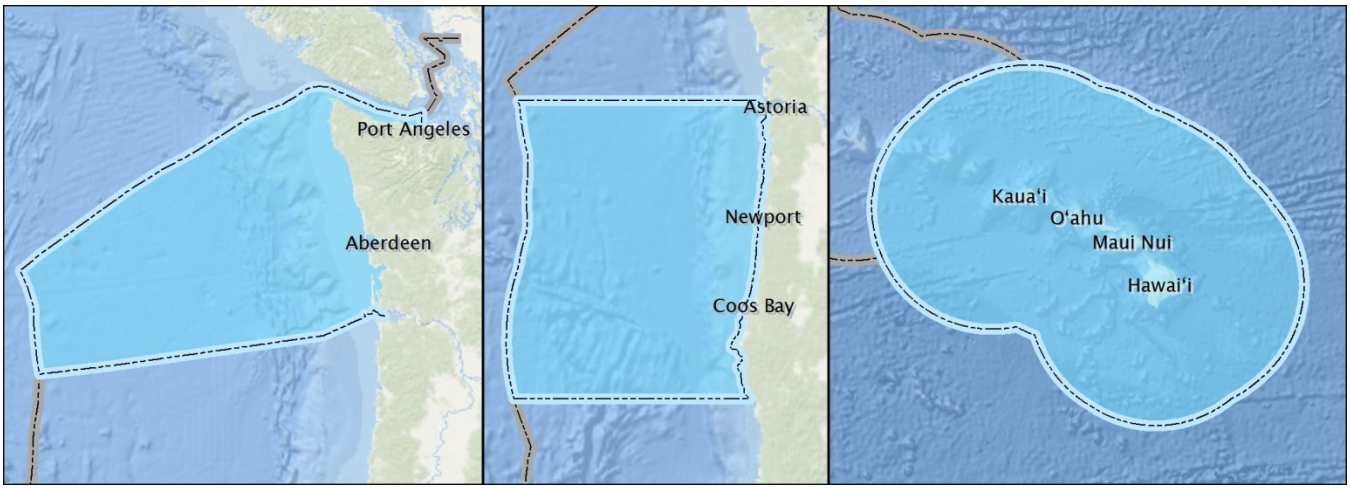


Figure 1 - PROUA study regions and workshop locations displayed from left to right, Washington (0-200 nautical miles), Oregon (3-200 nautical miles), and Hawaii (0-200 nautical miles)

In Washington, federal and state agencies partnered on the project to create a comprehensive dataset covering all marine waters from the shoreline to 200 nautical miles (nm) offshore. This included mapping all relevant use sectors and uses at a coarse scale, as well as target uses at a finer scale in federal waters in southern Washington, outside the boundaries of the Olympic Coast National Marine Sanctuary.

In Oregon, the PROUA was intended to build upon previous ocean use mapping efforts, such as those completed for the Territorial Sea Plan Amendment process and the BOEM-funded study "Identification of OCS Renewable Energy Space-Use Conflicts and Analysis of Potential Mitigation," and focused on federal waters (3-200nm). This included coarse grained mapping of the full range of ocean uses throughout federal waters, as well as fine scale mapping of selected target uses in up to 7 areas identified as feasible for renewable energy development.

In Hawaii, the PROUA focused on coarse scale mapping of the full range of relevant ocean uses throughout all state (0-3nm) and federal waters (3-200nm) around the main eight Hawaiian Islands. This was completed in partnership with the State of Hawaii Office of Planning.

Using the same participatory mapping methodology, ocean uses data for marine waters off of California were collected by NOAA in 2008-09 as part of the California Ocean Uses Atlas project. The results from the California effort when combined with the data derived from the PROUA will offer BOEM a complete and comprehensive picture of ocean uses occurring throughout the Pacific Region.

2.3.2. Target Uses

The PROUA was designed to capture information about the full range of ocean use activities occurring within the target geographies, which varies slightly from place to place. Use types were organized into three sectors, non-extractive, industrial/military and extractive and were explicitly defined for each geographic area with assistance from local experts.

The general list of uses targeted for the PROUA project is shown below. See Appendix I for detailed descriptions of the uses refined for each of the target geographies.

Table 1 - General list of extractive ocean uses targeted for the PROUA project.

EXTRACTIVE USES	
Commercial Fishing with Benthic Fixed Gear	**USE INCLUDES**: Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types used to catch benthic fishes and invertebrates.
	USE EXCLUDES: All other forms of fishing
Commercial Fishing with Benthic Mobile Gear	**USE INCLUDES**: The use of rod and reel, trolling, trawling and other mobile gear to catch benthic fishes and mobile invertebrates.
	USE EXCLUDES: All other forms of fishing
Recreational Fishing from Boats for Benthic Species *(used in OR and WA only)*	**USE INCLUDES**: Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates.
	USE EXCLUDES: Any other boat or shore-based fishing
Recreational Benthic Fishing from Boats with Fixed Gear *(used only in HI)*	**USE INCLUDES**: Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices.
	USE EXCLUDES: All other forms of fishing
Recreational Benthic Fishing from Boats with Mobile Gear *(used only in HI)*	**USE INCLUDES**: Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices.
	USE EXCLUDES: All other forms of fishing
Commercial Pelagic Fishing	**USE INCLUDES**: Use of mid-water trawling, purse seine, pelagic longlines, hand-lines, and harpoons, mid-water gillnets, rod and reel, trolling, and buoys to catch pelagic fishes and mobile invertebrates.
	USE EXCLUDES: All other forms of fishing
Recreational Fishing from Boats for Pelagic Species	**USE INCLUDES**: Recreational fishing from head boats, party boats, charters, or private boats targeting pelagic species.
	USE EXCLUDES: Any other boat- or shore-based fishing

Kayak Fishing	**USE INCLUDES**: The use of hook and line fishing from kayaks or any other similar vessel to catch fishes and mobile invertebrates.
	USE EXCLUDES: All other forms of fishing
Commercial Dive Fishing	**USE INCLUDES**: The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for commercial purposes.
	USE EXCLUDES: All other forms of fishing, recreational SCUBA/Snorkeling
Recreational Dive Fishing	**USE INCLUDES**: The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for recreational purposes.
	USE EXCLUDES: Commercial fishing with SCUBA/snorkel, SCUBA/snorkel for viewing purposes
Recreational Fishing From Shore	**USE INCLUDES**: Rod and reel, surf-casting, fishing from piers, jetties, crab traps, cast nets for recreational purposes.
	USE EXCLUDES: All other forms of shore-based fishing
Commercial Intertidal Harvest	**USE INCLUDES**: Commercial harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria.
	USE EXCLUDES: All other forms of intertidal or coastal harvesting
Recreational Intertidal Harvest	**USE INCLUDES**: Recreational harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria.
	USE EXCLUDES: All other forms of intertidal harvesting
Subsistence Fishing and Harvest	**USE INCLUDES**: Shore and boat-based fishing or hunting for vertebrates, birds, mammals and reptiles, harvest of seaweed or algae for subsistence purposes.
	USE EXCLUDES: All other forms of fishing

Table 2 - General list of non-extractive ocean uses targeted for the PROUA project.

NON-EXTRACTIVE USES	
SCUBA/Snorkeling	**USE INCLUDES**: SCUBA diving, surface supply diving, snorkeling (free diving).
	USE EXCLUDES: Swimming, Dive Fishing
Swimming	**USE INCLUDES**: Short- and long-distance surface swimming and wading any distance from shore, body surfing.
	USE EXCLUDES: SCUBA/Snorkeling, Surface Board Sports
Paddling	**USE INCLUDES**: Kayaking, canoeing, rowing, outrigger paddling, stand-up paddling.
	USE EXCLUDES: Motorized Boating, Surface Board Sports

Surface Board Sports	**USE INCLUDES**: Tow-in and paddle-in surfing, wind-surfing, kite surfing, sailboarding.
	USE EXCLUDES: Paddling, SCUBA/Snorkeling, Swimming
Motorized Boating	**USE INCLUDES**: Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC).
	USE EXCLUDES: Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing
Sailing	**USE INCLUDES**: Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes.
	USE EXCLUDES: Motorized Boating, Paddling
Wildlife Viewing at Sea	**USE INCLUDES**: Boat-based wildlife viewing at sea, usually on a commercial vessel.
	USE EXCLUDES: Incidental wildlife viewing from shore or while at sea pursuing other uses
Beach Use	**USE INCLUDES**: Walking, running, digging, resting, and collecting of shells, wildlife viewing, driving on the beach, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding.
	USE EXCLUDES: Tide Pooling, Mining and Mineral Extraction, Surface Board Sports, Swimming, Harvesting from Shore, Coastal Aquaculture
Tide Pooling	**USE INCLUDES**: Use of the intertidal zone between high and low tides for recreational, scientific or educational purposes.
	USE EXCLUDES: Harvesting from Shore, Shore Use
Cultural Use	**USE INCLUDES**: Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance.
	USE EXCLUDES: All other uses and activities
Permanent Research Areas	**USE INCLUDES**: Sites, transects, and monitoring areas where routine research or monitoring is conducted.
	USE EXCLUDES: Motorized Boating, Commercial Shipping

Table 3 - Generic list of industrial/military ocean uses targeted for PROUA project

INDUSTRIAL/ MILITARY USES	
Renewable Energy	**USE INCLUDES**: Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms.
	USE EXCLUDES: Onshore power grids
Commercial Shipping	**USE INCLUDES**: Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels.
	USE EXCLUDES: Cruise Ships, Military Vessels
Cruise Ships	**USE INCLUDES**: Transit, mooring or anchoring for extended overnight recreational travel on commercial ships.
	USE EXCLUDES: Motorized Boating, Commercial Shipping
Military Operations	**USE INCLUDES**: Transit of military vessels related to training activities, ship and submarine maneuvers, and fleet readiness training activities
	USE EXCLUDES: Wartime military operations
Underwater Transmission Cables	**USE INCLUDES**: Cables installed on the seafloor to transmit data, communications, and electricity generated on land.
	USE EXCLUDES: Lost fishing gear, renewable electricity transmission cables
Underwater Pipelines	**USE INCLUDES**: Any submerged pipe system used to transport oil, gas, sewage or other fluid.
	USE EXCLUDES: Underwater transmission cables
Mariculture	**USE INCLUDES**: Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages).
	USE EXCLUDES: Aquaculture wholly pursued on land
Mining and Mineral Extraction	**USE INCLUDES**: Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment.
	USE EXCLUDES: Energy production
Marine Debris	**USE INCLUDES**: The collection, monitoring and routine siting of marine debris, including targeted debris removal areas.
	USE EXCLUDES: Any other form of ocean dumping
Ocean Dumping	**USE INCLUDES**: The deliberate legal dumping of dredged spoils and other materials into ocean waters.

	USE EXCLUDES: Sewage Discharge, Mining and Mineral Extraction

2.3.3. Scope Considerations

The scope of work for each geography varied depending on the data needs (directed by BOEM) and the nature of ocean use activities in the region. So while the same data gathering approach and mapping process was applied to all geographies, the resulting data and maps vary in content and breadth. It is important to note that the results from the PROUA (and in particular the participatory ocean use mapping component described in more detail below) represent community perspectives on ocean uses as provided by ocean use experts and stakeholders and are designed to complement other existing sources of ocean uses data.

2.4. Study Elements

The PROUA project is composed of two separate, but complementary elements; the participatory ocean use mapping component, and the analysis of use interactions, conflicts and compatibilities component.

2.4.1. Participatory Ocean Use Mapping

The participatory ocean use mapping component of the PROUA focused on the collection of community-based, expert-derived information on ocean use activities through a series of collaborative mapping workshops. These workshops applied the NOAA participatory mapping process and were specifically designed to collect information on ocean use activities from local ocean users, experts and stakeholders.

The NOAA participatory mapping process is built upon the concept that communities hold irreplaceable and unique perspectives about place that with the proper methods can be captured and transformed into valuable information for planning and decision making. By integrating traditional social science methods for stakeholder engagement with geographical information system tools for mapping and data collection, participatory mapping offers a way to capture spatially explicit community knowledge about place in an interactive, collaborative setting.

The NOAA method works by identifying and convening ocean use experts, facilitating and guiding a collaborative mapping exercise, and then transforming that expert knowledge into products that can be readily accessed and interpreted by decision-makers.

Participatory mapping workshops were held in each of the project's target geographies (WA, OR and HI) throughout 2013-14. These workshops convened local ocean use experts and stakeholders, who through facilitated mapping exercises, documented their spatial and contextual knowledge about ocean uses both digitally on an interactive map and verbally through collaborative discussion and conversation. At each workshop, participants were separated into groups to map and discuss the ocean uses identified for that target geography. Information gathered during the workshops was compiled into draft maps detailing the use patterns and related contextual information and returned to the workshop participants for their review and comments. Participants were provided with draft maps and data (via an online interactive map tool for Oregon and Hawaii), as well as a review form and instructions for providing comments. During the data review period (~8 weeks but varied based on geography), a series of webinars were held (and in some circumstances in-person meetings were also convened) to solicit participant feedback and address questions or concerns regarding the draft data. Based upon the collective participant feedback, suggested refinements or modifications to the data were considered and addressed as appropriate. Final data and maps were generated, including detailed metadata records documenting all data processing steps and contextual use notes. The final spatial data products were then integrated with the results of the use conflicts and compatibilities assessment to explore the potential for use interaction, the nature of these interactions and the likelihood for conflict among uses occupying common ocean space.

2.5. Analysis of Interactions, Conflict and Compatibilities

The project's second phase, the analysis of use interactions, conflict and compatibilities component, combines newly generated information about how those *uses function* with new analytical tools to provide ocean managers with an unprecedented ability to identify, understand, plan and manage potential *interactions, conflicts and compatibilities among uses* when they co-occur in the same ocean spaces.

To this end, the analysis of use interactions, conflict and compatibilities component of the PROUA project generated four related products:

1. **Space Use Profiles** – describing each use's general operation, location and components, and quantify important functional aspects of its 3-D space occupancy that may influence its interactions, conflicts and/or compatibilities with other co-occurring uses.

2. **Ocean Use Interaction Assessment Tool**– a new analytical tool that uses the Space Use Profile data to evaluate whether, how and where two co-occurring ocean uses might come into contact and interact in 3-D ocean space.

3. **Interactions between Renewable Energy and other Uses** – a general, non-spatial analysis of how and where Renewable Energy operations may interact, conflict or be compatible with 34 other potentially co-occurring uses.

4. **Study Area Maps of Interaction/Conflict/Compatibility of Ongoing Uses** – maps identifying specific ocean areas where and *how* potential Renewable Energy facilities might interact or conflict or be compatible with other co-occurring uses in the three study areas.

Combined, the Space Use Profiles, the ocean use interaction assessment tool, and their application to Renewable Energy operations provide a new and powerful ability to understand, explain and effectively plan the spatial allocation of emerging offshore renewable energy operations in the three study areas (i.e. OR, WA, HI) and throughout U.S. waters.

2.6. Report Organization

This narrative report is a summary of activities conducted for the two components of the PROUA. The two components of the PROUA project are reported separately in this document with Section 3 focusing solely on the participatory ocean use mapping component and Section 4 on the analysis of use interactions and conflicts and compatibilities assessment component. Section 5 provides a brief summary of the project and includes relevant caveats and considerations.

3. Participatory Ocean Use Mapping

3.1. Methodology

Methods for the ocean use mapping component of the project were applied using a standardized NOAA participatory ocean use mapping method (http://marinecadastre.gov/oceanuses/GuidebooktoParticipatoryMappingofOceanUses.pdf) in each of the target geographies and proceeded in a series of phases as described below.

3.1.1. Phase 1: Scoping and Project Planning

The first phase of the ocean use mapping component involved scoping and workshop planning. This phase included the development of initial outreach documents and

consultation with key user groups, potential partners, stakeholders and agency representatives. During this phase, project partners were identified and the project team worked to confirm the study area boundaries and refine the target list of uses and use descriptions for each geography. Outreach through webinars, phone calls and in-person meetings was conducted to foster community support for the project and generate an initial list of potential workshop participants. Event planning was initiated to select the appropriate workshop locations, dates and times, to identify neutral and accessible venues and affordable catering options, as well as secure staff time and travel. This phase also included preparation for the mapping workshops, development of workshop materials and training of workshop staff.

An important part of the planning phase focused on identification of appropriate and diverse workshop participants. The intent was to convene a distributed sampling of ocean use experts and community representatives that were knowledgeable about a wide range of ocean uses due to consistent observation of the marine environment and could represent the perspectives of the broader use communities, not just their own use experience. To identify workshop participants, the project team applied a cascading referral process whereby individuals who were identified through initial local consultations were invited (through email and phone calls) to attend the workshops and asked to refer other qualified potential invitees. This referral invitation process continued until a diverse and representative group of ocean use experts were confirmed to attend. Workshop participants often included representatives from the following categories:

Table 4 - Targeted workshop participants. Participants represent a wide diversity of background and professions

Marine Business Operators	Harbor Masters
Marine Industry Specialists	Local/State/Federal Government Officials
Local Fishermen	Scientists & Researchers
Local NGO Representatives	Charter Operators
Traditional/Cultural Use Practitioners	Military Representatives
Community Leaders	Watermen/women
Law Enforcement Agents	Naturalists and Docents
Fish & Game Wardens	Lifeguards
Resort Managers	Park Managers

In preparation for the workshops, the project team also conducted extensive data mining to identify and collect existing spatial data for inclusion in the digital base map, the template that participants used in the workshops to document use areas. The base maps were populated with various existing data sources to provide spatial reference for drawing use

areas (e.g. nautical charts, depth contours, buoy locations, etc.), as well as thematic data showing the current state of knowledge for some uses when existing data was available from reliable sources (e.g. shipping lanes, cables, etc.).

Upon completion of the scoping and planning phase, the project proceeded to the mapping workshops and data collection phase.

3.1.2. Phase 2: Mapping Workshops and Data Collection

The second phase focused on the data collection through a series of mapping workshops held in various locations throughout the target geography. The workshops employed participatory mapping methods to document spatial use patterns through facilitated discussion and mapping with local stakeholders and ocean use experts. Workshops were held in various locations throughout the study regions to ensure participation from a wide sampling of the use community and to capture a comprehensive picture of ocean use patterns. The number and location of the workshops differed in each target area.

Ocean use data were gathered in the workshops through a facilitated, interactive, participatory mapping exercise designed to capture the knowledge of workshop participants about the patterns and drivers of ocean uses occurring in the study areas. At the start of the workshops, the project team (NOAA, BOEM and partners in Oregon and Hawaii) briefed the participants on the projects' objectives and opened the floor for comments and questions. The participants were then separated into groups, and assigned the task of mapping ocean uses as a team. In each group, a process facilitator and GIS facilitator led the participants through the mapping process, recorded notes on group discussions, and provided technical and process support. Each group mapped the same set of uses in order to gather a range of use perspectives and to build redundancy into the derived data to qualify agreement amongst the groups.

GIS-based maps of the study region were projected on to the wall and participants were asked to draw use-area polygons onto the projected map with a digital stylus which directly captured their areas into a GIS. Participants were asked to draw ocean use areas on the projected map and provided supplemental, non-spatial information through a use questionnaire. After each use was mapped, the participants had the opportunity to view their results and refine ocean use patterns through group discussion and deliberation. Throughout the exercise, participants were asked to provide information on ocean use areas from the collective perspective of the entire use community, rather than individual use experiences.

Figure 2 - PROUA Washington workshop mapping group

To map each use, the facilitator announced the use definition (See Appendix I for reference), and asked some general questions about the use to get the conversation started. Some of these questions included asking about where a use originates (shoreline, harbor, etc.), if it involves transit (fishing, diving from a boat), if it is restricted by depth or distance from shore, or perhaps if the use pattern is related to or driven by other features (e.g., near buoys, piers, or rocky areas). Project staff documented the answers to these questions in the group notes.

With guidance from the facilitators, participants were asked to draw areas on the map representing activity areas for each specific ocean use based on their knowledge of where the activity is known to occur. For some uses, existing data was shown on the basemap and participants were asked to review and modify the existing data for completeness and accuracy. For each ocean use, participants were asked to map the general use footprint and dominant use areas, as described below. Participants were asked to provide relevant supplemental information on uses (e.g., seasonality, social and cultural significance, historical patterns) on the ocean use information sheet or questionnaire.

General Use Footprint: The general use footprint includes all areas in which the use is *known to occur with some regularity* (over the past 3-5 years), regardless of its frequency or intensity. The general use footprint does not include areas where the use may occur once

or twice or where it might *conceivably* occur now or in the future. For this step, all areas drawn will be included in the final data layer.

Dominant Use Areas: Dominant use areas are defined as *ocean areas routinely used by most users most of the time* (within the seasonal patterns for that use). Dominant use areas must be drawn within the general use footprint. Participants will work together to draw dominant use areas as they occur throughout the study region. This step is designed as a group exercise and participants should work together to agree on which areas are dominant use areas and should be included in the final data layer.

Supplemental Use Data: Participants were asked to provide supplemental information on the *ocean use information sheet*. For some uses, participants may have been asked to draw specific locations on the map where variation of the use occurs (e.g. fishing for special events, night vs. day fishing).

Throughout the workshop, participants often provided valuable non-spatial information about use patterns that was difficult to document accurately on the projected map. For instance, they may have noted that a use is restricted to a certain depth or distance from shore, around buoys, or only between certain depth contours. These use-specific insights were captured in the staff notes and were used to assist in the post-processing for each use. At the end of the workshops, participants completed a workshop evaluation sheet to rate the process and provide feedback to the project team.

All workshop materials are included in the final deliverables to BOEM.

3.1.3. Phase 3: Data Processing, Analysis and Synthesis

Phase 3 focused on transforming the raw polygon data and notes collected in the workshops into a series of draft data products for review and validation by workshop participants. Upon completion of the workshops, the data and notes were compiled, synthesized and analyzed to create draft GIS data, online mapping services to facilitate user access and understanding of the spatial data, digital maps of all uses shown individually and combined, collated and edited notes for each use, as well as standardized lists of uses mapped and associated use definitions.

The workshop data and supplemental use notes were compiled and collated and any modifications or adjustments made based on the spatial notes collected during the workshops. The use data were then processed to a 1kilometer squared hexagonal microblock or vector based grid to allow for pattern comparison across the study area. For each use mapped, the data layers (one for each breakout group that mapped the use during

the workshops) were combined to look for agreement amongst the breakout groups. This redundancy is intentional and is designed as a way to evaluate the accuracy of the final data and visualize the degree of agreement amongst the groups. To create a final map for each use that depicts the general and dominant use areas, the majority rule was applied for designating dominant use areas. That is, dominant use areas represent areas where a majority of the groups mapped that area as dominant for the given use. Any other areas that did not fall within the majority agreement rule were included in the general use designation.

Detailed processing steps were provided as part of the project metadata and were included in the final deliverables to BOEM.

3.1.4. Phase 4: Data Validation

Data validation was an important step in finalizing the ocean use data collected during the workshops. The data validation task included outreach to project participants for feedback, consideration of comments and refinement of draft data, and final data product development, publication, and distribution. It provided the opportunity for stakeholders and workshop participants to review and comment on the draft data, as well as offer suggestions for refinement or improvement.

Workshop participants were asked to review the draft data and maps and to provide feedback and comments throughout a specified data review period. Webinars and meetings were held to discuss comments as a group, as well as individual correspondence via email and phone. All received comments and suggestions were recorded and considered when finalizing the ocean uses data and products.

To assist in data validation for the PROUA project, BOEM contracted with SeaSketch (see Figure 3) to provide access to an online tool that supports collaborative planning for coastal and marine applications. The PROUA team used SeaSketch (for Oregon and Hawaii only) as a platform to share project data and resources online and as means to collect online feedback from workshop participants and others, especially after the workshops were completed. Comments and feedback gathered via SeaSketch and throughout the data validation phase were addressed in the final versions of the spatial data and maps.

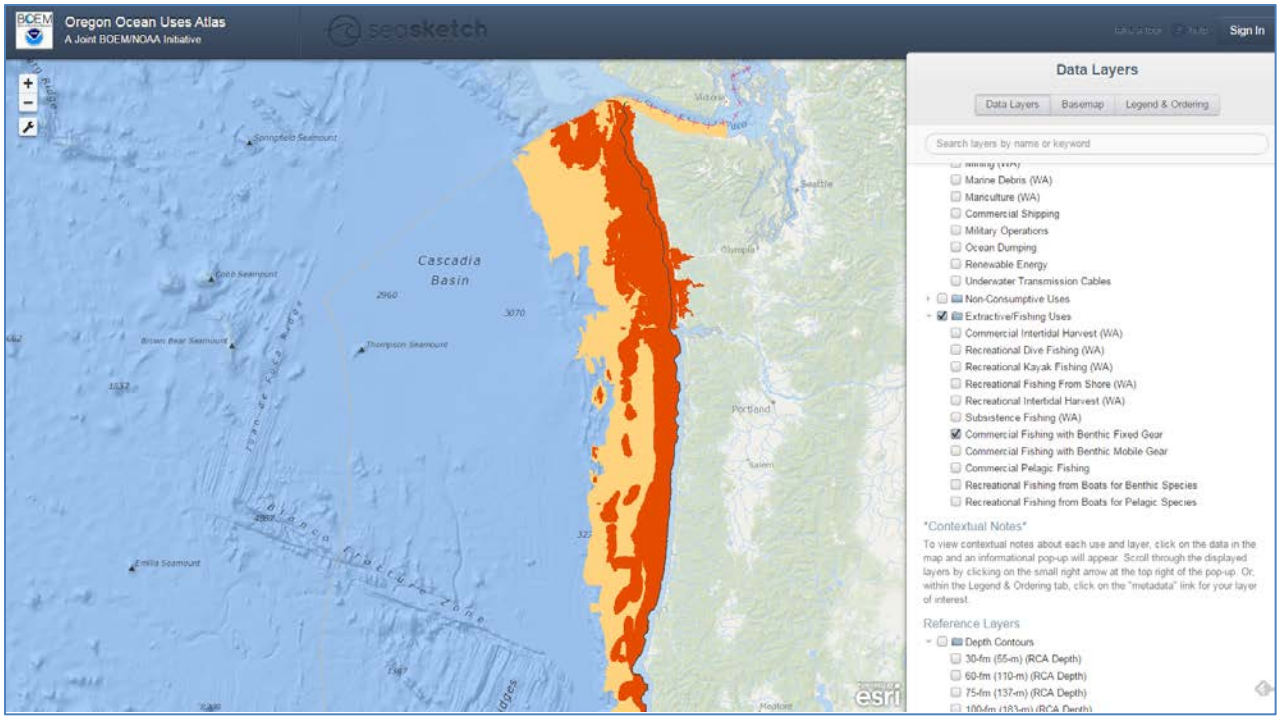


Figure 3 - Image showing use of SeaSketch application for the Oregon Ocean Uses Atlas. SeaSketch is an online data delivery platform that allowed users to access and interact with PROUA data, (zoom in and out, turn on layers, read use notes) and provide comment using an online forum.

3.2. Participatory Ocean Use Mapping Workshops

Following the process described above, the PROUA team conducted ocean use mapping workshops in each of the project's study areas throughout 2013-14. While the same general process was followed in each of the study areas, the workshops varied in scope and scale to account for varying data needs and in response to local guidance regarding best practices for stakeholder engagement. The PROUA factsheets used for workshop outreach and communication can be referenced in Appendix II.

3.2.1. Washington

3.2.1.1. Workshop Planning

The PROUA project in Washington was conducted in partnership with the Washington State Department of Ecology and Department of Natural Resources. Ocean uses data were collected for state and federal waters to both inform the state's marine spatial planning initiative and potential future offshore renewable energy decision making.

Outreach conducted in advance of the workshops included general information webinars and meetings targeting Washington's Marine Resource Committee members and to a larger audience via listserv. These presentations introduced the PROUA project to Washington

coastal and marine communities and stakeholders and provided an opportunity to address any questions or concerns in advance of the workshop planning. Project staff also presented in-person at local meetings in March, 2013, including the Olympic Coast National Marine Sanctuary Advisory Council meeting, a coordinated meeting of the Marine Resource Committee leads and the Tacoma chapter of the Surfrider Foundation.

For the Washington workshops, 180 participants were contacted and invited to attend. In addition, BOEM initiated communication with the Makah Tribe, Hoh Tribe, Quileute Tribe, Quinault Indian Nation and Shoalwater Bay Tribe to brief tribal representatives on the PROUA process, provide an opportunity for discussion and invite tribal participation.

Based on these discussions, tribes were invited to participate in the workshops and to contribute use information to the extent that they felt appropriate. The target list of uses for the Washington workshops (See Appendix I) was amended with references to tribal uses changed to more general cultural use categories, allowing any tribal use information that was provided by tribal representatives to be captured.

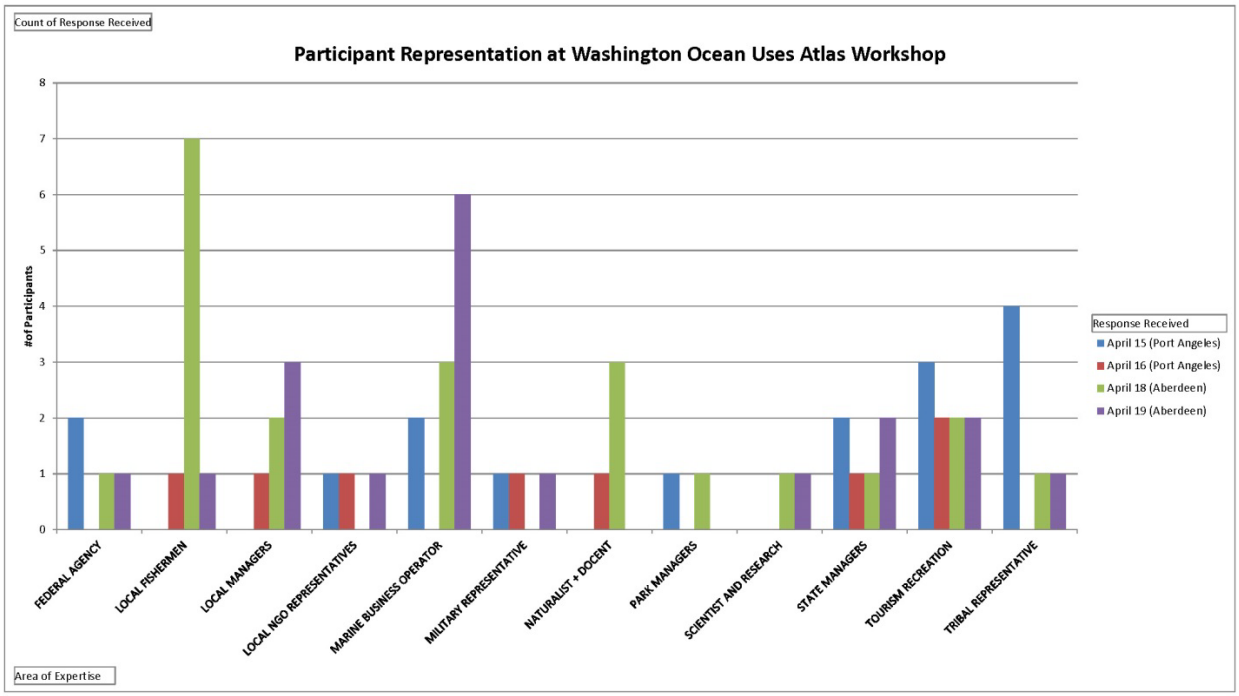
3.2.1.2. Workshops

For the state of Washington, the participatory ocean use mapping workshops were held in April of 2013 in Port Angeles (24 participants) and Aberdeen (41 participants), Washington. Workshops spanned two days in each location for a total of four workshop days and 65 participants attending.

Table 5 - PROUA Washington workshop dates and locations

Date (2013)	Workshop Location	# Participants
Monday, April 15th	Port Angeles	24
Tuesday, April 16th	Port Angeles	
Thursday, April 18th	Aberdeen	41
Friday, April 19th	Aberdeen	

Table 6 - PROUA Washington workshop participant representation



3.2.1.3. Data Validation

Draft data and maps were compiled and provided back to the workshop participants for review from August 26th – September 28th, 2013. A series of webinars were held during the month of September to meet virtually with workshop participants and discuss the draft maps, as well as address any questions or concerns about the data. During this time, the project team also corresponded with tribal representatives from the Makah Tribe, Hoh Tribe, Quileute Tribe, Quinault Indian Nation and Shoalwater Bay Tribe to invite their participation in the data review and to gather feedback regarding the PROUA data gathering process. In response to this correspondence, the team held conference calls and received comments from representatives of the Hoh, Quileute and Quinault tribes.

Upon completion of the data validation period, all received comments and suggestions were recorded and considered in the creation of the final data products. All resulting modifications and revisions were documented and included as part of the metadata and project deliverables. Data review summaries for all geographies can be referenced in Appendix III. For the Washington state partnership, the data for Washington's ocean uses in state waters were provided to the State for inclusion in their online Marine Spatial

Planning data portal[2]. The full dataset will be provided to Washington state partners upon conclusion of the PROUA project.

3.2.2. Oregon

3.2.2.1. Workshop Planning

The PROUA project in Oregon commenced in October 2012 with an initial presentation about the project and solicitation of feedback at the BOEM-Oregon Renewable Energy Task Force meeting in Portland on September 24, 2012. During the remainder of 2012, PROUA staff conducted project scoping meetings with state representatives and stakeholder groups to brief them on the PROUA process, locate existing data for inclusion in the workshop basemap, and identify appropriate workshop participants.

Prior to the workshops and as part of the invitation phase, BOEM initiated communication with the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians, the Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz Indians and the Coquille Indian Tribe) to brief tribal representatives on the PROUA process, provide an opportunity for discussion and invite tribal participation. Also, the BOEM Office of Congressional Affairs notified the members of Oregon's congressional delegation about the project and BOEM personnel briefed the Oregon Coastal Caucus.

3.2.2.2. Workshops

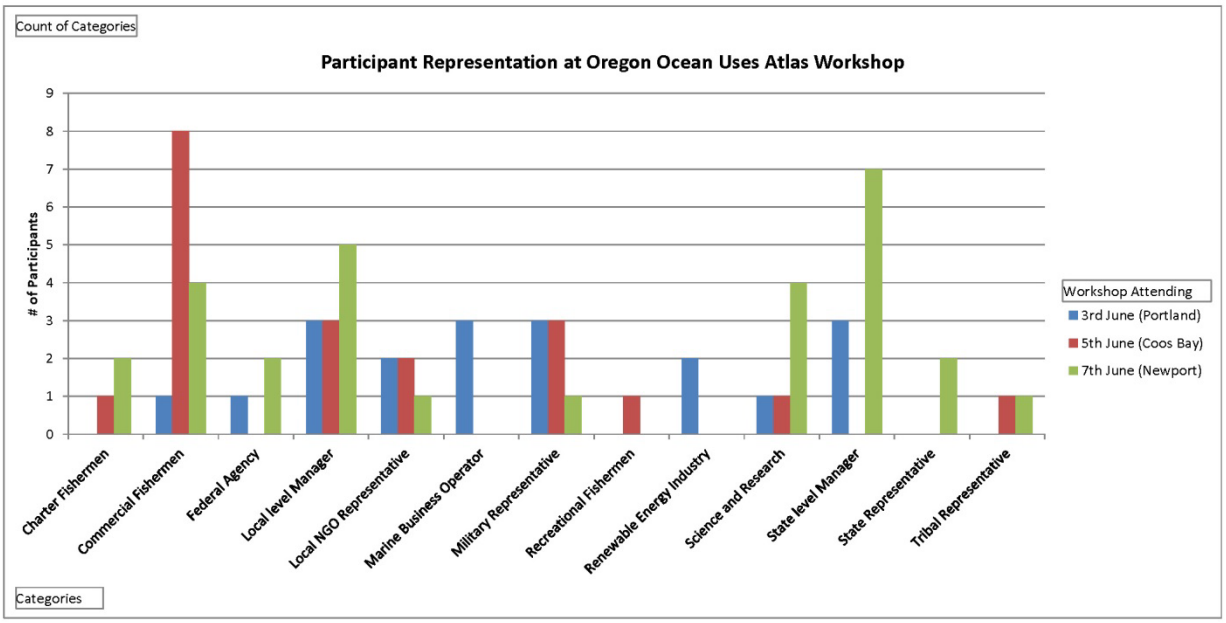
For the Oregon workshops, 254 individuals were contacted and invited to attend. One-day workshops were held in Portland, Newport and Coos Bay in June of 2013. Over the 3 workshops, 69 participants attended, representing all use sectors including tribal representatives from the Confederated Tribes of the Grand Ronde and the Confederated Tribes of Siletz Indians.

Table 7- PROUA Oregon workshop dates and locations

Date (2013)	Workshop Location	# Participants
Monday, June 2nd	Portland	20
Wednesday, June 4th	Coos Bay	19
Friday, June 6th	Newport	30

[2] http://www.msp.wa.gov

Table 8 - PROUA Oregon workshop participant representation



In Oregon, the PROUA was intended to build upon previous ocean use mapping efforts focused on federal waters (3-200nm), primarily the mapping completed for the Territorial Sea Plan Amendment process. This included coarse grained mapping of the full range of ocean uses throughout federal waters, as well as fine scale mapping of selected target uses in up to 7 areas identified as feasible for renewable energy development. These fine-grained areas were presented during the workshops and participants were asked to provide more detailed ocean use information for these locations, as appropriate. During the workshop, participants were hesitant to provide a higher level of detail on ocean use activities in these select areas, so consequently no fine-grained data were collected during the Oregon workshops.

Figure 4 - PROUA Oregon, Coos bay mapping workshop

3.2.2.3. Data Validation

Data collected from the Oregon workshops were processed and compiled into a series of draft maps, representing a summary of the spatial data collected combined with contextual knowledge captured through workshop conversations and dialogue. As part of the review phase, BOEM contacted the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians, the Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz Indians and the Coquille Indian Tribe to discuss the workshops, the PROUA data gathering process and the draft data. The project team held conference calls with Confederated Tribes of the Grand Ronde with representatives of the Confederated Tribes of Siletz Indians to receive feedback for the PROUA data.

The initial data validation phase ran from February 7th – April 30th, 2014 during which time participants received all draft data products and were invited to review these products and make note of errors, or inconsistencies via an online form, via webinar or direct correspondence. In addition, participants were invited to use SeaSketch (see Figure 3 above) to view and comment on the data online. During this data validation phase, various fishing industry stakeholders expressed concerns about adequate representation of the fishing industry at the participatory mapping workshops and resulting draft fishing uses data. These concerns were expressed directly to the project team and through state legislators and congressional representatives. In response to these concerns, the PROUA team reached out to a number of fishing industry groups (Fishermen Involved in Natural Energy [FINE], Depoe Bay Nearshore Action Team [NSAT], Fishermen's Advisory Committee for Tillamook County [FACT], Southern Oregon Ocean Resources Coalition

[SOORC], and Fishermen's Information Service for Housing Confidential Release and Essential Distribution [FISHCRED]) and the Oregon Department of Fish and Wildlife to solicit additional information and feedback on fishing uses. Based on recommendations from these groups, a second data validation period was held September 15th, 2014 - March 6, 2015 for the fishing groups to review and submit feedback on the revised fishing use maps. The second data validation period was led by BOEM and included email, phone, and in-person communication. Most of the feedback submitted during the second data validation period was collected by the Executive Director of FISHCRED, who consolidated the feedback from the various fishing groups and individual fishers and submitted a report to the project team. Upon completion of the data validation phases, all comments and suggestions were recorded and considered when creating the final data products. All resulting modifications and revisions were documented and included as part of the metadata and project deliverables. Data review summaries for all geographies can be referenced in Appendix III.

3.2.3. Hawaii

3.2.3.1. Workshop Planning

The planning and scoping for the Hawaii workshops commenced in November, 2013 with a series of in-person meetings held in Honolulu with range of state officials and stakeholder groups. Through these initial scoping meetings, the PROUA confirmed an in –kind partnership with the State of Hawaii Department of Planning to collect information on ocean uses to help inform analyses of any proposed offshore renewable energy projects and coastal zone planning strategies and permitting decisions. The BOEM Office of Congressional Affairs notified the members of Hawaii's congressional delegation about the project. Additionally, the PROUA team was advised to employ a local facilitator to assist in workshop planning and implementation, suggesting that a local representative could help broker trust with community and ensure that the process was sensitive to local cultural interests.

Additional outreach prior to the mapping workshops included a series of general information webinar meetings to introduce the PROUA project to a wide range of stakeholders, agency representatives and community leaders. And a series of in-person outreach and scoping meetings with project staff from BOEM and NOAA were also held in February 2014. These virtual and in-person meetings provided an opportunity for the project team to clearly communicate the intent and process of the PROUA, as well as address any questions or concerns prior to the workshops.

Eight workshop locations, Kona (Hawaii), Hilo (Hawaii), Lihue (Kauai), Honolulu (Oahu), Waipahu (Oahu), Wailuku (Maui), Lanai City (Lanai), and Hoolehua (Molokai) were

identified through expert recommendation as hubs that held or would attract a representative sample of both ocean users and policy makers. An initial series of six workshops was held in June of 2014 and the final two on Molokai and Lanai conducted the following September.

Based on feedback from participants throughout the initial series of workshops, the approach to gathering information on traditional and customary practices was slightly modified to incorporate the cultural aspect of all uses in the use definitions. Rather than mapping traditional and customary practices as a separate use category, participants were asked to contribute perspectives on the traditional and customary aspects for each use mapped, either through spatial data or on the ocean use questionnaire.

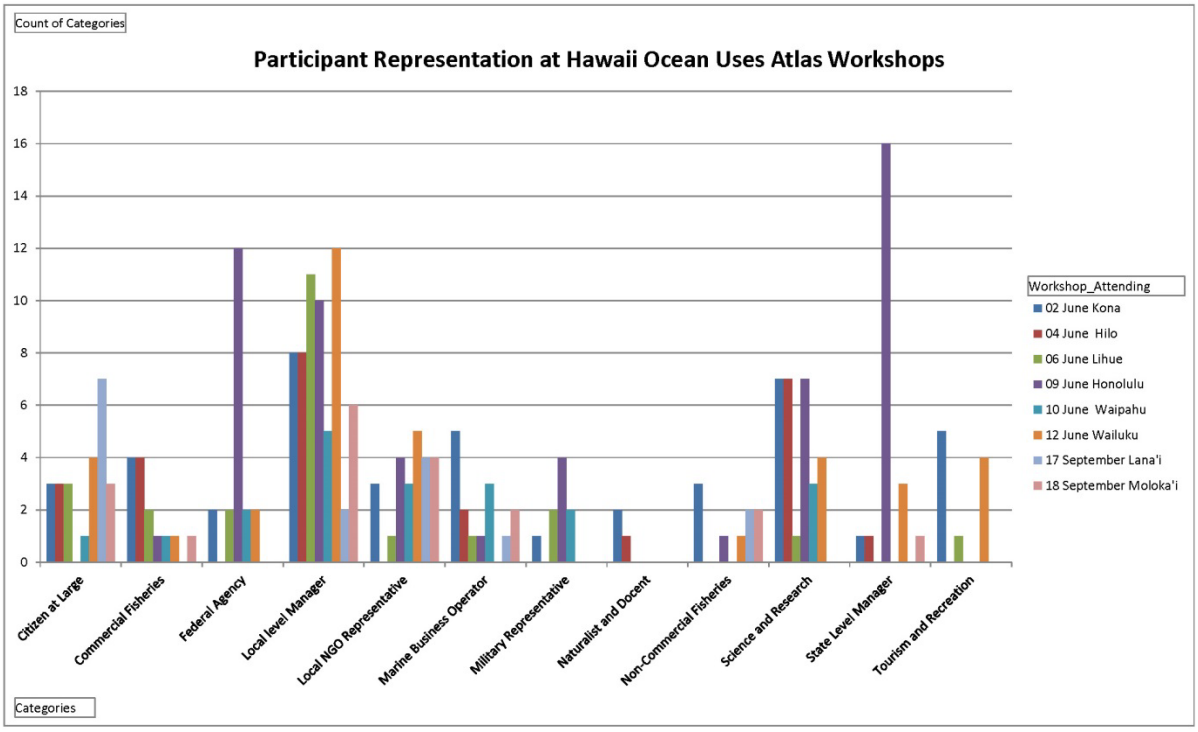
3.2.3.2. Workshops

For the Hawaii workshops, over 1500 participants were contacted and invited to attend. Over the full Hawaii suite of 8 workshops, a total of 241 participants attended the workshops. The Hawaii PROUA workshops were held in June and September of 2014 in Hilo, Kona, Lihue, Honolulu, Waipahu, Wailuku, Lanai City and Hoolehua.

Table 9- PROUA Hawaii geography workshop dates and locations

Date (2014)	Workshop Location	# Participants
Monday, June 2nd	Hawaii Island, Kona West Hawaii Civic Center	44
Wednesday, June 4th	Hawaii Island, Hilo Hawaii Community College	26
Friday, June 6th	Kauai, Lihue Kauai War Memorial	24
Monday, June 9th	Oahu, Honolulu Neal S. Blaisdell Center	56
Tuesday, June 10th	Oahu, Waipahu Waipahu High School	20
Thursday, June 12th	Maui, Wailuku J. Walter Cameron Center	36
Wednesday, September 17th	Lanai, Lanai City, Sacred Hearts Catholic Church	16
Thursday, September 18th	Molokai, Hoolehua, Lanikeha Community Center	19

Table 10 - PROUA Hawaii geography workshop dates and locations



3.2.3.3. Data Validation

All data from the Hawaii workshops were processed and compiled into a series of draft maps, representing the spatial data collected combined with contextual knowledge captured through workshop conversations and dialogue. The data validation phase ran from January 22nd – March 3rd, 2015 during which time participants received draft data products and were invited to review these products and make note of errors, or inconsistencies via an online form, via webinar or direct contact. In addition, participants were invited to use SeaSketch (see Figure 3) to view and comment on the data online. PROUA validation webinars were offered virtually and with in-person meetings hosted by PROUA staff on all the islands.

Upon completion of the data validation phase, all comments and suggestions were recorded and considered when creating the final data products. All resulting modifications and revisions were documented and included as part of the metadata and project deliverables. Data review summaries for all geographies can be referenced in Appendix III.

3.3. Data Products

Upon completion of data validation phase, final ocean use maps and spatial data layers were created for each of the study areas based on the results of workshop and subsequent

data review process. While the same method was applied in each geography, the resulting maps reflect the unique spectrum of uses mapped in each locale and the degree to which workshop participants were willing to share spatial knowledge about ocean uses.

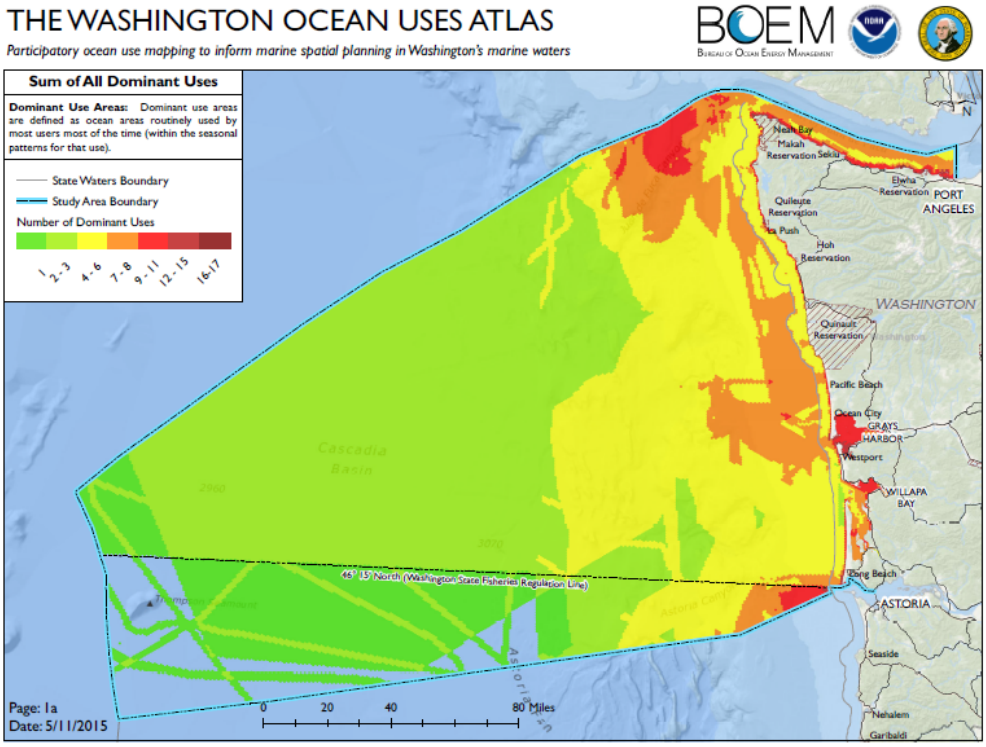
In Washington and Oregon, tribal uses of the ocean were not mapped explicitly, though tribal chairs and/or their designated representatives were formally invited by BOEM to participate in the mapping workshops. The sharing of tribal use information was dependent upon each tribe's determination of whether the mapping workshops were an appropriate forum for sharing such information. Any tribal use information shared during the workshops was incorporated into the defined use categories. Thus, the atlas data and map products do not explicitly depict tribal use.

In Hawaii, specific traditional and customary Hawaiian uses of the ocean were not mapped explicitly. The mapping workshops were deemed an inappropriate forum for sharing such sensitive information.

3.3.1. Maps

For each study area, final products included a set of ocean use maps depicting general and dominant use areas for each use mapped in the study area. The maps were created at various scales to visualize large and small scale patterns and included detailed supplemental use notes derived from the workshop conversations and ocean use questionnaires completed by the participants. In addition, aggregated use maps depicting the summary or count of all dominant uses were created for each study area. These maps, useful for identifying hot spots of ocean use activity, are symbolized with a color ramp or as a “heat map” wherein warmer colors indicate areas with more overlapping or co-occurring uses.

Sample maps are shown for each study area in Figure 5 -7 below. All ocean use pattern maps for all uses mapped in each of the project study areas can be found in Appendix IV.



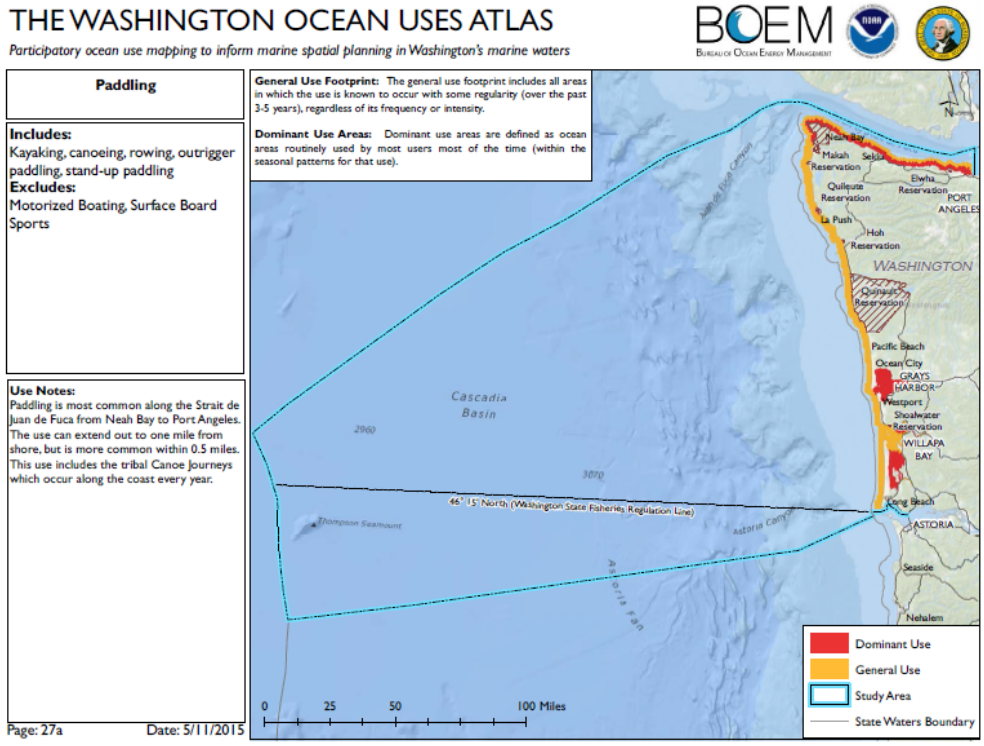


Figure 5 - Sample ocean use maps for Washington's marine waters. Maps show the sum of overlapping dominant uses for all uses mapped (top) and the dominant and general use areas for paddling (bottom). Maps for all uses at various scales can be found in Appendix IV.

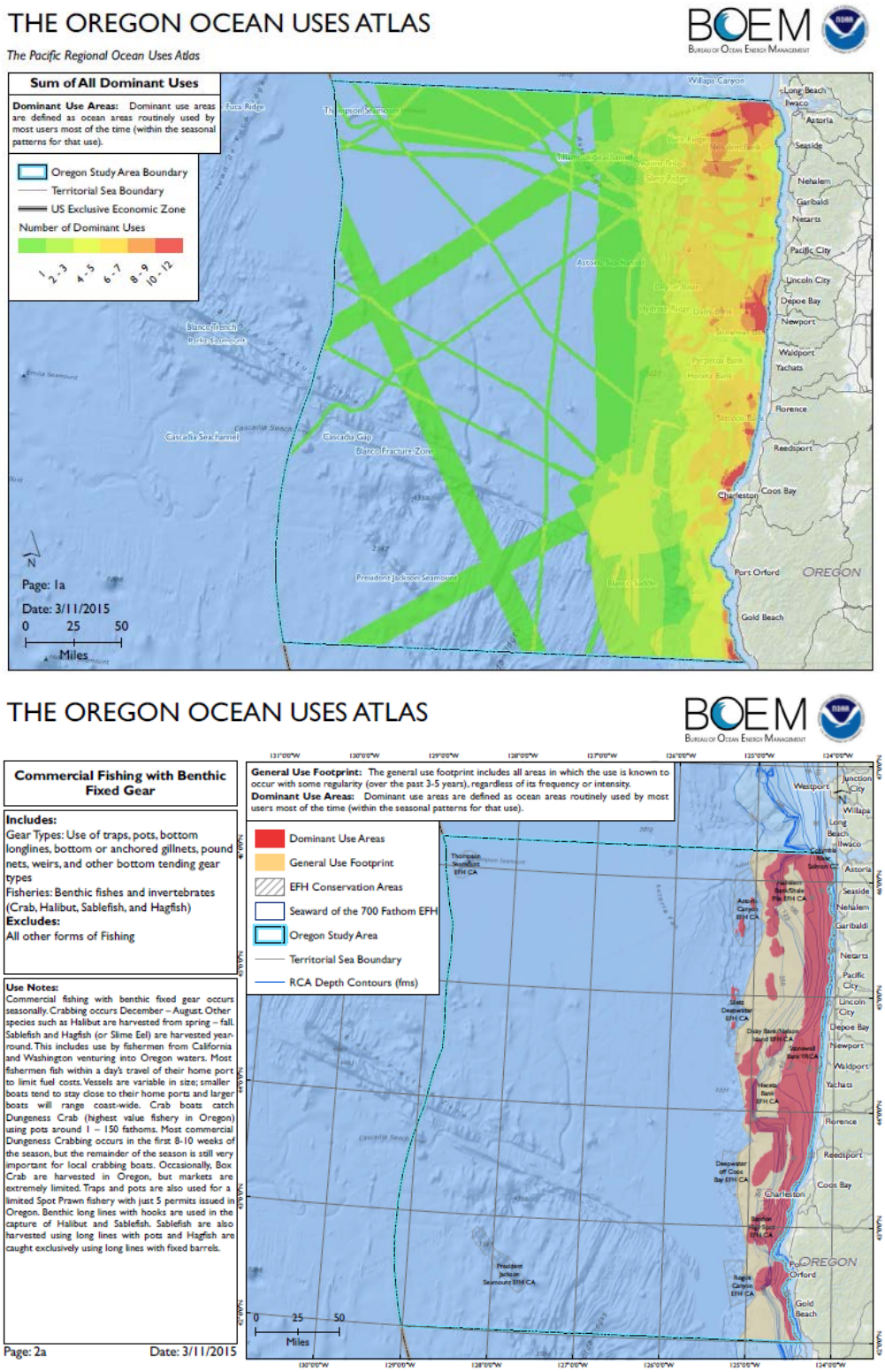
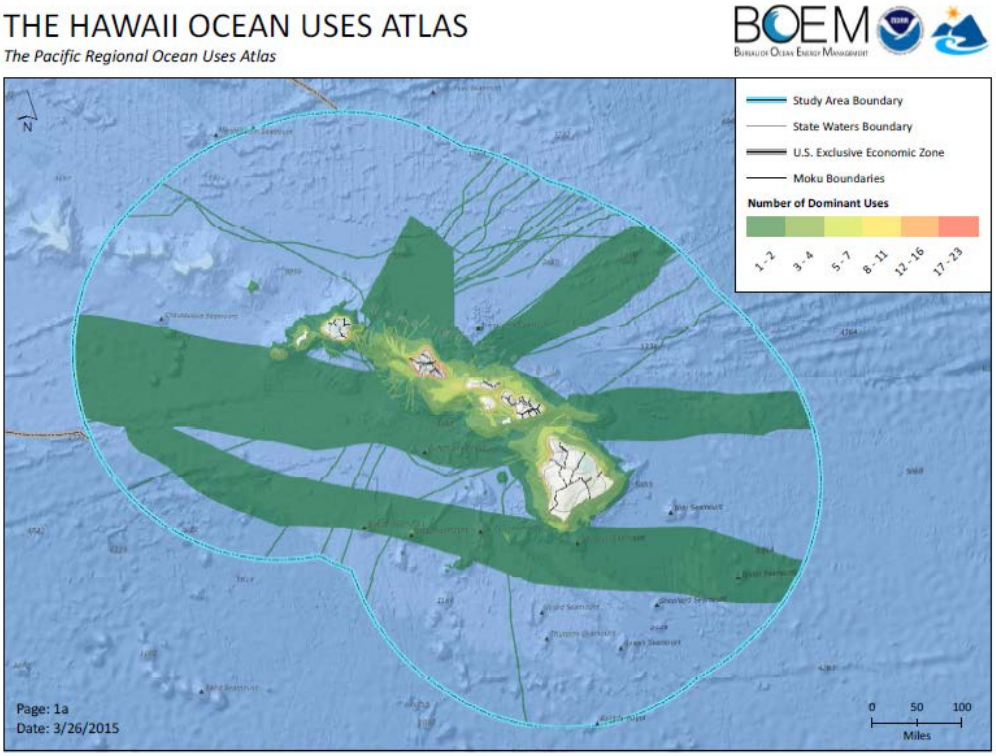


Figure 6 - Sample ocean use maps for Oregon's marine waters. Maps shows the sum of overlapping dominant uses for all uses mapped (top) and the dominant and general use areas for commercial fishing with benthic fixed gear (bottom). Maps for all uses at various scales can be found in Appendix IV.



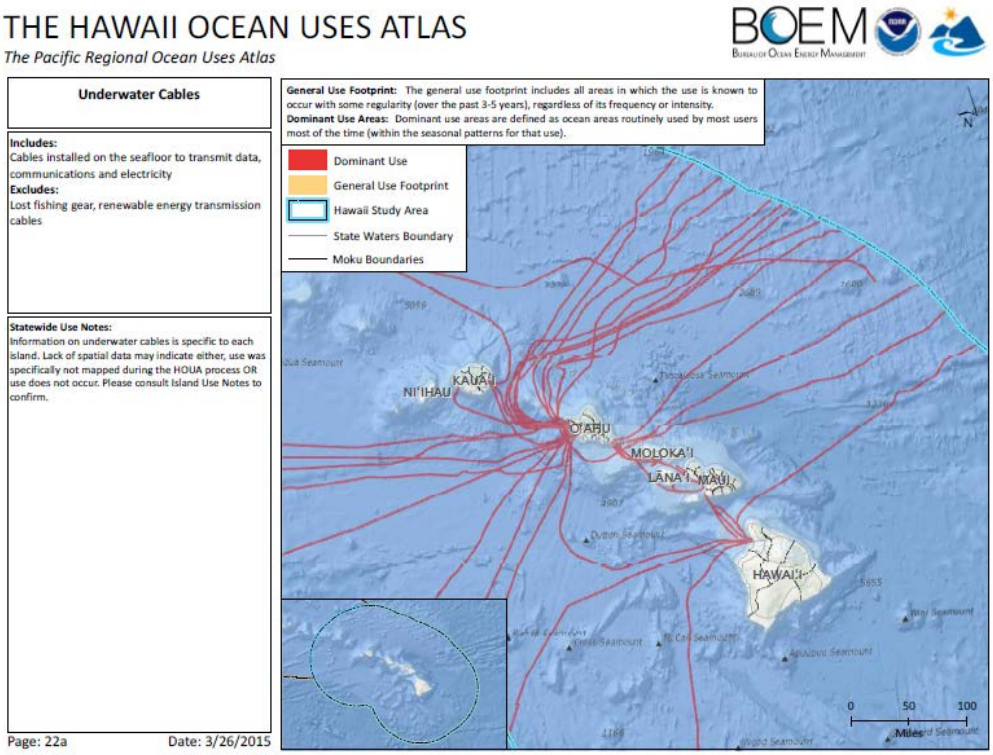


Figure 7 - Sample ocean use maps for Hawaii's marine waters. Maps show the sum of overlapping dominant uses for all uses mapped (top) and the dominant and general use areas for underwater cables (bottom). Maps for all uses at various scales can be found in Appendix IV.

3.3.2. Spatial Data

The spatial data used to compile the ocean use maps were also furnished to BOEM as part of the PROUA project deliverables. The GIS data are provided as a comprehensive geodatabase housing the general and dominant use area data for each use mapped in each of the study areas. Spatial data are provided in various formats to allow flexibility in visualizing the patterns and maximize spatial analysis potential. The geodatabase includes spatial data for all uses, project study area boundary data, as well as the supplemental use notes and the use definitions. Data can be symbolized to show individual use patterns or aggregated patterns for all mapped uses. The spatial data are complete with FGDC metadata detailing the data gathering methods and the data processing steps and were included as part of the project deliverable to BOEM. A Readme file explaining the various data layers within the geodatabase and a general ocean use data processing guide are also included for reference.

3.3.3. Use Notes

Supplemental information on ocean uses collected during the workshops and through the data review process is provided on the ocean use maps and in the spatial geodatabase. The use notes were distilled from the detailed notes recorded by project staff and participant responses provided on the ocean use questionnaires during the ocean use mapping workshops. These notes provide valuable perspectives about what drives or regulates the patterns of ocean uses depicted on the maps and should be used in concert with the spatial data shown on the ocean use maps.

See Appendix V for the use notes compiled for each PROUA study area. The notes are included as insets on the individual use maps (Appendix IV) and in the final project geodatabase.

3.4. Summary

The ocean use mapping component of the PROUA offers new perspectives on ocean use activities in Oregon, Washington and Hawaii from the people who know it best, the ocean use communities. The mapping workshops held in the project study areas provided a unique opportunity for diverse ocean interest groups to convene and work together to document and discuss how ocean spaces are used, as well as recognize the challenges planners face when making decisions for marine planning and resource management purposes. The data and resulting maps, while the primary deliverable for this component of the PROUA, were not the only outcomes to the PROUA ocean use mapping work. From

workshop planning and implementation through to the data review process, the PROUA team worked to build relationships and trust with the ocean use communities in coastal Washington, Oregon and Hawaii. And through these efforts, a foundation is being built to connect the communities that can be affected by planning with the agency tasked with making the planning decisions. The value of the PROUA engagement with the stakeholder communities in the study areas goes far beyond the spatial data and products detailed in this report. And while these outcomes are difficult to quantify, it is important to note that they exist and that stakeholder engagement is an essential component to effective marine planning.

4. ANALYSIS OF USE INTERACTIONS, CONFLICTS AND COMPATABILITIES

The first phase of the PROUA project employed proven participatory mapping methods to document *patterns of ocean use* in the three target geographies: Oregon, Washington, and Hawaii (i.e. shore to US Exclusive Economic Zone [EEZ] limit). The project's second phase, the analysis of use interactions, conflicts and compatibilities component, combines newly generated information about how those *uses function* with new analytical tools to provide ocean managers with an unprecedented ability to identify, understand, plan and manage potential *interactions, conflicts and compatibilities among uses* when they co-occur in the same ocean spaces.

By more fully understanding how each use occupies and functions in 3-dimensional ocean spaces, the Interactions, Conflicts and Compatibilities Component of the PROUA project provides valuable new perspectives on the challenges and opportunities involved in siting competing uses in any given ocean area. Four distinct but related products were created. Each is built on a foundation of understanding how any ocean use occupies 3-D space (i.e. the Space Use Profiles) and how that profile influences its likelihood of interaction, conflict or compatibility with other uses sharing the same area:

1. **Space Use Profiles**: For each of the ocean uses mapped in the PROUA study areas, the project created a comprehensive Profile of how it occupies and uses 3-dimensional ocean space across five horizontal zones (i.e. shore to EEZ limit) and five vertical zones (i.e. air to seabed) in a generalized ocean setting. Space Use Profiles describe each use's general operation, location and components, and quantify important functional aspects of its 3-D space occupancy that may influence its interactions, conflicts and/or compatibilities with other co-occurring uses.

2. **Ocean Use Interaction Assessment Tool**: In order to evaluate the potential implications of interactions between Renewable Energy and other co-occurring

uses, the PROUA project developed a new analytical tool that uses the Space Use Profile data to evaluate whether, how and where two co-occurring ocean uses might come into contact and interact in 3-D ocean space. This tool provides a unique window into potential management issues and approaches for ocean planning.

3. **Interactions between Renewable Energy and other Ocean Uses:** A general, non-spatial analysis using the new tool described above to examine and illuminate whether, where and how Renewable Energy operations may interact, conflict or be compatible with 34 other potentially co-occurring uses in a generalized ocean setting. For the PROUA project, all forms of Renewable Energy were lumped together into one generic use profile, with the exception of offshore solar energy, which was outside the scope of the analysis.

4. **Study Area Maps of Potential Interaction/Conflict/Compatibility between Renewable Energy and Other Ongoing Uses**: The final phase of the PROUA project applies the results of use interaction analysis on Renewable Energy (i.e. #3 above) to the spatial data on patterns of ocean uses in the 3 study areas. The resulting maps and analytical results identify specific ocean areas where and, perhaps as importantly, *how* potential Renewable Energy facilities might interact or conflict or be compatible with other co-occurring uses in the study areas.

4.1. The Space Use Profiles

Unique Space Use Profiles were developed for each of the different ocean uses mapped by the PROUA project in Oregon (16 uses), Washington (33 uses) and Hawaii (29 uses). Comprising a wide spectrum of ways that people use the ocean, these activities fall into three ocean sectors differing in purpose, drivers, scope, and potential benefits and impacts:

- Extractive
- Non-Extractive
- Industrial/Military

The full suite of uses examined in the PROUA Project are listed and defined in Table 1, Table 2, and Table 3.

4.1.1. Information Sources Used to Create Space Use Profiles

Prior to the PROUA project, comprehensive characterizations of how different ocean uses occupy 3-dimensional ocean space did not exist. Mirroring the widespread lack of data on *spatial patterns of ocean use*, meaningful and readily accessible information about how those *uses operate and function in, on and above the water* is similarly rare, qualitative and inferential. To fill this increasingly critical information gap in our collective understanding

of the mechanics and implications of human uses of the ocean, the PROUA Project synthesized existing diverse, and sometimes non-traditional, information from a variety of sources, including:

- Descriptive and spatial data gathered during other participatory mapping projects conducted by NOAA's MPA Center throughout US waters including California, New Hampshire, Southern Maine, Virginia, US Virgin Islands, and areas of the islands of Maui and Hawaii. (http://marinecadastre.gov/oceanuses/)

- Interviews with experts from relevant user groups, industries, management agencies, conservation organizations, and ocean sciences. Chief among these were:
    - Hundreds of ocean users and sector representatives involved in participatory mapping exercises conducted throughout US waters since 2006.
    - A smaller, more targeted group of external experts, drawn largely from industry and government, who provided input and advice on details of the PROUA Team's draft Space Use Profiles for operationally or technologically complex uses such as commercial fishing or energy extraction, which are not typically pursued or well-understood by private individuals or the PROUA team.
    - A large group (approximately 40) of ocean use experts, managers and researchers participating in a workshop on conflicts and compatibilities among common ocean uses.
    - The NOAA Data and Tools Theme Team, a group of approximately 20 experts in consumptive and non-consumptive ocean uses (e.g. commercial fishing, ocean recreation), convened over 2 years to help inform the implementation of the National Ocean Policy's Framework for Effective Coastal and Marine Spatial Planning.

- Publicly available documents, books, journals, magazines, websites and images. As stated above, although ocean uses are prevalent and diverse, there are few accessible compilations of information to inform the development of space use profiles for such a wide range of ocean uses. Consequently, the PROUA team stitched together disparate pieces of information from a variety of sources to characterize how many uses are pursued.

- Professional experiences and judgement of the PROUA Team. Members of the PROUA Team have nearly half a century of combined experience working on aspects of human uses of the oceans. This experience ranges from mapping ocean use patterns around the US; documenting their potential threats to ecosystems and their users; developing tools like the Common Language of Ocean Use to facilitate their

understanding and evaluation; assessing the nature and implications of their interactions in, on and under the water; and developing policies and permit criteria to manage their potential impacts in marine protected areas. Further, PROUA Team members also actively participate in many of the ocean uses assessed by the project, including sailing, motorized boating, SCUBA, paddling, surface board sports, recreational fishing, surfing, marine research, swimming, wildlife viewing from boats, tide-pooling and beach use. Combined, these diverse experiences were used by the PROUA Team to compile space use profiles and interpret how they may affect interactions with other uses sharing the same ocean space.

4.1.2. Overall Structure and Contents of the Space Use Profiles

Each Space Use Profile consists of six related Sections, describing the information needed to understand the use and how its patterns of 3-D space occupancy can influence its potential interactions, conflicts and compatibilities with other co-occurring uses. Each Section is described more extensively below.

Section 1. Use Description = a general overview of how and where the use is pursued in a typical ocean setting, including the primary functional components (e.g. vessels, anchors) employed during the use.

Section 2. General Space Use = the general spatial pattern of the overall use across distinct Horizontal and Vertical Zones in a typical ocean setting.

Section 3. Space Use by Components = the general likelihood that different functional components of the use will occupy specific horizontal and vertical zones during its pursuit.

Section 4. Use Component Rankings = the relative functional importance of different components of the use to its successful pursuit.

Section 5. Functional Characteristics of Space Use = operational aspects of the use that may influence the likelihood or consequences of its interactions with other uses.

Section 6. Spatial Management Considerations = fundamental aspects of how the use occupies ocean space and is managed by relevant authorities that shape the range of options available to users and planners for the spatial allocation of that and other ocean uses in ways that minimize conflict.

4.1.3. Specific Elements of the Space Use Profiles

This section provides, for each of the six Sections of the Space Use Profiles listed above:

a) its relevance of the information for understanding space occupancy, interactions, conflicts and compatibilities
b) definitions of its key concepts, terms and variables
c) the range of potential values for its variables

4.1.3.1. Profile Section 1: Use Description

a) Relevance to Interactions, Conflicts and Compatibilities

Section 1 summarizes the basic functional and operational aspects of the use, including its definition, components, typical ocean locations, and important notes and qualifications. The Use Description addresses the questions: what is the use; where does it typically occur; and what does it typically involve? This information is necessary to frame and interpret more detailed characterizations of where and how the use occupies ocean space and thus, whether and how it may interact, conflict or be compatible with other uses in the same area.

b) Key Concepts, Terms and Variables

- The Use Definition lists specific activities that are included in the typical forms of the use, and provides examples of other similar or seemingly related activities that are excluded from the category and addressed in other uses.

- The Use Components includes (i) people; (ii) vessels; (iii) anchors; (iv) moving gear; and (v) installed infrastructure that may be employed when conducting the use and that can profoundly influence how, and to what effect, the overall use occupies ocean space.

- The Core Activity Area(s) describe the types of ocean areas where the primary activities of the use are typically conducted (e.g. kinds of habitats often used as dive sites for SCUBA/Snorkel).

- The Overall Footprint of the use includes all the ocean areas potentially involved in its pursuit, including the Core Activity Area(s) and other ocean spaces traversed when moving to, from and among them.

- Notes and Assumptions about the use that clarify or highlight important distinctions or characteristics for the analysis.

c) Definition and Range of Data Values

Section 1 contains only qualitative, descriptive characterizations of the use which are self-explanatory.

4.1.3.2. Profile Section 2: General Space Use

a) Relevance to Interactions, Conflicts and Compatibilities

Section 2 describes for a generalized ocean setting, where the use is likely to be pursued, and thus where it can be expected to occupy ocean space across Horizontal Zones (i.e. from the shoreline outward) and across Vertical Zones (i.e. from the air down to the seabed). Throughout this and other Sections of the Space Use Profile, important qualifiers, examples and notations were included in the Notes field to aid in interpreting the data and results.

b) Key Concepts, Terms and Variables

Horizontal Zones **-** provides a general spatial overview of where, from the sea surface down, in plain view, the use typically occurs ranging from the shoreline to the outward (typically 200nm) boundary of the U.S. exclusive economic zone (EEZ). Each use is scored, for both its Core Activity Areas and its Overall Footprint, according to how likely it is for the use to occupy ocean space in five contiguous Horizontal Zones, when it is being pursued in a typical ocean setting.

- Shoreline = the zone of land extending seaward from the inland extent of the marine-influenced terrestrial environment (e.g. beaches, cliffs) to the Mean High Water (MHW) line. (Zone Range = marine environment to MHW)

- Intertidal = the marine zone extending seaward from the Mean High Water (MHW) line to the Mean Low Water (MLW) line. (Zone Range = MHW to MLW)

- Nearshore = the zone of water extending seaward from the MLW line to the 100 foot depth contour in open water; this zone usually falls within State waters (i.e. typically 0-3nm from shore). (Zone Range = MLW to 100 foot)

- Coastal/Offshore = the zone of water extending seaward from the 100 foot depth contour to the continental shelf break, which is often found around 300-600 foot depths; this zone usually falls within Federal waters (i.e. beyond 3nm from shore). (Zone Range = 100 foot to shelf break)

- Oceanic = the zone of water extending seaward from the continental shelf break to the deep ocean; this zone generally lies within Federal waters (i.e. 3-200nm). (Zone Range = shelf break to 200nm)

Vertical Zones – provides a general spatial picture of where the use tends to occupy vertical space (i.e. depth profile) when it is being pursued in a typical ocean setting. Each use is scored, for both its Core Activity Area(s) and its Overall Footprint, according how likely it is to occupy the following five Vertical Zones, *when it is being pursued in any particular area*.

- Air = the zone of air beginning 15 foot above the sea surface and extending upward. (Zone Range = >+15 foot above waterline)

- Surface **=** the zone of air and water beginning 15 foot above the water and extending downward to 10 foot below the upper surface of the water, regardless of overall depth; surface zone may subsume the entire "Water Column" (defined below) in shallow water with depths less than 10 foot. (Zone Range = +15 foot to -10 foot from waterline)

- Water Column **=** the zone of water beginning 10 foot below the sea surface and extending downward to the surface of the seafloor (defined below), regardless of overall depth. (Zone Range = -10 foot to seafloor)

- Seafloor **=** the uppermost layer of the seabed, extending downward to 1 foot, and consisting of either non-living rocks and sediments or solid biogenic structures such as hermatypic coral reefs or coralline algal crusts. (Zone Range = upper 1 foot of the seabed)

- Seabed **=** the zone of rock or sediment beginning 1 foot below the seafloor and extending downward indefinitely. (Zone Range = >1 foot below seafloor)

c) Definition and Range of Data Values

Possible data values for the relative likelihood of the overall use's occurrence in different Horizontal and Vertical Zones include:

- Always (A)
- Often (O)
- Sometimes (S)
- Rarely (R)
- Never (N)

Taken together, this vital information creates a holistic picture of the 3-dimensional spatial presence of a use in a generalized ocean setting. This basic information allows predictions about the use's occurrence in specific ocean space, and thus of the potential for co-occurrence and interaction among uses sharing the same space.

4.1.3.3. Profile Section 3: Space Use by Components

a) Relevance to Interactions, Conflicts and Compatibilities

Section 3 moves beyond generalized patterns of occurrence for the overall use, and begins to paint a more detailed picture of the 3-D space occupancy by the use's Components: the people, vessels, anchors, moving gear, and/or installed infrastructure that may be employed in, on or above the water as Section of the use. To that end, Section 3 describes the likelihood that any of these five different use Components (see definitions below) may occur and occupy ocean space in the five Horizontal and Vertical Zones listed above.

Combined, these two measures of Horizontal and Vertical distribution of any given use allow a more fine-grained assessment of where its main Components are likely to occur in 3-D space, and thus where they may potentially interact with other uses – and their Components - above, on or under the water. To generate this perspective, Section 3 poses two different and but complementary questions about the distribution of the use's Components.

- Horizontal Zones – Section 3 assesses the relative likelihood of each Component being employed by the use when it is being conducted in a specific Horizontal Zone (e.g. in the Nearshore environment), regardless of which Vertical Zone is involved.

- Vertical Zones **–** Section 3 assumes that a specific Component is being actively employed by the use (e.g. Vessels or Anchors) and assesses the Component's likelihood of occurrence in different Vertical Zones during the use (e.g. Air vs. Surface vs. Seafloor), regardless of where the use is occurring horizontally.

b) Key Concepts, Terms and Variables

- People = human beings actively pursuing the use.

- Vessels = watercraft used to transport people, gear, instruments or infrastructure to, from and within the main activity area as an integral part of the use. Examples: boats, ships, submersibles, kayaks, canoes, paddle boards, jet skis. Does not include

other types of floating structures such as those used to support energy production or aquaculture operations.

- Anchors = devices used by mariners to temporarily secure a vessel (see definition above) to the seafloor; typically consisting of a large, heavy device that digs into the seabed and prevents the vessel from moving, connected to the vessel by a length of chain and/or rope. Multiple anchors may be deployed depending on the conditions and the vessel's size. When in use, vessel anchors always occupy the entire column of water from the sea surface to the seafloor, and often into the seabed. (Note – this component does not include similar devices used to secure installed infrastructure for long periods of time.)

- Moving gear = objects often associated with, but distinct from, people or vessels employed by a use, that are temporarily placed in and moved through or over the water or seafloor as an integral part of the use. Examples: fishing lines, nets, traps, pots, harpoons, spears; and, autonomous aquaculture net pens.

- Installed Infrastructure = equipment, structures and devices installed in, or anchored to, the seafloor that provide integral and long-term support for the use. Examples: fixed mooring buoys, oil rigs, anchored aquaculture net pens; tether lines to floating gear, underwater habitats for saturation diving, underwater cables and pipelines.

c) Definition and Range of Data Values

Possible data values for the relative likelihood of any Component occurring in different Horizontal and Vertical Zones include:

- Always (A)
- Often (O)
- Sometimes (S)
- Rarely (R)
- Never (N)

4.1.3.4. Profile Section 4: Use Component Rankings

a) Relevance to Interactions, Conflicts and Compatibilities

Section 4 assesses the degree to which each of the five functional Components of the use (i.e. people, vessels, anchors, moving gear and infrastructure) is integral to its pursuit.

This, in turn, allows the analysis of potential interactions, conflicts and compatibilities to focus on those aspects of the use that are most likely to co-occur in the same ocean space.

b) Key Concepts, Terms and Variables

All Component types are described and defined above in section 4.1.3.3 b.

c) Definition and Range of Data Values

Not all potential Components of the use are employed in every situation. For example, SCUBA/Snorkeling is often conducted by swimming out from the shoreline to the dive site without using a vessel for transport or support. Consequently, vessels are not considered a necessary or Primary Component of the use in the use general situation. The relative importance of each Component to the successful pursuit of the use was scored as being either:

- Primary = essential and routinely used in the Core Activity Area(s).
- Secondary = may be used in the Core Activity Area(s) and/or in the Overall Footprint of the use.
- Not Applicable = rarely or never employed by the use anywhere within its Overall Footprint.

4.1.3.5. Profile Section 5: Functional Characteristics of Space Use

a) Relevance to Interactions, Conflicts and Compatibilities

Section 5 assesses non-spatial aspects of a use that can influence: (i) its potential for interactions with other uses; (ii) the likelihood that those interactions may result in conflict involving either Interference with, or Exclusion of, the other use; or, (iii) both (see definitions below). To this end, Section 5 examines four fundamental Functional Characteristics of how uses occupy space that may tend to minimize or exacerbate their potential for conflict with other uses.

b) Key Concepts, Terms and Variables

The PROUA Project examined the potential for two types of conflict among co-occurring ocean uses:

- Exclusion: the predictable long-term occupation of a particular ocean space by one use that physically precludes or excludes other uses from operating in the same area: typically involving large permanently installed infrastructure (e.g. oil rigs, underwater cables, channel markers, jetties).

- Interference: active interactions between different ocean uses that directly diminish the successful pursuit, value or enjoyment of one or both uses through risk of direct damage or harm to humans, vessels, anchors, mobile equipment, or installed infrastructure.

Functional Characteristics Contributing to Interference – the likelihood that any given use will actively interact physically in the same space at the same time with a different use can be influenced by two fundamental characteristics inherent to its operation:

- Operational Mobility – the degree to which the use typically can select or modify in advance or in real time, its area of operation, and thus control its movements and location (both Horizontally and Vertically) in response to the surrounding environment, including the presence of other uses or their components.

- Moving Gear – the degree to which the use typically involves non-human components (e.g. fishing nets) that are lowered, raised, dragged or propelled in the air, at the Sea Surface, through the Water Column, along the Seafloor, and/or through the Seabed with little or no real-time ability to either sense or respond to the immediate operating environment, including the presence of other uses or their components.

Functional Characteristics Contributing to Exclusion – the likelihood that any given use will exclude another use seeking to occupy the same space at the same time can be influenced by two fundamental characteristics inherent to its design, operation and management:

- Permanence of Space Occupancy – the degree to which the use typically occupies a fixed area of ocean indefinitely (e.g. Renewable Energy wind turbine pylons and transmission cables, oil pipelines).

- Buffer Zones – the degree to which the use's Core Activity Area is typically surrounded by an official, governmentally established buffer or exclusion zone that prohibits or limits approach by other uses for safety, security or other reasons (e.g. energy facility safety zone or military security exclusion zone).

c) Definition and Range of Data Values

Each of the above Characteristics was scored according to the likelihood that it applies to the use. Corresponding data values are:

- High: the characteristic either always applies or is highly likely to apply to the use in question.

- Medium: the characteristic may apply to the use depending on how, why and under what conditions or management regime it is being pursued.

- Low: the characteristic either never applies or is unlikely to apply to the use in question.

4.1.3.6. Profile Section 6: Spatial Management Considerations

a) Relevance to Interactions, Conflicts and Compatibilities

Section 6 of the Space Use Profile assesses two fundamental characteristics of an ocean use that can influence its potential flexibility in selecting operating areas, as well as the degree to which those areas are typically managed or controlled by spatial management authorities (e.g. aquaculture pens vs. swimming). Taken together, these characteristics shape and influence the range of spatial management options available to users and planners for the allocation of that and other ocean uses in ways that may avoid or minimize adverse interactions among them while optimizing their operational objectives.

b) Key Concepts, Terms and Variables

- Site Dependence – the degree to which the successful pursuit of the use requires access to specific ocean areas that possess certain essential and unevenly distributed resources, ecosystem features, or environmental conditions that are integral to the use (e.g. oil platforms near oil deposits, wind farms in areas of reliable wind, surf spots near consistent surf breaks, fishing areas where fish are abundant).

- Location of Use Managed Spatially – the degree to which the use's operating area is typically influenced by a government agency or planning entity that determines where, how and when it may operate with a broader ocean setting (e.g. offshore discharge pipes, trawling zones, shipping lanes).

c) Definition and Range of Data Values

As in Section 5, each of the above characteristics was scored according to the degree to which it applies to the use. Data values are:

- High: the characteristic either always applies or is highly likely to apply to the use in question.

- Medium: the characteristic may apply to the use depending on how, why and under what conditions or management regime it is being pursued.

- Low: the characteristic either never applies or is unlikely to apply to the use in question.

4.1.4. Outputs and Applications of Space Use Profiles

Taken together, these six Profile elements shape and inform a comprehensive picture of how individual ocean uses occupy and function in ocean space, and how, in turn, any given use may interact with other uses sharing or seeking to share the same areas. Figures 8-10 below provide an illustrative example of the Space Use Profiles of three ocean uses spanning the spectrum of how different uses occupy ocean space: (i) Renewable Energy; (ii) Commercial Fishing with Benthic Mobile Gear; and, (iii) SCUBA/Snorkel. Clearly, the Space Use Profiles of these common ocean uses differ substantially in space occupation and the resulting potential for interaction with other uses.

Individually, each Space Use Profile provides an objective depiction of how any single ocean use occupies various ocean spaces, from the shoreline to the furthest reaches of the EEZ, and from the air above the sea surface to the sediments below the seafloor. Taken together, these comprehensive Space Use Profiles present an unprecedented 3-dimensional perspective on how human use the oceans: the patterns, footprints and components of our activities, and the potential for different uses to encounter, interact and conflict with each other in, on or above the water. Space use profiles for all PROUA uses can be referenced in Appendix VI.

Use Profile: Renewable Energy

Section 1. Use Description

Use Includes:

Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms.

Use Excludes:

Onshore power grids; Solar Energy structures.

Use Footprint

The Overall Footprint comprises the Core Acitivity Area(s), and the areas covered by associated underwater cables and devices connected to shore and operational vessels (surface and submarine) and aircraft

Core Activity Area

Core Activities involve the in situ capture and generation of energy using an installed device. These typically occur in Near-Shore and Coastal Zones, but may occur in Oceanic Zones with floating, tethered structures.

Functional Components

Infrastructure (turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables, service platforms; Support Vessels; People (crew).

Notes and Assumptions

Assumes no solar.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Always	Always	Often	Rarely	Cables run from generation site(s) to onshore.
Core Activity	Never	Never	Sometimes	Often	Rarely	The location will vary w/ bathymetry, energy distributions (e.g. wind fields), and oceanographic conditions.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Always	Always	Always	Always	Assumes most but not all devices extend upward into Air, and all extend down into Seabed.
Core Activity	Often	Always	Always	Always	Always	Assumes most but not all devices extend upward into Air, and all extend down into Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Rarely	Rarely	Sometimes	Sometimes	Sometimes	People occur intermittently on structures for maintenance and operational activities.
Vessels	Never	Rarely	Sometimes	Sometimes	Sometimes	Vessels are involved in installation and maintenance and are more frequently used further offshore.
Anchors	Never	Never	Sometimes	Rarely	Never	Anchors may be used by Vessels during temporary visits to site(s); their use depends on depth and bottom type.
Moving Gear	Never	Rarely	Rarely	Rarely	Rarely	Mobile gear includes installation and maintenance, but not the moving parts of the devices.
Infrastructure	Always	Always	Always	Always	Always	Renewable Energy generation always involves Infrastructure spanning from the generation site (devices) to the Shoreline and potentially beyond

Figure 8 - Space Use Profile for Renewable Energy

Use Profile: Renewable Energy

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
	Always	Always	Always	Always	Always	(cables).
People	Sometimes	Always	Rarely	Rarely	Never	Assumes people are on rigs, vessels and aircraft at or above the Sea Surface, and relatively rarely in or under the water.
Vessels	Sometimes	Always	Sometimes	Never	Never	Assumes vessels are only surface boats and ships, not subs. Larger vessels may extend up to Air Zone and down to Water Column.
Anchors	Never	Often	Always	Always	Always	When used, anchors extend from Sea Surface to Seabed.
Moving Gear	Sometimes	Often	Often	Often	Sometimes	When used, Mobile Gear may include subs, ROVs, trenching and cable laying machines, helicopters.
Infrastructure	Often	Always	Always	Always	Always	Assume that Infrastructure extends from Sea Surface to Seabed, and some extend into the "Air" Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Secondary	People are intermittently involved onsite for maintenance and management but typically not for routine operations.
Vessels	Secondary	Vessels are involved mainly to ferry people to the sites, or to conduct assessments and repairs of the infrastructure and devices.
Anchors	Secondary	Anchors may be used by vessels during temporary operations at the sites.
Moving Gear	Secondary	Mobile gear may be temporarily employed by vessels. This Component does not include moving parts of the energy generating devices themselves, which may rotate or oscillate in place but are fixed spatially and do not change location over time.
Infrastructure	Primary	Infrastructure includes all devices, platforms, tethers, cables, and other equipment installed at the site as part of the generation and distribution of renewable energy.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Once installed, renewable energy infrastructure is immobile and cannot move to avoid obstacles or other uses.
Moving Gear:	Low	This use sometimes involves Moving Gear in connection with installation, maintenance or temporary trips by support Vessels.
Exclusion		
Permanence:	High	Renewable Energy infrastructure is permanently installed in the Seabed, along the Seafloor to the Shoreline, and up to the Sea Surface or Air Zone.
Buffer Zones:	High	Energy generation devices typically have an official exclusion zone surrounding their operating area for safety and security purposes.

Section 6. Spatial Management Considerations

Spatial Management:	High	Renewable Energy is heavily regulated and operating areas are determined by government agencies.
Site Dependence:	High	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.

Figure 8.1 - Space Use Profile (continued) for Renewable Energy

Use Profile: Non-Commercial Fishing (Benthic Mobile Gear)

Section 1. Use Description

Use Includes:

Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Use Excludes:

All other forms of Fishing

Use Footprint

Use Footprint includes the active fishing areas and areas transited from and back to port.

Core Activity Area

Benthic mobile fishing can occur throughout the Near-Shore, Coastal and Oceanic zones in all depths, including the Intertidal when submerged at high tides.

Functional Components

Vessel(s) (e.g. motorized, sailing or paddled); crew (i.e. people); anchors; and fishing gear (e.g. lines, hooks, pulled nets, trawls, dip nets, spears, harpoons) in the water.

Notes and Assumptions

Harpoons and spears are used for benthic fishing only in very shallow water where bottom-dwelling fish are visible and reachable. Excludes illegal fishing methods such as explosives or poison. Assumes that other forms of fishing are not combined during the same activity.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Rarely	Sometimes	Often	Often	Sometimes	Small boats may be launched and retrieved from shore.
Core Activity	Never	Sometimes	Often	Often	Sometimes	Fishing efforts typically peak in the Neashore and Coastal/Offshore zones, and decrease in extreme depths.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Often	Often	Often	Large vessels may extend into the Air Zone; anchors or fishing gear may rest on Seafloor and Seabed.
Core Activity	Rarely	Always	Often	Often	Sometimes	Assumes trawls can disturb sub-surface sediments and assemblages in the Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Always	Always	Always	Always	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Elsewhere, People are always involved (by definition).
Vessels	Not Applicable	Always	Always	Always	Always	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Elsewhere, Vessels are always involved (by definition).
Anchors	Not Applicable	Sometimes	Sometimes	Rarely	Never	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Typically, anchors are used for short periods, overnight or to ride out bad weather.
Moving Gear	Not Applicable	Always	Always	Always	Always	All fishing gear is, by definition, Mobile. The main activity does not occur on the Shoreline, and only at high tide in the Intertidal.
Infrastructure	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	Installed infrastructure can be used to secure vessels or as nav aids. The main activity does not

Figure 9 - Space Use Profile for Commercial Fishing with Benthic Mobile Gear

Use Profile: Non-Commercial Fishing (Benthic Mobile Gear)

	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	occur on the Shoreline, and only at high tide in the Intertidal.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Never	Never	Always involved, People occur exclusively at the Sea Surface, and by definition, in Vessels.
Vessels	Rarely	Always	Sometimes	Rarely	Never	Always involved, some large vessels extend up into "Air" zone; some down into the "Water Column" and some intentionally beached on the Seafloor as part of the fishing activity.
Anchors	Never	Always	Always	Always	Always	When used, anchors run from Surface to the Seabed.
Moving Gear	Rarely	Always	Often	Often	Sometimes	Mobile benthic gear is suspended from the Sea Surface to the Seafloor and sometimes into the Seabed; it occasionally extends into the Air Zone on davits or other devices; and it often extends downward thru the Water Column (except in the Intertidal) to the Seafloor (except when fishing immediately above the bottom.
Infrastructure	Rarely	Always	Always	Always	Often	When used, Infrastructure extends from Sea Surface to Seabed, and sometimes into the Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in this activity.
Vessels	Primary	Fishing vessels are always involved in this activity.
Anchors	Secondary	Fishing vessels may use anchors to secure to the seabed.
Moving Gear	Primary	The gear used in this type of fishing is always mobile.
Infrastructure	Secondary	Fishing vessels may use mooring buoys or navigation markers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Benthic mobile fishing operations are relatively maneuverable before Mobile Gear has been deployed. Afterward, their flexibility may be considerably more limited in real-time.
Moving Gear:	High	This activity routinely involves lowering, pulling or raising gear (e.g. lines, nets, traps, dredges, etc.) through the Water Column and along the Seafloor.
Exclusion		
Permanence:	Low	Benthic fishing w/ mobile gear is inherently transitory and only temporarily occupies ocean spaces.
Buffer Zones:	Medium	Fishing operations may involve official safety zones when underway, depending partly on the type of vessel and gear used.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Benthic mobile fishing is Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.
Site Dependence:	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Figure 9.1 - Space Use Profile (continued) for Commercial Fishing with Benthic Mobile Gear

Use Profile: SCUBA/Snorkeling

Section 1. Use Description

Use Includes:	Use Excludes:
SCUBA diving, surface supply diving, snorkeling (free diving).	Swimming, Dive Fishing.
Use Footprint	**Core Activity Area**
Typically encompasses dive sites and relatively narrow tracks followed by vessels to reach and return from dive sites.	Dive site(s), including areas traversed on drift dives, typically occurring in relatively shallow near-shore or coastal waters reachable by swimming or vessels, and extending from the sea surface to the seafloor.

Functional Components

People (divers, boat operators, observers), vessels, anchors, mobile gear (towed sleds, marker bouys), infrastructure (mooring bouys, nav aids).

Notes and Assumptions

Assumes a typical dive profile and gear (i.e. no extreme depths or saturation dives in underwater habitats).

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal	Oceanic	Notes
Use Footprint	Sometimes	Rarely	Often	Sometimes	Rarely	Footprint may include entry/exit from shore, which can be the norm in some areas.
Core Activity	Never	Rarely	Often	Sometimes	Rarely	Diving typically occurs in depths less than 100', but may occur in deeper open ocean or intertidal waters. Snorkeling typically occurs in very shallow water less than 50', but may occur deeper in certain areas with clear water (e.g. coral reefs).

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Often	Often	Sometimes	Divers typically occur from the Sea Surface to the Seafloor; large vessels may extend up into the Air Zone and/or use anchors or moorings extending into the Seabed. Snorkelers typically do not entend into the WC, but may contact the Seafloor in shallow waters.
Core Activity	Sometimes	Always	Often	Sometimes	Sometimes	Divers typically occur from the Sea Surface to the Seafloor; large vessels may extend up into the Air Zone and/or use anchors or moorings extending into the Seabed. Snorkelers typically do not entend into the WC, but may contact the Seafloor in shallow waters.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal	Oceanic	Notes
People	Always	Always	Always	Always	Always	By definition, if the Use is occurring, it involves People (i.e. divers) wherever it occurs.
Vessels	Sometimes	Rarely	Often	Always	Always	Diving from boats is more common as depths and distance from shore increases.
Anchors	Sometimes	Rarely	Often	Always	Always	Anchors for dive vessels are often used in relatively shallow water but not in extreme depths.

Figure 10 - Space Use Profile for SCUBA/Snorkeling

Use Profile: SCUBA/Snorkeling

Moving Gear	Sometimes	Sometimes	Sometimes	Sometimes	Sometimes	In all zones, mobile gear (e.g. tow lines and sleds, dive site markers, lift bags, etc.) may be used during the dive.
Infrastructure	Rarely	Rarely	Sometimes	Sometimes	Never	Mooring bouys and site markers may be used in moderate depths.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Often	Often	Never	Always used, divers always begin and end at the surface, often enter the Water Column, often contact the SeaFloor but never excavate the Seabed.
Vessels	Always	Always	Sometimes	Sometimes	Never	When used, dive boats typically occupy the Sea Surface and sometimes are intentionally beached on the Seafloor. Larger, deep-draft vessels may also extend upward into the Air Zone.
Anchors	Never	Always	Always	Always	Often	When used, anchors typically extend from the Sea Surface to the Seabed.
Moving Gear	Never	Always	Often	Sometimes	Never	When used, mobile gear (e.g. lines, floats, marker flags) is most often employed in the upper layers of the WC but may be temporarily anchored on the Seafloor.
Infrastructure	Sometimes	Always	Always	Always	Often	When used, fixed mooring bouys or navigation markes extend from Sea Surface to the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Activity always involves people as diver(s) or boat crew.
Vessels	Secondary	Boats are sometimes used to transport divers and gear to and from dive sites, depending on the area.
Anchors	Secondary	Anchors are sometimes used to secure boats to the seafloor.
Moving Gear	Secondary	Mobile gear is sometimes used operate boats (e.g. sea anchors), mark dive sites, or tow divers.
Infrastructure	Secondary	Fixed mooring or navigation bouys are sometimes used by vessels.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Divers and snorkelers have some flexibility in selecting a dive site especially by boat, but have somewhat limited manoeuverability once in the water.
Moving Gear:	Medium	Diving and snorkeling may involve safety lines, site markers, floats, lift bags, flags, etc. that may be towed or raised up thru the water.
Exclusion		
Permanence:	Low	Other than saturation diving, typical dives are short-term, mobile and do not occupy space for long periods.
Buffer Zones:	Low	Diving and snorkeling are not typically accompanied by official buffer zones around divers.

Section 6. Spatial Management Considerations

Spatial Management:	Low	Diving and snorkeling is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
Site Dependence:	Medium	Successful diving and snorkeling can be done in a fairly wide range of safe and optimal environmental conditions, including safe sea states, clean water, healthy ecosystems, and low crowding by other uses.

Figure 10.1 - Space Use Profile (continued) for SCUBA/Snorkeling

4.2. The Ocean Use Interaction Assessment Tool

Once each use was profiled individually using the above described approach, the profile data were used as the foundation for an analytical tool designed to compare uses and evaluate their potential to interact in 3D space, as well to consider the likelihood and nature of potential use conflicts. The Ocean Use Interaction Assessment (OUIA) tool was constructed to store and manage use profile data, calculate pairwise use interaction and related use comparison metrics as described above, and output analytical results in report and tabular formats for use in other applications. The tool was designed as a Microsoft Access database to allow for flexibility in data management, efficiency for iterative analysis, and ease of generating reports and tabular data that can be easily integrated with GIS data. The OUIA tool is included in the final project deliverables to BOEM.

The information (e.g., attributes fields, values, notes) from the space use profiles was imported into the OUIA database using an input form. The form was designed for easy import of profile data, as well as future additions of new uses or modifications of existing profiles. Once the database was populated with the space use profile data, the workflow described below was followed to transform and analyze use-use relationships and the potential for use interactions and conflict.

4.2.1. Transform to Numerical Values – Lookup Tables

All profile attributes (text values) were transformed to numbers using a series of data look-up tables. For the general space use and space use by components (Sections 2 and 3 of the space use profiles), the lookup tables replaced the values of Always, Often, Sometime, Rarely, Never, (AOSRN) to the numeric codes of 5, 4, 3, 2, 0, respectively.

For the use component rankings (Section 4), primary use components were valued as 1, secondary components as 0.5 and non-applicable as 0, to effectively weight the primary components more heavily in the analysis and reduce the influence of secondary and non-applicable components. For the functional characteristics (Section 5), the lookup table values varied by characteristic depending on how each characteristic might affect use interference or exclusion (i.e. low value for mobility increases the likelihood of use interference, while low value for permanence decreases the likelihood of exclusion). Figure 11 shows the look-up table values for each of the space use profile sections as they were applied in the analysis. When using the OUIA tool, these look-up table values are adjustable, providing the user with the flexibility to modify specific component weights, eliminate or reduce the influence of certain attributes or fine tune the analysis to a particular type of use (not captured in the existing space use profiles).

Profile Values

Value	Score
Not Applicable	0
Never	0
Rarely	2
Sometimes	3
Often	4
Always	5

Values used in section II (general space use) and section III (functional characteristics of space use)

Interference

Operational Mobility

Value	Score
High	0
Medium	0.5
Low	1

The Use typically has the ability to select or modify its area of operation and to control in real time its movements horizontally and vertically.

Moving Components

Value	Score
Low	0
Medium	0.5
High	1

Use has gear tethered to vessels or untethered submersible.

Exclusion

Buffers Zones

Value	Score
Low	0
Medium	0.5
High	1

Main Activity Area is mobile and typically surrounded by an exclusion zone that prohibits or limits approach by other Uses for safety, security or other reasons.

Permanence

Value	Score
Low	0
Medium	0.5
High	1

The Use typically occupies a fixed area of the ocean indefinitely. (i.e. won't change location).

Figure 11 - Lookup reference tables used in the Ocean Uses Interaction Assessment tool. Note that a High value for Operational Mobility (green) would decrease likelihood of use to use interference.

4.2.2. Use Comparison Analysis

After the conversion to numeric values, two use profiles can be combined to derive a series of analytical results that describe the likelihood and pattern of use interaction and how the use characteristics might influence interference and exclusion related conflicts.

4.2.3. General Space Use / Combined Core Activity Analysis

The pairwise analysis can be conducted on any profiled use pairs. The analytical workflow starts by selecting the two uses to be compared and calculating the horizontal and vertical ***core activity*** scores for this combination of uses. This calculation combines the core activity values for both uses from Section 2 (General Space Use) of the use profiles. The numeric AOSRN values are averaged for each horizontal and vertical zone to generate a ***combined core activity value***. This metric is calculated for each zone (horizontally and vertically) and suggests the relative likelihood of co-occurrence of the compared uses in 3-D space (higher values indicate higher likelihood of co-occurrence).

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal	Oceanic
Core Activity	Always(5)	Sometimes(3)	Never(0)	Never (0)	Never (0)
Core Activity	Never (0)	Rarely (2)	Often (4)	Sometimes (3)	Never (0)
Combined Core Activity Value	$\frac{5+0}{2} = 2.5$	$\frac{3+2}{2} = 2.5$	$\frac{0+4}{2} = 2$	$\frac{0+3}{2} = 1.5$	$\frac{0+0}{2} = 0$

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed
Core Activity	Sometimes (3)	Never (0)	Never(0)	Always(5)	Sometimes (3)
Core Activity	Never (0)	Always (5)	Often (4)	Often(4)	Sometimes (3)
Combined Core Activity Value	$\frac{3+0}{2} = 1.5$	$\frac{0+5}{2} = 2.5$	$\frac{0+4}{2} = 2$	$\frac{5+4}{2} = 9.5$	$\frac{3+3}{2} = 3$

Figure 12 - Combined core activity calculation for two sample uses, suggesting that the uses most commonly co-occur in the shore and intertidal and on the sea floor.

4.2.4. Use Component Interaction Analysis

The next step focuses on the analysis of the use component (Section 3) values. These are the numeric values that represent the likelihood that each component (people (p), vessels (v), moving gear (mg), anchors (a) and installed infrastructure (ii)) will occur in each horizontal and vertical zone. These values are analyzed to evaluate which components are most likely to interact across the horizontal and vertical marine zones.

First, the use component value is weighted based upon the *use component ranking (Section 4)* as primary (1), secondary (0.5) or non-applicable (0). This step serves to weight the primary components in the subsequent analysis and reduced the influence of secondary and non-applicable components. For each use, the use component values are divided by the use component rankings to create a ***weighted use component value*** for each component in each zone.

The weighted use components values are then analyzed to calculate the interaction values for each horizontal and vertical zone. This pairwise analysis compares the values for each weighted use component of Use[1] with all the other weighted use components of Use[2] as follows:

$$p^i = (p^1 \times p^2) + (p^1 \times v^2) + (p^1 \times mg^2) + (p^1 \times a^2) + (p^1 \times ii^2)$$
$$v^i = (v^1 \times p^2) + (v^1 \times v^2) + (v^1 \times mg^2) + (v^1 \times a^2) + (v^1 \times ii^2)$$
$$mg^i = (mg^1 \times p^2) + (mg^1 \times v^2) + (mg^1 \times mg^2) + (mg^1 \times a^2) + (mg^1 \times ii^2)$$
$$a^i = (a^1 \times p^2) + (a^1 \times v^2) + (a^1 \times mg^2) + (a^1 \times a^2) + (a^1 \times ii^2)$$
$$ii^i = (ii^1 \times p^2) + (ii^1 \times v^2) + (ii^1 \times mg^2) + (ii^1 \times a^2) + (ii^1 \times ii^2)$$

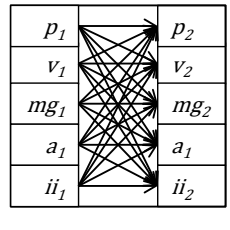


Figure 13 - Pairwise comparison of use components to generate interaction values

This step yields use component interaction values for each component in each horizontal and vertical zone. The ***use component interaction values*** (p^i, v^i, mg^i, a^i and ii^i) suggest the relative liklihood that the use component (e.g. people) will be involved in a use-use interaction in each marine zone (e.g. sea floor). The calculation shown in Figure 13 is used to create interaction values for each use component in each marine zone. Figure 14, illustrates sample values for the calculations illustrated in Figure 13.

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	(p^i) 0.00	(p^i) 60.00	(p^i) 28.80	(p^i) 16.00	(p^i) 8.00
Vessels	(v^i) 0.00	(v^i) 60.00	(v^i) 21.60	(v^i) 0.00	(v^i) 0.00
Anchors	(a^i) 0.00	(a^i) 60.00	(a^i) 36.00	(a^i) 20.00	(a^i) 16.00
Gear	(mg^i) 0.00	(mg^i) 30.00	(mg^i) 14.40	(mg^i) 6.00	(mg^i) 0.00
Installed Infrastructure	(ii^i) 0.00	(ii^i) 30.00	(ii^i) 18.00	(ii^i) 10.00	(ii^i) 8.00

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	(p^i) 7.00	(p^i) 6.00	(p^i) 7.00	(p^i) 0.00	(p^i) 0.00
Vessels	(v^i) 0.00	(v^i) 6.00	(v^i) 7.00	(v^i) 0.00	(v^i) 0.00
Anchors	(a^i) 0.00	(a^i) 0.00	(a^i) 7.00	(a^i) 0.00	(a^i) 0.00
Moving Gear	(mg^i) 0.00	(mg^i) 6.00	(mg^i) 5.00	(mg^i) 0.00	(mg^i) 0.00
Installed Infrastructure	(ii^i) 34.00	(ii^i) 32.00	(ii^i) 24.00	(ii^i) 0.00	(ii^i) 0.00

Figure 14 - Sample component interaction values generated from pairwise comparison of components

4.2.5. Use Components Score

To complete the final step in the interaction analysis, *the* ***use components score*** (UCS) is calculated based on the use component rankings (Section 4 of the use profile) for each use. The UCS is a sum of the weights for the ranked use components for each use and serves to reduce or lessen the influence of secondary and non-applicable components in the interaction analysis. The maximum UCS is 5 for a use that involves all five components as primary components. For example, Table 8 shows an example use profiled with the following use component rankings, resulting in a UCS of 2.5.

Table 11 - Use Component Score calculation

Use Component	Use Component Weight Classification	Component Weight Value
People	Primary	1
Vessels	Secondary	0.5
Anchors	Secondary	0.5
Moving Gear	Secondary	0.5
Installed Infrastructure	N/A	0
		UCS = Sum = 2. 5

As shown in Figure 15, the use components interactive values are summed and normalized by the UCS and then multiplied by the combined core actvity area to derive a zone-based interaction score (%) for each horizontal and vertical zone.

This ***zone interaction score*** combines the use ***component interaction values***, the ***use component scores*** (averaged over both uses) and the ***combined core activity values*** for that zone. The metrics derived from this phase of the analysis are insightful for understanding what components of the uses are likely to interact in each zone when the uses co-occur, and how all components of use *combined* are likely to interact in a zone. These values are also averaged across the vertical and horizontal dimensions to provide an average score in each dimension, the overall horizontal and vertical interaction score.

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/ Offshore	Oceanic
People	(p^i) 7.00	(p^i) 6.00	(p^i) 7.00	(p^i) 0.00	(p^i) 0.00
Vessels	(v^i) 0.00	(v^i) 6.00	(v^i) 7.00	(v^i) 0.00	(v^i) 0.00
Anchors	(a^i) 0.00	(a^i) 0.00	(a^i) 7.00	(a^i) 0.00	(a^i) 0.00
Moving Gear	(mg^i) 0.00	(mg^i) 6.00	(mg^i) 5.00	(mg^i) 0.00	(mg^i) 0.00
Installed Infrastructure	(ii^i) 34.00	(ii^i) 32.00	(ii^i) 24.00	(ii^i) 0.00	(ii^i) 0.00

$$\begin{matrix} nearshore \\ interaction\ value \\ (viewed\ in\ \%) \end{matrix} = \left(\frac{7(p^i) + 7(v^i) + 7(a^i) + 5(mg^i) + 24(ii^i)}{\left(\frac{UCS^1 + UCS^2}{2}\right)} \right) \times combined\ \ core\ activity\ value^i$$

Figure 15 - Calculating the marine zone interaction score using the sum of the component interaction values, averaged use component scores and combined core activity values

This ***horizontal and vertical component interaction scores*** represents the potential interaction likelihood for the use pair in each marine zone (as a percent).

4.2.6. Functional Characteristics of Space Use

The functional characteristics of space use analysis examines how each funtional characteristic of space use (operational mobility, moving gear, site permanence or buffer zones) may affect or contribute to potential conflict as either use *interference* related conflict or use *exclusion* related conflict (defined above). The nature of each use characteristic determines how it might influence conflict (i.e. low value for mobility increases the likelihood of use interference, *however* low value for permanence, decreases the likelihood of exclusion). Figure 16 below shows the functional characteristics Section 5 from the Marine Debris space profile, including the characteristic values (high, medium or low) as well as notes to clarify the values assigned. For more information and guidelines detailing how the values were assigned, see Appendix VII.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Aspects of the Use (e.g. monitoring) may be flexible in selecting locations, but documentation and removal are focused on the site of the marine debris and thus are not able to shift locations permanently.
Moving Gear:	Medium	This Use may periodically employ mobile gear, such as ROVs or aerial surveillance drones.
Exclusion		
Permanence:	Low	This Use is inherently temporary and mobile.
Buffer Zones:	Low	This Use is not likely to involve formal buffer zones, except for very brief periods to allow removal of heavy or dangerous materials.

Figure 16 - Sample functional characteristics of space use

When analyzing use pairs, the functional characteristic values are transformed to numeric values and averaged to generate the ***combined use characteristic value*** for each functional characteristic. The resulting value is assigned one of 5 rankings to convey the likelihood that the selected uses may contribute to interference or exclusion related conflict if they share the same operating area. These rankings and values can be seen in Table 9.

Table 12- Combined Use Characteristic Rankings

Ranking	Value
High	1
Medium/ High	0.75
Medium	0.5
Medium/ Low	0.25
Low	0

4.2.7. Spatial Management Considerations

The spatial management considerations for each use that are recorded in Section 6 of the space use profiles (See Figure 17) are not directly used for quantitative calculations of interaction or conflict potential within the OUIA. However, these considerations provide valuable information on two fundamental characteristics (site dependence and spatial management) of an ocean use that can influence its potential flexibility in selecting operating areas, as well as the degree to which those areas are typically managed or controlled by spatial management authorities (e.g. aquaculture pens vs. swimming).

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Beach access is sometimes controlled directly or influenced indirectly by the presence of relevant infrastructure (e.g. parking, restrooms, etc.).
Site Dependence:	Medium	Successful Beach Use is influenced by many place-based factors but can often be pursued in a variety of settings.

Figure 17 - Section 6, Sample spatial management considerations

For the pairwise use analysis, the spatial management considerations are simply reported for both of the compared uses. When viewed together, these considerations can shape and influence the range of spatial management options available to users and planners for the allocation of that and other ocean uses in ways that may avoid or minimize adverse interactions among them while optimizing their operational objectives.

4.2.8. Use Comparison Report

The above described workflow is conducted within the Ocean Use Interaction Assessment tool (described below) with resulting metrics output in the form of a ***use comparison report***. This report provides details for each use combination individually and can be used to compare and contrast use-use relationships. The resulting data can also be exported in tabular format for integration with GIS or analysis in spreadsheet format. A sample use comparison can be seen in Figure 18.

Use Comparison Report

Tuesday, May 19, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Fishing with Benthic Mobile Gear

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	3.60	40.00	9.60	8.00	0.00
Vessels	3.60	40.00	14.40	0.00	0.00
Anchors	0.00	32.00	24.00	20.00	17.00
Moving Gear	3.60	32.00	19.20	16.00	10.20
Installed Infrastructure	9.60	80.00	48.00	40.00	34.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	3.50	64.00	32.91	24.00	15.74
Overall Vertical Interaction	28.03				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/ Offshore	Oceanic
People	0.00	0.00	20.00	20.00	18.00
Vessels	0.00	0.00	20.00	20.00	18.00
Anchors	0.00	0.00	20.00	14.00	0.00
Moving Gear	0.00	0.00	14.00	14.00	12.00
Installed Infrastructure	0.00	0.00	68.00	68.00	60.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	28.56	31.09	15.43
Overall Horizontal Interaction	15.01				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Comparison scores last updated on: 5/8/2015

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Figure 18 - Sample use comparison report generated by the Ocean Uses Interaction Assessment Tool. This report shows for two uses, the interaction value by zone, the results of their combined functional characteristics of space use, and spatial management considerations regarding each use.

4.2.9. Using the Ocean Use Interaction Assessment Tool

An additional goal in designing the OUIA was to make it adjustable, allowing for modifications to the use profiles and subsequent re-analysis of use relationships. Using adjustable input forms, the user can modify use profile parameter values to account for local variation in ocean use activities (e.g. change the ranking of use components, the frequency of use in specific zones, the ranking of functional characteristics, etc), the look-up table to adjust the numeric values attributed to profile parameters, and to specify particular use combinations or focus use pairs (see Figure 19). The tool includes printable reports for individual use profiles and all pairwise use comparison analysis results, as well as an excel output formatted for use with spatial GIS data (see Figure 18 for sample use comparison report).

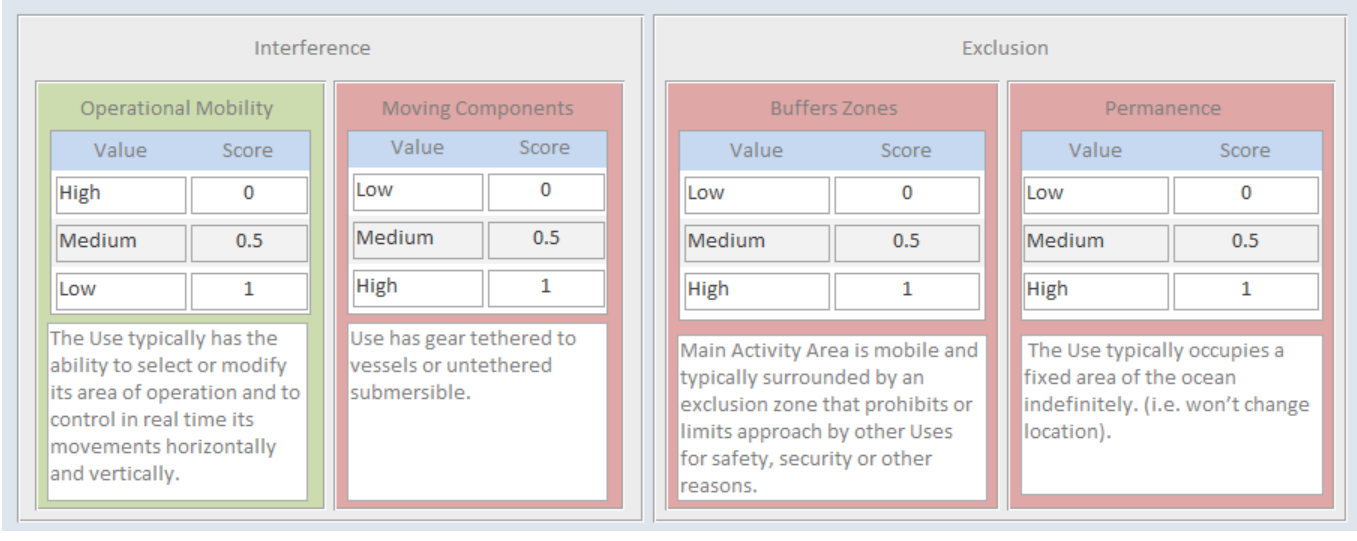


Figure 19 - Ocean Use Interaction Assessment tool lookup tables for functional characteristics of space use.Here a user can adjust the numeric values attributed to the profiles to adjust interaction analyses based on localized data.

This flexibility offers a user the option to either use the existing values and reports as provided in the delivered tool or modify the input variables and rerun the analysis based on other specifications or unique use scenarios.

4.3. Interactions between Renewable Energy and other Uses

The results derived from the OUIA provide valuable insight into three critical dimensions of the challenge of siting Renewable Energy operations amidst other ocean uses:

1. Assessing the potential for interactions and conflict between Renewable Energy and other uses based on their typical spatial footprints in a generalized ocean setting (Section 4.3.1);
2. Incorporating the role of each use's Functional Components in shaping the nature, intensity and consequences of those interactions (Section 4.3.2); and,
3. Considering other operational or management factors that can profoundly influence where, and with what consequences, different ocean uses select, or are permitted to operate in, a typical ocean setting (Section 4.3.3).

Combined, these insights into how, where and why different ocean uses occupy ocean space can be applied to existing spatial data patterns of ocean use in specific geographies.

4.3.1. How the Spatial Footprints of Ocean Uses Affect Interaction and Conflict

4.3.1.1. Overview

Whether two different ocean uses will interact and potentially conflict in any 3-dimensional space depends on: (i) the likelihood that they will co-occur in the same space at the same time; and, (ii) the degree to which their unique combinations of functional components (e.g. people, vessels, anchors, mobile gear, and infrastructure) are typically involved in conducting the use. Built upon the information in the Space Use Profiles, the OUIA tool incorporates both suites of variables into a calculation of the likelihood of interaction between any two ocean uses. Here, we apply that tool to assess and illustrate the interaction potentials between Renewable Energy and each of the 31 other uses considered in the PROUA project.

For each pairing of Renewable Energy *versus* another ocean use, Table 10 provides the calculated Interaction Score across two dimensions of ocean space: (i) Horizontally from the Shoreline Zone to the Offshore Zone; and, (ii) Vertically, from the Air Zone to the Seabed Zone. Average interaction scores for each ocean use are calculated across Horizontal and Vertical Zones and are shown in the first column for each dimension (Horizontal and Vertical). Similarly, average interaction values for each of the three ocean use Sectors (i.e. Extractive, Non-Extractive, Industrial/Military) were calculated and are shown in rows with bold type in the last row in each Sector. Additionally, overall averages were calculated across all Zones (far right column) and across all Uses (bottom row).

The individual values for interaction scores are color-coded using a continuous color ramp from green (lower interaction values) to yellow (medium values) to red (higher values). Values were color-coded separately for the two major dimensions of ocean space (i.e. Horizontal and Vertical), to better illustrate the relative highs and lows of the interaction scores within each Zone. For

example, the maximum interaction score (dark red highlight) for interactions within the Vertical Zone (i.e. at the Sea Surface = 64.0) is roughly double that calculated for interactions within the Horizontal Zones (i.e. Nearshore = 31.4). Both have the same shade of red highlight, reflecting their maximum value within their respective Horizontal and Vertical dimensions. Some relevant emergent patterns in the results are discussed below.

Table 13 - Likelihood of interaction between Renewable Energy and other Ocean Uses within specific horizontal and vertical zones. Illustrating, for pairwise comparisons of Renewable Energy vs. each other use in the PROUA project, the relatively likelihood that the two uses will co-occur and interact in the same 3D ocean space across a generalized ocean setting. Calculated values in each cell are based on the relative likelihood of occurrence and space occupancy by each paired use in each Horizontal and Vertical Zone (see 4.2.5 for details). Average values present an overall picture of interaction for the paired uses across Horizontal and Vertical Zones, or across an Ocean Use Sector within Zones. Values are shown in a continuous Red-Green color ramp to reflect the likelihood of interaction, with Red = Higher, and Green = Lower.

		INTERACTION SCORE BETWEEN RENEWABLE ENERGY AND EACH OCEAN USE												
		INTERACTIONS WITHIN HORIZONTAL ZONES						INTERACTIONS WITHIN VERTICAL ZONES						Avg. by Use + Sector
	OTHER USES COMPARED TO RENEWABLE ENERGY	Average Horiz.	Shoreline	Intertidal	Nearshore	Coastal/ Offshore	Oceanic	Average Vertical	Air	Sea Surface	Water Column	Sea Floor	Seabed	
EXTRACTIVE	Commercial Dive Fishing	11.3	0.0	2.4	26.9	27.2	0.0	29.2	0.0	64.0	40.7	28.1	13.2	20.2
	Commercial Fishing with Benthic Fixed Gear	15.2	0.0	0.0	29.4	31.1	15.4	30.6	8.8	64.0	35.7	28.8	15.7	22.9
	Commercial Fishing with Benthic Mobile Gear	15.0	0.0	0.0	28.6	31.1	15.4	28.0	3.5	64.0	32.9	24.0	15.7	21.5
	Commercial Pelagic Fishing	15.6	0.0	0.0	30.2	31.1	16.5	25.3	14.3	64.0	32.1	9.6	6.6	20.4
	Commercial Intertidal Harvest	4.2	2.1	11.1	7.8	0.0	0.0	16.7	1.0	28.5	2.6	36.7	14.7	10.4
	Recreational Dive Fishing	12.4	0.0	2.2	25.5	24.3	10.1	23.4	0.0	56.0	34.6	21.3	5.0	17.9
	Kayak Fishing	12.9	0.0	4.8	30.2	23.3	6.2	23.8	0.8	64.0	22.2	28.8	3.1	18.3
	Non-Commercial Fishing with Benthic Fixed Gear	14.2	0.0	5.5	26.5	27.7	11.5	22.6	4.1	56.0	23.0	17.6	12.5	18.4
	Non-Commercial Fishing with Benthic Mobile Gear	17.2	0.0	7.2	30.2	32.0	16.5	27.1	5.8	64.0	29.6	23.8	12.3	22.1
	Recreational Fishing from Boats for Pelagic Species	15.7	0.0	0.0	31.1	32.0	15.4	25.3	14.3	64.0	32.1	9.6	6.6	20.5
	Recreational Fishing from Boats for Benthic Species	15.5	0.0	0.0	30.2	32.0	15.4	30.3	7.6	64.0	32.9	31.2	15.7	22.9
	Recreational Fishing From Shore	6.8	9.6	12.8	11.8	0.0	0.0	16.3	3.3	40.3	13.8	24.2	0.0	11.6
	Recreational Intertidal Harvest	3.8	2.1	9.9	6.9	0.0	0.0	16.0	0.0	28.5	0.0	36.7	14.7	9.9
	Extractive Sector Averages	**12.3**	**1.1**	**4.3**	**24.2**	**22.4**	**9.4**	**24.2**	**4.9**	**55.5**	**25.6**	**24.6**	**10.4**	**18.2**
NON-EXTRACTIVE	Beach Use	4.1	8.2	6.1	6.0	0.0	0.0	11.9	4.8	7.8	0.0	31.9	15.0	8.0
	Motorized Boating	14.0	0.0	6.5	27.1	26.6	9.7	23.6	6.6	60.3	18.6	23.8	8.9	18.8
	Paddling	15.7	8.0	10.6	30.0	19.2	10.6	20.5	1.3	60.3	9.6	25.8	5.4	18.1
	Permanent Research Areas	15.5	4.7	8.7	25.3	25.8	12.8	27.0	9.4	48.1	33.2	30.2	14.2	21.2
	Sailing	14.1	3.4	4.3	27.1	26.6	8.9	23.0	6.6	60.3	18.6	20.7	8.9	18.5
	SCUBA/Snorkeling	12.6	0.0	4.1	23.5	24.3	11.0	26.6	6.3	56.0	36.0	26.9	7.7	19.6
	Surface Board Sports	12.5	0.0	10.2	31.4	20.8	0.0	12.0	0.0	50.4	0.0	9.8	0.0	12.3
	Swimming	10.9	6.4	9.6	22.4	12.3	3.6	24.9	3.2	56.0	23.5	36.4	5.4	17.9
	Tide Pooling	2.8	6.0	8.0	0.0	0.0	0.0	10.4	0.0	22.4	0.0	21.0	8.6	6.6
	Wildlife Viewing at Sea	10.8	0.0	0.0	21.7	23.6	8.9	21.0	8.8	60.3	23.6	7.8	4.4	15.9
	Non-Extractive Sector Averages	**11.3**	**3.7**	**6.8**	**21.5**	**17.9**	**6.6**	**20.1**	**4.7**	**48.2**	**16.3**	**23.4**	**7.8**	**15.7**
INDUSTRIAL/MILITARY	Commercial Shipping	12.3	0.0	0.0	18.2	26.7	16.6	23.1	15.4	56.0	25.9	9.8	8.4	17.7
	Cruise Ships	14.6	4.7	3.7	24.5	28.3	11.8	27.3	13.2	62.4	32.1	16.3	12.3	20.9
	Mariculture	10.3	0.0	7.0	21.6	18.7	4.3	28.7	8.7	56.0	36.0	26.5	16.2	19.5
	Marine Debris	9.9	3.5	7.4	20.2	18.3	0.0	17.9	6.7	36.7	22.0	19.5	4.6	13.9
	Mining and Mineral Extraction	17.2	6.6	6.6	31.1	28.8	13.2	34.5	16.3	64.0	35.7	36.0	20.6	25.9
	Ocean Dumping	11.9	0.0	0.0	18.7	27.6	13.3	23.1	5.4	55.1	32.5	16.8	5.5	17.5
	Underwater Pipelines	12.0	4.8	6.4	20.2	19.2	9.6	19.7	3.2	31.4	17.9	28.0	18.0	15.9
	Underwater Transmission Cables	12.4	4.8	6.4	20.2	19.2	11.5	20.9	3.2	31.4	25.9	28.0	16.2	16.7
	Industrial/Military Sector Averages	**12.6**	**3.1**	**4.7**	**21.8**	**23.3**	**10.0**	**24.4**	**9.0**	**49.1**	**28.5**	**22.6**	**12.7**	**18.5**
	Average by Zone	**12.1**	2.4	5.2	22.7	21.2	8.7	**22.9**	5.9	51.5	23.3	23.7	10.2	**17.5**

4.3.1.2. Horizontal and Vertical Patterns of Interaction: Results

Interactions within Different Horizontal Zones

The potential for other ocean uses to interact with Renewable Energy is not the same in all ocean spaces. Clearly, the Nearshore and Coastal Zones are hotspots of potential interactions between

Renewable Energy and other ocean uses as one looks across all uses from the Shoreline to the Offshore Zone. Average interaction scores for these two Horizontal Zones are between 2-3 times those of the Offshore Zone, and up to 9.5 times those calculated for the Shoreline and Intertidal Zones.

Similar Horizontal patterns are seen within the three ocean use Sectors: Extractive, Non-Extractive and Industrial/Military. Interaction scores for the Nearshore and Coastal Zones far exceed those seen in the other Horizontal Zones. Minimal scores for interactions with Renewable Energy were found in the Shoreline Zone, as expected given the limited potential for co-occurrence of components of each use, particularly among Extractive Uses occurring mainly offshore.

These patterns likely reflect the concentration of ocean uses, including Renewable Energy, in the Nearshore and Coastal Zones, as well as the relatively high potential for interaction among their components (e.g. people, vessels, anchors, moving gear, infrastructure) when they co-occur.

Interactions within Different Vertical Zones

As described above for the Horizontal dimension, the likelihood of interaction between Renewable Energy and other ocean uses differed markedly across the five Vertical Zones. Notably, the hotspot of interactions with all ocean uses in the Vertical dimension was clearly at the Sea Surface, with average values of 51.5 being up to 8.7 times those calculated for the other Vertical Zones above and below it. Interaction scores for the Sea Surface were roughly twice those calculated for the Water Column and Seafloor, and approximately five times those at the Seabed. As above, this trend also holds across the three ocean use Sectors. Average interaction scores for all three Sectors were highest at the Sea Surface (55.5), intermediate in the Water Column and Seafloor Zones, and least in the Air and Seabed Zones.

The predominance of the Sea Surface as the locus of interactions between Renewable Energy and other uses likely reflects the overlap of multiple and interacting components (e.g. vessels, infrastructure, anchors, etc.) employed by many potentially co-occurring ocean uses.

4.3.1.3. Patterns of Interaction among Different Ocean Uses and Sectors: Results

Interactions among Sectors

In addition to the geographically-based Horizontal and Vertical comparisons of interaction scores described above, the OUIA tool also provides insight into how individual uses or Sectors interact with Renewable Energy throughout their range. For example, Table 10 illustrates that all three of the ocean use sectors examined in the PROUA project have similar overall interaction scores with Renewable Energy when examined across all Horizontal and Vertical Zones. Average interaction scores across all Zones combined range from a maximum of 18.5 for Industrial/Military to a minimum of 15.7 for Non-Extractive, and largely recreational, uses. This pattern held within Horizontal and Vertical Zones as well, showing similar relative values across the three sectors.

Interactions among Individual Uses

Interestingly, however, there is less uniformity of interaction scores among the individual uses within each Sector. For example, values among uses in the Extractive Sector range from 22.9 for Commercial Benthic Fishing with Fixed Gear to 9.9 for Recreational Intertidal Harvest. Similar variability is seen among Non-Extractive Uses. In contrast, interaction scores for Industrial/Military Uses have the greatest uniformity within the Sector, likely reflecting their uses of vessels and installed infrastructure, both of which may contribute heavily to interaction potentials. These results suggest that, the unique space use characteristics of each ocean use play an important role in its likelihood of interaction and conflict.

4.3.1.4. Perspective

Overall, the results in Table 10 illustrate that within broad patterns of interaction scores among Horizontal and Vertical Zones and Ocean Use Sectors, there are certain individual uses whose unique functional characteristics and patterns of space occupancy may tend to increase the likelihood for interaction and conflict with Renewable Energy. Chief among these are vessel-based activities, benthic fishing, and permanent installations of fixed infrastructure. The OUIA tool provides a flexible approach to identifying those relationships and to exploring alternate ocean management strategies to avoid or reduce the potential for conflict among co-occurring uses.

4.3.2. How Functional Characteristics of Ocean Uses Shape Interactions and Conflicts

4.3.2.1. Overview

When two different ocean uses co-occur in the same Horizontal Zone at the same time (i.e. Shoreline, Intertidal, Nearshore, Coastal, or Offshore), they may interact in some way. The nature of that interaction, and its consequences for one or both uses, depends partly on which Components of the use(s) (e.g. People, Vessels, Anchors, Mobile Gear, Infrastructure) are being

employed and occupying ocean space in the local Vertical dimension (i.e. Air, Sea Surface, Water Column, Sea Floor, Seabed).

In addition, their interaction is often driven and shaped by another set of intrinsic factors: how each ocean use functions operationally in the water while being conducted, and the degree to which the uses' operating areas are actively selected and managed. To fully understand the nature of interaction, conflict and compatibility among ocean uses, the PROUA project considered four fundamental Functional Characteristics of Space Use. The combination of these characteristics can influence whether and how co-occurring uses may conflict or co-exist.

- Operational Mobility – the degree to which the use typically can select or modify, in advance or in real time, its area of operation and thus control its movements and location (both Horizontally and Vertically) in response to the surrounding environment, including the presence of other uses or their components. The lack of Operational Mobility may lead to Interference Conflict with other uses.

- Moving Gear – the degree to which the use typically involves non-human components (e.g. fishing nets) that are lowered, raised, dragged or propelled in the air, at the Sea Surface, through the Water Column, along the Seafloor, and/or through the Seabed with little or no real-time ability to either sense or respond to the immediate operating environment, including the presence of other uses or their components. The presence of Moving Gear may lead to Interference Conflict.

- Permanence of Space Occupancy – the degree to which the use typically occupies a fixed area of ocean indefinitely (e.g. Renewable Energy wind turbine pylons and transmission cables, oil pipelines). Permanence can lead to Exclusion Conflict with other place-based uses.

- Buffer Zones – the degree to which the use's Core Activity Area is typically surrounded by an official, governmentally established buffer or exclusion zone that prohibits or limits approach by other uses for safety, security or other reasons (e.g. energy facility safety zone or military security exclusion zone). Buffer Zones can lead to Exclusion Conflict with other place-based uses.

4.3.2.2. Differences in Functional Characteristics among Ocean Uses: Results

Table 11 summarizes, for each of the 32 ocean uses examined by the PROUA project, how these four Functional Characteristics apply to the use as it is typically conducted. Derived from the Space Use Profiles, the values in the table's cells reflect the likelihood that the characteristic applies to the use as it is normally conducted. Values are expressed as High, Medium or Low likelihood. Each cell is further color-coded to indicate the relative degree to which that Functional Characteristic, if applicable, may contribute to the likelihood of interactions and conflicts with

other co-occurring uses. In Table 11, Green = lower conflict potential; Yellow = medium conflict potential, and Red = higher conflict potential. Note that in Table 11 only, for the characteristic "Operational Mobility", the directional relationship between "applicability" of the characteristic (H,M,L in text) and "conflict potential" (H,M,L in color) is the inverse of the other three characteristics, reflecting the ability of operationally mobile uses to avoid conflicts with other activities or structures (e.g. High Operational Mobility = Lower Conflict potential = Green shading). For the other three Functional Characteristics, High = Red, Medium = Yellow, and Low = Green in all Tables.

Table 14 - Functional characteristics of space use. Illustrating, for each ocean use in the PROUA study, the relative degree to which four Functional Characteristics of Space Use describe how that use operates above, on, in and below the water in a typical ocean setting. Discussed in 4.1.3.5, these four characteristics -- Operational Mobility, Moving gear, Permanence of Space Occupation, and Buffer Zones - can profoundly affect how any use occupies 3-D ocean space, and thus whether and how it may interact with other co-occurring uses. Values in each cell (H,M,L) reflect the likelihood that a use has the Functional Characteristic (columns), and are derived from each use's Space Use Profile (see 4.1.4 for details). Values are then color-coded to indicate their potential to contribute to interactions and conflict among co-occurring uses, including Interference or Exclusion conflict. Color codes: Red = High, Yellow = Medium, and Green = Low, potential for interaction or conflict as a result of the Functional Characteristic.

		Functional Characteristics of Space Use			
	Ocean Uses	**Operational Mobility**	**Moving Gear**	**Permanence**	**Buffer Zones**
Extractive	Commercial Dive Fishing	Medium	Medium	Low	Low
	Commercial Fishing with Benthic Fixed Gear	Medium	Medium	Medium	Medium
	Commercial Fishing with Benthic Mobile Gear	Medium	High	Low	Medium
	Commercial Pelagic Fishing	Medium	High	Low	Medium
	Commercial Intertidal Harvest	Medium	Low	Low	Low
	Recreational Dive Fishing	Medium	Medium	Low	Low
	Kayak Fishing	Medium	High	Low	Low
	Non-Commercial Fishing with Benthic Fixed Gear	Medium	Medium	Medium	Medium
	Non-Commercial Fishing with Benthic Mobile Gear	Medium	High	Low	Medium
	Recreational Fishing from Boats for Pelagic Species	Medium	High	Low	Medium
	Recreational Fishing from Boats for Benthic Species	Medium	High	Low	Medium
	Recreational Fishing From Shore	Medium	High	Low	Low
	Recreational Intertidal Harvest	Medium	Medium	Low	Low
Non-Extractive	Beach Use	High	Medium	Low	Low
	Motorized Boating	High	Medium	Low	Low
	Paddling	High	Low	Low	Low
	Permanent Research Areas	Low	Medium	Medium	Medium
	Sailing	High	Low	Low	Medium
	SCUBA/Snorkeling	Medium	Medium	Low	Low
	Surface Board Sports	Medium	Medium	Low	Low
	Swimming	Medium	Low	Low	Low
	Tide Pooling	High	Low	Low	Low
	Wildlife Viewing at Sea	High	Low	Low	Medium
Industrial / Military	Commercial Shipping	Medium	Low	Low	Medium
	Cruise Ships	Low	Medium	Low	High
	Mariculture	Low	Medium	Medium	Medium
	Marine Debris	Medium	Medium	Low	Low
	Mining and Mineral Extraction	Low	High	Low	Medium
	Ocean Dumping	Low	Medium	High	High
	Renewable Energy	Medium	Low	High	High
	Underwater Pipelines	Low	Low	High	High
	Underwater Transmission Cables	Low	Low	High	High

Operational Mobility

The ability to select and/or change operating locations in real-time is critical to avoiding interaction and conflict with other uses. Table 11 illustrates the range of Operational Mobility among different uses and Sectors. Interestingly, most (19) of the uses studies are characterized by Medium mobility. This middle ranking stems from the fact that many of these uses involve vessels or other relatively mobile activities that, while inherently mobile, become less flexible and maneuverable once their Components (e.g. mobile gear, people, anchors) are in the water as part of the use. Seven of the studied ocean uses had Low Operational Mobility, often due to their involving either permanent installations, or large vessels with limited maneuverability and fixed traffic lanes and destinations. Six ocean uses had High Operational Mobility, and thus relatively Low interaction potential, due to their ability to select sites or change course readily in response to local conditions.

In general, Extractive Uses had universal (100%) Medium Operational Mobility, while 66% of Industrial/Military Uses shared that score. All (100%) of the uses with High Operational Mobility were part of the Non-Extractive Sector. These uses often involve highly maneuverable vessels, individual land-based activities, and/or a lack of submerged Components in the water which may constrain maneuverability in real-time (e.g. fishing gear). These differences among Sectors may influence their interactions with other uses and Sectors.

Moving Gear

Ocean uses that routinely employ Moving Gear in the air and/or water create the potential for encounters, interactions and conflicts with other uses operating in the same space at the same time. Examples of uses with a Higher likelihood of using Moving Gear include various fishing methods that involve pulling mobile fishing gear behind vessels (Table 11). Fishing with benthic fixed gear (i.e. not pulled horizontally through the water) poses somewhat lower (i.e. Medium), but still real, risks of interaction and conflict because the bottom-tending gear traverses a more limited geographical area while being deployed and retrieved and while actively fishing. Activities with a Lower likelihood of using Moving Gear include many individually-based recreational activities like Swimming or Tide Pooling in which the Person is the primary Component, or fixed, installed Infrastructure with few or no moving Components.

Moving Gear, and the attendant potential for interaction and conflict, is markedly more common among Extractive Uses. Among that Sector's 13 ocean uses, 7 (54%) scored High and 5 (38%) scored Medium, comprising 92% of all uses with High-Medium likelihood of Moving Gear. Only 1 ocean use (7%), Commercial Intertidal Harvest, scored Low due to its essentially land-based focus. Interestingly, the Non-Extractive and Industrial/Military Sectors show similar degrees of reliance on Moving Gear, presumably due to their relatively static nature (e.g. infrastructure) or their highly mobile operations (e.g. shipping). For Non-Extractive Uses, the percentages of High, Medium and Low likelihood scores were: 0%, 50% and 50%, respectively. For Industrial/Military Sector, the same sequence is: 11%, 44% and 44%, respectively.

These patterns reveal interesting and important differences in how different uses and Sectors may interact on or in the water. Moreover, they shed light on the potentially profound importance of Moving Gear – the often invisible components of ocean use – in determining the likelihood that two uses may interact and conflict.

Permanence

Permanent, fixed occupation of ocean space can result in direct interactions and conflict by Exclusion of other uses seeking to operate in the same area at the same time. While the details and consequences of these interactions will likely vary among specific use pairs, the general outcome is that one use excludes or significantly constrains the access and operations of the other.

Table 11 highlights some important patterns in this relationship. First, 28 out of the 32 (89%) ocean uses studied are characterized by Low likelihoods of permanently occupying ocean space. In contrast, only 4 (13%) have High likelihood of Permanence. These include the fixed installations or sites for ocean dumping, renewable energy, underwater pipelines and transmission cables, all of which are in the Industrial/Military Sector. The 4 uses having a Medium score for Permanence tend to be mobile and/or to occupy an area for a given time and then either terminate or change location to another operating area (e.g. benthic fishing with fixed gear). These patterns suggest that relatively few uses, and only one sector, require permanent and potentially sole access to a given operating area in a general ocean setting.

Buffer Zones

Like Permanence, the use of officially established Buffer Zones for safety or security purposes can create conflicts through exclusion of other uses in the same operating area. In effect, Buffer Zones extend the diameter of the use's Core Activity Area, often preventing access by others to those waters and its resources and services.

As seen above with Permanent space occupancy, relatively few (5 of 32, or 16%) of the ocean uses studied have a High likelihood of routinely using Buffer Zones. All members of the Industrial/Military Sector, they include: cruise ships; ocean dumping; renewable energy; underwater pipelines; and, underwater transmission cables. Thirteen uses (41%) have a Low likelihood of employing Buffer Zones, while an equal number (13, or 41%) have Medium scores for Buffer Zones. Ocean uses with Medium values for Buffer Zones span the Extractive and Non-Extractive Sectors, and most are vessel-based uses such as fishing or recreational boating where safety zones may apply during certain times or situations.

Understanding these patterns – which ocean uses may employ Buffer Zones vs. those that tend to have more circumscribed operating areas – will be crucial to allocating key ocean uses to appropriate ocean spaces.

4.3.3. Influence of Functional Characteristics on Interactions and Conflict with Renewable Energy

4.3.3.1. Overview

Clearly, many of the 32 ocean uses examined in the PROUA project have very different Functional Characteristics (Table 11, and Space Use Profiles). These fundamental functional differences among uses can be expected to be reflected in how they occupy ocean space, and in turn, interact and conflict with other co-occurring uses. Table 12 builds upon the understanding of Functional Characteristics for each ocean use (Table 11) to examine how these features may affect interactions between pairs of different ocean uses, with particular reference to Renewable Energy.

To that end, the rows in Table 12 depict, for the pairing of that use with Renewable Energy, the calculated likelihood of interaction and conflict generated by each of their four Functional Characteristics. As described more fully in the Table legend, cell values range from Low, to Low-Medium, to Medium, to Medium-High, to High, and are color-coded to indicate their relative likelihood of that pairing generating interaction and conflict between the two uses. The four Functional Characteristics are often associated with two different types of conflict: (i) Interference results from the Lack of Operational Mobility and/or Moving Gear; and (ii) Exclusion results from Permanence and/or Buffer Zones.

For example, a relative Lack of Operational Mobility in one or both uses may increase the potential for Interference Conflict by impeding their ability to actively avoid interactions. Similarly, uses having Moving Components may be more likely to be involved in direct physical interactions with Renewable Energy facilities, which may also lead to Interference Conflict. In contrast, both Permanence of space occupancy and the use of Buffer Zones tend to increase the likelihood of Exclusion Conflict with Renewable Energy, which has high values of both Functional Characteristics.

Table 15 - Functional Characteristics Contributing to Interactions and Conflicts with Renewable Energy, Illustrating, for pairwise comparisons of Renewable Energy vs. each other use in the PROUA project, the degree to which both use's Functional Characteristics may contribute to the potential for use-to-use interaction and conflict through either Interference (left columns) or Exclusion (right columns) (see Profiles Section 4.1.3.5 for details). Color-coded values in each cell for any given use (row) represent a calculated ranking (H, M-H, M, M-L, L; red to green color ramp) of the likelihood that the use will interact and conflict with Renewable Energy due to the Functional Characteristic listed in each column. Rankings for each Functional Characteristic (cells) are calculated from values derived from two uses' Space Use Profiles and the Use Comparison Reports (see Section 4.2.8 for details). The characteristic "Operational Mobility" is depicted here as its inverse, "Lack of Operational Mobility" in order to maintain a consistent color-coding scheme as it relates to the potential for Interference Conflict. For example, a relative Lack of Operational Mobility in one or both uses may increase the potential for Interference Conflict by impeding their ability to actively avoid interactions. In contrast, uses having Moving gear may be more likely to be involved in direct physical interactions with Renewable Energy facilities, which may lead to Interference Conflict. Similarly, both Permanence of space occupancy and the use of Buffer Zones tends to increase the likelihood of Exclusion Conflict with Renewable Energy, which has high values of both Functional Characteristics.

		Functional Characteristics Contributing to Interactions and Conflict			
		Interference Conflict		Exclusion Conflict	
	Renewable Energy Interacting with:	Lack of Operational Mobility	Moving Gear	Permanence	Buffer Zones
Extractive	Commercial Dive Fishing	Medium-High	Low-Medium	Medium	Medium
	Commercial Fishing with Benthic Fixed Gear	Medium-High	Low-Medium	Medium-High	Medium-High
	Commercial Fishing with Benthic Mobile Gear	Medium-High	Medium	Medium	Medium-High
	Commercial Pelagic Fishing	Medium-High	Medium	Medium	Medium-High
	Commercial Intertidal Harvest	Medium-High	Low	Medium	Medium
	Recreational Dive Fishing	Medium-High	Medium	Medium	Medium
	Kayak Fishing	Medium-High	Low-Medium	Medium-High	Medium-High
	Non-Commercial Fishing with Benthic Fixed Gear	Medium-High	Medium	Medium	Medium-High
	Non-Commercial Fishing with Benthic Mobile Gear	Medium-High	Low-Medium	Medium	Medium
	Recreational Fishing from Boats for Pelagic Species	Medium-High	Medium	Medium	Medium-High
	Recreational Fishing from Boats for Benthic Species	Medium-High	Medium	Medium	Medium-High
	Recreational Fishing From Shore	Medium-High	Medium	Medium	Medium
	Recreational Intertidal Harvest	Medium-High	Low-Medium	Medium	Medium
Non-Extractive	Beach Use	Medium	Low-Medium	Medium	Medium
	Motorized Boating	Medium	Low-Medium	Medium	Medium
	Paddling	Medium	Low	Medium	Medium
	Permanent Research Areas	High	Low-Medium	Medium-High	Medium-High
	Sailing	Medium	Low	Medium	Medium-High
	SCUBA/Snorkeling	Medium-High	Low-Medium	Medium	Medium
	Surface Board Sports	Medium-High	Low-Medium	Medium	Medium
	Swimming	Medium-High	Low	Medium	Medium
	Tide Pooling	Medium	Low	Medium	Medium
	Wildlife Viewing at Sea	Medium	Low	Medium	Medium-High
Industrial / Military	Commercial Shipping	Medium-High	Low	Medium	Medium-High
	Cruise Ships	High	Low-Medium	Medium	High
	Mariculture	High	Low-Medium	Medium-High	Medium-High
	Marine Debris	Medium-High	Low-Medium	Medium	Medium
	Mining and Mineral Extraction	High	Medium	Medium	Medium-High
	Ocean Dumping	High	Low-Medium	High	High
	Underwater Pipelines	High	Low	High	High
	Underwater Transmission Cables	High	Low	High	High

4.3.3.2. Functional Characteristics: Results

Lack of Operational Mobility

Interestingly, all (100%) of the 31 pairings of Renewable Energy against other ocean uses scored between Medium and High likelihood of interaction based on their combined lack of Operational Mobility. Clearly, as installed infrastructure, energy facilities always have the lowest score for Operational Mobility, thus skewing the results compared to less extreme pairings. As a result, all (100%) of the pairings between Renewable Energy and ocean uses in the Extractive Sector scored between Medium-High for interaction potential, probably because both uses have limited Operational Mobility. Three Non-Extractive uses and two Industrial/Military uses also scored Medium-High. Importantly, ocean uses with the lowest interaction/conflict scores (i.e. Medium) with Renewable Energy were all from the Non-Extractive Sector and were all recreational activities with moderate ability to select or move within and among operating areas.

Moving Gear

Uses with relatively high likelihoods of employing Moving Gear in the water demonstrated an interesting and potentially important pattern of interaction with Renewable Energy. Lowest scores for interaction/conflict were seen within the Non-Extractive Sector, where the recreational uses tend not to deploy moving gear into the air or water (50% Low, 50% Low-Medium), Similarly, Industrial/Military Sector scores were also relatively low (25% Low, 50% Low-Medium, and 12.5% Medium). Extractive Sector uses, especially fishing with mobile and fixed gear, exhibited the highest scores for the potential to interact and conflict with Renewable Energy, probably due to their extensive use of mobile gear lowered, pulled and raised through the Water Column, or dragged along the Sea Floor and Seabed, in ocean spaces where key Components of Renewable Energy facilities are typically located.

Permanence

Permanent occupancy of ocean space, always a characteristic of Renewable Energy, was a major contributor to relatively high interaction and conflict scores across all ocean uses and Sectors. Of the 31 pairings with Renewable Energy, 55% scored either High or Medium-High for the potential to interact and conflict due to the permanence of one or both uses. The remainder, 45%, had an average interaction/conflict score of Medium. Highest potentials for conflict with Renewable Energy were seen, as expected, among uses with relatively fixed locations and siting requirements: ocean dumping, underwater pipelines, and underwater transmission cables. Lowest scores (all Medium) were seen among uses that tend to be relatively mobile, transitory and flexible in their choice of operating areas, like many recreational activities.

Buffer Zones

The possibility for ocean uses to involve Buffer Zones was a significant contributor to the potential for interaction and conflict between Renewable Energy and other uses. Overall, this Functional Characteristic had the second largest impact on interaction/conflict scores, showing a similar pattern to that seen for the Lack of Operational Mobility. For Buffer Zones, the highest interaction/conflict scores for pairings with Renewable Energy were seen in the Industrial/Military Sector, with 4 of the 8 uses (50%) scoring High, 3 (38%) scoring Medium-High, and 1 (13%) scoring Medium. Within the Extractive Sector, 7 of 13 uses (54%) scored Medium-High, while 6 of 13 (46%) scored Medium. Interestingly, there were no Low or Low-Medium scores for Buffer Zones affecting interaction and conflict in pairings with Renewable Energy and any other use.

4.3.3.3. Perspective

The 32 ocean uses examined in the PROUA project have very different profiles for how they occupy and operate within ocean space. A major determinant of that profile and of their interactions and conflicts with other ocean uses are the four Functional Characteristics of space use (Table 11). When the Functional Characteristics of two co-occurring uses are taken into account (Table 12), the results shed light on how Renewable Energy may interact and potentially conflict with other use seeking to operate in the same ocean space.

4.3.4. How the Nature of Ocean Uses Can Influence Siting Options and Conflict Avoidance

4.3.4.1. Overview

Every ocean use has a unique spatial footprint and set of Functional Characteristics that determine how it occupies ocean space, and in turn, whether it may interact and conflict with other uses seeking to share the same operating area (Table 11- 12). In addition to the factors considered above, each of those ocean uses also has two inherent features that shape its range of options for viable operating areas with minimal risk of conflicts with other uses.

4.3.4.2. Site Dependence: Results

Site Dependence in any given ocean use is "the degree to which the successful pursuit of the use requires access to specific ocean areas that possess certain essential and unevenly distributed resources, ecosystem features, or environmental conditions that are integral to the use". Familiar examples of Site Dependent uses are oil platforms sited near oil deposits, wind turbines sited in areas of reliable wind, surf spots sited at consistent surf breaks, and fishing areas sited where the target species are reliably abundant.

Table 13 illustrates the degree to which each of the PROUA project's 32 ocean uses are considered to be Site Dependent. Derived from the Space Use Profiles, the values in each cell show that use's

score for the likelihood of Site Dependence on a relative scale from High to Medium to Low. In this analysis, there were no low scores assigned to any ocean use, because all had some requirement for specific environmental or operating conditions. Color-coding of the cell values indicates the contribution of that use's Site Dependence to potential conflict with other uses. Ocean uses with High/Red scores are likely to strongly require specific, and known, operating areas for their successful pursuit (e.g. mining and mineral extraction). Those with Medium/Yellow scores have somewhat more flexibility in selecting an operating area (e.g. motorized boating) but still have some significant operating constraints, often related to safety. When two different uses have similar requirements for where they operate, they may interact and conflict.

Clearly, all 32 ocean uses have relatively high levels of Site Dependence. Only 10 (31%) have scores of Medium, while 22 (69%) have High scores for potential interaction and conflict due to their Site Dependence. All (100%) of the Extractive Uses are heavily Site Dependent due to their need to harvest specific natural resources that are often discontinuously distributed spatially in the ocean. Similarly, most (67%) of Industrial/Military uses have high Site Dependence as well, largely due to permitting and/or operational requirements, especially those that involve extraction of patchily distributed natural resources such as energy. The prevalence of relatively high Site Dependence among a wide variety of ocean uses and Sectors has important implications for the space allocation and siting options available to future ocean planning and management endeavors.

Table 16 - Site Dependence Among Ocean Uses: Implications for Interaction and Conflict, Illustrating the degree to which the successful pursuit of each use (rows) requires, or is influenced by, the presence of specific environmental or ecosystem features in its operating area (e.g. consistent wind energy near wind farms; predictably abundant fish in allocated fishing grounds). Ocean uses with High Site Dependence, shown in Red, require specific operating areas to be fully successful and thus may provide few siting options for spatial planners. Those ocean uses with Medium Site Dependence, shown in Yellow, are typically activities for which the successful pursuit is a continuous function of the local conditions. For these uses (e.g. swimming), some sites may be preferable but alternate operating areas may suffice. Renewable Energy is highlighted in grey in the Industrial/Military Sector.

	Ocean Use	Potential for Site Dependence	Site Dependence Considerations
Extractive	Commercial Dive Fishing	High	Successful dive fishing requires certain environmental conditions, including safe sea states, abundant prey and low crowding.
	Commercial Fishing with Benthic Fixed Gear	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).
	Commercial Fishing with Benthic Mobile Gear	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).
	Commercial Pelagic Fishing	High	Successful Pelagic Fishing depends upon the presence of target species, and safe operating conditions.
	Commercial Intertidal Harvest	High	Successful harvest depends upon adequate population numbers of target species, and safe operating conditions and access.
	Recreational Dive Fishing	High	Successful dive fishing requires certain environmental conditions, including safe sea states, abundant prey and low crowding.
	Kayak Fishing	High	Successful Kayak Fishing depends upon the presence of target species, and safe operating conditions.
	Non-Commercial Fishing with Benthic Fixed Gear	High	Successful benthic fishing with fixed gear requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).
	Non-Commercial Fishing with Benthic Mobile Gear	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).
	Recreational Fishing from Boats for Pelagic Species	High	Successful Pelagic Fishing depends upon the presence of target species, and safe operating conditions.
	Recreational Fishing from Boats for Benthic Species	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).
	Recreational Fishing From Shore	High	Successful fishing depends upon the presence of the target species and favorable operating conditions such as waves, beach access, low crowding, and good weather.
	Recreational Intertidal Harvest	High	Successful harvest depends upon access to sites with adequate population numbers of target species and safe harvesting conditions.
Non-Extractive	Beach Use	Medium	Successful Beach Use is influenced by many place-based factors but can often be pursued in a variety of settings.
	Motorized Boating	Medium	Successful and safe Motorized Boating requires certain environmental conditions, including levels of crowding by other uses.
	Paddling	Medium	Safe/enjoyable paddling requires a certain range of sea state and environmental conditions, including levels of crowding by other users.
	Permanent Research Areas	High	Permanent study areas are typically selected for their unique characteristics, and returning to the same reference area is often critical to the success of permanent research and monitoring stations.
	Sailing	Medium	Successful and safe sailing benefits from areas with predictably steady wind, calm seas and uncrowded conditions, but it can be conducted under a wide range of conditions.
	SCUBA/Snorkeling	Medium	Successful diving and snorkeling can be done in a fairly wide range of safe and optimal environmental conditions, including safe sea states, clean water, healthy ecosystems, and low crowding by other uses.
	Surface Board Sports	High	Successful areas for this use are defined by specific and relatively rare environmental conditions such as consistently well-shaped and large waves, consistent winds, adequate water depths, low crowding, etc.
	Swimming	Medium	Although successful and safe swimming requires certain broad environmental conditions, it can often be conducted in a variety of situations.
	Tide Pooling	High	Successful tidepooling is heavily dependent upon access to diverse and healthy intertidal habitats with safe environmental conditions, which often vary spatially within any given ocean
	Wildlife Viewing at Sea	Medium	While successful viewing requires the vessel being where the wildlife is, those locations change dynamically and often unpredictbly as animals move from place to place. Consequently, the overall dependence of Wildlife Viewing from Vessels on specific sites is Medium for the whole Use, but High during any given outing depending on the target animals' distribution and abundance in real time.
Industrial/Military	Commercial Shipping	Medium	Shipping often follows established vessel traffic lanes for safety and efficiency, especially near land, as well as reasonable weather and sea states along its planned routes.
	Cruise Ships	High	Transit depends on established vessel traffic lanes for safety and efficiency, and on reliable access to specific destinations (e.g. mooring, anchoring, docking).
	Mariculture	Medium	Successful mariculture requires certain environmental conditions (e.g. depth, water quality, water movement) that often vary spatially.
	Marine Debris	Medium	This Use is targetd to areas that are considered likely to have marine debris by virtue of their location, exposure, topography, oceanography, etc.
	Mining and Mineral Extraction	High	The successful use requires proper environmental conditions (e.g. extracted resource) and governmental approvals.
	Ocean Dumping	High	Dumping is often only allowed in delineated areas with specific environmental features (e.g. substrate, currents), and the use depends on access to those sites.
	Renewable Energy (reference value for comparisons to other uses)	**High**	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.
	Underwater Pipelines	High	Pipeline routes require the correct geological and ecological conditions which tend to vary spatially.
	Underwater Transmission Cables	High	Cable routes require access to the correct geological, oceanographic and ecological conditions, all of which tend to vary spatially.

4.3.4.3. Spatial Management: Results

Different ocean uses often vary widely in their ability to independently select where they will operate in an ocean setting. Some uses are heavily managed while others tend to be left to the discretion of the individual user. In this context, Spatial Management refers to "the degree to which the use's operating area is typically influenced by a government agency or planning entity that determines where, how and when it may operate with a broader ocean setting." Familiar examples of uses that are managed spatially include offshore discharge pipes, fishery trawling zones, shipping lanes, and aquaculture operations. Unregulated uses may include paddling, sailing, SCUBA/Snorkeling: all typically recreational activities conducted independently by individuals. In some contexts, it may be possible to avoid or minimize interaction and conflict among co-occurring uses by allocating separate operating areas to incompatible uses.

Table 14 illustrates the relative degrees of Spatial Management that typically apply to each of the ocean uses in the PROUA project. Each use is scored as either High, Medium or Low applicability for spatial management. Cells are further color-coded to the likely impact of that use's degree of Spatial Management on avoiding or minimizing interactions and conflicts with other ocean uses, including Renewable Energy (e.g. High degree of spatial management/Green = higher ability to avoid conflict; Medium Spatial Management/Yellow = moderate ability to avoid conflict; Low Spatial Management/Red = lower ability to avoid conflict).

In contrast to the patterns seen for some other aspects of ocean uses, it is the ocean uses in the heavily regulated Industrial/Military Sector that show the greatest potential for avoiding future conflicts with other uses through spatial management of their allocated operating areas. Seven of that Sector's 9 uses (78%) have High levels of Spatial Management, and thus, of potential conflict avoidance. One, Commercial Shipping, has a Medium score for Spatial Management. Although shipping routes are relatively flexible and variable in the Oceanic Zone, traffic lanes tend to be more regulated and constrained closer to shore where the bulk of the other ocean uses occur. All 13 (100%) of Extractive Uses have Medium levels of Spatial Management, reflecting the variety and complexity of their management regimes, which are often very context dependent and variable over time and space. Importantly, Non-Extractive uses, which are largely pursued for recreational purposes, tend to have lower levels of Spatial Management and therefore are often not constrained in their choice of operating areas. This degree of independence may lead to a greater likelihood of co-occurrence, interaction and potential conflict with other uses sharing the same ocean spaces. Understanding the nature and origin of these differences in the ability for spatial management to minimize conflict among the key ocean use Sectors may provide insights into practical and equitable solutions for all ocean users.

Table 17 - Spatial Management for Ocean Uses: Implications for Interaction and Conflict, Illustrating the degree to which existing spatial management authorities and tools are typically used in a general ocean setting to allocate ocean uses to specific operating areas in order to influence whether, where and/or how they co-occur, interact or conflict. Rankings (H, M, L) for each ocean use indicate the relative likelihood that spatial management might provide ways to allocate a specific operating area to that use. Values are derived from the Space Use Profiles (see Section 4.1.4). Color codes indicate the potential relative utility of existing spatial management tools to allocate the use in ways that may avoid or reduce conflict with other uses (Red = Low, Yellow = Medium, Green = High). Renewable Energy is highlighted in grey in the Industrial/Military Sector.

	Ocean Use	Potential for Spatial Mgmnt	Spatial Management Considerations
Extractive	Commercial Dive Fishing	Medium	Dive fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
	Commercial Fishing with Benthic Fixed Gear	Medium	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
	Commercial Fishing with Benthic Mobile Gear	Medium	Benthic fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
	Commercial Pelagic Fishing	Medium	Pelagic fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
	Commercial Intertidal Harvest	Medium	Intertidal commercial harvesting is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
	Recreational Dive Fishing	Medium	Dive fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
	Kayak Fishing	Medium	Kayak fishing is not typically managed spatially other than in local MPAs or through broader-scale fisheries management measures.
	Non-Commercial Fishing with Benthic Fixed Gear	Medium	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
	Non-Commercial Fishing with Benthic Mobile Gear	Medium	Benthic mobile fishing is Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
	Recreational Fishing from Boats for Pelagic Species	Medium	Pelagic fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
	Recreational Fishing from Boats for Benthic Species	Medium	Benthic sport fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
	Recreational Fishing From Shore	Medium	Fishing from shore is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
	Recreational Intertidal Harvest	Medium	Intertidal harvesting is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Non-Extractive	Beach Use	Medium	Beach access is sometimes controlled directly or influenced indirectly by the presence of relevant infrastructure (e.g. parking, restrooms, etc.).
	Motorized Boating	Low	Motorized Boating is sometimes but relatively rarely zoned as part of spatial management schemes, particulalry in zoned MPAs.
	Paddling	Low	Paddling is not typically managed spatially except w/ relatively rare zoning schemes such as MPAs and other forms of spatial management.
	Permanent Research Areas	Medium	Permanent study areas are occasionally delineated in spatial management schemes.
	Sailing	Low	Sailing is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
	SCUBA/Snorkeling	Low	Diving and snorkeling is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
	Surface Board Sports	Medium	Surface board sports are sometimes managed spatially or temporally w/in a given space to avoid conflicts (e.g. Hawaii).
	Swimming	Medium	Swimming is sometimes concentrated in designated zones for safety, access, surveillance, etc.
	Tide Pooling	Medium	Access to and use of tidepools are sometimes managed locally through MPAs or other spatial management schemes.
	Wildlife Viewing at Sea	Low	Wildlife Viewing may occasionally be allocated to specific zones in MPAs or other spatial management schemes.
Industrial / Military	Commercial Shipping	Medium	Outside of established shipping lanes near land, vessel traffic is not highly controlled on a local scale.
	Cruise Ships	High	Cruise ship transit lanes and destinations are often managed spatially by various federal, state and local authorities.
	Mariculture	High	Mariculture operations are typically allocated to specific areas by permitting agencies.
	Marine Debris	Low	This Use is not likely to be managed spatially.
	Mining and Mineral Extraction	High	Both dredging/mining and renourishment are heavily regulated at multiple governmental levels.
	Ocean Dumping	High	Approved dump sites are determined and regulated by governmental agencies.
	Renewable Energy (reference value for comparisons to other uses)	***High***	*Renewable Energy is heavily regulated and operating areas are determined by government agencies.*
	Underwater Pipelines	High	Pipelines are typically sited through governmental management and regulatory process.
	Underwater Transmission Cables	High	Cables are typically sited through governmental management and regulatory process.

4.3.4.4. Perspective

Clearly, the 32 different ocean uses examined in the PROUA project function very differently in the water (Table 10 - 12). These functional differences, reflected in the Space Use Profile of each use, can affect where and how uses occupy ocean space, and, in turn, whether and how they may interact and conflict with other uses. In addition to these inherent functional differences, ocean uses can also vary widely and in important ways in their degrees of Site Dependence and Spatial Management, both of which may greatly influence their selection or allocation of operating areas (Table 13-14). Table 15 illustrates, for each ocean use, the combination of their Site Dependence and Spatial Management, allowing an integrated assessment of the opportunities and challenges related to allocating operating areas that avoid or minimize interaction and conflict. These inherent characteristics of all uses may profoundly influence the range of siting options available to ocean planners and managers for certain key ocean uses, including Renewable Energy. For that reason, it is critical to understand and take them into account in any ocean planning endeavor.

Table 18 - Planning Considerations for Minimizing Conflicts with Renewable Energy, Illustrating, for each ocean use examined in the PROUA project, how their levels of Site Dependence and Spatial Management may influence the potential for spatial planning options. Comparing values for two or more uses provides insight into the challenges and opportunities facing ocean managers seeking to allocate co-occurring uses to avoid or minimize conflict. Renewable Energy is highlighted in grey in the Industrial/Military Sector.

		Spatial Planning Considerations	
	Ocean Uses	**Site Dependence**	**Spatial Management**
Extractive	Commercial Dive Fishing	High	Medium
	Commercial Fishing with Benthic Fixed Gear	High	Medium
	Commercial Fishing with Benthic Mobile Gear	High	Medium
	Commercial Pelagic Fishing	High	Medium
	Commercial Intertidal Harvest	High	Medium
	Recreational Dive Fishing	High	Medium
	Kayak Fishing	High	Medium
	Non-Commercial Fishing with Benthic Fixed Gear	High	Medium
	Non-Commercial Fishing with Benthic Mobile Gear	High	Medium
	Recreational Fishing from Boats for Pelagic Species	High	Medium
	Recreational Fishing from Boats for Benthic Species	High	Medium
	Recreational Fishing From Shore	High	Medium
	Recreational Intertidal Harvest	High	Medium
Non-Extractive	Beach Use	Medium	Medium
	Motorized Boating	Medium	Low
	Paddling	Medium	Low
	Permanent Research Areas	High	Medium
	Sailing	Medium	Low
	SCUBA/Snorkeling	Medium	Low
	Surface Board Sports	High	Medium
	Swimming	Med	Medium
	Tide Pooling	High	Medium
	Wildlife Viewing at Sea	Medium	Low
Industrial / Military	Commercial Shipping	Medium	Medium
	Cruise Ships	High	High
	Mariculture	Medium	High
	Marine Debris	Medium	Low
	Mining and Mineral Extraction	High	High
	Ocean Dumping	High	High
	Renewable Energy	High	High
	Underwater Pipelines	High	High
	Underwater Transmission Cables	High	High

4.3.5. The Role of the Ocean Use Interaction Assessment Tool

In support of the PROUA project, the National MPA Center developed an integrated suite of new information and tools designed to help ocean planners understand the nature and origins of interaction and conflict between Renewable Energy and other co-occurring ocean uses. Built upon the foundation of the Space Use Profiles, the OUIA tool provides unprecedented insight and analytical flexibility for understanding where and how ocean uses occupy 3-dimension ocean space, and how each use's Functional Characteristics and other management considerations may influence its potential for interaction, conflict or compatibility with Renewable Energy to that end.

1. The OUIA tool provides valuable insight into three critical dimensions of the challenge of siting Renewable Energy operations amidst other ocean uses: Assessing the potential for interactions and conflict between Renewable Energy and other uses based on their typical spatial footprints in a generalized ocean setting (Section 4.3.1);
2. Incorporating the role of each use's Functional Components in shaping the nature, intensity and consequences of those interactions (Section 4.3.2); and,
3. Considering other operational or management factors that can profoundly influence where, and with what consequences, different ocean uses select, or are permitted to operate in, a typical ocean setting (Section 4.3.3).

The results of the OUIA tool, as reported here, are not a static picture of these complex issues. Instead, the OUIA is designed to be flexible and adaptable, and its key variables and rankings can be customized to reflect local situations or to explore alternative siting scenarios in any geography where ocean uses co-occur.

4.4. Study Area Maps of Interaction/Conflict/Compatibility of Ongoing Uses

The OUIA tool offers a flexible and user-friendly resource for exploring the universal relationships between uses in any hypothetical ocean space. It can be applied to analyze any pair of profiled ocean uses and explore the nature of use interactions and potential for conflict in any non-specific location. And while the results from the assessment tool (detailed in the use comparison report metrics) are not explicitly tied to any actual geographic space (i.e. latitude and longitude), they can easily be linked to geospatial ocean uses data to explore real-world use interactions and conflict potential when spatial data on ocean use patterns are available.

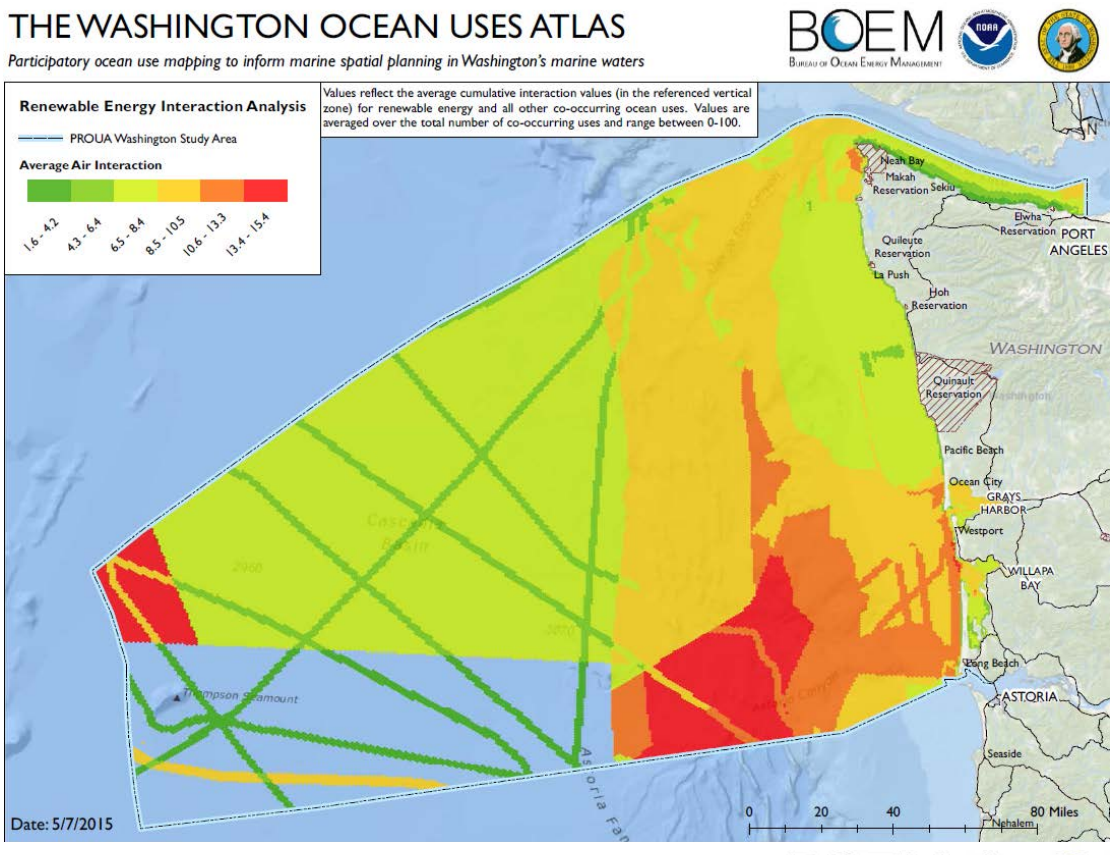
For the PROUA in particular, the results from the OUIA tool were used to explore the relationships between renewable energy and other ocean use activities in the specific project-focused geographies (Washington, Oregon and Hawaii). The tool was first run to derive use comparison reports for renewable energy compared to all other ocean uses (see Figure 18 and Appendix VIII). The resulting interaction metrics were then exported and joined to the spatial data derived from the participatory ocean use mapping component of the PROUA. When combined with the metrics from the use comparison reports, the spatial pattern data can be symbolized based on the

interaction values, allowing a way to visualize the results of the use interaction and conflict analysis in real world space.

The spatial data derived from the PROUA reveal the patterns of ocean uses occurring over horizontal ocean space (from the shoreline to the offshore) for all the uses mapped in the project's target geographies. These data layers when combined with the interaction metrics from the use comparison reports can visually depict the likelihood of interaction of uses in the vertical dimension when uses are known to co-occur in horizontal ocean space.

There are a wide range of options for visualizing the use interaction analysis (documented in the use comparison reports) in a GIS. This report explores the utility of visualizing the interaction values over the vertical dimension (see Figure 20 and Figure 21) to illustrate patterns of use interaction potential (in relation to renewable energy) from the air to below the seafloor based upon the number and pattern of co-occurring dominant uses. These interaction maps add dimensionality to the understanding of co-occurring uses by coding each ocean space by the relative likelihood that co-occurring uses will interact, and more specifically where within the vertical dimension that interaction will likely take place. Integrating these metrics into GIS elevates their utility for spatial decision making by putting them into a geo-spatial context where they can be overlain, evaluated and considered alongside other relevant spatial data layers.

Visualizing co-occurrence in concert with interaction potential illustrates that while ocean uses may share common space, not all components of a use necessarily interact in and throughout that shared space to the same degree. These insights are fundamental to understanding space-use conflict and ultimately for considering strategies for reducing or mitigating conflict in 3-dimensions. Incorporating the results from the functional use characteristics and spatial management implications the potential for conflict, the type of conflict (interference or exclusion) and how existing management considerations might influence how interaction or conflict could be mitigated. Taken together, these data and tools offer a new way to visualize and evaluate ocean uses, providing a more systematic and holistic understanding of where uses are occurring, what components of use are likely to interact and how management and functional characteristics of use can influence the potential for space-use conflict.



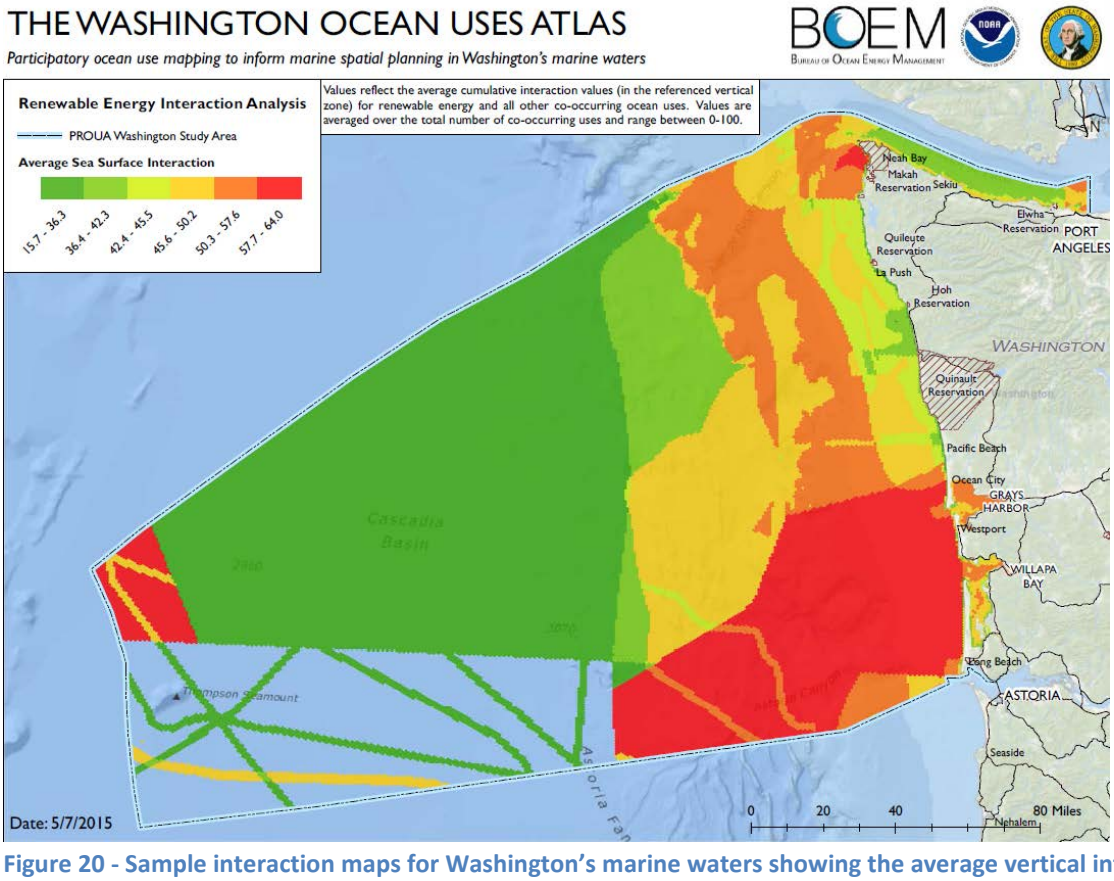
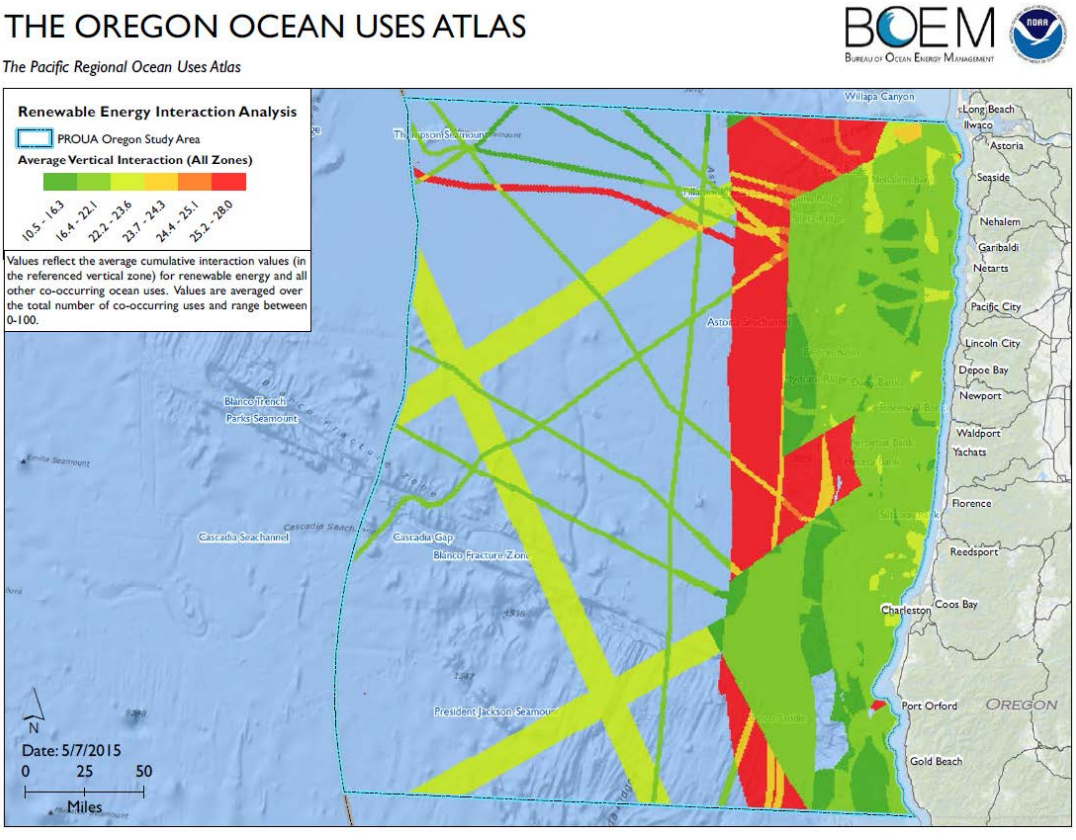


Figure 20 - Sample interaction maps for Washington's marine waters showing the average vertical interaction potential in the air (top) and the sea surface (bottom) for all uses when compared to renewable energy. The hotter (red) colors suggest increased vertical interaction potential with renewable energy given the types of uses mapped in that area.



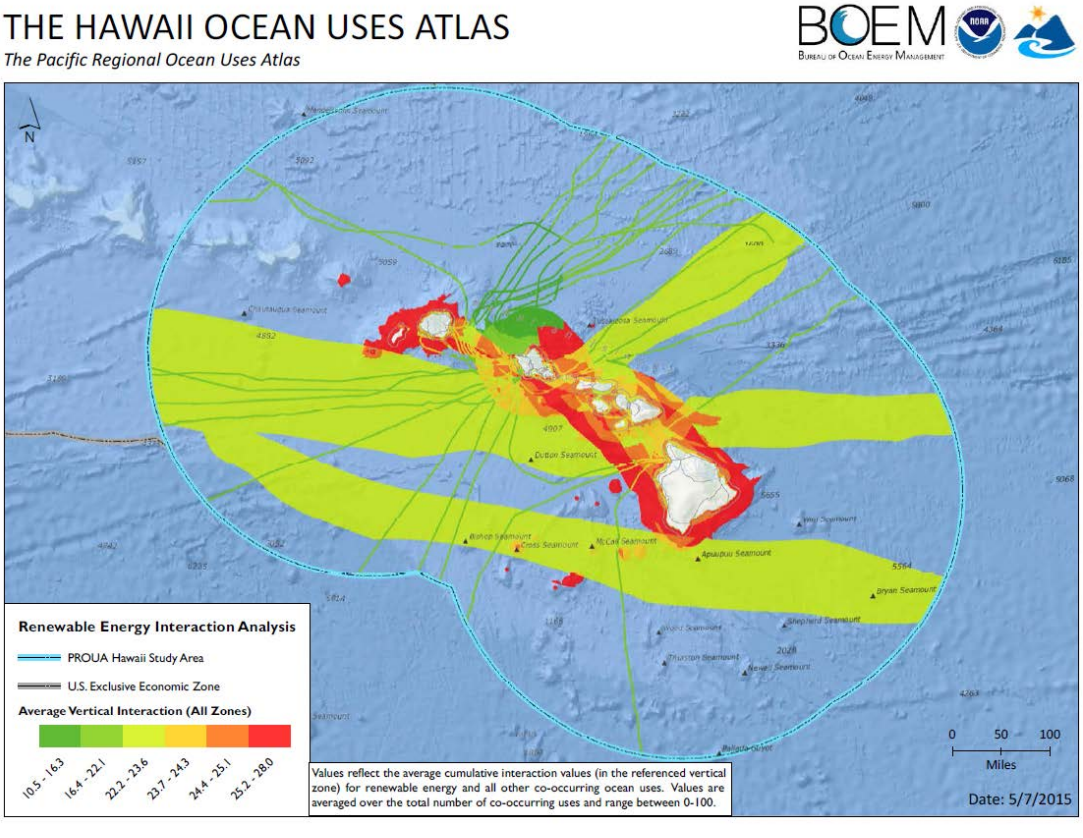


Figure 21 - Sample interaction maps for Hawaii and Oregon showing the average vertical interaction potential for all uses when compared to renewable energy. The hotter (red) colors suggest increased vertical interaction potential with renewable energy given the types of uses mapped in that area.

The linked spatial data can then be used to create a variety of maps to visually interpret these interaction relationships in real world space. There are many options for displaying the attribute information, but the maps shown in Figure 21 offer an example of how the integrated GIS data can be used to depict vertical interaction potential based on the number and type of co-occurring uses. Additional maps showing ocean use interaction potential for the PROUA geographies are included in Appendix IX.

5. PROJECT DISCUSSION

The nation's oceans are getting crowded as existing ocean uses expand and new ones emerge. Among these are a growing number of approaches to harvest Renewable Energy from offshore areas and transmit the energy to land-based facilities by underwater cables. Finding appropriate operating areas for Renewable Energy requires new information about the spatial distribution of those energy resources, as well as new analytical capabilities to understand how to minimize potentially adverse interactions and conflict between Renewable Energy and other existing co-occurring ocean uses.

NOAA's Pacific Regional Ocean Use Atlas (PROUA) project represents an innovative approach to providing space-use information for ocean planning and Renewable Energy siting in U.S. waters, with particular emphasis on Oregon, Washington and Hawai'i. Applying insights derived for generalized ocean settings to the target geographies, the PROUA project combines new spatial data about how and where people use the oceans in specific areas with new analytical tools to understand the potential for those ocean uses to interact and conflict with Renewable Energy operations in those waters.

The primary outputs of the PROUA project include:

- Maps of existing ocean uses in 3 sectors for each of the 3 target geographies.
- Space Use Profiles for all of the uses mapped by the project.
- The Ocean Use Interaction Assessment tool that can be applied in many situations to evaluate siting options to minimize conflict among any combination of co-occurring uses in any geography.
- The results of the OUIA tool as applied to potential conflicts between Renewable Energy and 31 other ocean uses.
- Digital and paper maps, combining the ocean use pattern data gathered in Oregon, Washington and Hawaii with the OUIA tool's results for conflict potentials between those uses and Renewable Energy.

Taken together, the PROUA project's output and products provide an unprecedented and powerful window into how Renewable Energy operations might fit within the broader mosaic of ocean uses in Oregon, Washington and Hawaii.

5.1. Considerations and Caveats

Relevance, Scale, and Extent. The PROUA ocean use data are intentionally broad, coarse-scale patterns that depict a wide range of ocean use activities as they occur over large areas. They are intended to provide a regional perspective on the types of uses occurring, the communities invested in certain use activities and the relative density of co-occurring activities across large areas of ocean space. The data were not designed to be the sole basis of local or site-scale decisions in terms of space-use, but rather to inform more localized and fine-scale analysis and communication with relevant ocean users and stakeholders. The data represent only a snapshot of how a sample of the ocean use communities perceived the use of ocean space at the time the data were collected. When using the PROUA data in any planning process, it important to consider the scale of the data in relation to the planning question.

Seasonality. The distribution and density of ocean uses can vary greatly from one season to the next, as can the relative importance or relevance of certain uses and use sectors (e.g. recreational uses in the summer, fishing year-round). In addition to general patterns of occurrence averaged over time, it may also be useful to understand seasonal or other temporal variations in use patterns when analyzing potential conflicts between ocean uses.

Temporal trends. PROUA data represent a snapshot in time and do not account for patterns of use as they may change over time. While the intent was to capture patterns of use as they have occurred in recent years (over the past 5-10 years), many use patterns are quite dynamic and may already be shifting in response to new regulations, climate change, coastal development and water quality, etc.

Uncertainty and variability. The participatory methods employed to collect the PROUA data from ocean use communities inevitably contributes a fair share of variability and uncertainty to its results, much of which is impossible to quantify. While this process relied on expert input from ocean use community representatives, it was not possible to invite all ocean use experts in the region to the workshops. The data obtained are therefore representative of a sampling of perspectives from the ocean users and experts who contributed information. Therefore, it is important to see the PROUA as one resource, not the only resource for understanding ocean use patterns and evaluating the likelihood of ocean use interactions and potential use conflict.

6. REFERENCES

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Marine Cadastre
http://marinecadastre.gov/oceanuses/

7. APPENDICES

APPENDICES

Appendix I: **Lists of Uses Mapped by Geography**

Appendix II: **Project Factsheets**

Appendix III: **Ocean Use Data Review Summaries by Geography**

Appendix IV: **Ocean Use Maps by Geography**

Appendix V: **Ocean Use Notes by Geography**

Appendix VI: **Space Use Profiles**

Appendix VII: **Space Use Profile Guidelines**

Appendix VIII: **Ocean Use Comparison Reports**

Appendix IX: **Ocean Use Interaction Potential Maps by Geography**

APPENDIX I

Lists of Uses Mapped by Geography

WASHINGTON OCEAN USES ATLAS USE DESCRIPTIONS

Extractive Uses

Use Name	Use Definition
Commercial Fishing with Benthic Fixed Gear	**Includes:** Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types used to catch benthic fishes and invertebrates **Excludes:** All other forms of fishing
Commercial Fishing with Benthic Mobile Gear	**Includes:** The use of rod and reel, trolling, trawling and other mobile gear to catch benthic fishes and mobile invertebrates **Excludes:** All other forms of fishing
Commercial Pelagic Fishing	**Includes:** Use of mid-water trawling, purse seine, pelagic longlines, handlines, harpoons, mid-water gillnets, rod and reel, trolling, and buoys to catch pelagic fishes and mobile invertebrates **Excludes:** All other forms of fishing
Recreational Fishing from Boats for Benthic Species	**Includes:** Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates **Excludes:** Any other boat- or shore-based fishing
Recreational Fishing from Boats for Pelagic Species	**Includes:** Recreational fishing from head boats, party boats, charters, or private boats targeting pelagic species **Excludes:** Any other boat- or shore-based fishing
Commercial Dive Fishing	**Includes:** The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for commercial purposes **Excludes:** All other forms of fishing, recreational SCUBA/Snorkeling
Commercial Intertidal Harvest	**Includes:** Commercial harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria **Excludes:** All other forms of intertidal or coastal harvesting
Recreational Dive Fishing	**Includes:** The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for recreational purposes **Excludes:** Commercial fishing with SCUBA/snorkel, SCUBA/snorkel for viewing purposes
Kayak Fishing	**Includes:** The use of hook and line fishing from kayaks or any other similar vessel to catch fishes and mobile invertebrates **Excludes:** All other forms of fishing
Recreational Fishing From Shore	**Includes:** Rod and reel, surf-casting, fishing from piers, jetties, crab traps, cast nets for recreational purposes **Excludes:** All other forms of shore-based fishing
Recreational Intertidal Harvest	**Includes:** Recreational harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria **Excludes:** All other forms of intertidal harvesting
Subsistence Fishing and Harvest	**Includes:** Shore and boat-based fishing or hunting for vertebrates, birds, mammals and reptiles, harvest of seaweed or algae for subsistence purposes **Excludes:** All other forms of fishing

Industrial Uses

Use Name	Use Definition
Ocean Dumping	**Includes:** The deliberate legal dumping of dredged spoils and other materials into ocean waters **Excludes:** Sewage Discharge, Mining and Mineral Extraction
Military Operations	**Includes:** Transit of military vessels related to training activities, ship and submarine maneuvers, war games, and ordnance disposal **Excludes:** Wartime military operations
Renewable Energy	**Includes:** Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms **Excludes:** Onshore power grids
Commercial Shipping	**Includes:** Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels **Excludes:** Cruise Ships, Military Vessels
Mariculture	**Includes:** Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) **Excludes:** Aquaculture wholly pursued on land
Marine Debris	**Includes:** The collection, monitoring and routine siting of marine debris, including targeted debris removal areas **Excludes:** Any other form of ocean dumping
Mining and Mineral Extraction	**Includes:** Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment **Excludes:** Energy production
Underwater Pipelines	**Includes:** Any submerged pipe system used to transport oil, gas, sewage or other fluid **Excludes:** Underwater transmission cables
Underwater Transmission Cables	**Includes:** Cables installed on the seafloor to transmit data, communications, and electricity generated on land **Excludes:** Lost fishing gear, renewable electricity transmission cables

Recreational Uses

Use Name	Use Definition
Motorized Boating	**Includes:** Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC) **Excludes:** Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing
Cruise Ships	**Includes:** Transit, mooring or anchoring for extended overnight recreational travel on commercial ships **Excludes:** Motorized Boating, Commercial Shipping
Cultural Use	**Includes:** Traditional use of specific ocean, coastal, and shoreline areas

	based on inherent cultural, spiritual, or aesthetic values and significance **Excludes:** All other uses and activities
Permanent Research Areas	**Includes:** Sites, transects, and monitoring areas where routine research or monitoring is conducted **Excludes:** Motorized Boating, Commercial Shipping
Sailing	**Includes:** Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes **Excludes:** Motorized Boating, Paddling
Wildlife Viewing at Sea	**Includes:** Boat-based wildlife viewing at sea, usually on a commercial vessel **Excludes:** Incidental wildlife viewing from shore or while at sea pursuing other uses
Beach Use	**Includes:** Walking, running, digging, resting, collecting of shells, wildlife viewing, driving on the beach, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding **Excludes:** Tide Pooling, Mining and Mineral Extraction, Surface Board Sports, Swimming, Harvesting from Shore, Coastal Aquaculture
Paddling	**Includes:** Kayaking, canoeing, rowing, outrigger paddling, stand-up paddling **Excludes:** Motorized Boating, Surface Board Sports
SCUBA/Snorkeling	**Includes:** SCUBA diving, surface supply diving, snorkeling (free diving) **Excludes:** Swimming, Dive Fishing
Surface Board Sports	**Includes:** Tow-in and paddle-in surfing, wind-surfing, kite surfing, sailboarding **Excludes:** Paddling, SCUBA/Snorkeling, Swimming
Swimming	**Includes:** Short- and long-distance surface swimming and wading any distance from shore, body surfing **Excludes:** SCUBA/Snorkeling, Surface Board Sports
Tide Pooling	**Includes:** Use of the intertidal zone between high and low tides for recreational, scientific or educational purposes **Excludes:** Harvesting from Shore, Shore Use

OREGON OCEAN USES ATLAS USE DESCRIPTIONS

Extractive Uses

Use Name	Use Definition
Commercial Fishing with Benthic Fixed Gear	**Includes**: Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types used to catch benthic fishes and invertebrates **Excludes**: All other forms of Fishing
Commercial Fishing with Benthic Mobile Gear	**Includes**: The use of rod and reel, trolling, trawling, dredging, and other mobile gear to catch benthic fishes and mobile invertebrates **Excludes**: All other forms of Fishing
Commercial Pelagic Fishing	**Includes**: Use of mid-water trawling, purse seine, handlines, rod and reel, trolling, and buoys to catch pelagic fishes and mobile invertebrates **Excludes**: All other forms of Fishing
Recreational Fishing from Boats for Benthic Species	**Includes**: Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates **Excludes**: Any other boat- or shore-based fishing
Recreational Fishing from Boats for Pelagic Species	**Includes**: Recreational fishing from head boats, party boats, charters, or private boats targeting pelagic species **Excludes**: Any other boat- or shore-based fishing
Subsistence Fishing and Harvest	**Includes:** Shore and boat-based fishing or hunting for vertebrates, birds, mammals and reptiles, harvest of seaweed or algae for subsistence purposes **Excludes**: All other forms of Fishing
Commercial Seaweed Harvest	**Includes**: Large-scale commercial harvesting of macroalgae by machine, or limited-scale individual harvesting by hand from a small boat **Excludes**: Excludes: Aquaculture, Tide Pooling, other harvest

Industrial Uses

Use Name	Use Definition
Ocean Dumping	**Includes**: The deliberate legal dumping of dredged spoils and other materials into ocean waters **Excludes**: Sewage Discharge, Mining and Mineral Extraction
Military Operations	**Includes**: Transit of military vessels related to training activities, ship and submarine maneuvers, war games, and ordnance disposal **Excludes**: Wartime military operations
Renewable Energy	**Includes**: Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms **Excludes**: Onshore power grids
Commercial Shipping	**Includes**: Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels **Excludes**: Cruise Ships, Military Vessels
Underwater Transmission Cables	**Includes**: Cables installed on the seafloor to transmit data, communications, and electricity generated on land **Excludes**: Lost fishing gear, renewable electricity transmission cables

Use Name	Use Definition
Mariculture	**Includes**: Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) **Excludes**: Aquaculture wholly pursued on land
Mining and Mineral Extraction	**Includes**: Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment **Excludes**: Energy production
Underwater Pipelines	**Includes**: Any submerged pipe system used to transport oil, gas, sewage or other fluid **Excludes**: Underwater transmission cables

Non-Extractive Uses

Use Name	Use Definition
Motorized Boating	**Includes**: Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC) **Excludes**: Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing
Cruise Ships	**Includes**: Transit, mooring or anchoring for extended overnight recreational travel on commercial ships **Excludes**: Motorized Boating, Commercial Shipping
Cultural Use	**Includes**: Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance **Excludes**: All other uses and activities
Permanent Research Areas	**Includes**: Sites, transects, and monitoring areas where routine research or monitoring is conducted **Excludes**: Motorized Boating, Commercial Shipping
Sailing	**Includes**: Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes **Excludes**: Motorized Boating, Paddling
Wildlife Viewing at Sea	**Includes**: Boat-based wildlife viewing at sea, usually on a commercial vessel **Excludes**: Incidental wildlife viewing from shore or while at sea pursuing other uses

HAWAII OCEAN USES ATLAS DESCRIPTIONS

Recreational Uses

Use Name	Use Definition
Boating	**Includes:** Transit, mooring or anchoring by vessels for recreation or traditional and customary practices. Includes sailboats, personal watercraft (PWC), parasailing, jet boats, jet skis, sailing kayaks and canoes, voyaging canoes, thrill craft rentals and lava tours **Excludes:** Fishing Charters, Wildlife Viewing at Sea, Cruise Ships, Shipping, Military Operations
Permanent Research Areas	**Includes:** Sites, transects, and specific areas monitored or studied for research or traditional and customary practices **Excludes:** Motorized Boating, Commercial Shipping
Wildlife Viewing At Sea	**Includes:** Charter boating to observe wildlife, includes dolphin tours, whale-watching tours, scenic tours, sea bird tours from a boat for recreation or traditional and customary practices **Excludes:** Fishing Charters, Dive Charters, Boating, swim with dolphins/manta tours
Mariculture & Fishponds	**Includes:** Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) for commercial purposes or traditional and customary practices **Excludes:** Aquaculture wholly pursued on land
Beach Use	**Includes:** Walking, running, tide pooling, wildlife viewing from shore, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding for recreation or traditional and customary practices **Excludes:** Intertidal Harvest, Mining and Mineral Extraction, Surface Board Sports, Swimming, Mariculture
Paddling	**Includes:** Outrigger canoe paddling, paddle-driven kayaking, kayak-based snorkeling or free diving, and flat-water stand up paddle boarding for recreation or traditional and customary practices **Excludes:** Charter/commercial boating, use of motorized vessels, surf-style stand up paddling
SCUBA & Snorkeling	**Includes:** SCUBA, snorkel and free-diving (shore-based and vessel-based) for recreation or traditional and customary practices. Includes recreational dive charters, swimming with dolphins/manta tours **Excludes:** Research, spearfishing, extractive activities
Surface Board Sports	**Includes:** Tow-in, wind-surfing, kite surfing, sailboarding, surfing, surf-style stand up paddling and boogie boarding for recreation or traditional and customary practices

	Excludes: Paddling, SCUBA/Snorkeling, Swimming, flat-water stand up paddle boarding
Swimming	**Includes:** Short- and long-distance surface swimming from shore, body surfing and race training/events for fitness, recreation or traditional and customary practices **Excludes:** Surface Board Sports, Beach Use/Shore Use, SCUBA/Snorkeling

Extractive Uses

COMMERCIAL FISHING: According to the Department of Aquatic Resources, commercial purpose means the taking of marine life for profit or gain, or as a means of livelihood, when the marine life is taken in or outside of the State, and when the marine life is sold, offered for sale, landed, or transported for sale anywhere in the State.

NON-COMMERCIAL FISHING: According to the Code of Federal Regulations (CFR), non-commercial fishing means fishing that does not meet the definition of commercial fishing in the Magnuson-Stevens Fishery Conservation and Management Act, and includes, but is not limited to, sustenance, subsistence, traditional indigenous, and recreational fishing (fishing conducted for sport or pleasure, including charter fishing).

TRADITIONAL AND CUSTOMARY PRACTICES: While included in the federal definition of Non-Commercial Fishing, traditional and customary practices in Hawaii are recognized as significant and distinct from commercial and non-commercial activities. Under Article XII, Section 7 of Hawaii State Constitution, the State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua`a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

Non-Commercial Fishing (Benthic Mobile Gear)	**Includes:** Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices **Excludes:** All other forms of Fishing
Commercial Dive Fishing/Harvest	**Includes:** Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for commercial purposes. Includes in-water use of spear for fish and he'e(octopus), hand gathering of ula (lobster) and pupu (shells) **Excludes:** Non-Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest, use of lobster nets
Commercial Intertidal Harvest	**Includes:** Intertidal and shallow water gathering from shore of living marine plant and animal species for commercial purposes. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab and sea cucumbers **Excludes:** Mariculture, Tide Pooling, SCUBA/Snorkeling, net fishing
Non-Commerical Dive	**Includes:** Use of SCUBA, surface supply diving or free diving to

Fishing/Harvest	catch fishes and invertebrates for non-commercial purposes or traditional and customary practices. Includes in-water use of spear for fish and he'e (octopus), hand gathering of ula (lobster) and pupu (shells) **Excludes:** Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest
Non-Commercial Kayak Fishing	**Includes:** Use of hook and line and other gear from kayaks, canoes or any other similar vessel to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices **Excludes:** All other forms of fishing
Non-Commercial Shore Fishing	**Includes:** Fishing from piers, jetties or shore with pole and line (whipping/dunking), surf fishing and kite fishing for non-commercial purposes or traditional and customary practices. Includes use of shallow traps and nets (cast, lay, drift, surround, akule or throw nets) **Excludes:** Any boat-based fishing, Intertidal Harvest, Dive Fishing/Harvest
Non-Commercial Intertidal Harvest	**Includes:** Intertidal and shallow water gathering from shore of living marine plant and animal species for consumption, education or research purposes or traditional and customary practices. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab, and sea cucumbers **Excludes:** Tide Pooling, SCUBA/Snorkeling, net fishing
Commercial Fishing with Benthic Fixed Gear	**Includes:** Use of traps, pots, long lines, bottom or anchored gillnets and other bottom-tending gear types used to catch benthic fishes and invertebrates for commercial purposes **Excludes:** All other forms of fishing
Commercial Fishing with Benthic Mobile Gear	**Includes:** Use of hand lines, benthic longlines, drag nets, drift nets and other mobile gear to catch benthic fishes and invertebrates for commercial purposes **Excludes:** All other forms of fishing
Commercial Pelagic/Midwater Fishing	**Includes:** Use of pelagic longlines, hand lines, mid-water gillnets, rod and reel, trolling, buoys and other mobile gear to catch pelagic fishes and mobile invertebrates for commercial purposes. Includes fishing at Fish Aggregation Devices (FADs) **Excludes:** All other forms of fishing
Non-Commercial Fishing (Benthic Fixed Gear)	**Includes:** Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices **Excludes:** All other forms of Fishing
Non-Commercial Pelagic/Midwater Fishing	**Includes:** Fishing from private or charter boats using mobile gear to catch pelagic fishes and mobile invertebrates for non-

	commercial purposes or traditional and customary practices. Includes sport fishing and fishing at Fish Aggregating Devices (FADs) **Excludes:** All other forms of Fishing

Industrial Uses

Ocean Dumping	**Includes:** The deliberate legal dumping of dredged spoils, ballast water and other materials into ocean waters **Excludes:** Sewage Discharge, Mining and Mineral Extraction
Military Operations	**Includes:** Transit of military vessels related to training activities, ship and submarine maneuvers and fleet readiness training activities **Excludes:** Wartime military operations
Renewable Energy	**Includes:** Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms **Excludes:** Onshore power grids
Commercial Shipping	**Includes:** Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels **Excludes:** Cruise Ships, Military Vessels
Underwater Cables	**Includes:** Cables installed on the seafloor to transmit data, communications and electricity **Excludes:** Lost fishing gear, renewable energy transmission cables
Mining & Mineral Extraction	**Includes:** Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging and beach re-nourishment **Excludes:** Energy production
Underwater Pipelines	**Includes:** Any submerged pipe system used to transport oil, gas, sewage or other fluid **Excludes:** Underwater cables
Cruise Ships	**Includes:** Transit, mooring or anchoring for extended overnight recreational travel on commercial ships **Excludes:** Recreational Motorized Boating, Commercial Shipping

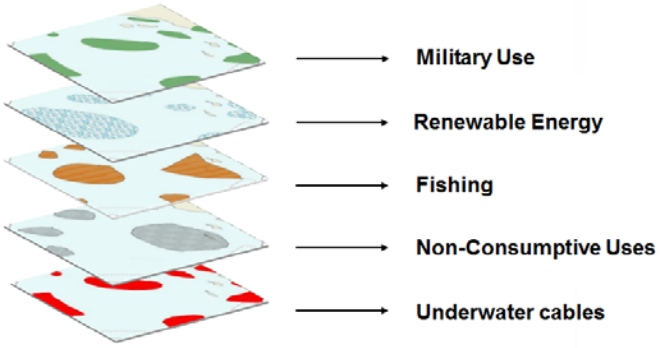
APPENDIX II

Project Factsheets

The Pacific Regional Ocean Uses Atlas

Collecting expert community knowledge on ocean uses through participatory mapping

Human uses of the ocean and coasts are expanding at a rate that challenges our ability to plan and manage them. To minimize potential use conflicts and to inform ocean planning strategies for new and emerging uses, including various forms of offshore renewable energy, it is critical to understand the patterns and implications of ongoing and future human uses of the ocean.



The Pacific Regional Ocean Uses Atlas Project is an interagency collaboration between NOAA and the Bureau of Ocean Energy Management (BOEM) designed to document where coastal communities use the ocean across a full range of typical human activities and sectors. Using participatory mapping techniques, the project offers a proven, flexible, and scalable approach that empowers coastal communities to paint an accurate picture of human use on a scale appropriate for local-, state-, or regional-level ocean planning.

PROJECT DETAILS

➢ ***What is the primary purpose of the project?*** To enhance ocean planning for offshore renewable energy development and inform other ocean planning strategies that require insight to how and where ocean areas are used for recreational, commercial, and industrial types of activities

➢ ***What are the goals of the project?*** To collect spatial data on the full range of human uses of the ocean through consultation with use experts, community stakeholders, and cultural use practitioners; to create data and analysis tools to assist in understanding use patterns, hotspots, conflicts and compatibilities

➢ ***What is the geographic focus of the project?*** The Outer Continental Shelf areas off the states of Washington, Oregon, and Hawaii, with some additional mapping in state waters in select areas

➢ ***Who will lead this effort?*** NOAA's Ocean Uses team (NOAA Coastal Services Center & MPA Center staff) with support from BOEM

February 2014

The Pacific Regional Ocean Uses Atlas

Informing offshore renewable energy planning through participatory mapping of ocean uses

The Participatory Mapping Approach

Ocean use data are gathered in interactive, participatory mapping workshops that capture the knowledge of community experts about the patterns and drivers of ocean uses occurring in the study areas. Prior to the workshops, existing geospatial base layers are gathered and compiled into a basemap that is used as the basis of interactive mapping.

Target List of Uses

This project will gather information on a wide range of ocean uses occurring offshore Washington, Oregon, and Hawaii, including, but not limited to:

Industry/Military Sector	Extractive Sector	Non-Extractive Sector
• Commercial Shipping (including Towing & Barging)	• Commercial Dive Fishing	• Indigenous Cultural Use
• Designated Dumping & Outfall Sites	• Commercial Fishing with Benthic Mobile & Fixed Gear	• Motorized Boating
• Mariculture	• Commercial Pelagic Fishing	• Paddling
• Military Operations & Ordnance Disposal	• Commercial Seaweed Harvest	• Sailing
• Mining and Mineral Extraction	• Commercial Shore-Based Harvest	• SCUBA/Snorkeling
• Renewable Energy	• Indigenous Fishing	• Shore Use
• Underwater Pipelines	• Kayak Fishing	• Surface Board Sports
• Underwater Telecommunication & Power Cables	• Recreational Dive Fishing	• Swimming
	• Recreational Fishing from Boats	• Tide Pooling
	• Recreational Shore-Based Harvest	• Tourism Cruise Ships
	• Subsistence Fishing & Harvest	• Wildlife Viewing at Sea

Products

Data gathered through the participatory mapping workshops will be compiled and analyzed to create a suite of data products in various formats for use in ocean planning applications. These products include, but are not limited to:

- ☆ GIS data and online mapping services
- ☆ Digital and paper maps of ocean patterns
- ☆ Maps of ocean use hotspots and potential use conflict areas

Timeline

Washington: Fall 2012 – Fall 2013
Oregon: Winter 2012 – Spring 2014
Hawaii: Fall 2013 – Fall 2014
Final data and deliverables due Summer 2015

Funding

This project was funded by the U.S. Department of the Interior, Bureau of Ocean Energy Management, through an Interagency Agreement with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

For more information, please contact:
Mimi D'Iorio: Mimi.Diorio@noaa.gov
Hugo Selbie: Hugo.Selbie@noaa.gov
Sara Guiltinan: Sara.Guiltinan@boem.gov

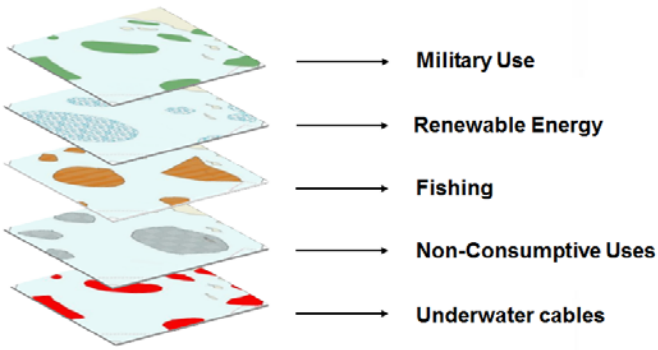
BOEM
Bureau of Ocean Energy Management

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

The Pacific Regional Ocean Uses Atlas

Informing offshore renewable energy planning through participatory mapping of ocean uses

Human uses of the ocean and coasts are expanding at a rate that challenges our ability to plan and manage them. To minimize potential use conflicts and to inform ocean planning strategies for new and emerging uses, including various forms of offshore renewable energy, it is critical to understand the patterns and implications of ongoing and future human uses of the ocean.



The Pacific Regional Ocean Uses Atlas Project is an interagency collaboration between NOAA and the Bureau of Ocean Energy Management (BOEM) designed to document where coastal communities use the ocean across a full range of typical human activities and sectors. Using participatory mapping techniques, the project offers a proven, flexible, and scalable approach that empowers coastal communities to paint an accurate picture of human use on a scale appropriate for local-, state-, or regional-level ocean planning.

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December 2013

The Washington Ocean Uses Atlas

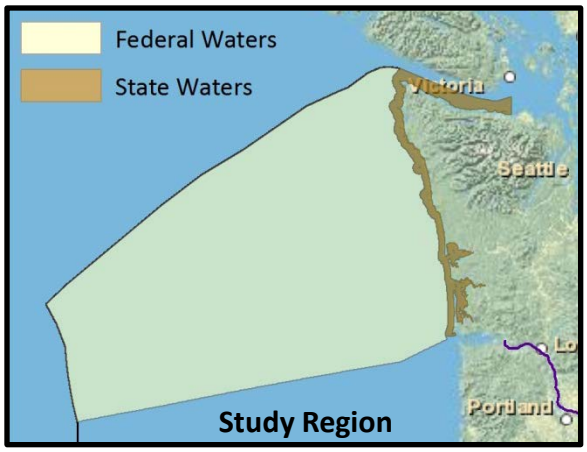
Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

The Washington Ocean Uses Atlas is one of three state-level mapping efforts that comprise the Pacific Regional Ocean Uses Atlas project. In collaboration with Washington state agencies, the NOAA Ocean Uses Team collected ocean uses data for Washington's coastal and offshore waters to collectively inform both marine spatial planning and planning for potential offshore renewable energy development.

Workshop Schedule
Port Angeles: April 15 & 16, 2013
Aberdeen: April 18 & 19, 2013

Methods

Ocean use data were gathered in interactive, participatory mapping workshops that captured the knowledge of community experts about the patterns of ocean uses occurring in the study area. Existing data was gathered and used as the basis of the mapping exercise to refine, expand, and build upon previous mapping efforts. Tribal uses of the ocean were not mapped explicitly, though tribal chairs and/or their designated representatives were formally invited by BOEM to participate in the mapping workshops.



Project Scope

The project focused on Washington's state and federal waters (excluding Puget Sound) from Port Angeles north to the Canadian border, south to the mouth of the Columbia River and offshore to 200 nautical miles. The project targeted a wide range of ocean uses, including:

Industry/Military Sector
- Commercial Shipping
- Mariculture
- Marine Debris
- Military Operations
- Mining and Mineral Extraction
- Ocean Dumping
- Renewable Energy
- Underwater Transmission Cables
- Underwater Pipelines

Extractive Sector
- Commercial Dive Fishing
- Commercial Fishing with Benthic Mobile & Fixed Gear
- Commercial Intertidal Harvest
- Commercial Pelagic Fishing
- Kayak Fishing
- Recreational Dive Fishing
- Recreational Fishing from Boats for Benthic & Pelagic Species
- Recreational Fishing from Shore
- Recreational Intertidal Harvest
- Subsistence Fishing & Harvest

Non-Extractive Sector
- Beach Use
- Cruise Ships
- Cultural Use
- Motorized Boating
- Paddling
- Permanent Research Areas
- Sailing
- SCUBA/Snorkeling
- Surface Board Sports
- Swimming
- Tide Pooling
- Wildlife Viewing at Sea

For more information, please contact:
Mimi D'Iorio: Mimi.Diorio@noaa.gov
Hugo Selbie: Hugo.Selbie@noaa.gov
Sara Guiltinan: Sara.Guiltinan@boem.gov
Jen Hennessey: JenH461@ecy.wa.gov
Katrina Lassiter: Katrina.Lassiter@dnr.wa.gov

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Bureau of Ocean Energy Management

The Pacific Regional Ocean Uses Atlas

Informing offshore renewable energy planning through participatory mapping of ocean uses

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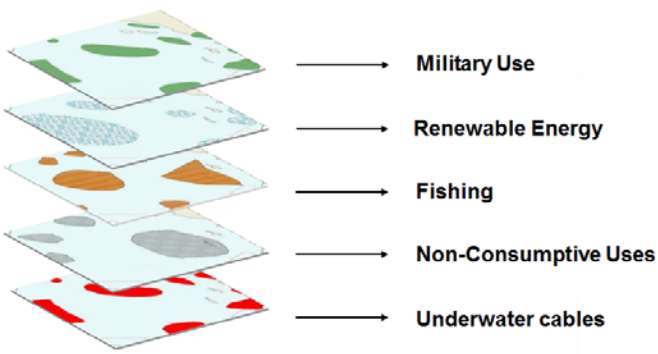

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January 2014

The Oregon Ocean Uses Atlas

Collecting expert community knowledge on ocean uses through participatory mapping

The Oregon Ocean Uses Atlas is one of three state-level mapping efforts that comprise the Pacific Regional Ocean Uses Atlas project. The NOAA Ocean Uses Team conducted workshops throughout the state to collect Oregon ocean uses data to inform planning for potential offshore renewable energy development.

Methods

Ocean use data were gathered in interactive, participatory mapping workshops that captured the knowledge of community experts about the patterns of ocean uses occurring in the study area. Existing data were gathered and used as the basis of the mapping exercise to refine, expand, and build upon previous mapping efforts. Tribal uses of the ocean were not mapped explicitly, though tribal chairs and/or their designated representatives were formally invited by BOEM to participate in the mapping workshops.

Project Scope

The primary focus was to identify ocean uses on the Outer Continental Shelf (OCS) at a coarse scale. Some fine-scale information was collected for select areas where renewable energy development on the OCS is prospective. The project will document a wide range of ocean uses, including:

Workshop Schedule

Portland: June 3rd
Coos Bay: June 5th
Newport: June 7th

Industry/Military Sector
- Commercial Shipping
- Ocean Dumping
- Mariculture
- Military Operations
- Mining and Mineral Extraction
- Renewable Energy
- Underwater Pipelines
- Underwater Transmission Cables

Extractive Sector
- Commercial Fishing with Benthic Fixed Gear
- Commercial Fishing with Benthic Mobile Gear
- Commercial Pelagic Fishing
- Commercial Seaweed Harvest
- Recreational Fishing from Boats for Benthic Species
- Recreational Fishing from Boats for Pelagic Species
- Subsistence Fishing and Harvest

Non-Extractive Sector
- Cruise Ships
- Cultural Use Areas
- Motorized Boating
- Permanent Research Areas
- Sailing
- Wildlife Viewing at Sea

For more information, please contact:
Mimi D'Iorio: Mimi.Diorio@noaa.gov
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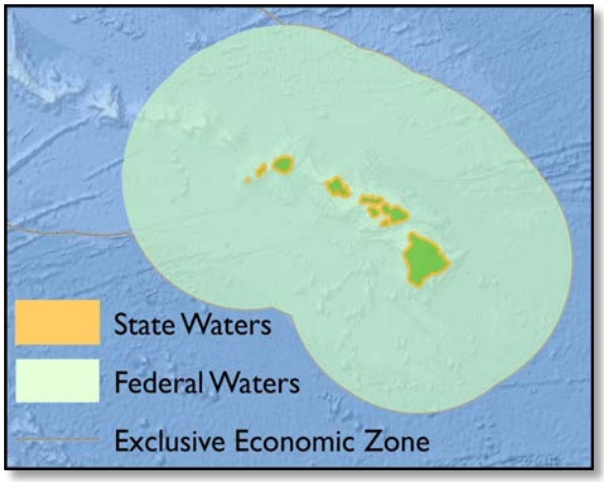
The Hawai‘i Ocean Uses Atlas

Collecting expert community knowledge on ocean uses through participatory mapping

The Hawai‘i Ocean Uses Atlas is a collaboration by the Bureau of Ocean Energy Management (BOEM), NOAA and the State of Hawai‘i Office of Planning. The Atlas is designed to collect information on ocean uses to help inform analyses of any proposed offshore renewable energy projects and coastal zone planning strategies and permitting decisions. Generalized information about ocean uses was collected for the marine waters surrounding the eight main Hawaiian Islands from the shoreline to 200 nautical miles offshore.

Information on ocean uses was gathered during a series of participatory mapping workshops in June and September, 2014. Existing data collected from previous use mapping efforts were presented and participants were asked to review, update and build upon the current state of ocean use knowledge, representing perspectives from the broader use community rather than individual use experience.

Workshops were held on 6 of the main 8 Hawaiian Islands to ensure participation from a diverse group of use experts and to gather perspectives representative of many ocean users including specific island residents.



Non-Extractive Sector
Beach Use; Boating; Paddling; Permanent Research Areas; SCUBA & Snorkeling; Surface Board Sports; Swimming; Wildlife Viewing at Sea

Extractive Sector
Commercial Dive Fishing/Harvest; Commercial Fishing with Benthic Mobile & Fixed Gear; Commercial Pelagic Fishing; Commercial Intertidal Harvest; Non-Commercial Dive Fishing; Non-Commercial Kayak Fishing; Non-Commercial Fishing with Benthic Mobile & Fixed Gear; Non-Commercial Pelagic Fishing; Non-Commercial Fishing from Shore; Non-Commercial Intertidal Harvest

Industrial/Military Sector
Commercial Shipping; Cruise Ships ; Mining and Mineral Extraction; Mariculture & Fishponds; Military Operations ; Ocean Dumping; Renewable Energy; Underwater Cables ; Underwater Pipelines

Hawai‘i Ocean Uses Atlas Workshops, 2014

- June 2nd, Hawai‘i Island, Kona (West Hawai‘i Civic Center)
- June 4th, Hawai‘i Island, Hilo (Hawai‘i Community College)
- June 6th, Kaua‘i, Lihue (Kaua‘i War Memorial)
- June 9th, O‘ahu, Honolulu (Neal S. Blaisdell Center)
- June 10th, O‘ahu, Waipahu (Waipahu High School)
- June 12th, Maui, Wailuku (J. Walter Cameron Center)
- September 17th, Lana‘i, Lana‘i City, (Sacred Hearts Catholic Church)
- September 18th, Moloka‘i, Ho‘olehua, (Lanikeha Community Center)

For more information, please contact:
Mimi D’Iorio: Mimi.Diorio@noaa.gov
Hugo Selbie: Hugo.Selbie@noaa.gov
Sara Guiltinan: Sara.Guiltinan@boem.gov
Leo Asuncion: Leo.Asuncion@dbedt.hawaii.gov

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Considerations & Commonly Asked Questions

The Hawai‘i Ocean Uses Atlas is a participatory mapping project designed to collect ***generalized*** information about a wide range of ocean use activities that occur in Hawai‘i’s marine waters. Data were collected through a series of workshops intended to serve as forums for discussing ocean use perspectives and capturing both spatial and non-spatial local expert knowledge.

- Information was gathered at a broad scale (i.e., general areas where uses occur, not exact locations).
- Invited workshop participants were asked to provide data voluntarily to the extent they were comfortable sharing.
- Workshop participants are invited to review and offer feedback on draft data before publication.
- The project does not assign economic or social value to any place, use or suite of uses.
- The final data products, maps and project reports will be publicly available.
- Project information is not used to designate suitable offshore renewable energy areas or zones.
- Communities will have future opportunities to engage throughout decision-making processes.
- The project does not replace the need for in-depth, finer-scale studies for specific offshore renewable energy project proposals and site-specific planning purposes.

How will the results of this project be used by BOEM and the State?
The results of this project are a step toward a better understanding of ocean uses and user communities to help inform analyses and decision-making by agencies. The data will offer a broad look at ocean use patterns and will assist in identifying at least a minimum number of ocean use communities that must be engaged when site-specific projects and planning efforts arise. This project is not intended to capture the level of detail required for site-specific project and planning decisions, which would go through separate, thorough analyses and public comment processes.

Why were data collected within state waters, federal waters and marine protected areas?
Offshore ocean uses influence nearshore uses and users, and vice versa. Information on ocean uses for all of Hawai‘i’s marine waters provides a more complete understanding of general ocean use patterns. Management authorities and jurisdictions differ throughout the study area; the project was designed to improve decision-making capabilities for a variety of agencies.

Who was invited to attend the workshops?
This effort targeted representatives of ocean use communities who could provide knowledge on a wide range of ocean uses activities as they occur over large areas. While it engaged members of Hawai‘i’s communities, it is not a community-scale project. Workshop attendees were asked to provide information on uses that they are aware of, not only those they engage in personally.

How were cultural uses of the ocean addressed?
To varying degrees, all uses of the ocean are inherently cultural uses. While this project strove to capture the cultural significance of various ocean uses during the data gathering workshops, it is not intended to thoroughly address cultural use. This project complements other culturally-focused efforts that are currently underway and are designed to address ocean cultural landscapes more comprehensively.

APPENDIX III

Ocean Use Data Review Summaries by Geography

PACIFIC REGIONAL OCEAN USES ATLAS

Washington Ocean Uses Atlas Validation Period Comments

Validation period August 19th – September 28th, 2013

General Protocol Comments

1. Validation event occurred when fishing fleet at sea and during Lake Ozette sockeye steering committee meeting
2. Must make clear that these data do not explicitly include tribal use data.
3. Coordination between NOAA (PROUA) and WA DNR and ECY to be improved

Specific Ocean Use Comments

Ocean Use	Comments Received	Any Changes in Data
Ocean Dumping	• *No general dredge ocean dumping allowed, there are specific legal Dredge Disposal Site dump areas* • *Check and get specific disposal site information from the USACE; Portland and Seattle* • *Other ocean dumping needs to be listed as a MARPOL convention & mapped separately*	Spatial Changes • Added dominant areas at the mouth of the Columbia River and Grays Harbor entrance using the ENC dredge spoil grounds Reporting Changes • Comments added to final report
Commercial Fishing (all categories)	• *Fishing areas and species should be cataloged by specific gear type* • *Crab – Dominant use inside 100 fathoms, some out to 200, none outside 200* • *Black Cod via methods other than trawl can be fished in the RCA* • *6d Razor clams spits at the Willapa entrance should be dominant* • *7d dominant area off of Long Beach peninsula extend halfway up with dominant area in Willapa Bay* • *Represent recent Crab fishery shifts to southern 13 miles of coast south of Klipsan Beach*	Spatial Changes • Added dominant area to commercial intertidal harvest on the entrance to Willapa Bay • Added offshore of Long Beach peninsula to recreational fishing from boats (benthic species) dominant. Reporting Changes • Comments added to final use descriptions • Comments added to final state report

Ocean Use	Comments Received	Any Changes in Data
Commercial Shipping	• *0 – 6 nm or more not used by large ships or barges; No use in south Willapa Bay or Baker Bay* • *Some shipping lanes seem to end in the mid-ocean*	Spatial Changes • Remove general use footprint from south Willapa bay • Adjust spatial threshold to remove shipping ending in mid-ocean Reporting Changes • Comments added to final report
Underwater Transmission Cables	• *22d Electrical transmission line planned along the coast of WA, OR and CA, with tie in along SW WA and NW OR.* • *Not mapped Alaska – Warrenton OR undersea cable that runs under SE corner of study region*	Reporting Changes • Comments added to final use descriptions
Cruise Ships	*25d The Columbia entrance is a dominant area for Cruise Ships*	Spatial Changes • Columbia entrance area changed to dominant
Permanent Research Areas	*28d WA Dept. Fish and Wildlife have 4 permanent transect areas on the Long Beach Peninsula and on all other coastal razor clam beaches*	Reporting Changes • Added comments to final use descriptions
Sailing	*29d Annual regatta off Oysterville in Willapa bay, between main channel and high tide line, covering about 2 sq. miles*	Reporting Changes • Added comments to final use descriptions
Mariculture	*15d In Willapa bay on the west side, all parts of the bay except the main channel should be red*	Spatial Changes • Changed all west side areas to dominant
Marine Debris	• *16d The Long Beach peninsula should be red along its length* • *Omission of WDFW derelict crab pot recovery projects*	Spatial Change • All seaward Long Beach peninsula changed to dominant • Added to general use derelict crab pot recovery projects
Pipelines	*Spatial coordinates for existing pipelines not represented*	Spatial Change • Added 300m buffered polygons of coordinates sent by Jennifer Hennessey for sewage outfalls (Ecology – state dataset)

Ocean Use	Comments Received	Any Changes in Data
Renewable Energy	*Makah bay installation improperly represented, participant confusion regarding what constitutes renewable energy institution.*	Spatial Change • Moved Makah Bay footprint to outside 3nm • Added approximate locations for Westport, Ocean Shores and Willapa Bay past projects
Military Operations		Spatial Change • Minor gap filling to extend SONAR line to shore
Subsistence fishing		Spatial Change • Minor gap filling

General Map Comments

Comment received	Any changes made
Maps do not represent economic value of use shapes to local community	Reporting Changes • Comments added to final state report
Dominant areas don't differentiate between relative economic impact	Reporting Changes • Comments added to final state report
Maps don't show temporal variations of high use i.e. Klipsan Beach fisheries line	Reporting Changes • Comments added to final state report
Maps don't show RCA's or other ancillary data	Reporting Changes • Comments added to final state report
Map lacked appropriate annotations, e.g. BOEM has no jurisdiction in the Olympic Coast Marine National Sanctuary.	Reporting Changes • Comments added to final state report
Oregon side of map hasn't been completed, no mention of cumulative impacts between state lines	Reporting Changes • Comments added to final state report
Combined use map is confusing, indicates greatest use by most amount of uses, rather than other economic, or use intensity	Reporting Changes • Comments added to final state report
Combined use map shouldn't represent shipping lanes and cable corridors	Reporting Changes • Comments added to final state report
Offshore hydrocarbons not mapped on study regions	Reporting Changes • Comments added to final state report
These maps also need latitude longitudes and 100 fathom curve	Reporting Changes • Comments added to final state report

PACIFIC REGIONAL OCEAN USES ATLAS

Oregon Ocean Uses Atlas Validation Period Comments

Validation period February 7th to April 30th, 2014

General Protocol Comments

1. PROUA did not engage regional leaders as 'partners' to develop the process for gathering information from people on the Oregon Coast.
2. PROUA did not engage enough appropriate user community members (e.g., members of the fishing fleet, local government and advisory groups).
3. PROUA participant sample size was too small to get accurate representation of fishing use areas.
4. Small coastal communities that depend on ocean uses such as charter boat fleets and whale watching tours for their economic base must be included in the PROUA.
5. Only 4 fishery species were asked about in the mapping workshops; PROUA should have included all 22 species.
6. A participatory mapping workshop on the North Coast was needed.
7. Flawed engagement and data collection process produced inaccurate draft maps.
8. Public engagement and a community-driven methodology are needed to establish an accurate atlas.
9. Need to mention historic high use fishing grounds that are in temporary regulatory closures. These areas need to be 'part of the conversation' regarding renewable energy siting.
10. To broaden perspectives provided, host draft data validation with people that did not attend the mapping workshops.
11. PROUA validation needs to solicit perspectives of stakeholders that did not attend.
12. Only 2 webinars held for input prior to closing of data validation comment period. Need more concerted effort to engage affected communities and industries.
13. Involving the fishing community more thoroughly in the process before the maps are finalized would enable BOEM and NOAA to develop more appropriate questions, draw on their extensive historical knowledge of Oregon's offshore areas, and increase stakeholder participation in information gathering activities.
14. Ensure that communities are comfortable with data that will be made public and associated caveats.

15. If PROUA data is made available alongside other ocean uses data (e.g., *Identification of Outer Continental Shelf Renewable Energy Space-Use Conflicts and Analysis of Potential Mitigation Measures* study data), ensure both datasets are easily accessible together and have equally good notes.
16. If PROUA data is published in the Marine Cadastre, it will be assumed to be authoritative data, which may lead to incorrect conclusions about ocean uses and potential development sites. If included in the Marine Cadastre, the PROUA maps should clearly guide users to other available data and point to data gaps.
17. If appropriate corrections to the fishing maps are made, the atlas will be a helpful tool in the long run.
18. Participants feel that the PROUA is the only chance for input on BOEM's leasing process.
19. PROUA data is too general to be useful in a regulatory framework.

General Map Comments

Comment received	**Any changes made**
Maps do not account for excessive use from neighboring ports.	Reporting Changes • Comments added to PROUA Oregon report
Show historical uses and include Rockfish Conservation Areas (RCAs) and 30 fathom closure.	Map Changes • RCA and Fishery MPAs added to validation map
Maps do not show enough activity out of Garibaldi and offshore the North Coast or use from neighboring ports	Reporting Changes • Comments added to PROUA Oregon report
The Identification of Outer Continental Shelf Renewable Energy Space-Use Conflicts and Analysis of Potential Mitigation Measures *study maps are better for shrimp, crab and tuna.*	Reporting Changes • Comments added to PROUA Oregon report
Current regulatory closures such as the RCAs should be shown on final use maps.	Map Changes • RCA and Fishery MPAs added to validation map
Would consider some of the general use areas to be high use, especially for smaller operators of same use.	Reporting Changes • Comments added to PROUA Oregon report
No latitude or longitude lines and depth contours on the draft PDF maps, this makes it difficult for users to review accurately or provide specific comments.	Map Changes • Latitude and Longitude lines added to validation map
Fishing use descriptions are not accurately portrayed in terms of the	Reporting Changes

regulatory framework. Fishing use footprints should reflect regulated area rules.	• Comments added to PROUA Oregon report
Much of Oregon fishing fleet operates on the continental shelf and upper slope out to ~700 fathoms.	Reporting Changes • Comments added to PROUA Oregon report

Specific Ocean Use Comments

Ocean Use	Comments Received	Any Changes in Data
Commercial Fishing with Benthic Fixed Gear	• *80% of commercial Dungeness crabbing is done in the first 8 – 10 weeks of the season, which ends in August. The remainder of the season is still very important for local crabbing boats.*	Spatial Data Changes: • Added dominant areas between Seaside to Depoe Bay as depicted on marked up validation maps • Removed general use area based on deepest species caught from workshop notes, and comment that BOEM Space Use Conflicts data more accurate for specific use.
		Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report

Commercial Fishing with Benthic Mobile Gear	• *Dinglebar is a type of fishing gear, not a place.* • *Dinglebar gear used to be the dominant lingcod gear, more hook and line now.* • *No hook, line or dinglebar commercial fisheries for lingcod in winter (November – April) but open to recreational.* • *Scallop fishing with dredges is not known to occur in Oregon.* • *Need to call out the RCAs specifically.* • *Shrimping occurs in 30 – 150 fathoms, anywhere with a muddy bottom.* • *Groundfish are fished commercially and recreationally May 1 – September 30 (2014), all inside 30 fathoms.* • *Bottom trawling is very intensive on the entire upper continental slope (well-documented in fishery logbooks) whereas draft maps show only ~1/3 of upper slope as dominant.* • *High-use inshore trawling areas off the northern coast are not show on the draft maps.* • *Trawling in Essential Fish Habitat (EFH) areas and RCAs is prohibited.* • *Areas between 200 and 700 fathoms particularly outside and around Garibaldi, Coos Bay, Port Orford and Gold Beach, should be highlighted as dominant use*	Spatial Data Changes: • Added areas had shown as dominant in marked up validation maps • Removed seaward of 700 fathoms from footprint based on EFH groundfish closures • Included shoreward of 30 fathoms • Upper slope boundary (depicted by 91 – 411 meters) covered by existing use swath • Areas between 200-700 fathoms highlighted to reflect comments Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report

Commercial Pelagic Fishing	• *Pelagic long lines, harpoons and mid-water gillnets are not used in Oregon waters.* • *Coos Bay and Newport are not mid-water trawl focused.* • *Mid-water trawl nets are usually used for whiting, not herring and anchovies.* • *Newport is the #1 port for tuna landings, #2 for salmon.* • *Coos Bay is the #2 port for tuna landings #3 for salmon.* • *Number of tuna boats on the North Coast is higher than 100.* • *For commercial tuna, extend dominant use footprint in 70-mile arc around Garibaldi south to Newport (50 miles offshore in the southern extension). This area includes a large commercial tuna fleet in small boats.* • *Tuna and salmon boats are not concentrated in one geography (i.e., the northern portion of the state), but are quite spread out throughout the study region.* • *Columbia River is the biggest producing system for Chinook and Coho salmon. Pelagic fishing maps should show more salmon fishing from northern waters south to Tillamook Head.* • *Bigger tuna boats go out beyond 200 miles.* • *Migratory fish do not always migrate on the same routes; migration depends on water temperature, current strength and where the baitfish are.* • *Pacific whiting (hake) fleet comes down from Alaska and Washington to fish 20 – 50 miles out in the summer. Processor ships are 400 feet long.* • *Garibaldi Charters deliver crewmen, captains and parts to*	Spatial Data Changes: • Revised the dominant area to include the whole coast out to approximately 500 fathoms based on a combination of workshop notes and validation notes • Added as dominant 70 NM buffer around Garibaldi, 50 NM buffer around Newport, and smoothed Reporting Changes: • Amended use definition and description based on received comments • Validation comments captured for PROUA Oregon report

	processor ships that come in to 20 – 30 miles offshore. • *Larger boats from Garibaldi have to travel to Astoria or Ilwaco for haul outs and maintenance every year.* • *Individual,* "I fish for pelagic species out to 50 miles, mostly out of Pacific City and Garibaldi."	
Recreational Fishing from Boats for Pelagic Species	• *Astoria and Garibaldi ports host the tuna classic tournament, the food goes to a local cannery and then to children in need.* • *Sport fishermen in small boats fish close to the entrance of Tillamook Bay because the weather can change very quickly and they may need to get back in the bay quickly. Emphasize fishing activity close to the mouth of Tillamook Bay and north up to Twin Rocks near Nehalem, out to 30 – 40 fathoms. It is easier to get back into the bay from the north.* • *Chinook salmon from central California rivers varies by season time and area.* • *For tuna charters, dominant use area should be a 70-mile arc around Garibaldi from July 1 – September 30.* • *Columbia River is the biggest producing system for Chinook and Coho salmon. Pelagic fishing maps should show more salmon fishing from northern waters south to Tillamook Head.* • *200 sport boats per day out of Depoe Bay are not unusual.* • *For some uses. WA participants mapped into OR EEZ, just as OR participants mapped into WA EEZ. These data were*	Spatial Data Changes: • Added as dominant 70 NM buffer surrounding Garibaldi • Validation map changes incorporated in 70 nm buffer • WA general use area added Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report

	included in the current draft map products	
Recreational Fishing from Boats for Benthic Species	• *Draft crabbing use notes are wrong, occurs up to breakers.* • *The inside crabbing line is 30 fathoms.* • *Cannot fish in 45 – 60 fathoms.* • *Crabs out to 20 fathoms from Cape Falcon to Cape Lookout.* • *Groundfish are fished commercially and recreationally May 1 – September 30 all inside 30 fathoms.* • *200 sport boats per day out of Depoe Bay is not unusual.*	Spatial Data Changes: • Added areas shown in validation maps. • Added shoreward of 30 fathoms • Unable to substantiate 45- 60 fathom comment, please provide fishing regulation reference for further review Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report
Sailing	• *Garibaldi Charters has 6 sailboats that go to the San Juan Islands and south to Newport ~10 miles offshore.*	Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report
Renewable Energy	• *Showing the potential geothermal energy resource area may cause concern. The area should be ground truthed with experts such as the NOAA vents group, and the geothermal footprint should not be shown if it is questionable.*	Spatial Data Changes: • Removed offshore geothermal area from footprint • Revised near shore polygons using current proposed lease area data provided by BOEM

		Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report
Military Operations	• *The notes for this use are correct. Since the Coast Guard responds to distress calls from the local fishing vessels and recreational boaters, its area of operations migrates with the fleet's seasonal movement* • *Generally, the 50 NM caveat works for this use footprint; the Coast Guard also operates heavily within the 3 mile zone*	Reporting Changes: • Amended use description based on received comments • Validation comments captured for PROUA Oregon report
Commercial Shipping	• *For some uses. WA participants mapped into OR EEZ, just as OR participants mapped into WA EEZ. These data were included in the current draft map products*	Spatial Data Changes: • Data were amended and smoothed to align with WA data
Ocean Dumping	• *Data anomaly in dominant use area*	Spatial Data Changes: • Amended and smoothed data anomaly
Motorized Boating	• *For some uses. WA participants mapped into OR EEZ, just as OR participants mapped into WA EEZ. These data were included in the current draft map products*	Spatial Data Changes: • Data were amended and smoothed to align with WA data
Underwater Transmission Cables	• *Advised to get accurate spatial cable data from OFCC*	Spatial Data Changes: • General use areas removed due to specific OFCC spatial data
Cruise Ships	• *For some uses. WA participants mapped into OR EEZ, just as OR participants mapped into WA EEZ. These data were included in the current draft map products*	Spatial Data Changes: • WA general use area added
Permanent Research Areas	• *For some uses. WA participants mapped into OR EEZ, just as OR participants mapped into WA EEZ. These data were*	Spatial Data Changes: • WA general use area added

	included in the current draft map products	
Wildlife Viewing at Sea	• *For some uses. WA participants mapped into OR EEZ, just as OR participants mapped into WA EEZ. These data were included in the current draft map products*	Spatial Data Changes: • Data were amended and smoothed to align with WA data

Other Comments

- Depoe Bay is a small community dependent on fishing and whale charters for economic base; it is the economic engine of the community and has the largest charter fleet.
- Fishing is the largest producer of revenue in Lincoln County. It is important to coastal businesses not to sacrifice business for experimental marine renewable energy.
- There are areas of the coast (Astoria, Gold Beach, Brookings) where fishing communities are not as organized.
- PROUA should be an iterative process, by continuing to work with full representation of all sectors of fishing industry, and by integrating other existing information into final map products.
- Marine Cadastre should guide users to all available map resources and illustrate existing data gaps.
- Need to make sure data are transparent (e.g., appropriate metadata and caveats) and accessible to be comparable to other studies e.g., *Space-Use Conflicts* study, or TSP use mapping.
- Maps do not account for excessive use from neighboring ports.
- Scale of mapping was not appropriate for users to provide detailed data.
- No North Coast fishermen were represented in the workshops.
- Need a more robust stakeholder involvement process with assets behind it; MSP with funding to map as much of OCS as possible so communities are ready when developers approach them.

PACIFIC REGIONAL OCEAN USES ATLAS

Hawaii Ocean Uses Atlas Validation Period Comments

Validation period January 22nd – March 3rd, 2015

General Protocol Comments

The following comments were received in reference to the PROUA data review process and will be included in the final project report to BOEM.

- Attendance at weekday lunch time data review meeting and webinar was limited because this is a difficult time for working public to attend.
- No project partners able to attend in person data review meetings.
- Suggested data review amendments were not carried out during the data review period.
- Data should only be represented about an island if those data are gathered from resident participants.

General Map Comments

The following comments were received in reference to the PROUA data. The table lists the comments received and any subsequent modifications or changes made to the use notes (reporting) or use pattern data (spatial changes) in response to those comments. For some comments where there were no changes were made to the PROUA data, an explanation is provided.

Comment received	Any changes made
Maps do not account for excessive use from neighboring ports.	**Reporting Changes** • None This project was designed to broadly document where ocean uses are occurring, not to assign value, impact or socio-economic importance to a place, a use or a suite

	of uses.
Notes depict acronym for Pacific Islands Ocean Observing System as PaciOOS PacIOOS	**Reporting Changes** • Spelling Changed
Change spelling of Keahou to Keauhou	**Reporting Changes** • Spelling Changed
Use descriptions include illegal or restricted activities	**Reporting Changes** • None Use descriptions are intentionally broad and can include reference to illegal or restricted activities. This does not suggest that this activity occurs. Information about uses is represented spatially (on the map) and/or in written format in the use notes. The map and the notes together collectively capture information provided during the mapping workshops and should be consulted as a whole to fully understand the nature of the use pattern.

Specific Ocean Use Comments

Ocean Use	Comments Received	Any Changes in Data
Military Use Areas	• *Use description:* Includes illegal activities (ordnance disposal) and out of date terminology (war games)* • *Spatial Data:* Include operational and training areas as provided • *Use Note Comment: These areas are documented on*	Reporting Changes: • Kauai use note amended to: *There are a number of documented military areas around Kauai; these are displayed in the federal register and nautical charts. These areas are used by the Navy for training and exercises, including torpedo recoveries.* • Lanai use note amended to: *Submarines are observed operating in the*

*War games term changed to "fleet readiness training" and ordance disposal removed from use description in Hawaii.

	nautical charts and in the Federal Register. • ('There are a number of undocumented military areas around Kauai that are used by the Navy for training and exercises, including torpedo recoveries. ') • *Use Note Comment: Submarines routinely train throughout Hawaiian waters and those activities are not limited to RIMPAC* • ('In recent years, submarines were observed operating in the waters surrounding Hawaii as part of the Rim of the Pacific Maritime Exercises (RIMPAC). ') • *Use Note Comment: Kahoolawe has not been used as a training range since 1990* • ('The area around Kahoolawe was used for target practice and unexploded ordnance has been found in surrounding waters.') • *Use Note Comment: False* • ('Military vessels typically demand a 500 meter buffer from commercial and non-commercial boats.') • *Use Note Comment: RIMPAC has no bearing on frequency, location and timing of military training* • ('Across the other islands, military use is much less frequent, but there are areas designated for maneuvers, notably during the Rim of the Pacific (RIMPAC) maritime exercises.')	*waters surrounding Hawaii.* • Maui use note amended to: *Maui is a transit area for the military, there are no permanent military bases on the island but there are National Guard facilities. The area around Kahoolawe was used for target practice and training until 1990 and unexploded ordnance has been found in surrounding waters.* Statewide use notes amended to: *Across the other islands, military use is much less frequent, but there are areas designated for maneuvers in the federal register and noted on nautical charts.* • Oahu use notes amended to: *Military operations occur throughout the Hawaiian islands. The US Coast Guard is involved in regular military operations and provides rescue services all throughout Hawaiian waters year round. The biennial Rim of the Pacific Exercise (RIMPAC) also brings military ships from around the world to Hawaii. The Navy also trains regularly off south and east Pearl Harbor and all waters surrounding Oahu. Within Kaneohe Bay, there is a naval defensive sea area that serves as a buffer to Marine Corps Base Hawaii on the Mokapu Peninsula. Amphibious landing trainings take place on the peninsula and on Marine Corps Training Area Bellows (MCTAB) in Waimanalo. Marine aviation assets routinely transit from Mokapu Peninsula along the east coast of Oahu to the Whiskey 189 (W189) warning area on the northeast corner of Oahu and PMRF as well as south to MCTAB, Molokai and Hawaii Island.*

	• *Use Note Comment: Navy does not have authority to for routine training to evacuate civilian vessels* • ('During a military training exercise, all civilian vessels are evacuated within a 3 nautical mile exclusion zone.')	*MCTAB is opened to the public on most weekends and Holidays.* • Hawaii use notes amended to: *There are a number of documented military installation and training areas on and around Hawaii Island used for exercises and training and specifically for Blackhawk helicopters and other aviation transiting to Pohakuloa Training area overflights and C-17 transporters practicing touch-and-go. While the Rim of the Pacific Exercise (RIMPAC) (the world's largest international maritime warfare exercise) brought various foreign military ships to local waters, this is not a common occurrence.* • Removed from statewide and Kauai use notes due to false statement: *During a military training exercise, all civilian vessels are evacuated within a 3 nautical mile exclusion zone.* • Use descriptions are intentionally broad and can include reference to illegal or restricted activities. Information about uses is represented spatially (on the map) and/or in written format in the use notes. The map and the notes together collectively capture information provided during the mapping workshops and should be consulted as a whole to fully

		understand the nature of the use pattern. Spatial Changes: • Operational and training areas added into footprint
Commercial fishing with benthic fixed and mobile gear (Hawaii)	• *Use Note Comment:* No trawling or trolling for bottomfish in the state, the only exception is Cross seamount, species targeted are Monchong (Pomfret). • *Spatial Data:* Restricted bottom fishing areas exist in Hilo and Upolu point west to Pololu valley	Reporting Changes: • Hawaii island use and state notes amended to include the sentence: *Across the state there is no benthic trawling or trolling except to target Monchong near Hawaii island on the Cross seamount.* Spatial Changes: • BRFA areas removed from footprint and dominant areas in data
Commercial fishing with benthic fixed and mobile gear (Oahu)	• *Use Description:* Includes illegal activities (anchored gillnets) (Comm. Benth. Fixed) • *Use Description:* Includes illegal activities (benthic long lines) (Comm. Benth. Mobile) • *Use Note Comment:* Confusion in use notes regarding where Kahala Bay is and if it is a dominant fishing area • *Use Note Comment:* Use notes indicate Penguin Banks is part of Oahu, not Maui Nui • *Use Note Comment:* Kona crab fishing occurs primarily between 20-40 fathoms	Reporting Changes: • Oahu use note amended to remove reference to Kahala bay as dominant fishing area. • Fishing grounds are referenced in island specific use notes because participants referenced them during mapping workshops. Fishing areas are not attributed to island ownership. • Oahu use note amended to reference Kona crab fished between 20 - 40 fathoms • Use descriptions are intentionally

		broad and can include reference to illegal or restricted activities. Information about uses is represented spatially (on the map) and/or in written format in the use notes. The map and the notes together collectively capture information provided during the mapping workshops and should be consulted as a whole to fully understand the nature of the use pattern.
Commercial pelagic/ mid-water fishing (Oahu)	• *Use Description:* Includes prohibited activities (mid-water gillnets) • *Used Description:* Replication, buoys are covered under "fishing at fish aggregation devices (FADs)" • *Use Note Comment:* "akule, opelu and ono" are generally targeted near the 40 fathom benthos	Reporting Changes: • Use descriptions are intentionally broad and can include reference to illegal or restricted activities. Information about uses is represented spatially (on the map) and/or in written format in the use notes. The map and the notes together collectively capture information provided during the mapping workshops and should be consulted as a whole to fully understand the nature of the use pattern. • Use description not altered. The fish aggregation devices are not the only buoys present in Hawaii's marine waters, • No use note amendment because

		existing sentence satisfies comment: • *e.g. akule, opelo and ono between 50-200 fathoms*
Commercial pelagic/ mid-water fishing (Hawaii)	• *Use Note Comment:* Most long liners are based from Honolulu including selling their catch and resupplying there. Some short line boats are based on Hawaii, but sell primarily in Honolulu and lesser amounts in Kona/Hilo • *Use Note Comment:* Opelu are too small to be caught by long line • *Use Note Comment:* Cross Seamount is where smaller Tuna are caught. Longlining is prohibited within 80 or 100 Miles of the leeward side of the Island of Hawaii, short lining is carried out either on Cross Seamount or around the NOAA weather buoys. • *Use Note Comment:* No mention of Private FADS around the Big Island • *Use Note Comment:* Longlining is the primary method of fishing, if measured by pounds of landed fish - much of longlining however occurs on the far reaches of the EEZ due to the Long Line Exclusion Zones that are close in (~40 NM). The primary use, when measured by effort, however is trolling for pelagics (marlin, mahi mahi, ono, and ahi). This occurs closer to shore and is correctly noted on the maps as dominant use areas. • *Spatial Data:* The non-dominant use area east of the area marked "Hawi" (really Opolu Point) is the Bottomfish Restricted Fishing Area - it should be noted that trolling	Reporting Changes: • State use note amendment: • *There are 110 long liners in the state and 11 short liners (<1 nautical mile length line). Most long liners are based from Honolulu including selling their catch and resupplying there. Some short line boats are based on Hawaii island, but sell primarily in Honolulu and to a lesser amount in Kona/Hilo. Long liners using gear longer than 1 nautical mile are restricted by the MHI longline fishing prohibited area. Longlining is the primary method of fishing, if measured by pounds of landed fish. The primary use, when measured by effort, is trolling for pelagics (marlin, mahi mahi, ono, and ahi).* • Hawaii island use note amendment: • *The main pelagic species targeted are marlin, ono (usually within 40 – 60 fathoms), ahi using opelu as bait.* • Hawaii use note amendment: • *Smaller tuna are caught on the cross seamount using short lines (<1 nautical mile length) and around NOAA weather buoys. Private FADs have been placed offshore in a few select locations, but these are not as highly used as the state-maintained FADs.* • Hawaii use note amendment: • *Long line and short line fishermen tend to fish by exclusion zones rather than depth.*

	for pelagics IS NOT restricted in that area, and it should be marked as dominant. Additionally, DLNR has proposed to open six BRFA's throughout Hawaii of which the Opolu Point area is one of them. While bottomfishing does not currently occur there, once it is opened (i.e. restriction lifted) that area will become dominant. • *Use Note Comment:* Page 5b: The 110 longliners and 11 shortliners information was misquoted - these numbers are not for Hawaii Island, this is the total number of licensed vessels in the State of Hawaii. Only a few of these fish off the coast of Hawaii Island.	Spatial Changes: • Noted areas added to dominant use
Paddling (Oahu)	• *Use Note Comment:* Paddling occurs year round. The following generally applies statewide. For more information on the HSCR member outrigger canoe associations and their schedules see: http://www.hcrapaddler.com/index.php?action=assoclist. o March - May = Preseason iron distance races (4-12 miles, off shore) o June-July = Regatta (sprint) season. o August - Mid October = Distance (change races 20-100 miles, off shore and between islands) o November - June = OC1/ OC2 racing season (8-32 miles, off shore and between islands) o December-January - Na Opio Canoe Racing	Reporting Changes: i) Notes incorporated into final report to Bureau of Ocean Energy Management (BOEM)

	Association (high school sprints and off shore distance (2-4 miles)) • *Use Note Comment:* For the HSCA (sailing canoe) racing information, see: http://hsca.info/ May- September (30-100 miles, offshore and between islands) • *Use Note Comment:* o Interisland races are in or across the following channels: o ‘Alenuihāhā Channel between Big island and Maui – btwn islands o ‘Alalākeiki Channel between Maui and Kaho’olawe - Maui side only o Kealaikahiki Channel between Lanai and Kaho’olawe – Lanai side only o ‘Au‘au Channel between Lanai and Maui – btwn islands o Pailolo Channel between Maui and Molokai – btwn islands o Kalohi Channel between Molokai and Lanai – btwn islands o Kaiwi Channel between Molokai and Oahu – btwn islands o Kaulakahi Channel between Kauai and Ni`ihau – Kauai side only (Ni`ihau is forbidden access) o Ka‘ie‘ie Waho Channel between Oahu and Kauai –	

	btwn islands • *Use Note Comment:* SUP, prone paddle board, and surfski racing schedules – tie into the OC1/2/4/6/12/sail schedules	
Renewable Energy (Lanai)	• *Spatial Data:* Prospective renewable energy areas should not be listed in the data	Spatial Changes: • Prospective renewable energy areas on Lanai removed
All fishing (Kauai)	• *Spatial Data:* No commercial fishing will be allowed in the future between the watershed from Lawai Kai to Waimea River	Reporting Changes: • Comments are noted for the final report to BOEM.
Mariculture & Fishponds (Hawaii)	• *Spatial Data:* Floating net pens not shown on map	Reporting Changes: • Use descriptions are intentionally broad and can include reference to illegal or restricted activities. Information about uses is represented

		spatially (on the map) and/or in written format in the use notes. The map and the notes together collectively capture information provided during the mapping workshops and should be consulted as a whole to fully understand the nature of the use pattern.
Permanent Research Areas (Hawaii)	• *Spatial Data:* No laboratory shown at Puako	Reporting Changes: • Use descriptions are intentionally broad and can include reference to illegal or restricted activities. Information about uses is represented spatially (on the map) and/or in written format in the use notes. The map and the notes together collectively capture information provided during the mapping workshops and should be consulted as a whole to fully understand the nature of the use pattern.
Commercial Intertial Harvest (Hawaii)	• *Spatial Data:* Use should be shown as dominant from Keauhou to Milolii	Spatial Changes: • Dominant are added as noted
Beach Use (Hawaii)	• *Spatial Data:* Beach use should be removed where there are cliff areas i.e. no access	Reporting Changes: • No change due to comment being addressed in existing use notes: *Beach use occurs on all accessible coastal areas along the shoreline.*

		Spatial Changes: • No change

Other Comments

- Concerns expressed regarding alternate NOAA federal mapping programs for example Habitat Blue Print.
- Concerns expressed regarding north island homeowners perceived attempt to block public access to the ocean
- Concerns expressed that state agencies are proposing to close the access Old Puako Road
- Concern expressed regarding implementation of renewable energy areas that provide power to neighboring islands
- Concern expressed regarding implementation of new technology that might interfere with Hawaiian cultural sites or the environment.
- Local area constituents must be consulted regarding any future planning initiatives
- Airspace restrictions 14 CFR Part 77 should be displayed on ocean use maps

APPENDIX IV

Ocean Use Maps by Geography

WASHINGTON OCEAN USES ATLAS PROJECT
OCEAN USES MAP BOOK

Introduction

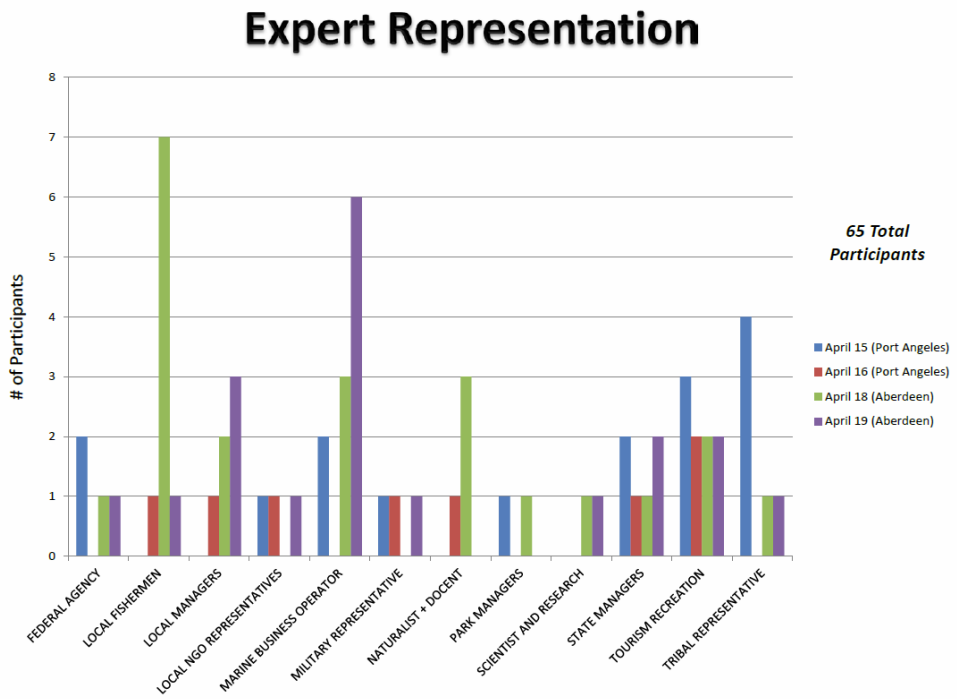
This map book contains cartographic products derived from the Washington Ocean Uses Atlas participatory mapping workshops conducted in Port Angeles on April 15-16, 2013 (at the Clallam County Courthouse) and Aberdeen on April 18-19, 2013 (at Grays Harbor College). These participatory mapping workshops were designed to collect spatial data from regional ocean uses experts and stakeholders for a wide range of activities that occur throughout the coastal and marine waters offshore of Washington. Through facilitated discussion and hands-on digital mapping, workshop participants documented areas where uses occur, variation in use patterns and historical and/or community perspectives on how the use has evolved over recent years.

The Washington Ocean Uses Atlas project is a collaborative effort between NOAA, the Bureau of Ocean Energy Management, and Washington state agencies designed to collect spatial data on ocean uses throughout Washington's coastal and offshore waters to inform the state's marine spatial planning process and planning for potential offshore renewable energy development. The project was funded by the U.S. Department of the Interior, Bureau of Ocean Energy Management, through an Interagency Agreement with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

Workshop Attendance

The four days of participatory mapping workshops were facilitated by 7 staff from both NOAA Coastal Services Center and NOAA's Marine Protected Areas Center.

In total over the 4 days, 65 participants attended from throughout the state, representing all use sectors, including tribal representatives from the Makah Tribe, Quileute Nation and Quinault Indian Nation. The participants spanned a wide range of expertise, as shown on the adjacent plot.



Targeted Uses

Industry/Military Sector	Extractive Sector	Non-Extractive Sector
• Commercial Shipping • Mariculture • Marine Debris • Military Operations • Mining and Mineral Extraction • Ocean Dumping • Renewable Energy • Underwater Cables • Underwater Pipelines	• Commercial Dive Fishing • Commercial Fishing with Benthic Mobile & Fixed Gear • Commercial Intertidal Harvest • Commercial Pelagic Fishing • Commercial Seaweed Harvest • Kayak Fishing • Recreational Dive Fishing • Recreational Fishing from Boats • Recreational Fishing from Shore • Recreational Intertidal Harvest • Subsistence Fishing & Harvest	• Beach Use • Cruise Ships • Cultural Use Areas • Motorized Boating • Paddling • Permanent Research Areas • Sailing • SCUBA/Snorkeling • Surface Board Sports • Swimming • Tide Pooling • Wildlife Viewing

The following is the list of uses that were mapped in the workshops. Maps for each of these uses are provided at various scales in this map book and include definitions for each use category.

Generalized Workshop Process

At the start of the workshop, participants were assigned to a work group and an associated mapping station. With guidance from facilitators, participants were asked to draw use areas based on their knowledge and observation of where this type of activity is known to occur. For some uses, existing data was presented and participants were asked to review, if necessary, modify the existing data for completeness and accuracy. Each use was explicitly defined (see uses list) and participants were asked to map the general use footprint and dominant use areas, as described below. Participants were also asked to record relevant supplemental information (e.g., seasonality, social and cultural significance, historical patterns) that was compiled and added to the final use maps. The following provides detail for type of information collected for each use category:

- **General Use Footprint:** The general use footprint includes all areas in which the use is *known to occur with some regularity* (over the past 3-5 years), regardless of its frequency or intensity. The general use footprint does not include areas where the use may occur once or twice or where it might *conceivably* occur now or in the future.

- **Dominant Use Areas:** Dominant use areas are defined as *ocean areas routinely used by most users most of the time* (within the seasonal patterns for that use). Dominant use areas must be drawn within the general use footprint. Participants were asked to work together to draw dominant use areas as they occur throughout the study region.

- **Supplemental Use Data:** Participants were asked to provide supplemental information on the *ocean use information form*. For some uses, participants noted specific locations on the map where variation of the use occurs (e.g. fishing for special events, night vs. day fishing). This information was compiled and added to the use maps in the notes section.

Tribal uses of the ocean were not mapped explicitly, though tribal chairs and/or their designated representatives were formally invited by BOEM to participate in the mapping workshops. The sharing of tribal use information was dependent upon each tribe's determination of whether the mapping workshops were an appropriate forum for sharing such information. Any tribal use information shared during the workshops was incorporated into the defined use categories. Thus, the atlas data and map products do not explicitly depict tribal use.

Maps

Data compiled during the workshop were processed to create maps documenting the use patterns as drawn by the workshop participants. The following maps show patterns for each use mapped in the workshops and include the general use footprint and dominant use areas, as well as a compilation of the supplemental data provided by participants throughout the mapping process. In creating the use maps, note the following protocol used to create the general use footprint and dominant use areas.

The ***general use footprint*** includes **ALL** areas that were mapped as general use by **ANY** of the groups that mapped that particular use over the four days of workshops.

The ***dominant use areas*** shown on the maps include **ONLY** those areas that were mapped as dominant by a **MAJORITY** of the groups that mapped that particular use over the four days of workshops.

The maps have been reviewed by workshop participants prior to publication. Slight revisions and modifications were made to some of the draft maps based on the collective participant feedback. For access to the spatial data (including detailed metadata on processing, review and revisions) please visit NOAA's Digital Coast (https://coast.noaa.gov/dataregistry/) or the Washington Marine Spatial Planning (www.msp.wa.gov) online mapping application.

Contacts

If you have questions about this project, please contact:

Mimi D'Iorio
Project Lead
Mimi.Diorio@noaa.gov

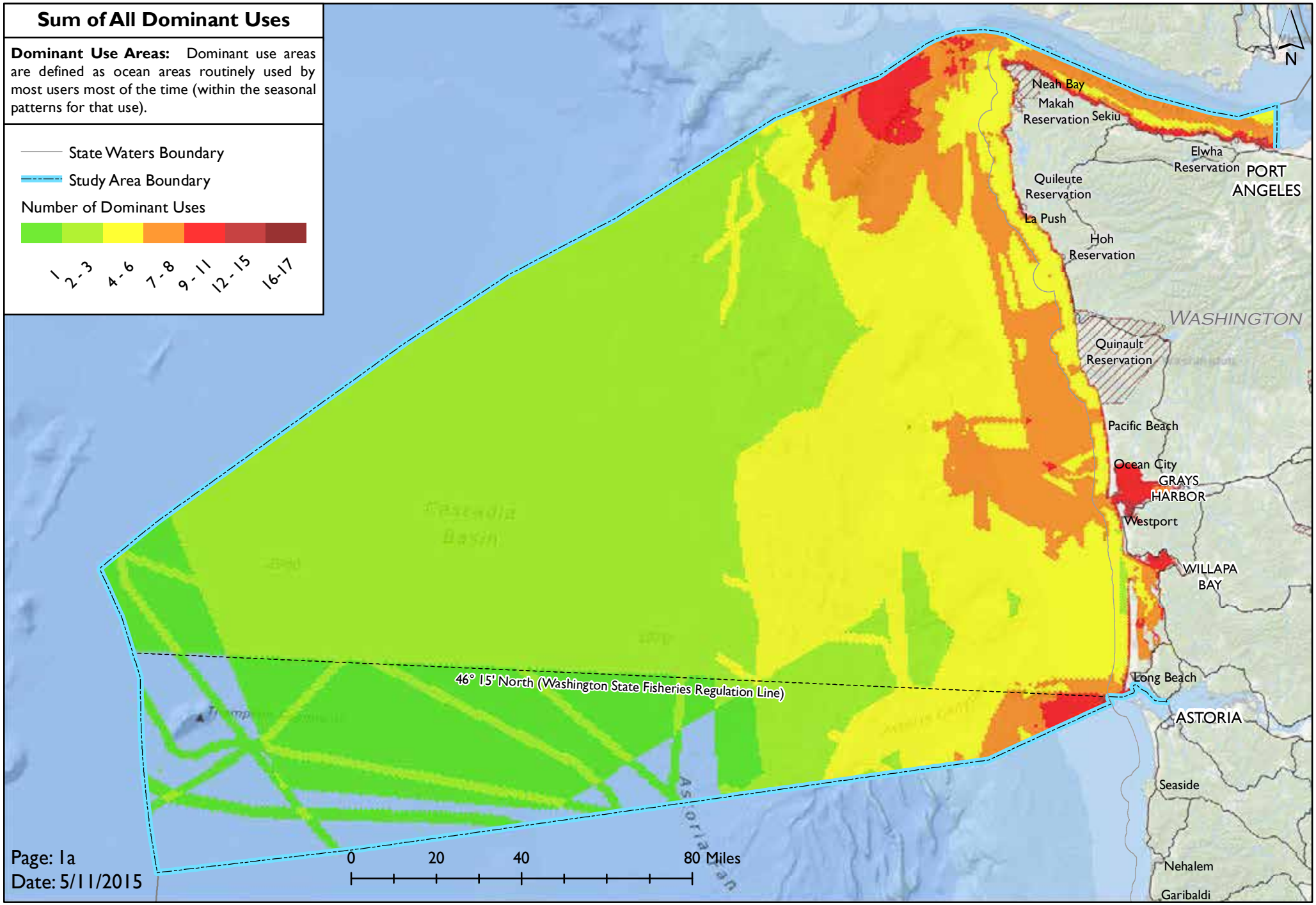
Sara Guiltinan
Project Officer
Sara.Guiltinan@boem.gov

May 2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

BOEM
Bureau of Ocean Energy Management



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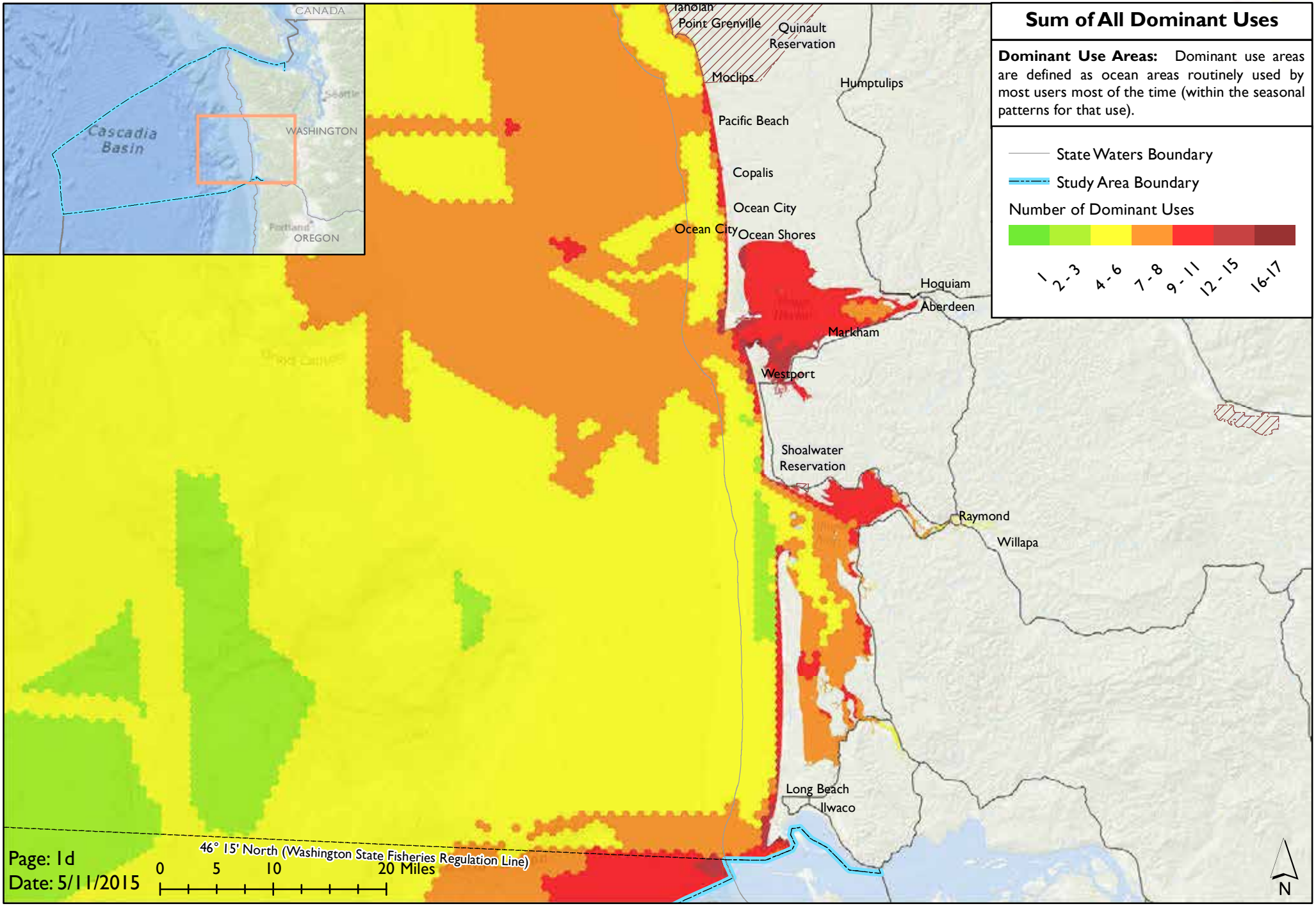
Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters



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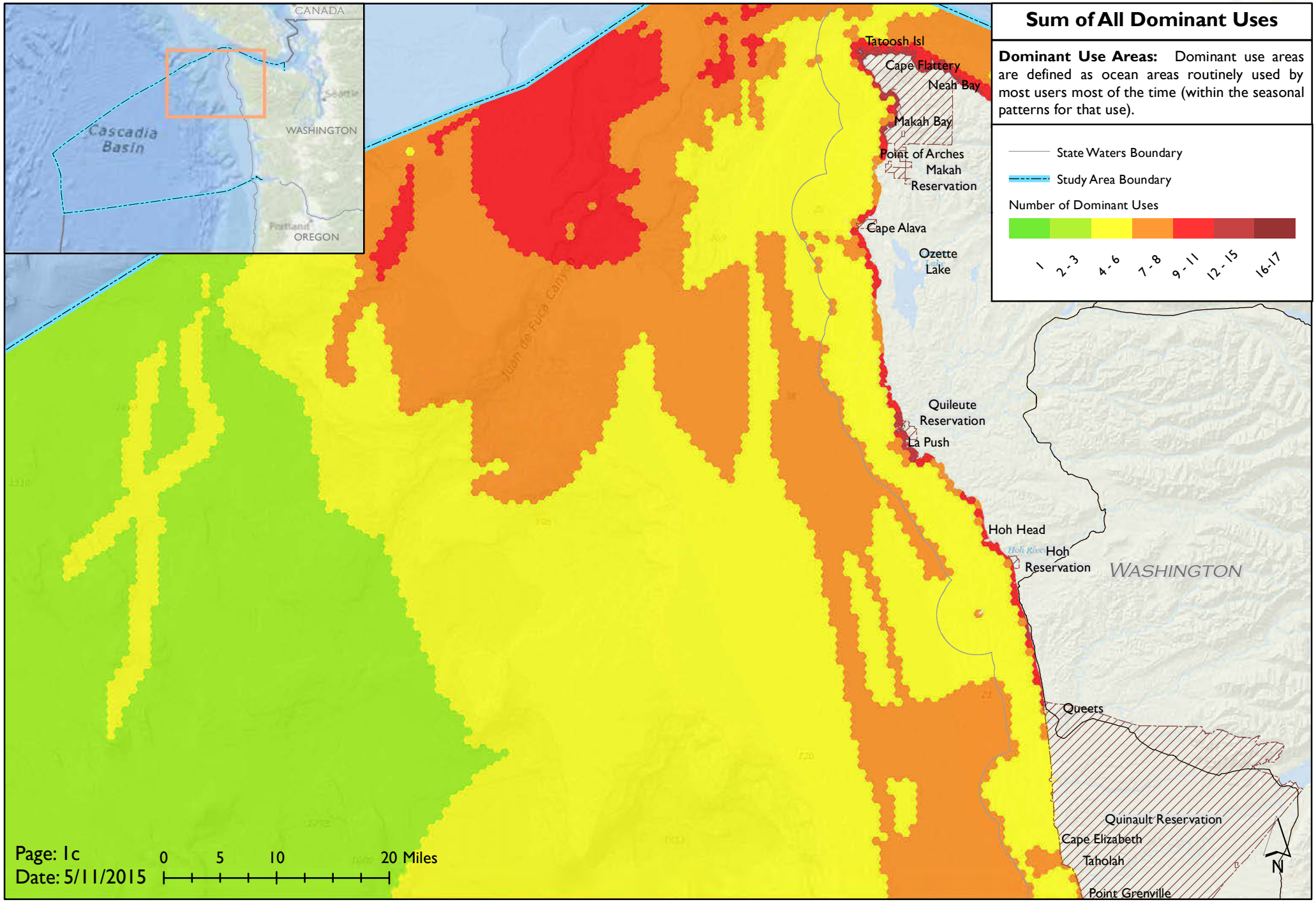
Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters



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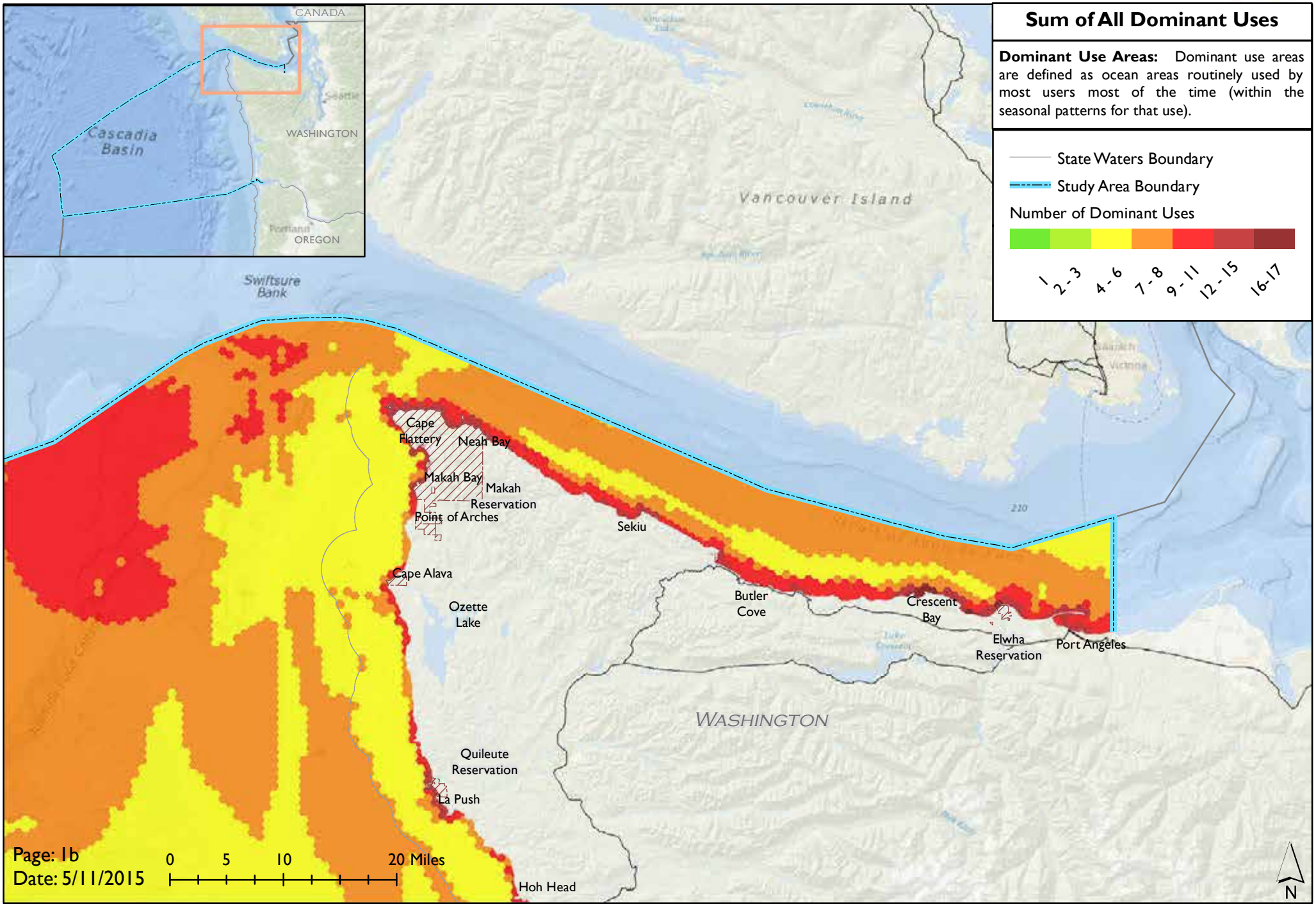
BOEM
Bureau of Ocean Energy Management



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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Commercial Fishing with Benthic Fixed Gear

Includes:
Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types used to catch benthic fishes and invertebrates

Excludes:
All other forms of fishing

Use Notes:
Commercial fishing with benthic fixed gear occurs throughout the study area with a focus on dungeness crab, black cod, halibut, spot prawn and hagfish. Longlines are used in the canyons at depths of 50 fathoms or more; crab pots are most commonly between 2-75 fathoms with most of the crabbing inside 100 fathoms. Crabbers hold over 200 permits in the state and account for over 100,000 crab pots. Protection of the crab fisher heritage and culture is very important to the local coastal communities. Recently the crab fishery has been shifting towards the southern coast near Klipsan Beach where 40-50% of the crab fleet is fishing in 9% of the 140 mile coast.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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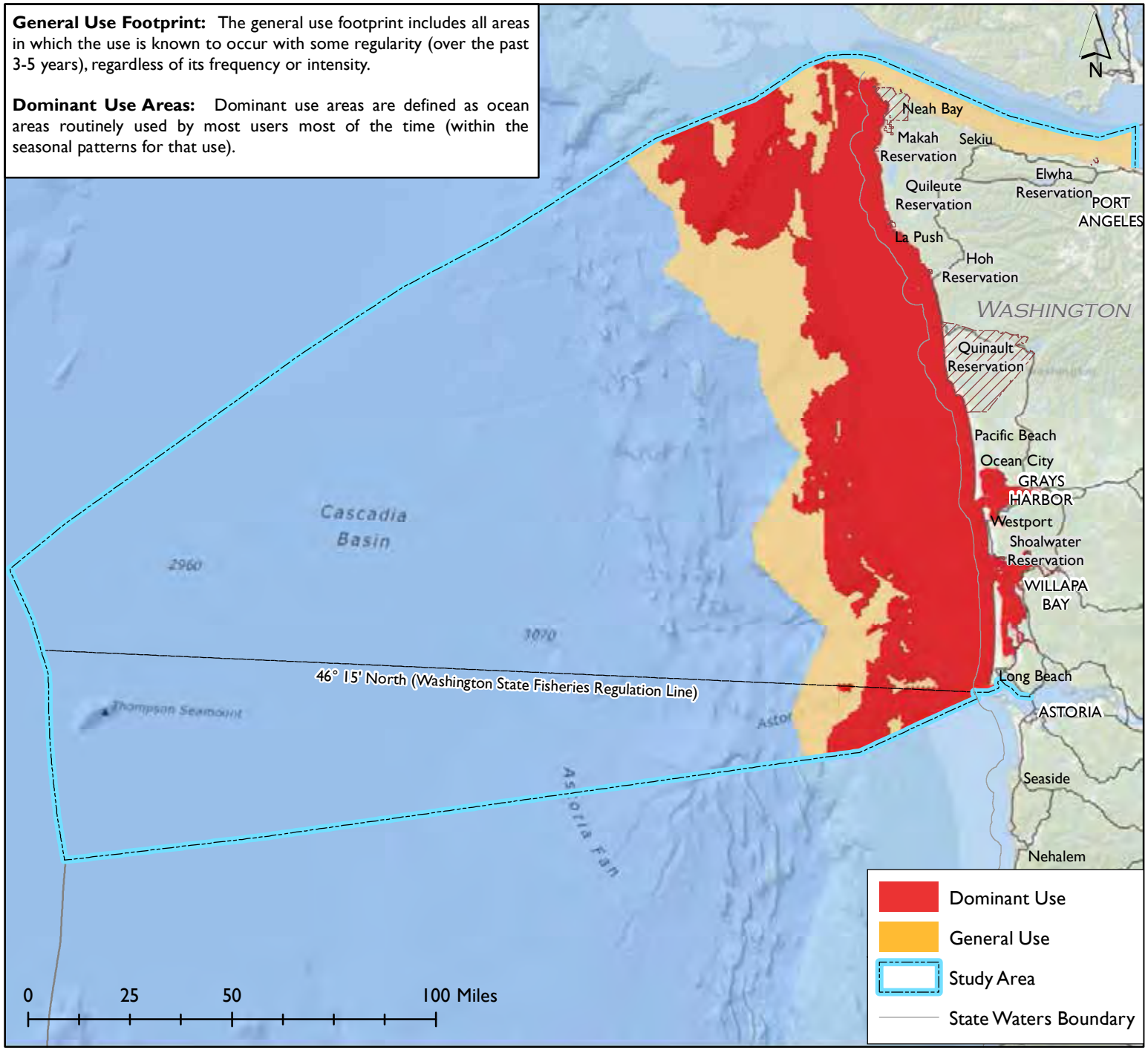

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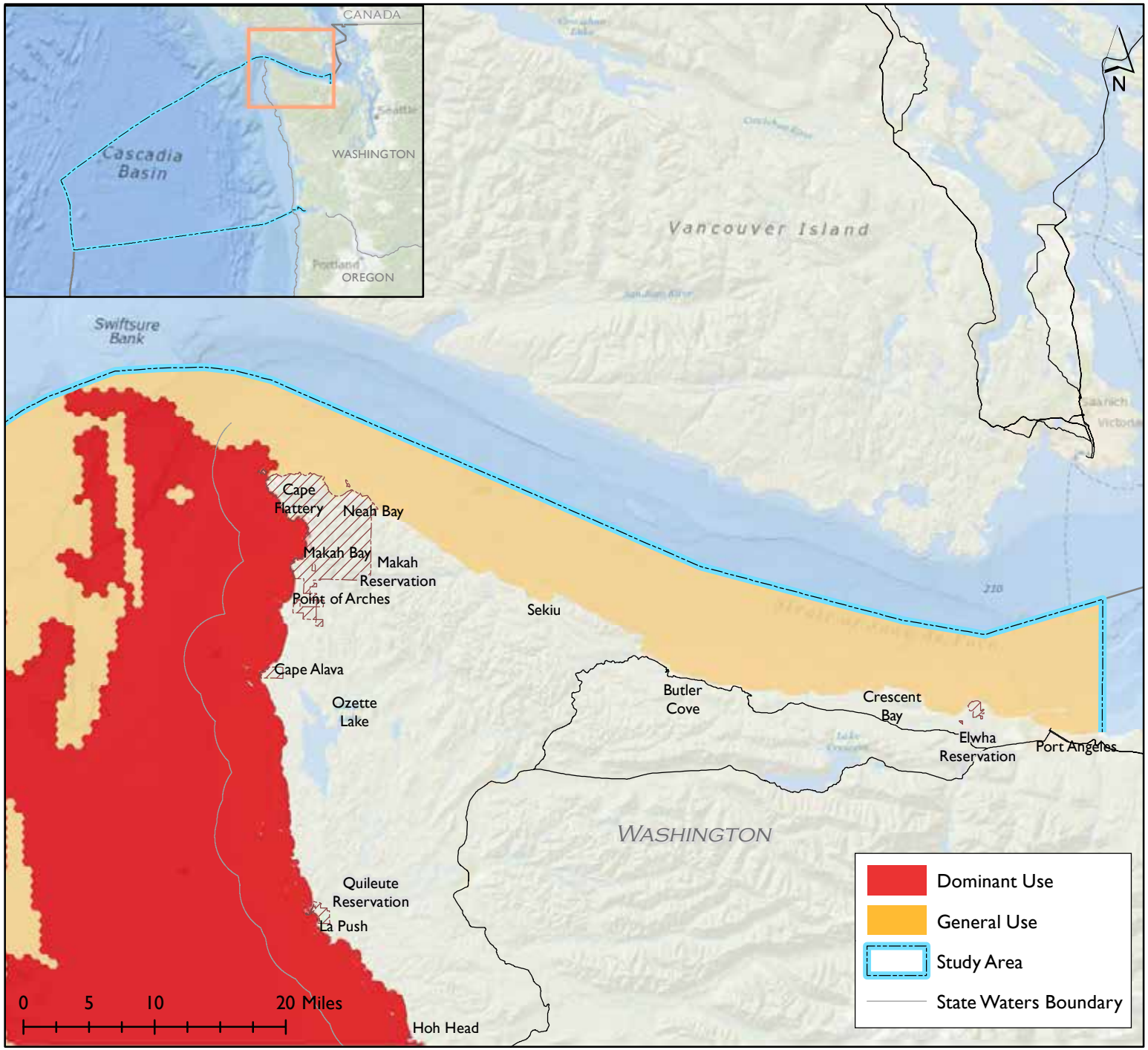

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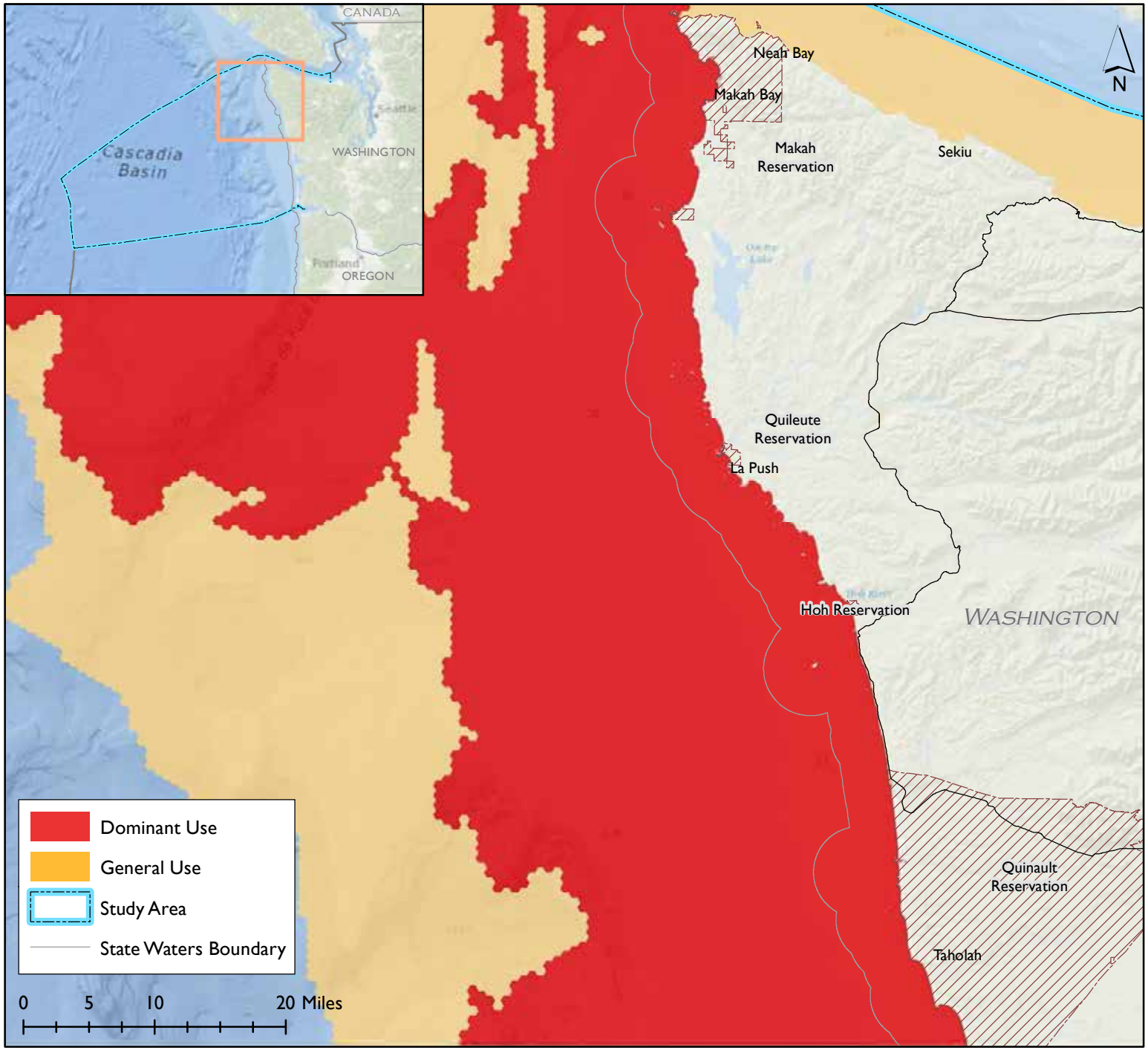

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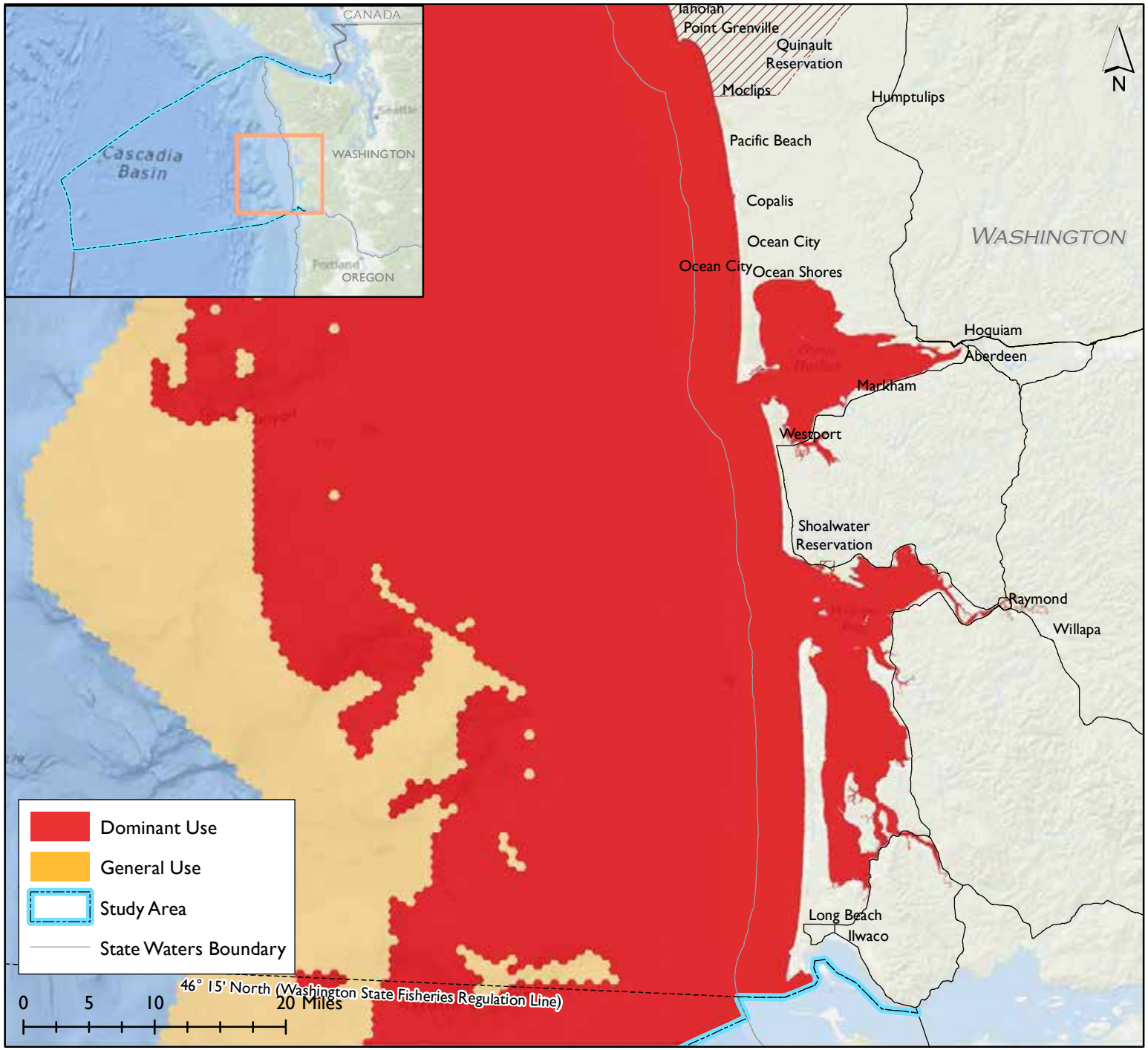

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Commercial Fishing with Benthic Mobile Gear

Includes:
The use of rod and reel, trolling, trawling and other mobile gear to catch benthic fishes and mobile invertebrates

Excludes:
All other forms of fishing

Use Notes:
Commercial fishing with benthic mobile gear occurs mainly on the offshore portion of the continental shelf between 20-700 fathoms. This includes fishing for pink shrimp along the rocky edge of the shelf and around muddy, soft bottom areas; halibut trolling concentrated around 30-180 fathoms; black cod and groundfish between 60-700 fathoms; sole or flatfish between 20-700 fathoms.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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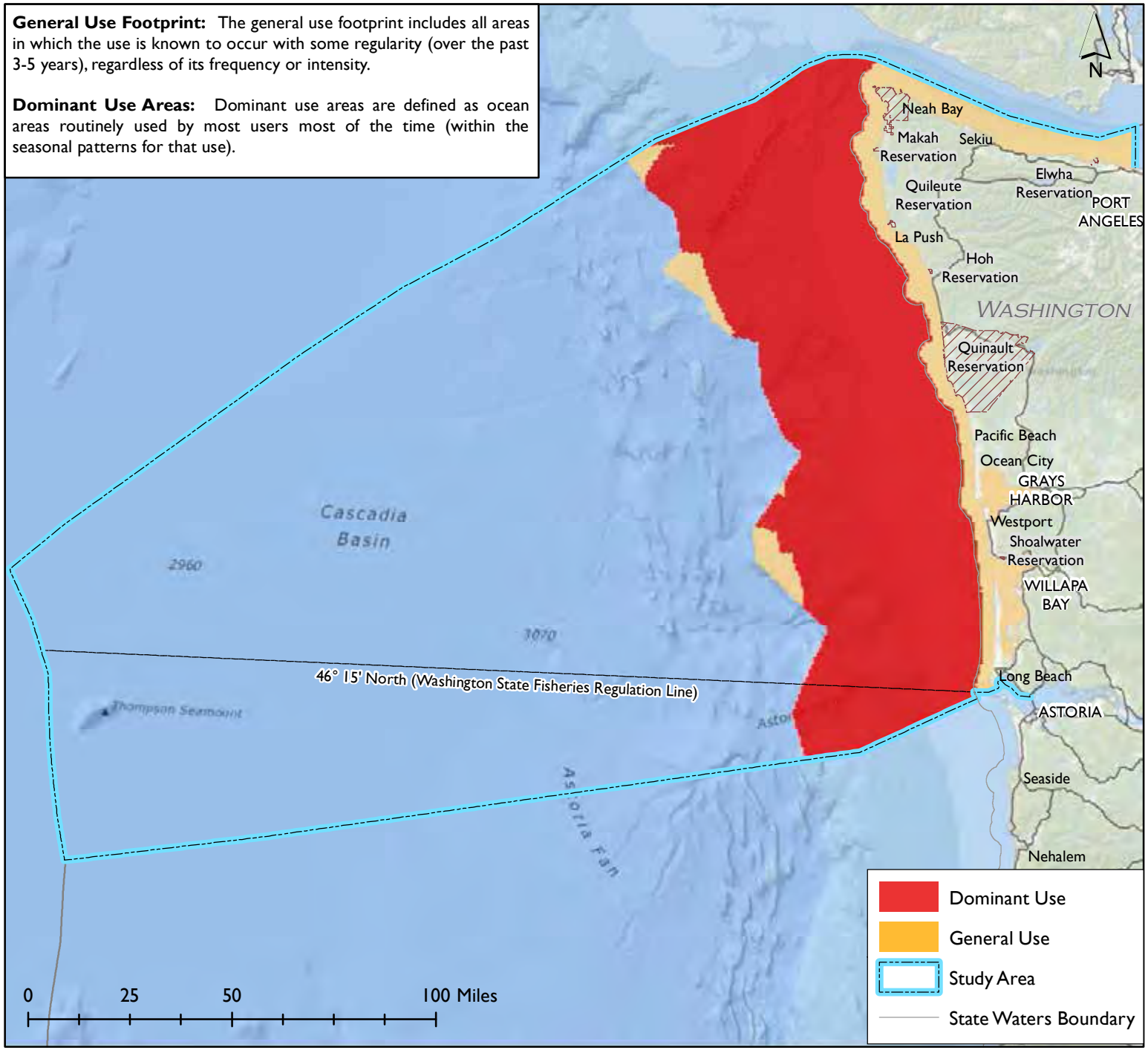

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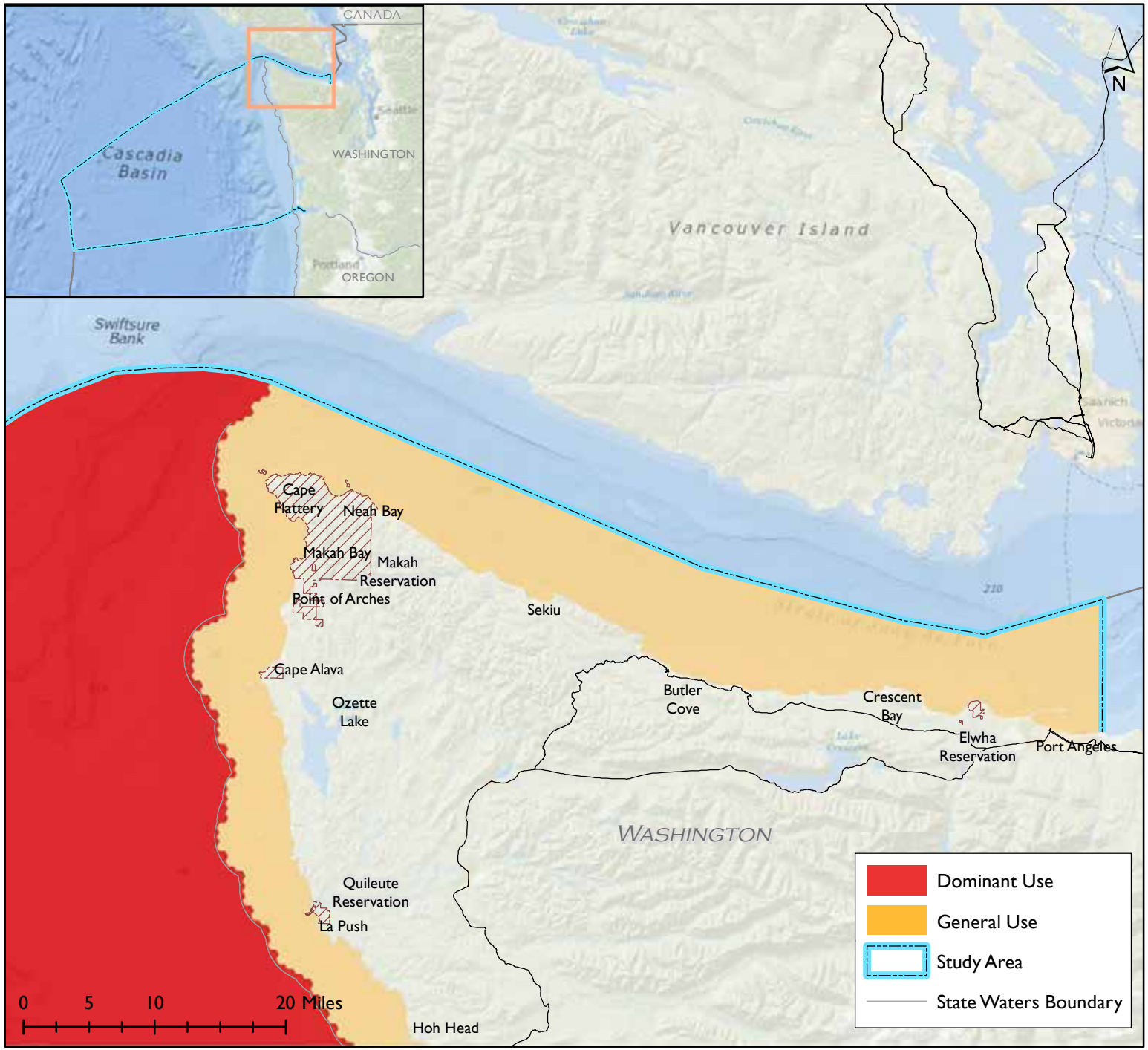

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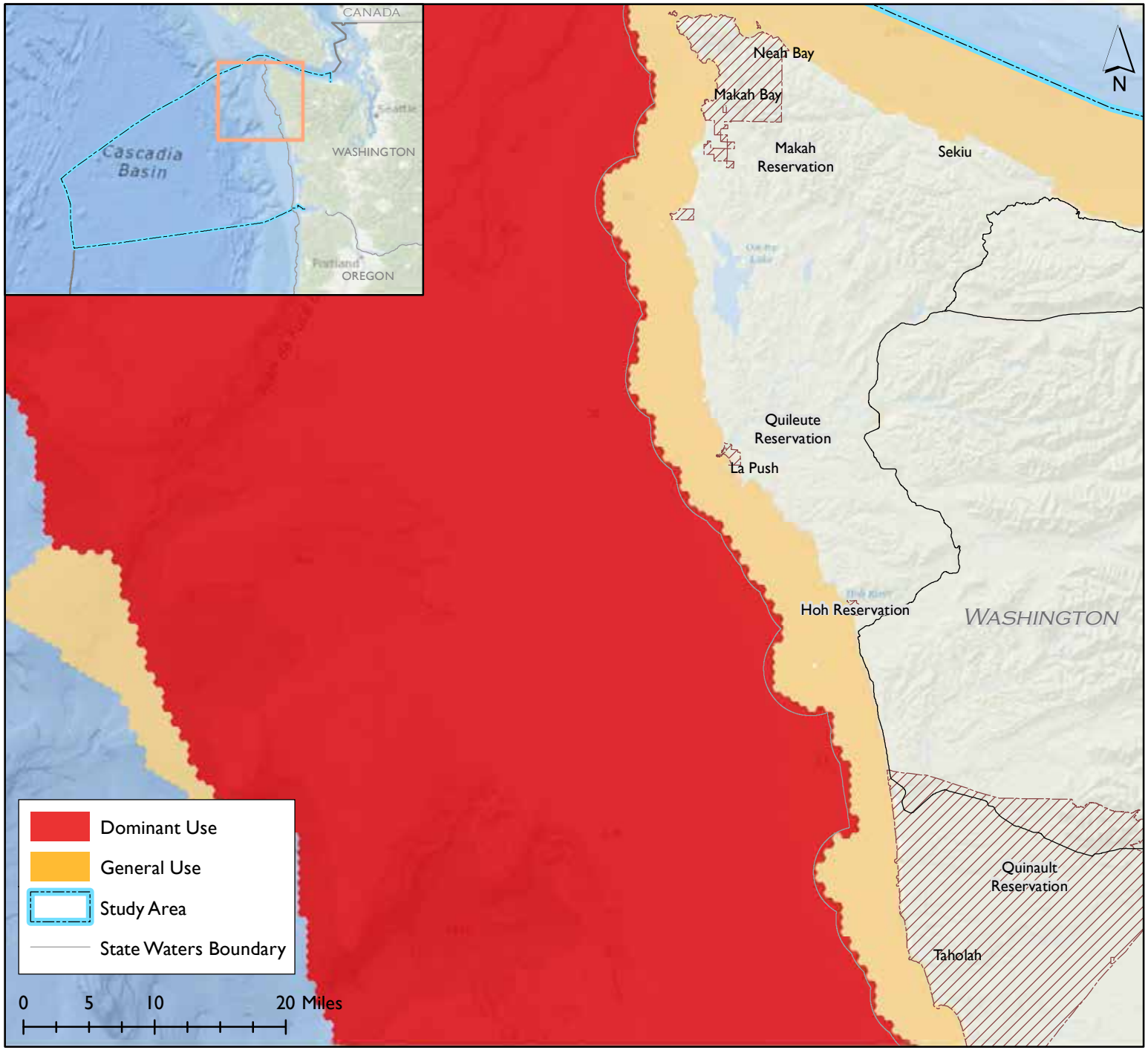

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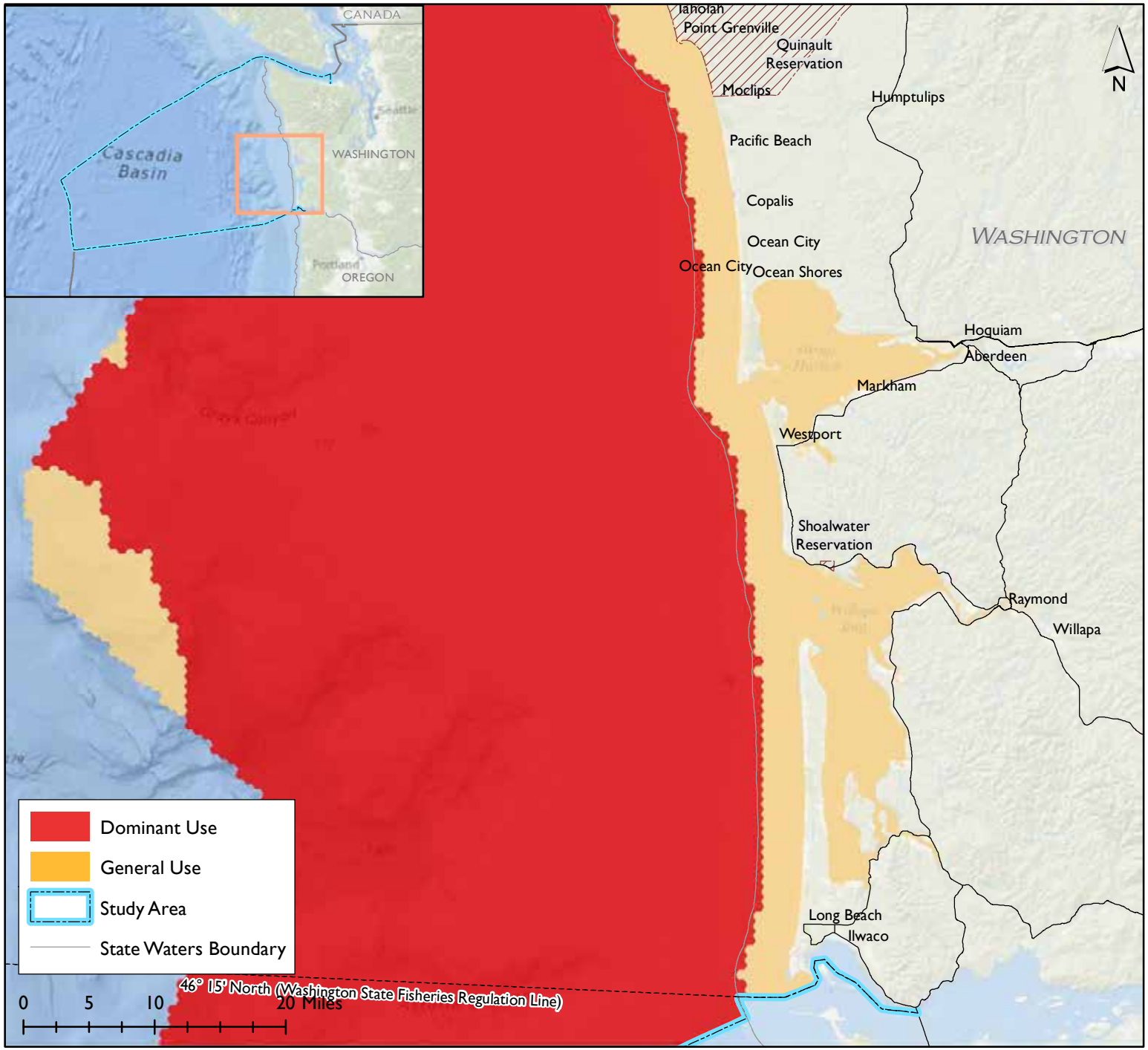

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Commercial Dive Fishing

Includes:
The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing, recreational SCUBA/Snorkeling

Use Notes:
Commercial dive fishing is not a significant use in this area. Mainly a tribal use, it is most common along the eastern shore of the Strait within 50 feet of water. Geoduck, shellfish, urchin and sea cucumber are the most commonly targeted species.

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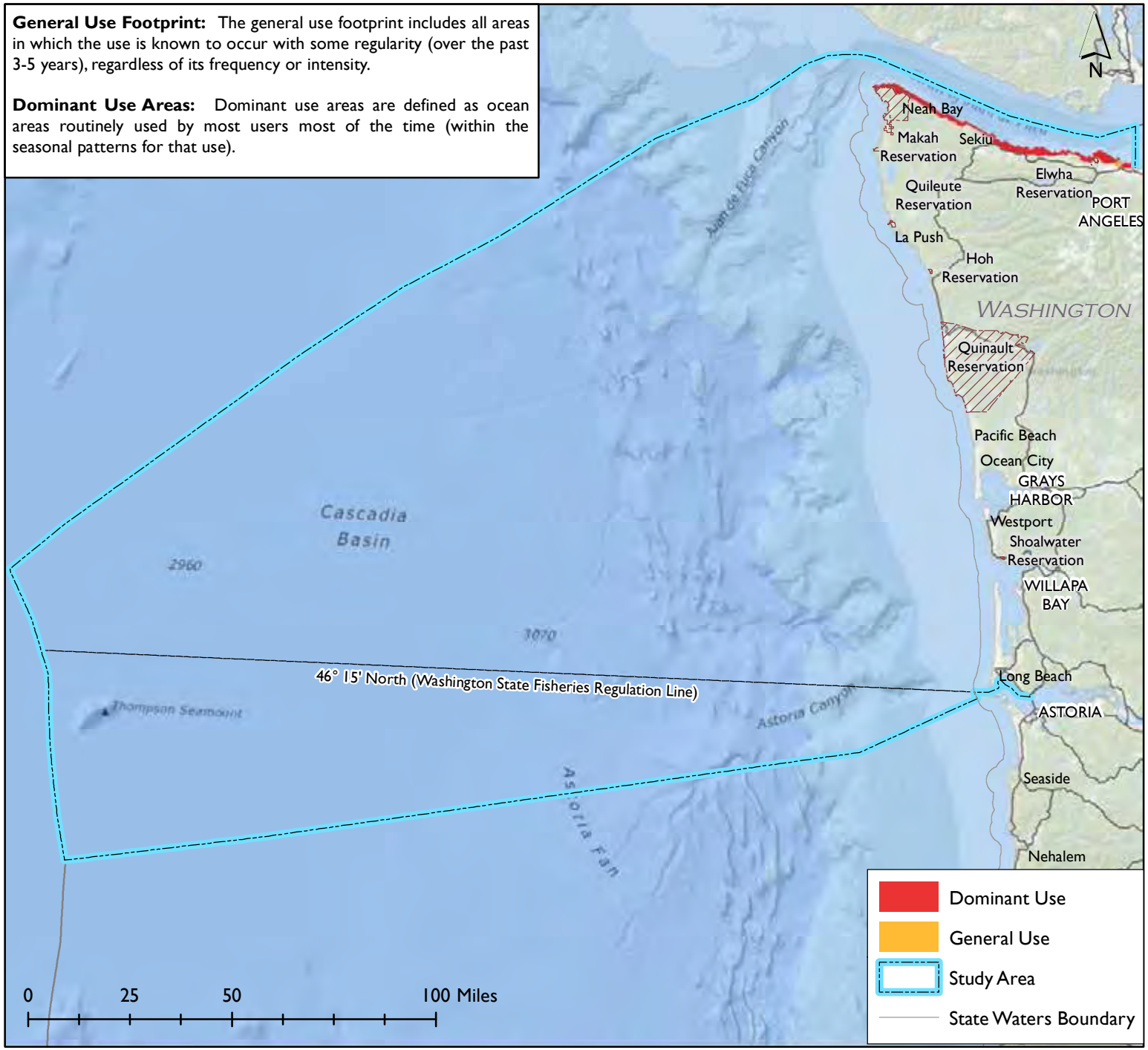

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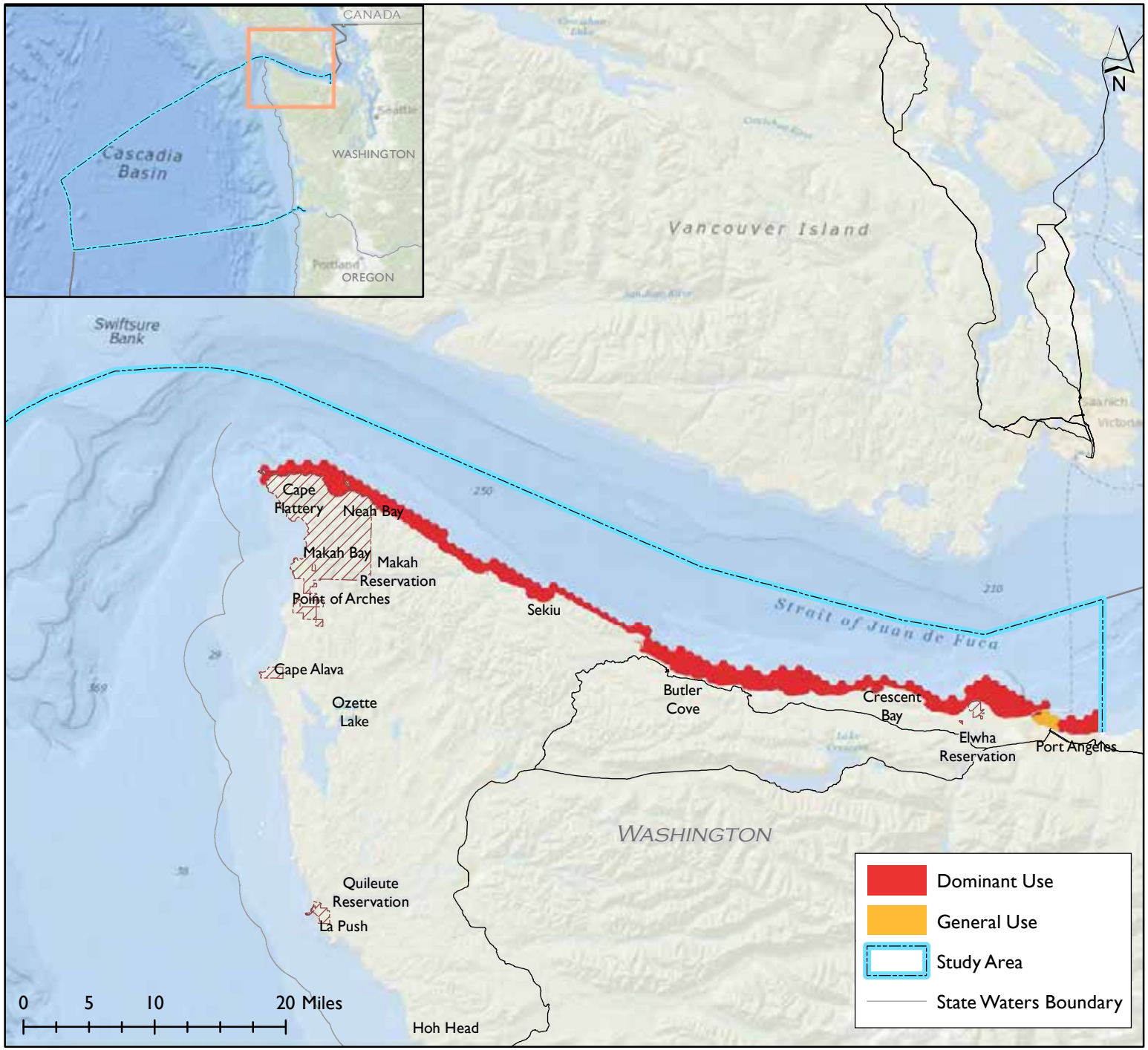

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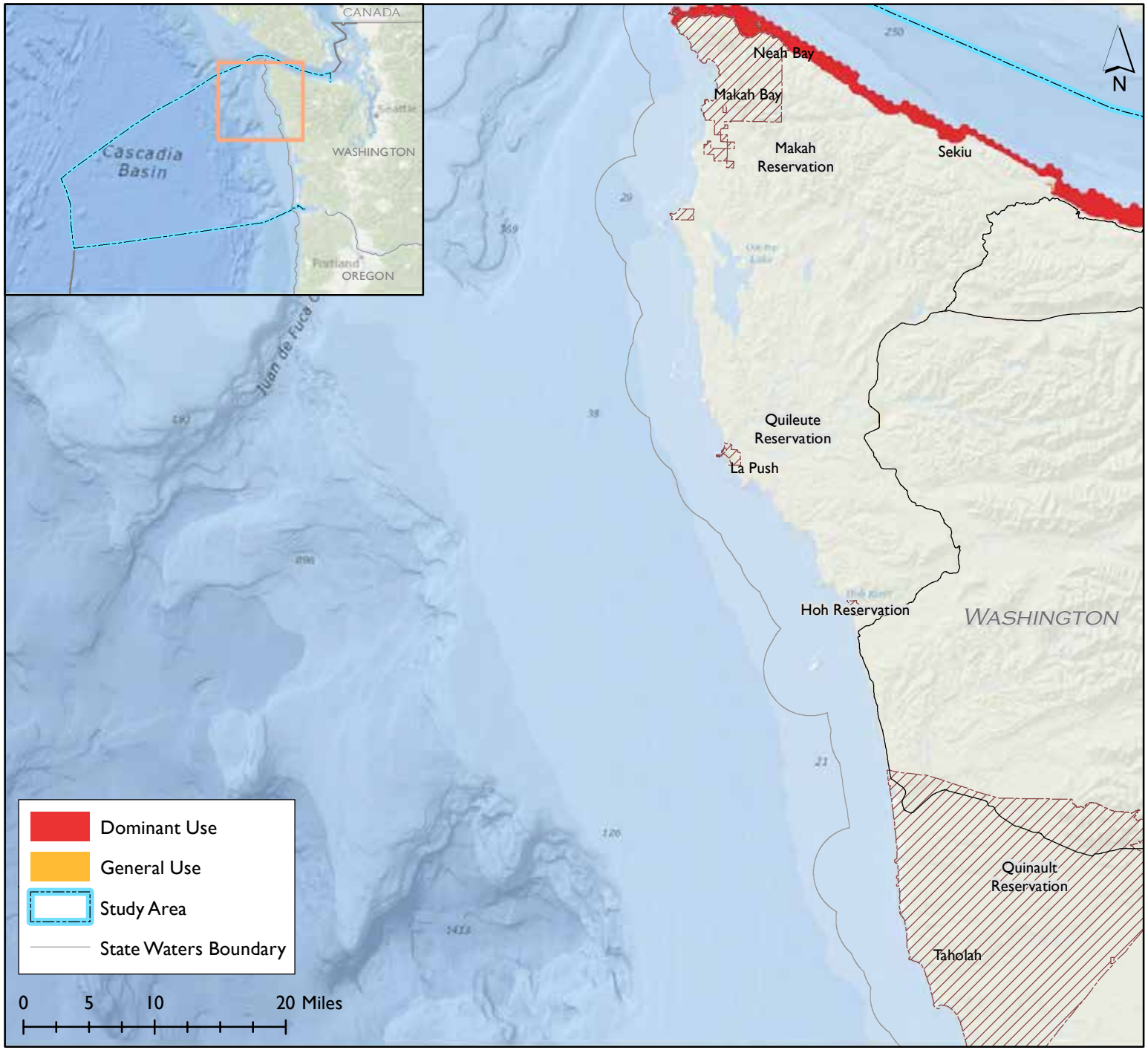

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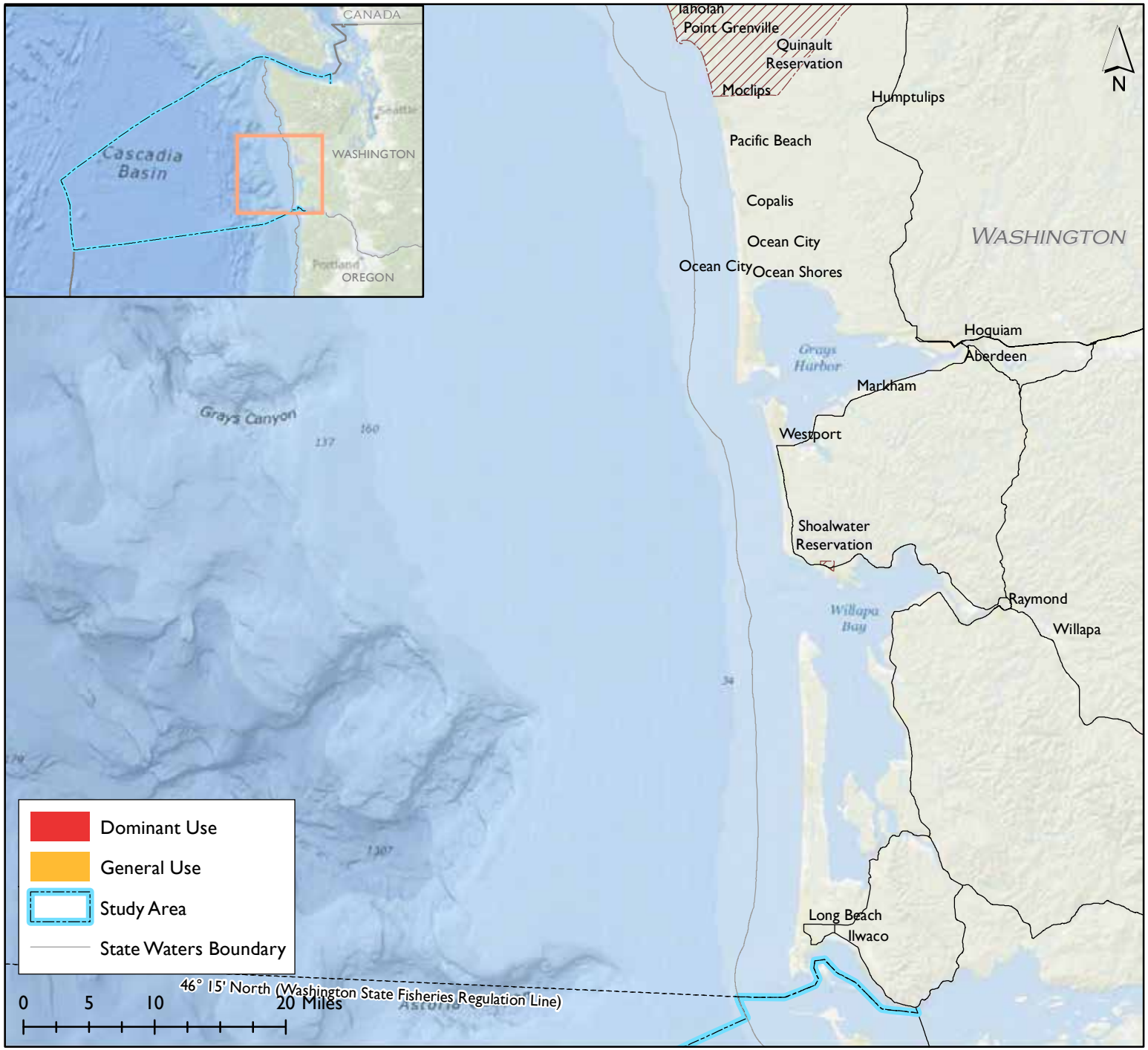

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Commercial Pelagic Fishing

Includes:
Use of mid-water trawling, purse seine, pelagic longlines, handlines, harpoons, mid-water gillnets, rod and reel, trolling, and buoys to catch pelagic fishes and mobile invertebrates

Excludes:
All other forms of fishing

Use Notes:
Commercial pelagic fishing is most common from March-September and targets a wide range of pelagic species including salmon, tuna, whitting, anchovy and sardines. There is some limited commercial pelagic fishing in estuaries for salmon and bait fish, but mainly it occurs outside of 3 miles. Use is concentrated around the channels within 30-40 miles from shore, but it is highly mobile, subject to the regulatory seasons, migration patterns, ocean temperatures and currents.

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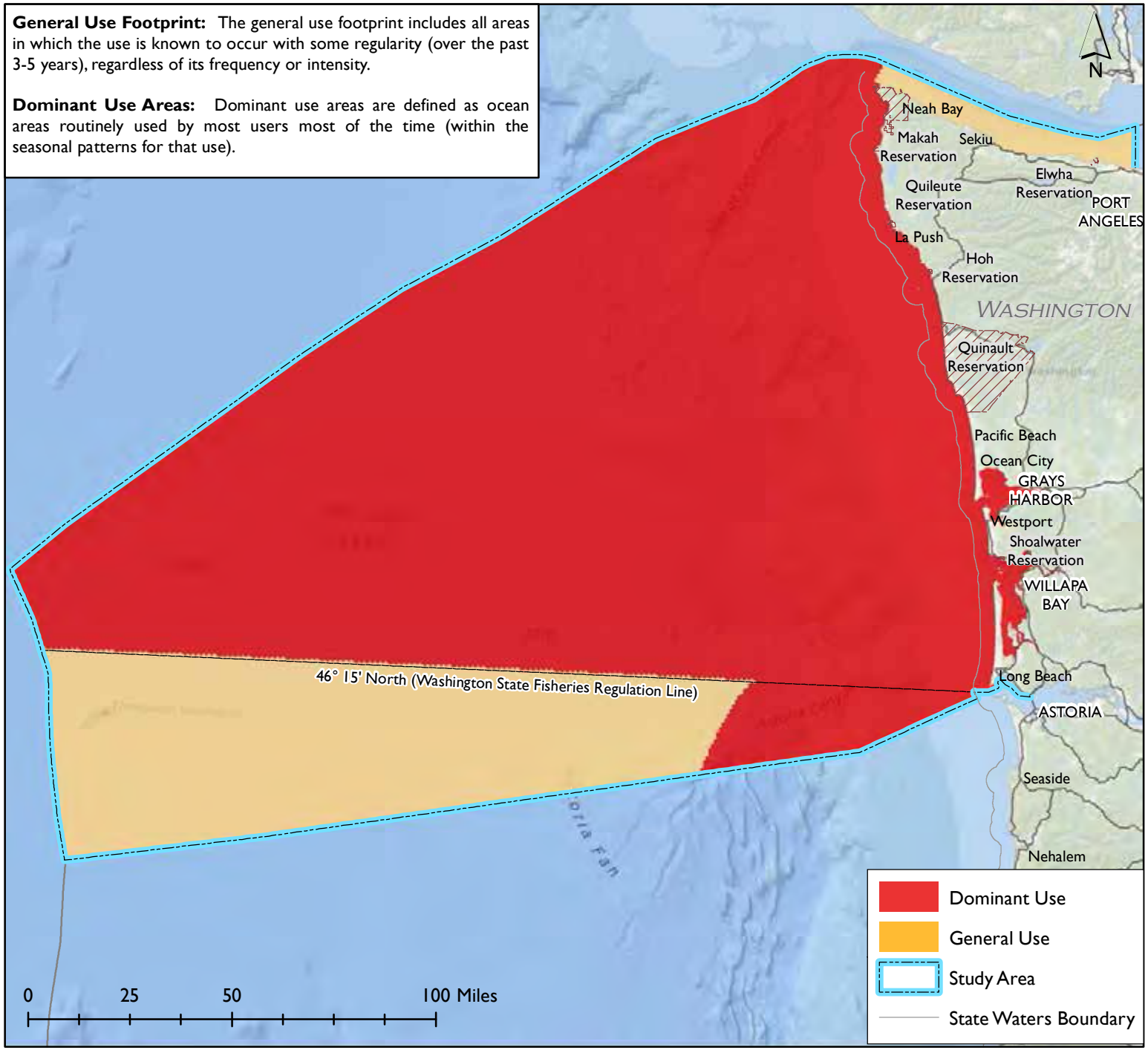

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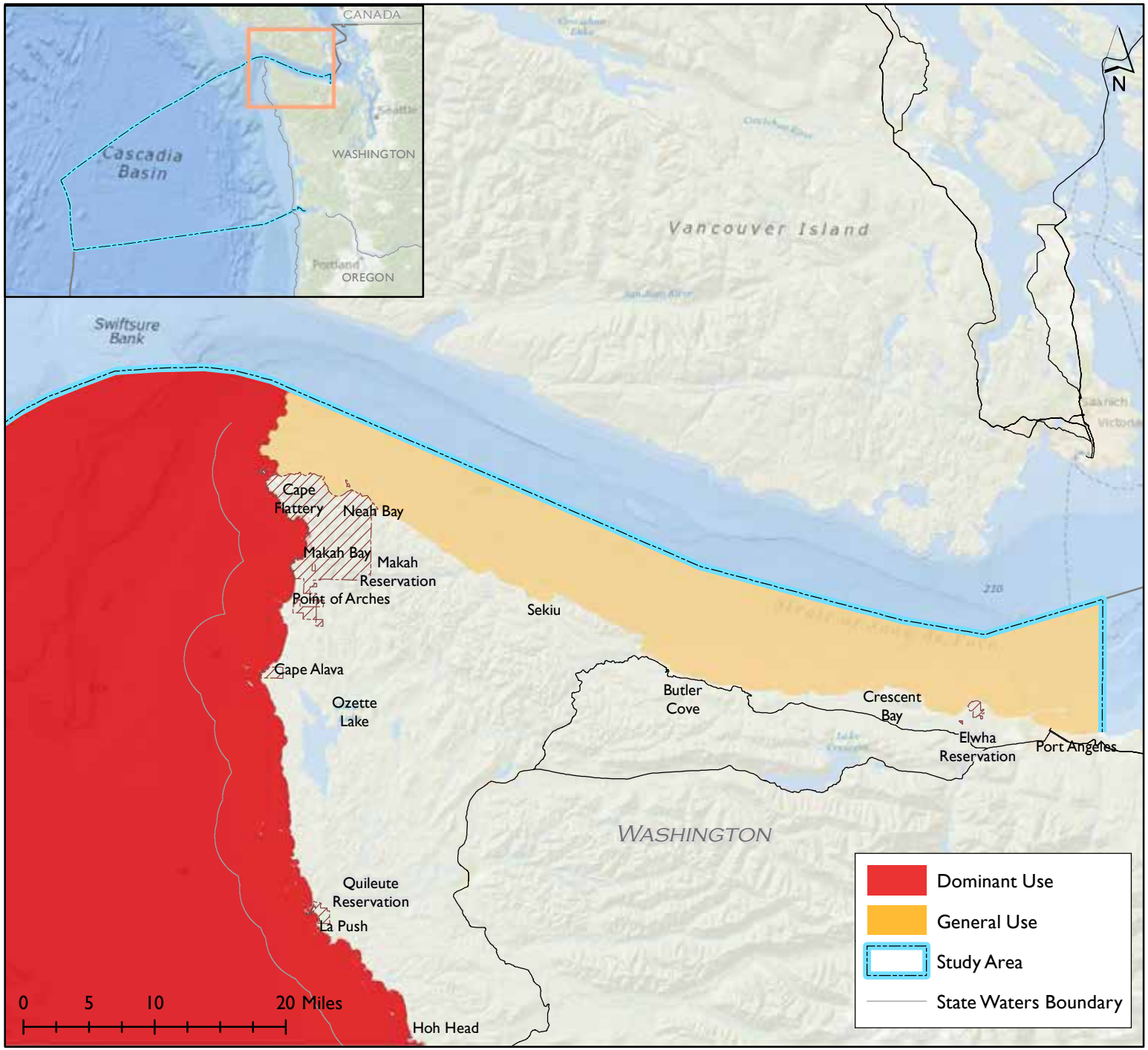

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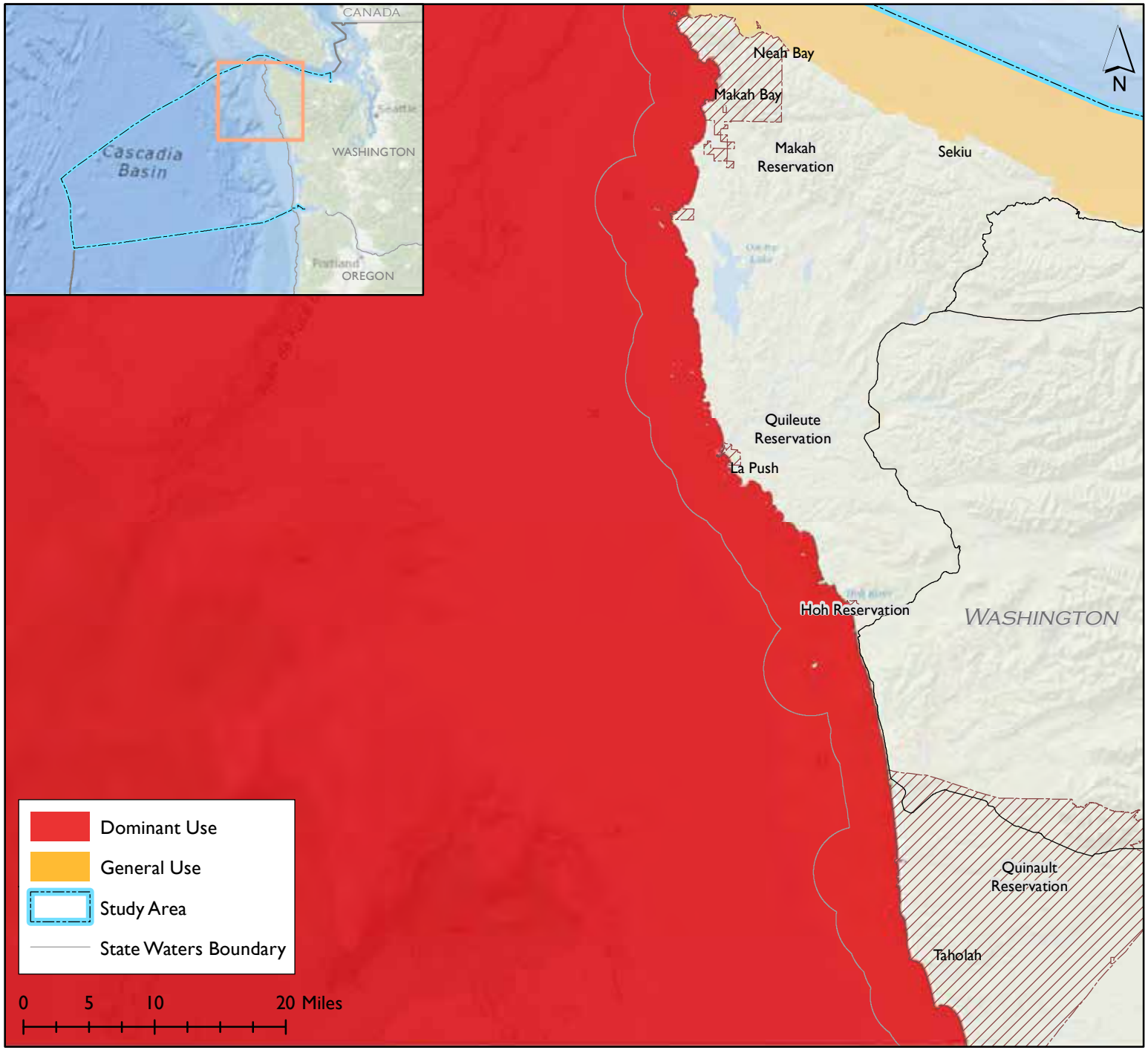

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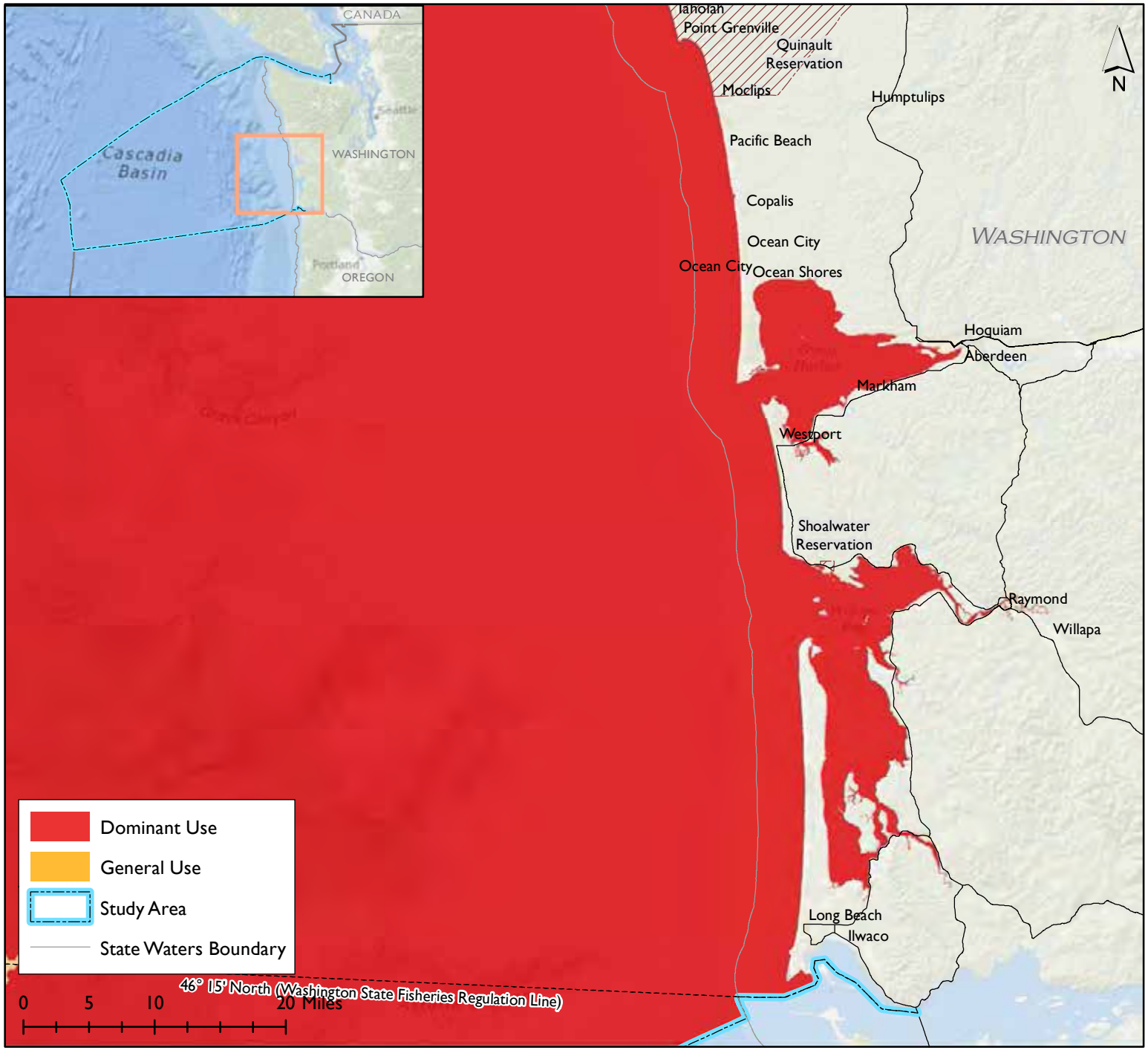

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THE WASHINGTON OCEAN USES ATLAS

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Commercial Intertidal Harvest

Includes:
Commercial harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria

Excludes:
All other forms of intertidal or coastal harvesting

Use Notes:
Commercial intertidal harvest occurs predominantly in Willapa and Grays Harbors. These two bays account for nearly 10 percent of oyster production in the US. Harvesting for clams is also a significant within the study area.

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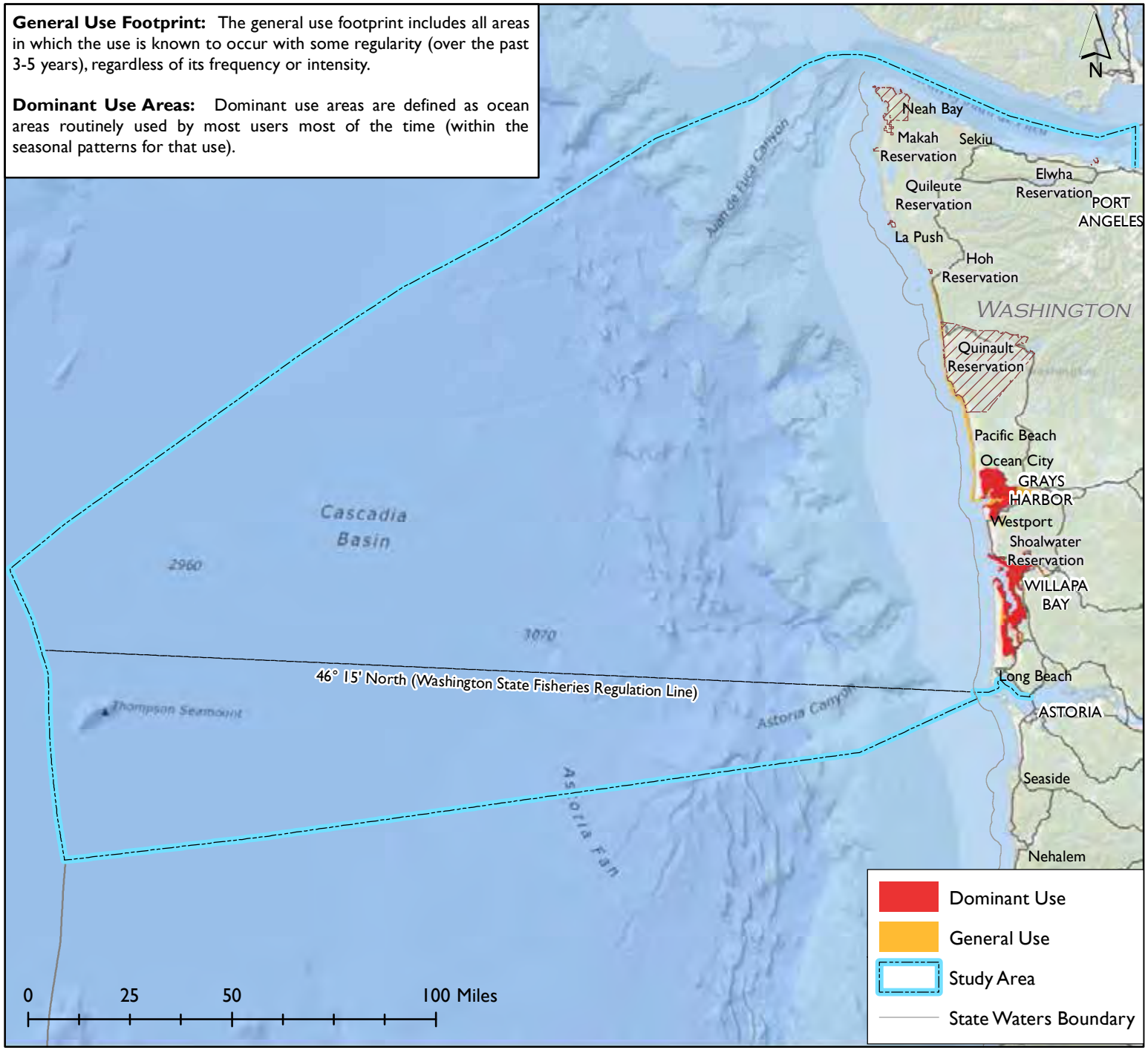

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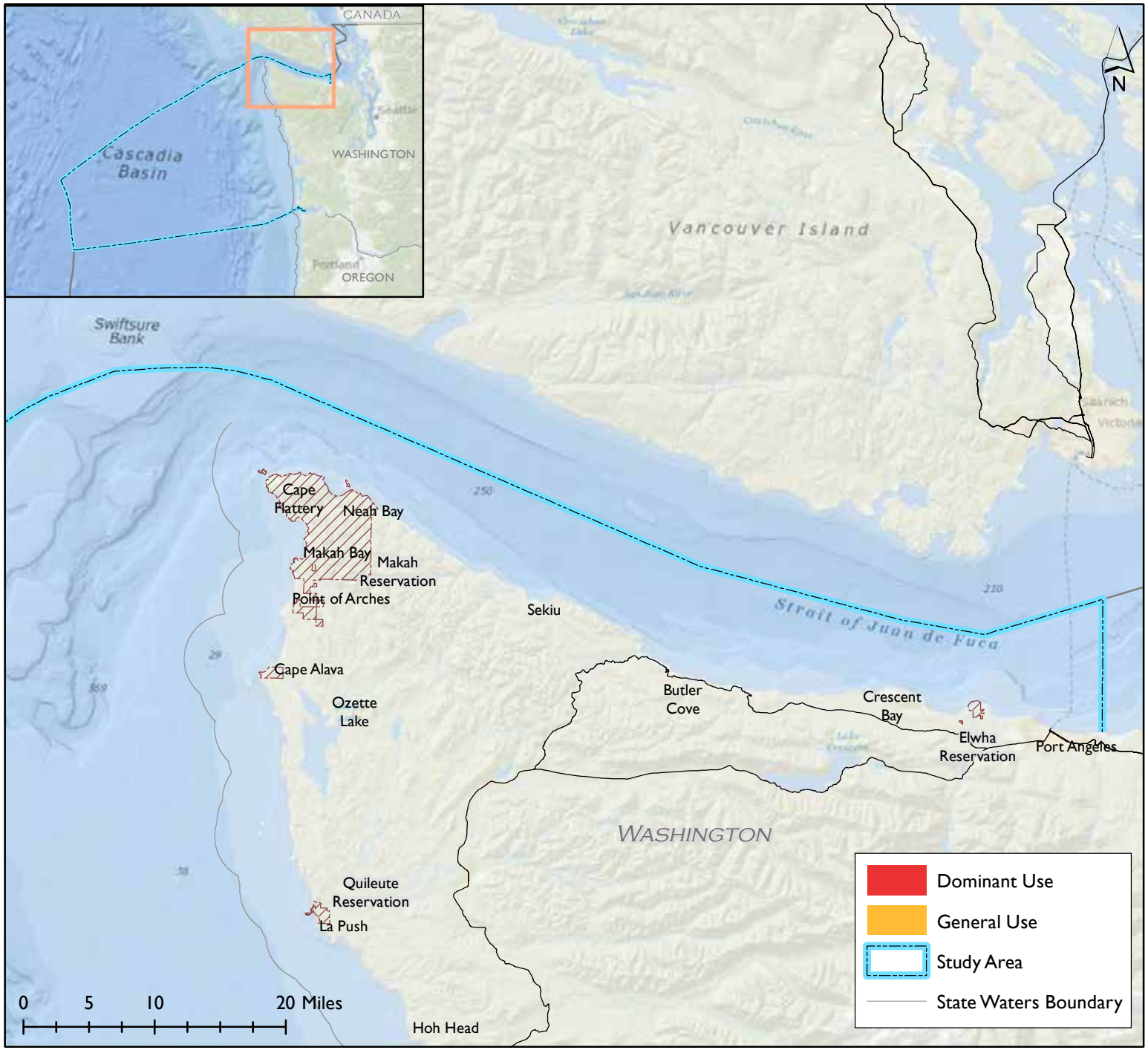

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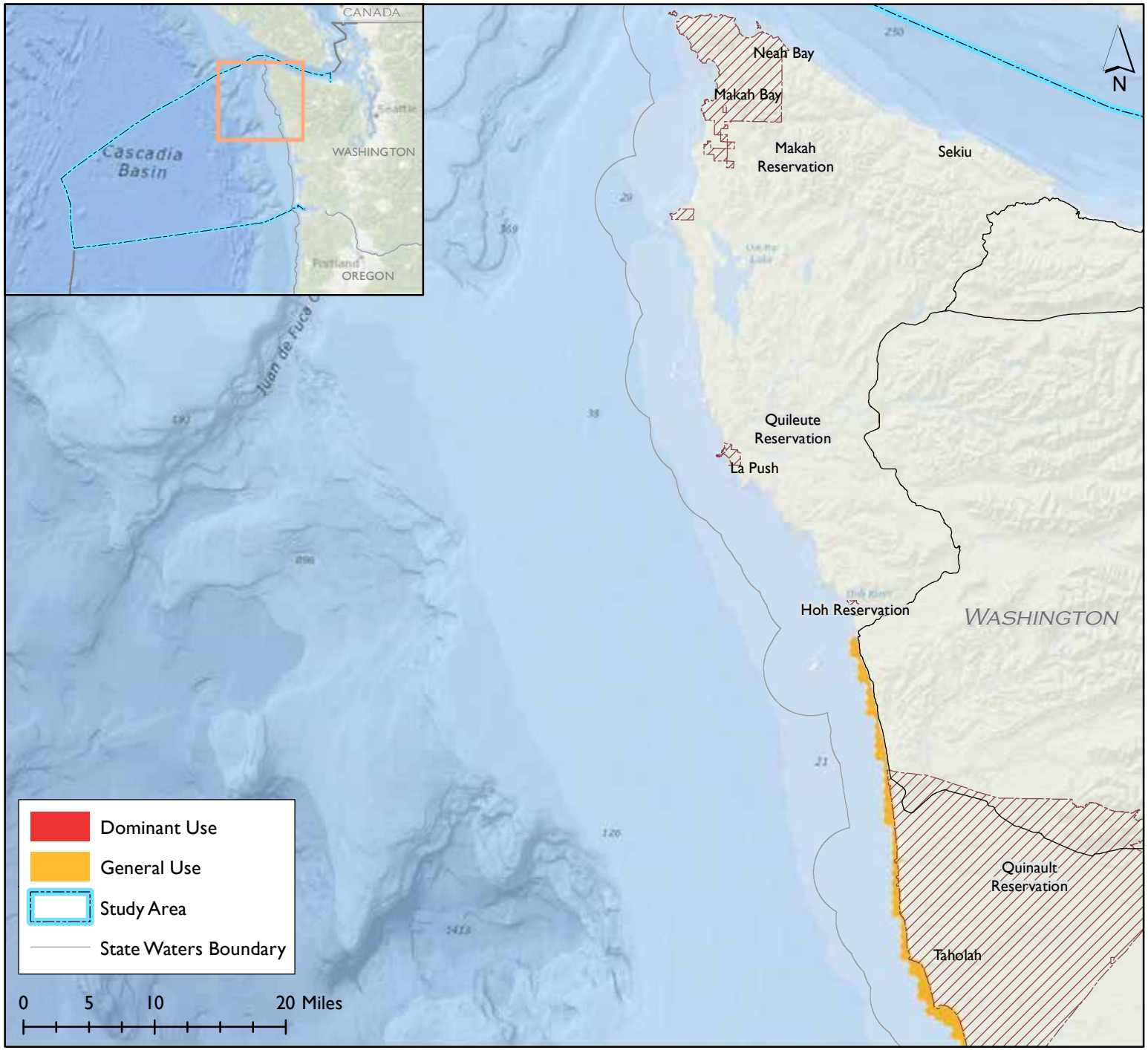

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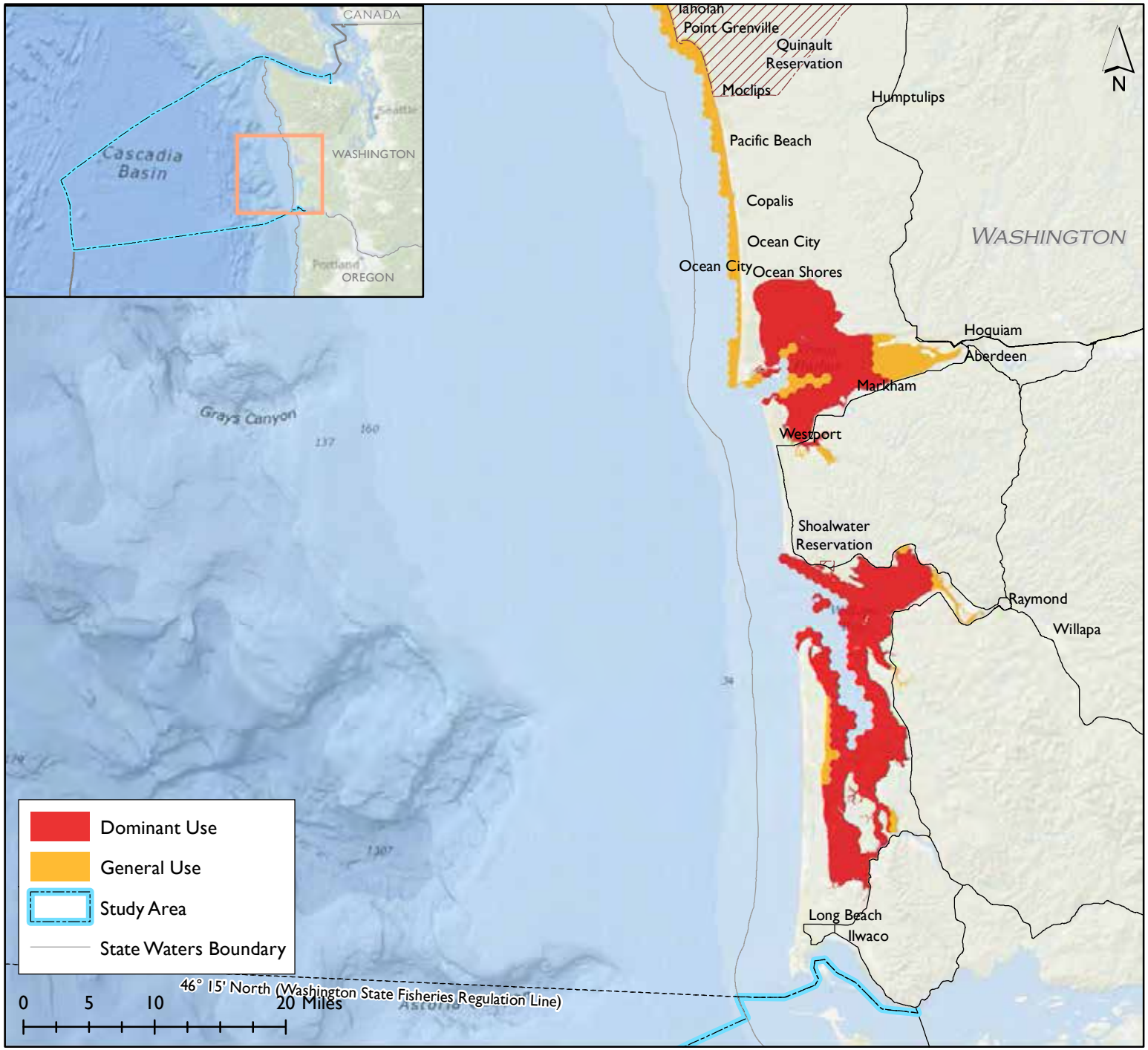

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Recreational Fishing from Boats for Benthic Species

Includes:
Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates

Excludes:
Any other boat- or shore-based fishing

Use Notes:
Recreational fishing from boats for benthic species occurs all throughout the area from the shoreline out to around 150 fathoms, including the bays. The use occurs mostly through recreational charters and is more common near to port due to fuel costs. Generally, the use targets halibut and rockfish.

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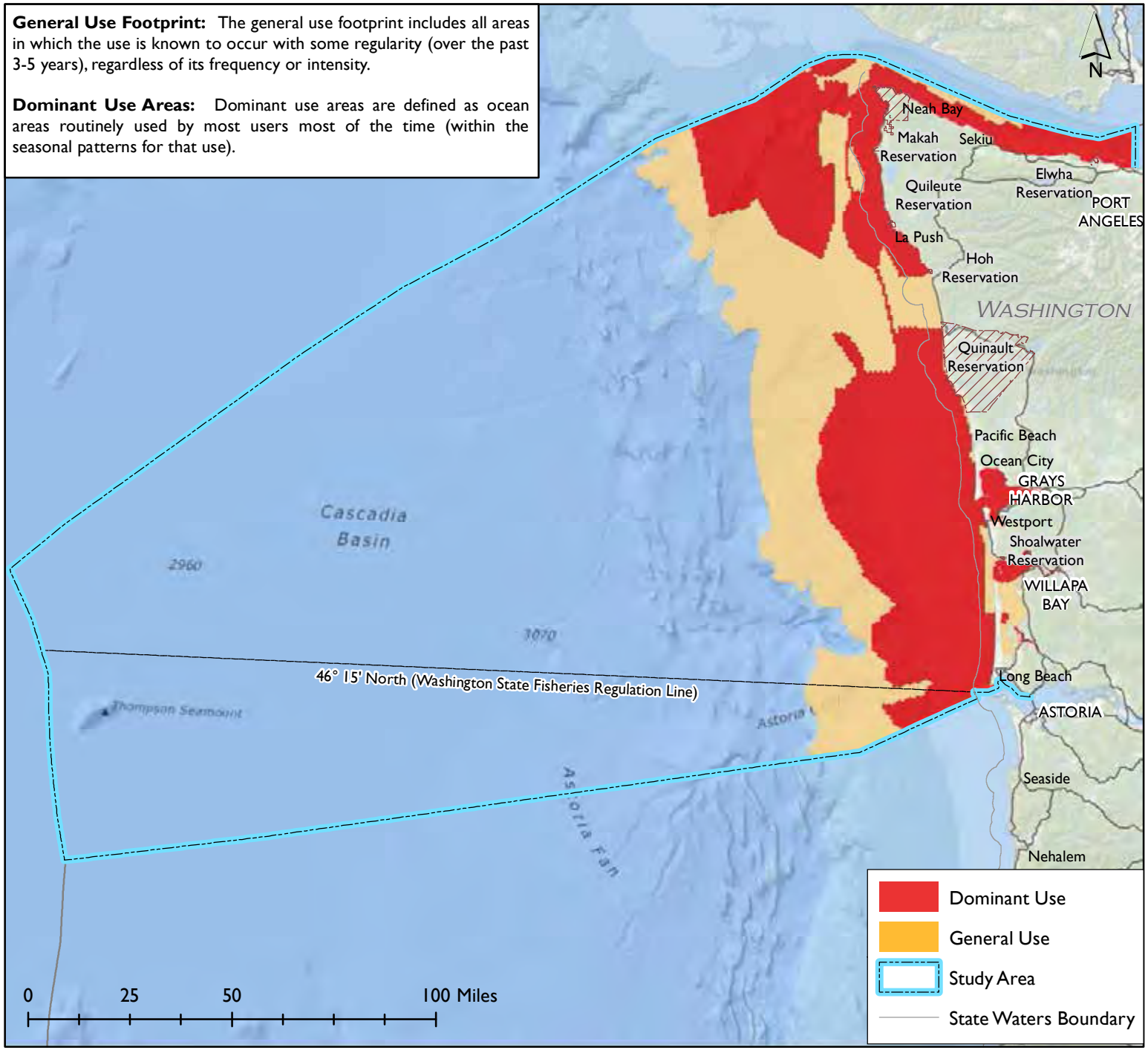

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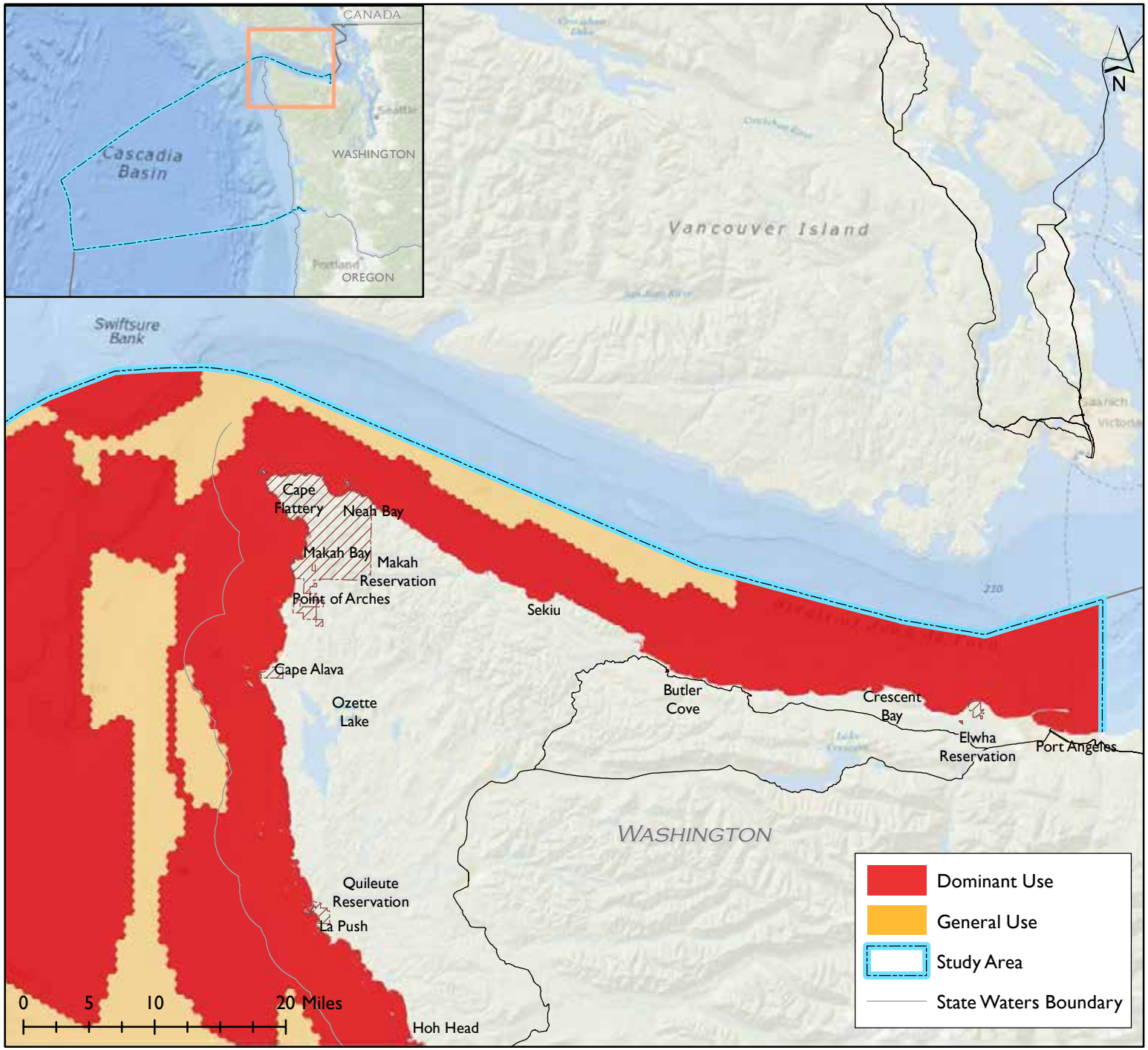

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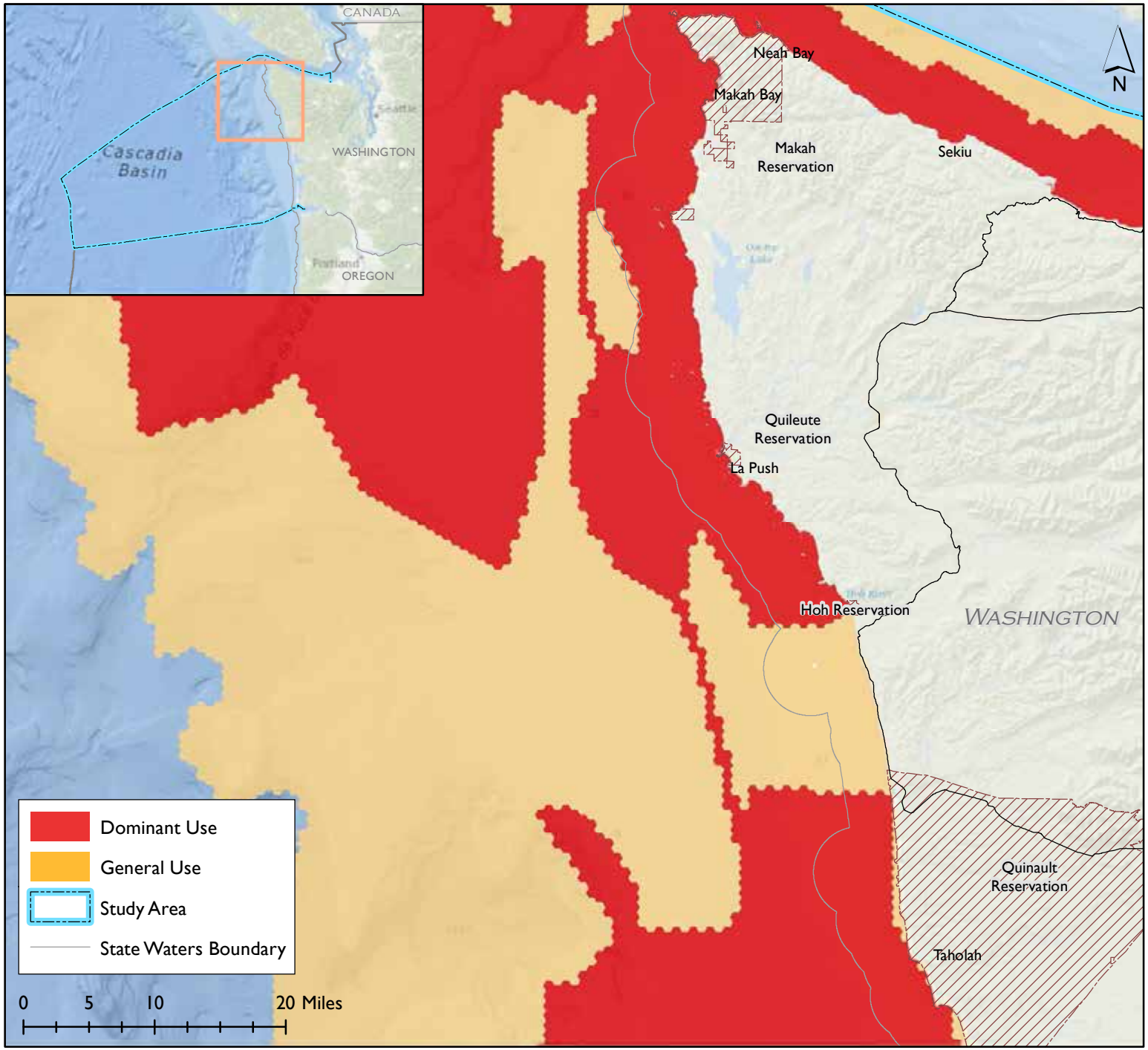
Recreational fishing from boats for benthic species occurs all throughout the area from the shoreline out to around 150 fathoms, including the bays. The use occurs mostly through recreational charters and is more common near to port due to fuel costs. Generally, the use targets halibut and rockfish.



 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

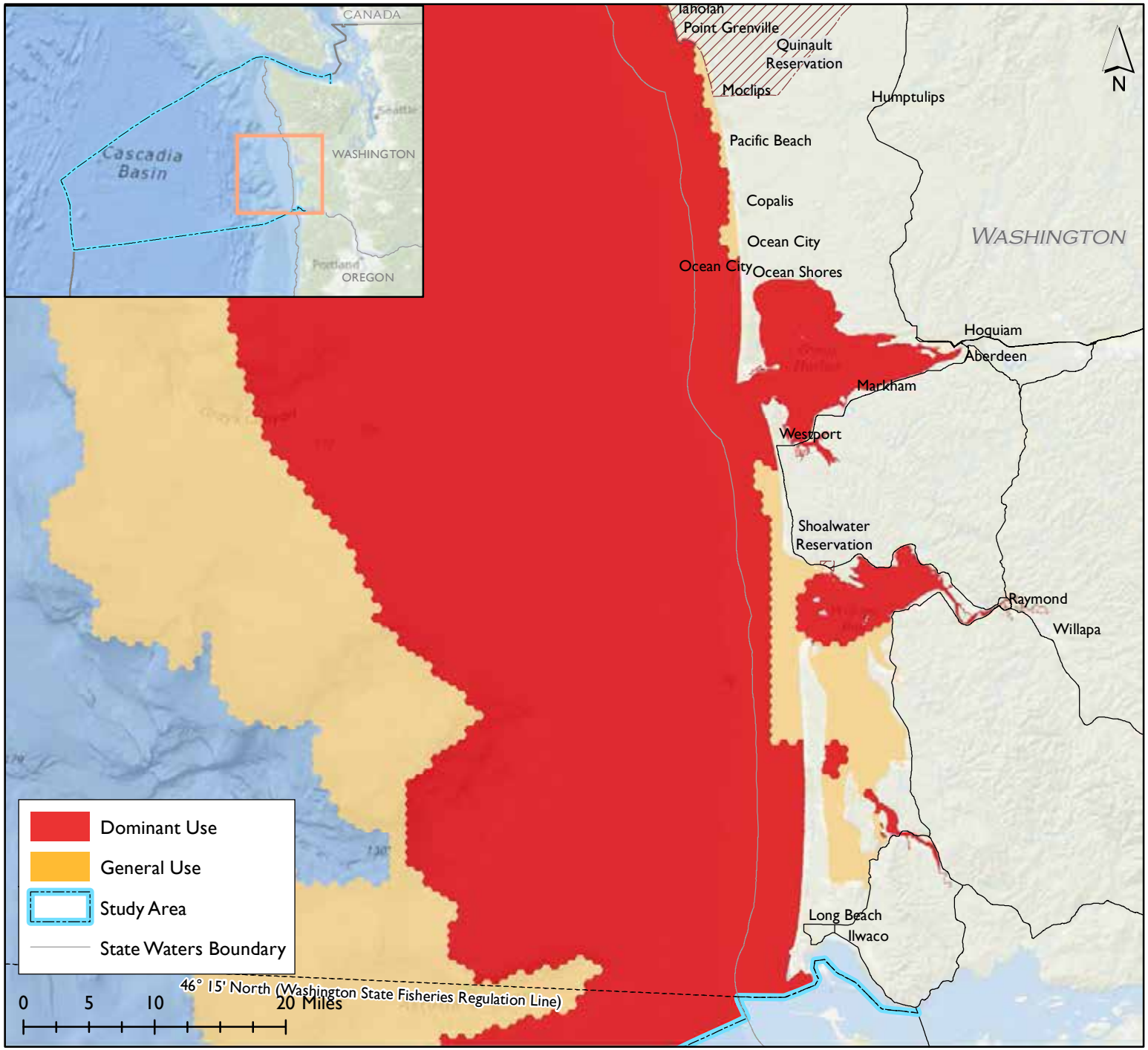
Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Recreational Fishing from Boats for Benthic Species

Includes:
Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates

Excludes:
Any other boat- or shore-based fishing

Use Notes:
Recreational fishing from boats for benthic species occurs all throughout the area from the shoreline out to around 150 fathoms, including the bays. The use occurs mostly through recreational charters and is more common near to port due to fuel costs. Generally, the use targets halibut and rockfish.



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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Recreational Fishing from Boats for Pelagic Species

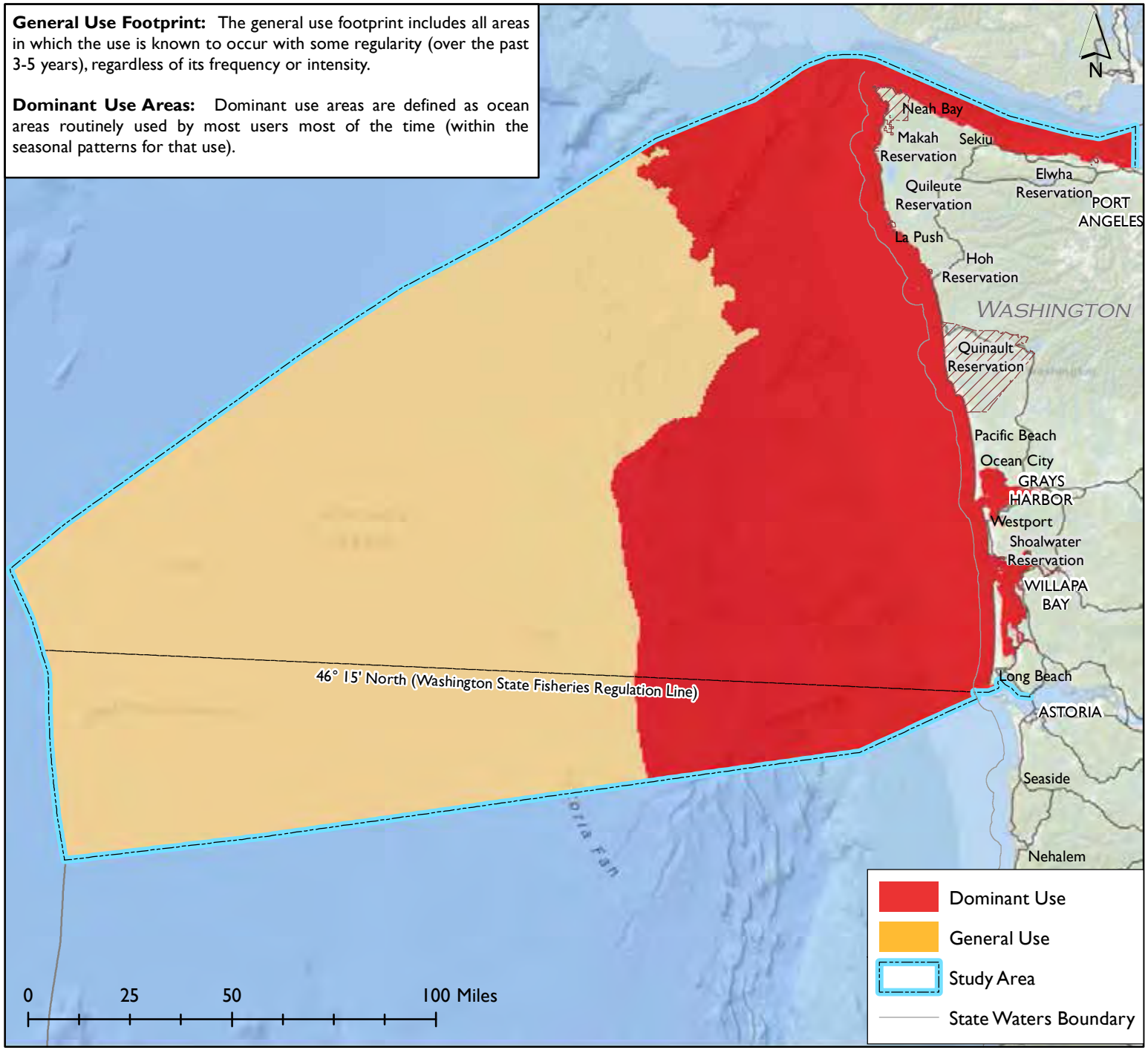
Includes:
Recreational fishing from head boats, party boats, charters, or private boats targeting pelagic species

Excludes:
Any other boat- or shore-based fishing

Use Notes:
Recreational fishing from boats for pelagic species is dominant along the edges of canyons. It is most common during the fishing openers (annual event to kick off fishing season), and decreases significantly in the winter months. The use mainly targets salmon and tuna, with some bait fishing. The use has decreased in recent years due to increased fuel costs.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



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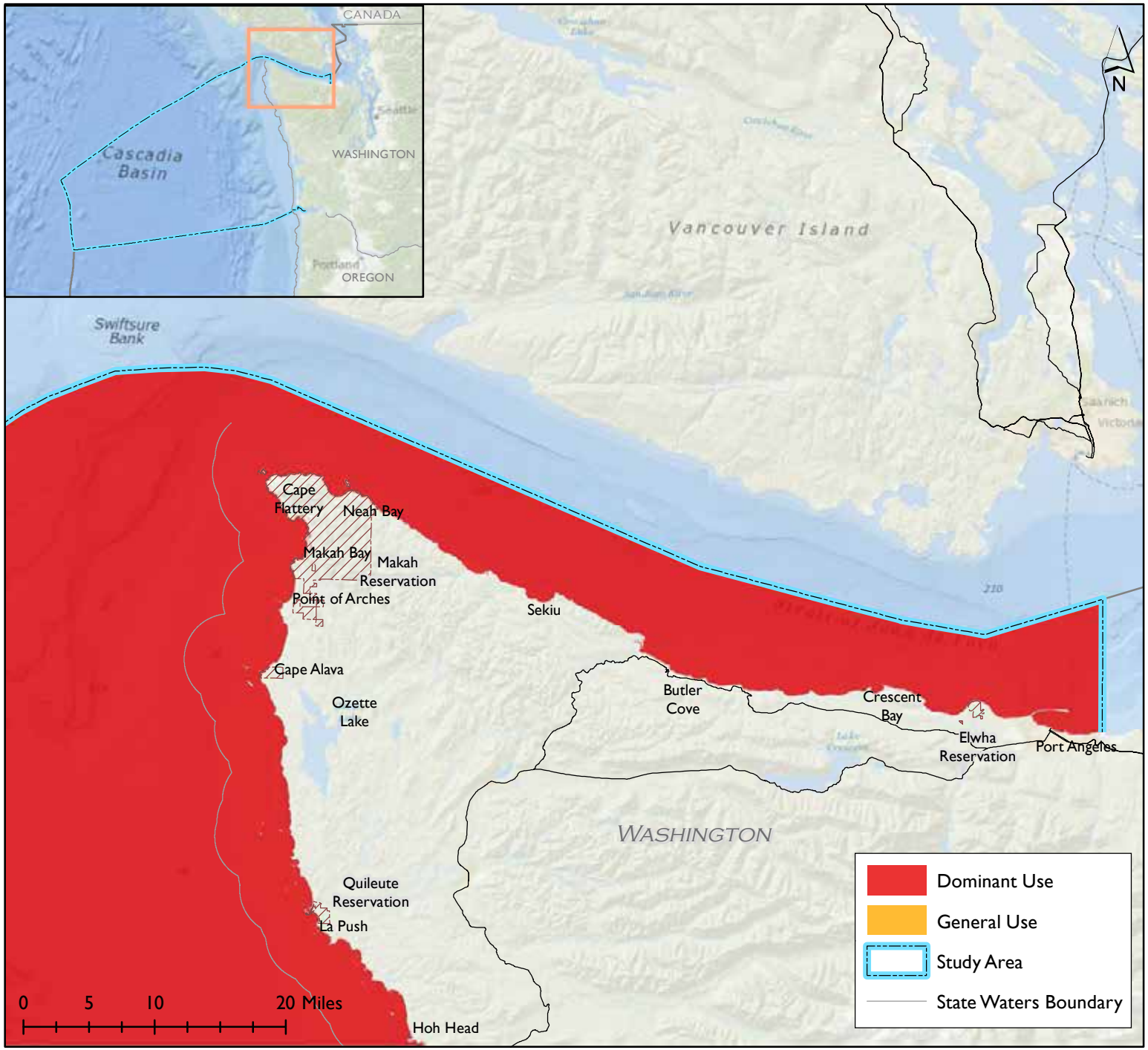

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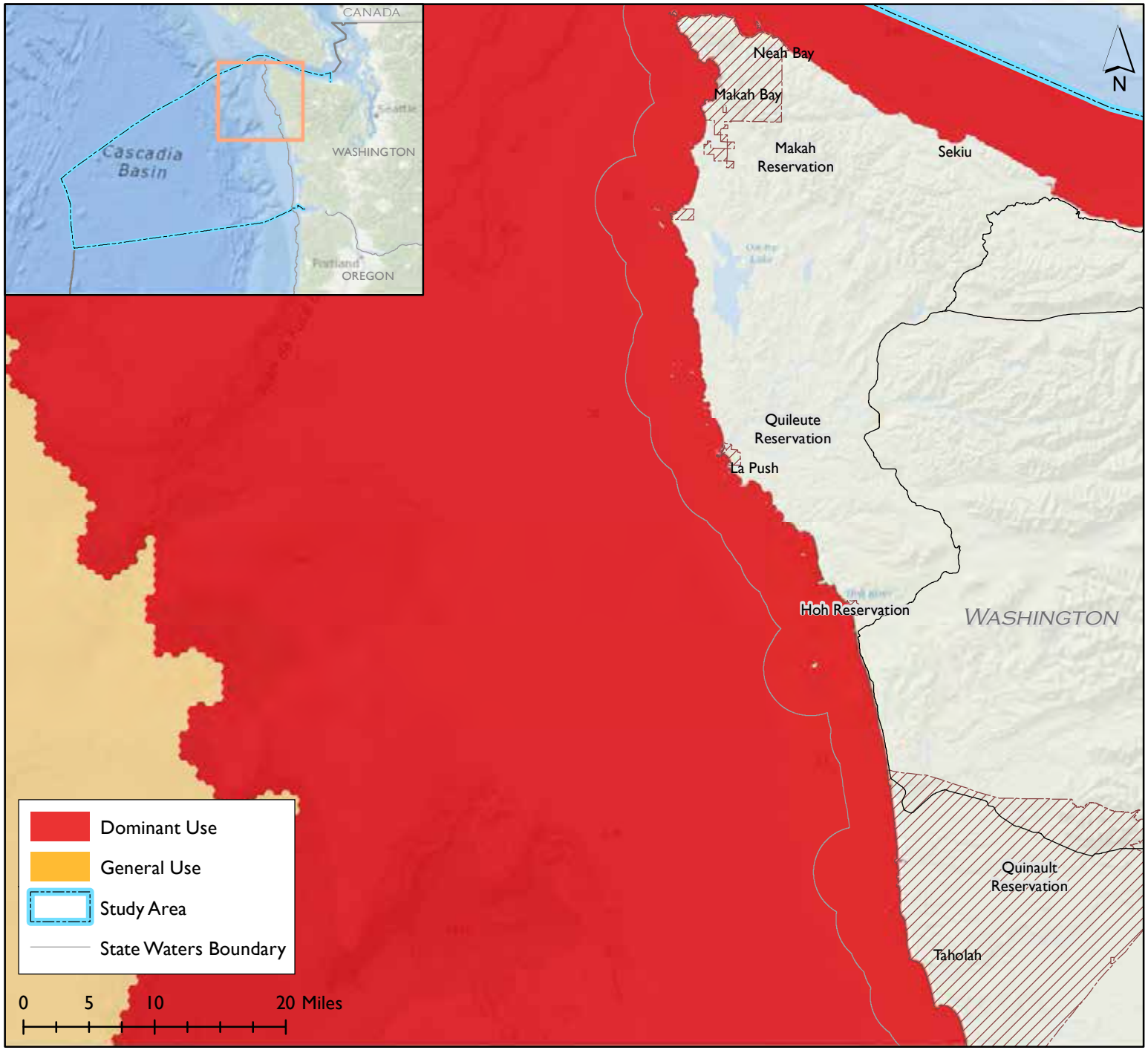

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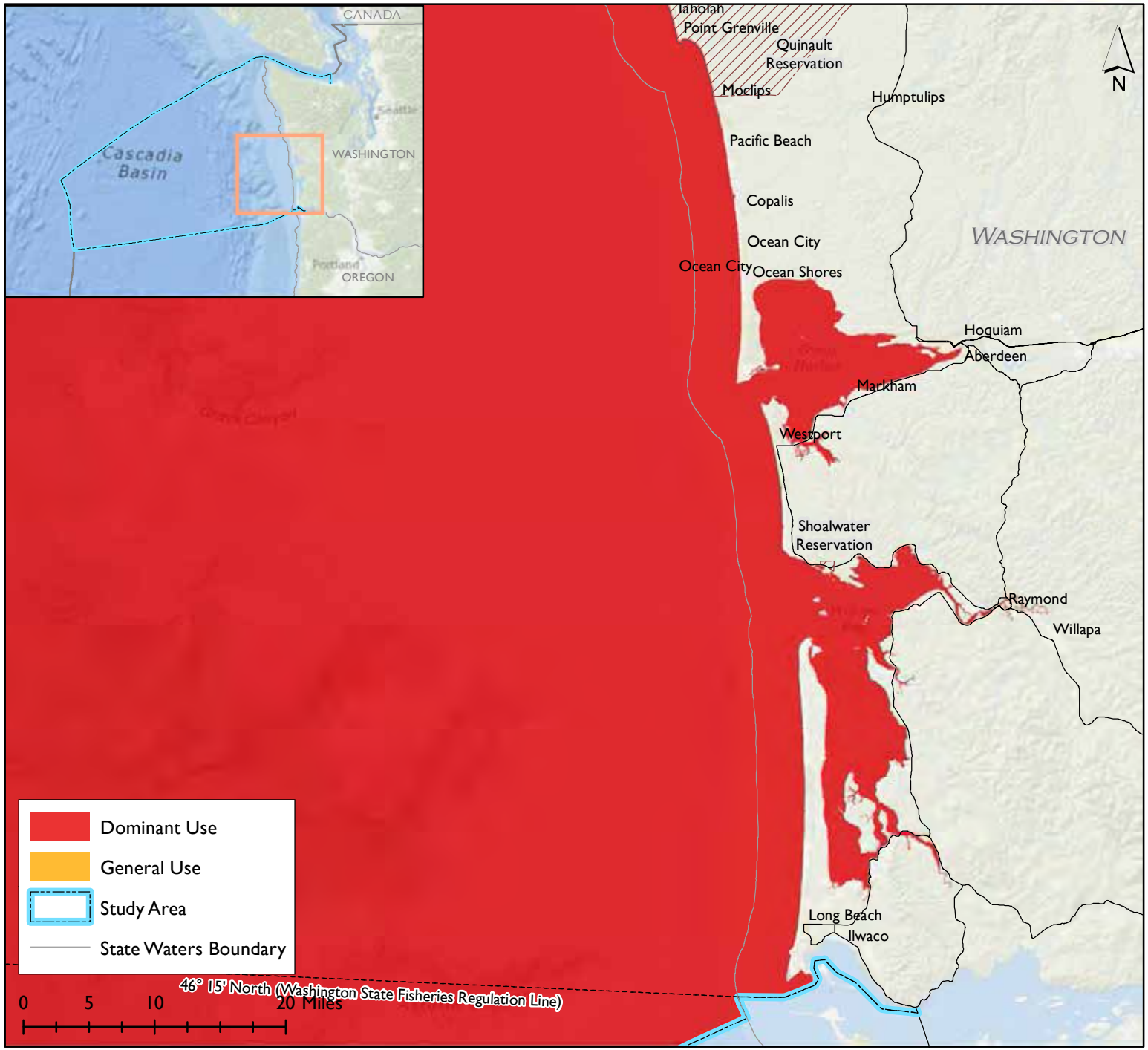

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THE WASHINGTON OCEAN USES ATLAS

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Recreational Dive Fishing

Includes:
The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for recreational purposes

Excludes:
Commercial fishing with SCUBA/snorkel, SCUBA/snorkel for viewing purposes

Use Notes:
Recreational dive fishing occurs year-round and is concentrated around jetties, rocky pinnacles and shipwrecks, as well as in select bays. The use occurs mainly within 60 feet of water, but can go as deep as 120 feet. The target species include rockfish, lingcod, dungeness crab and occasionally octopus. The use is more dominant when salmon season is closed.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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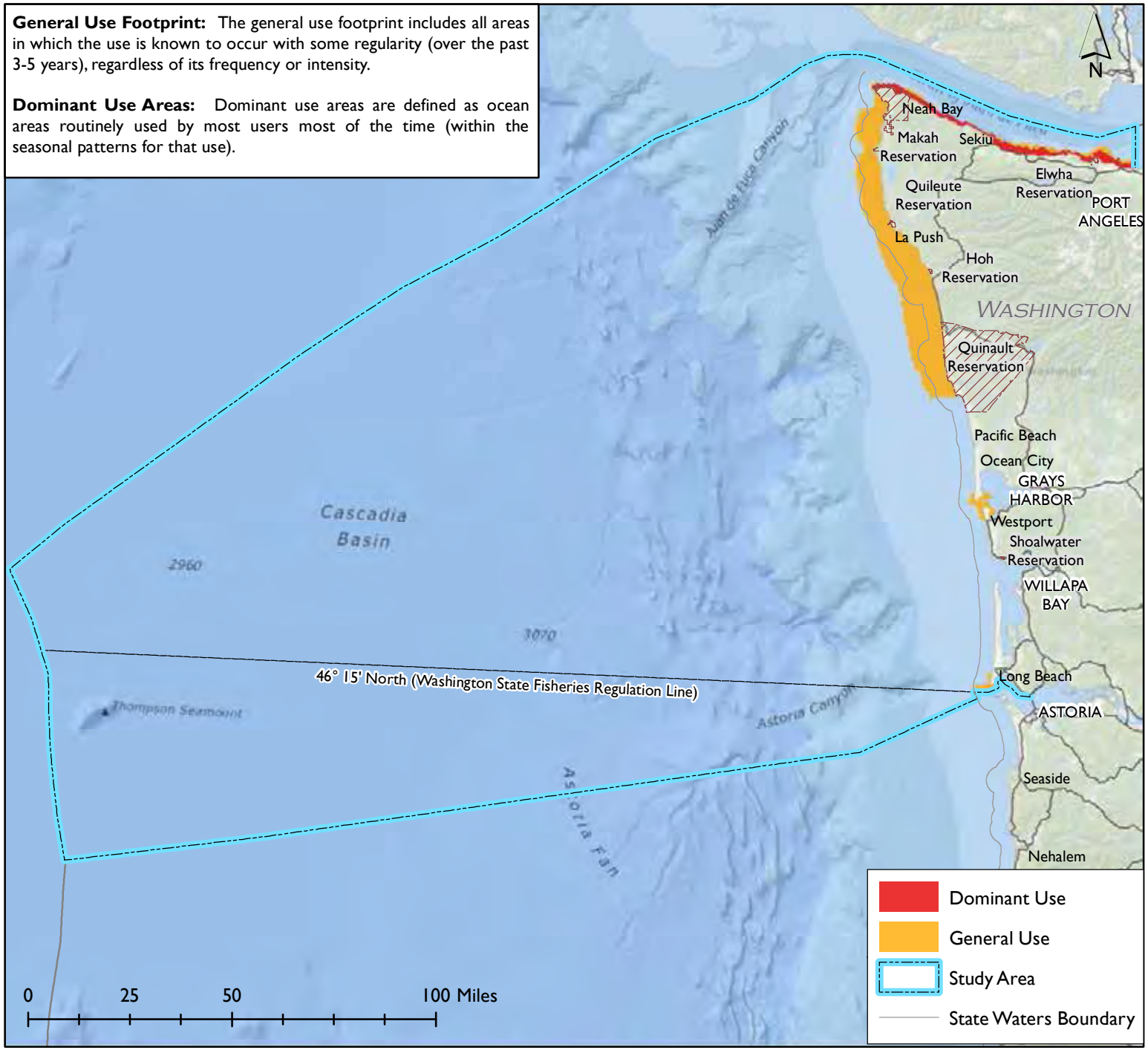

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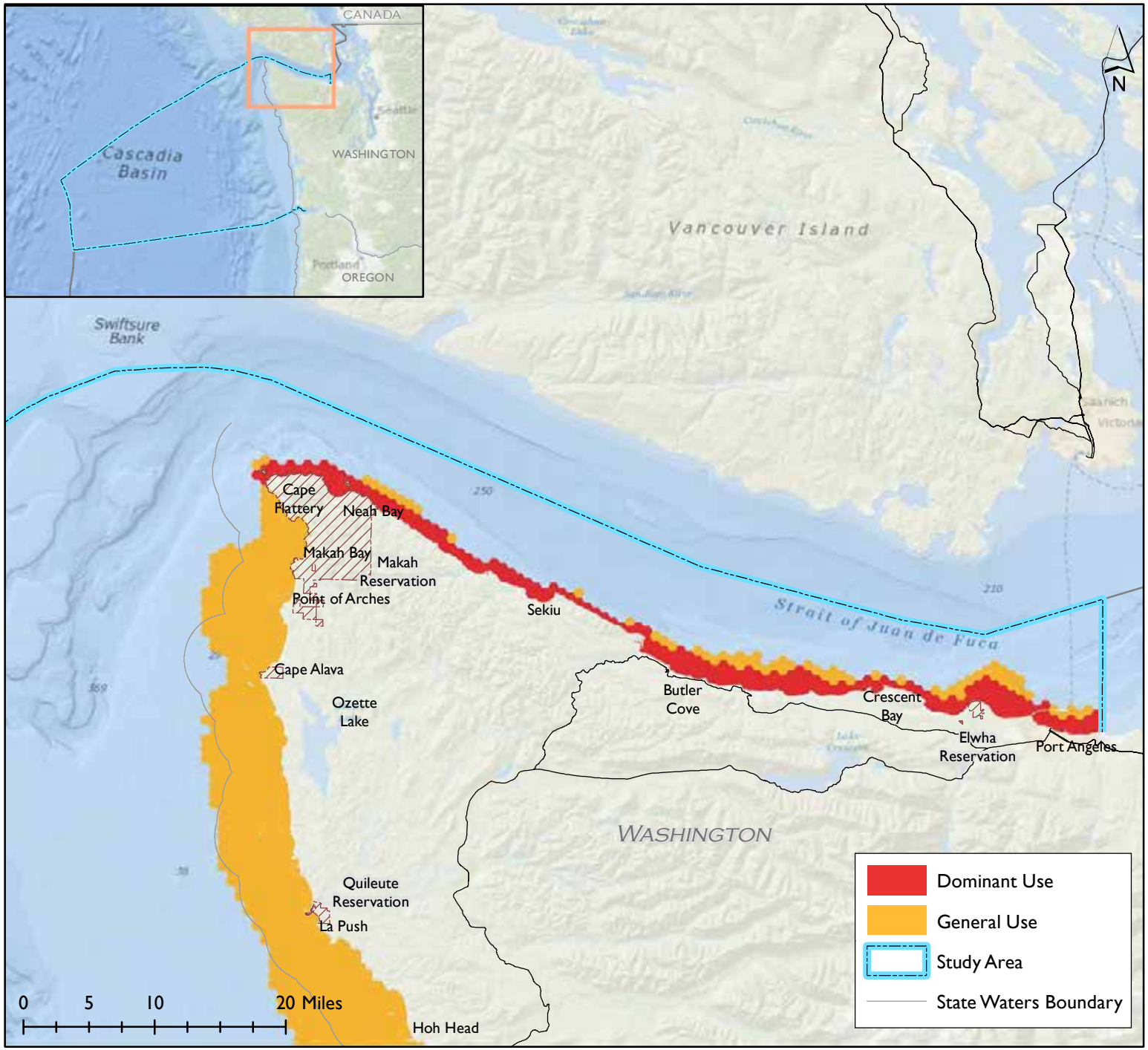

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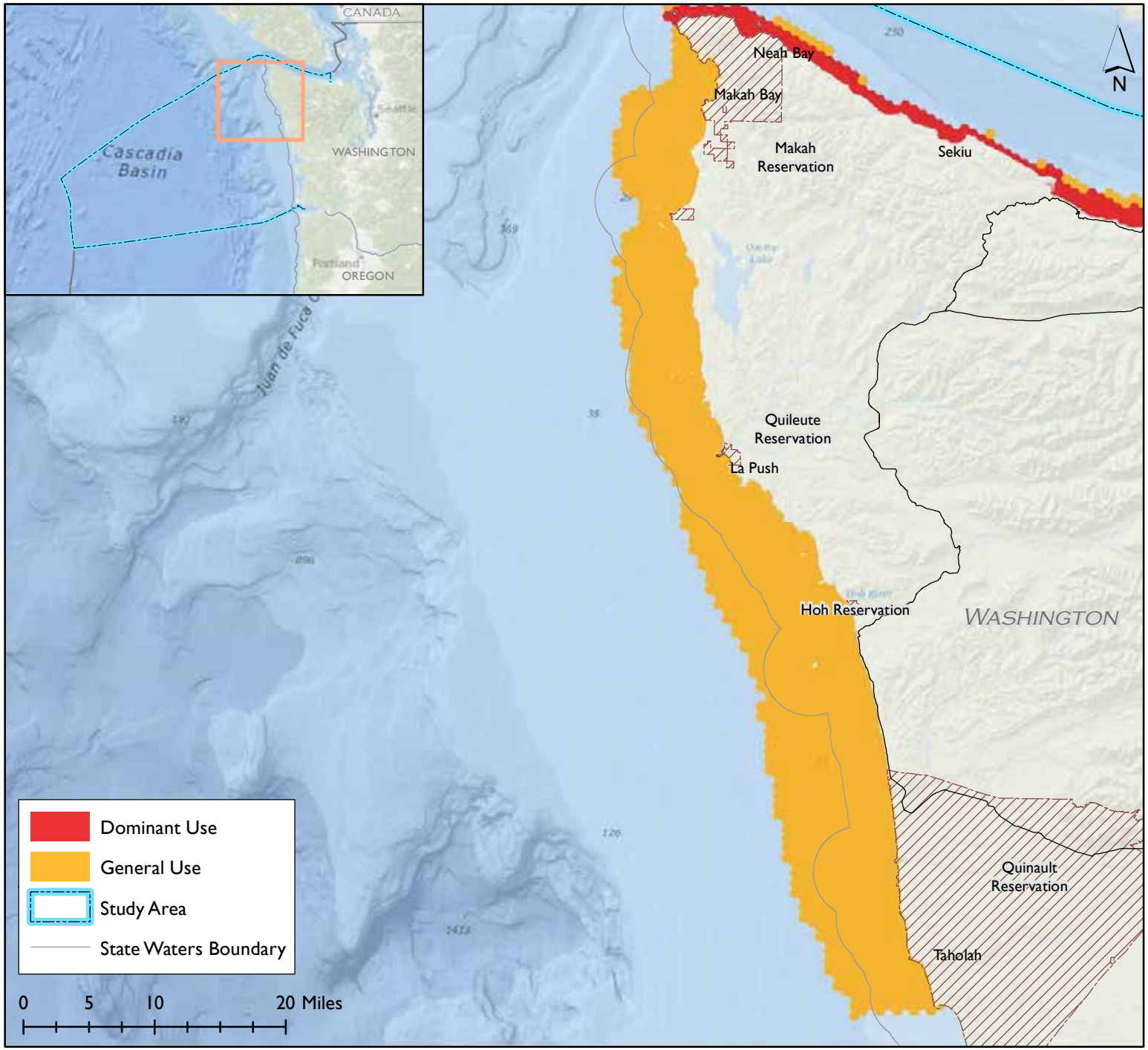

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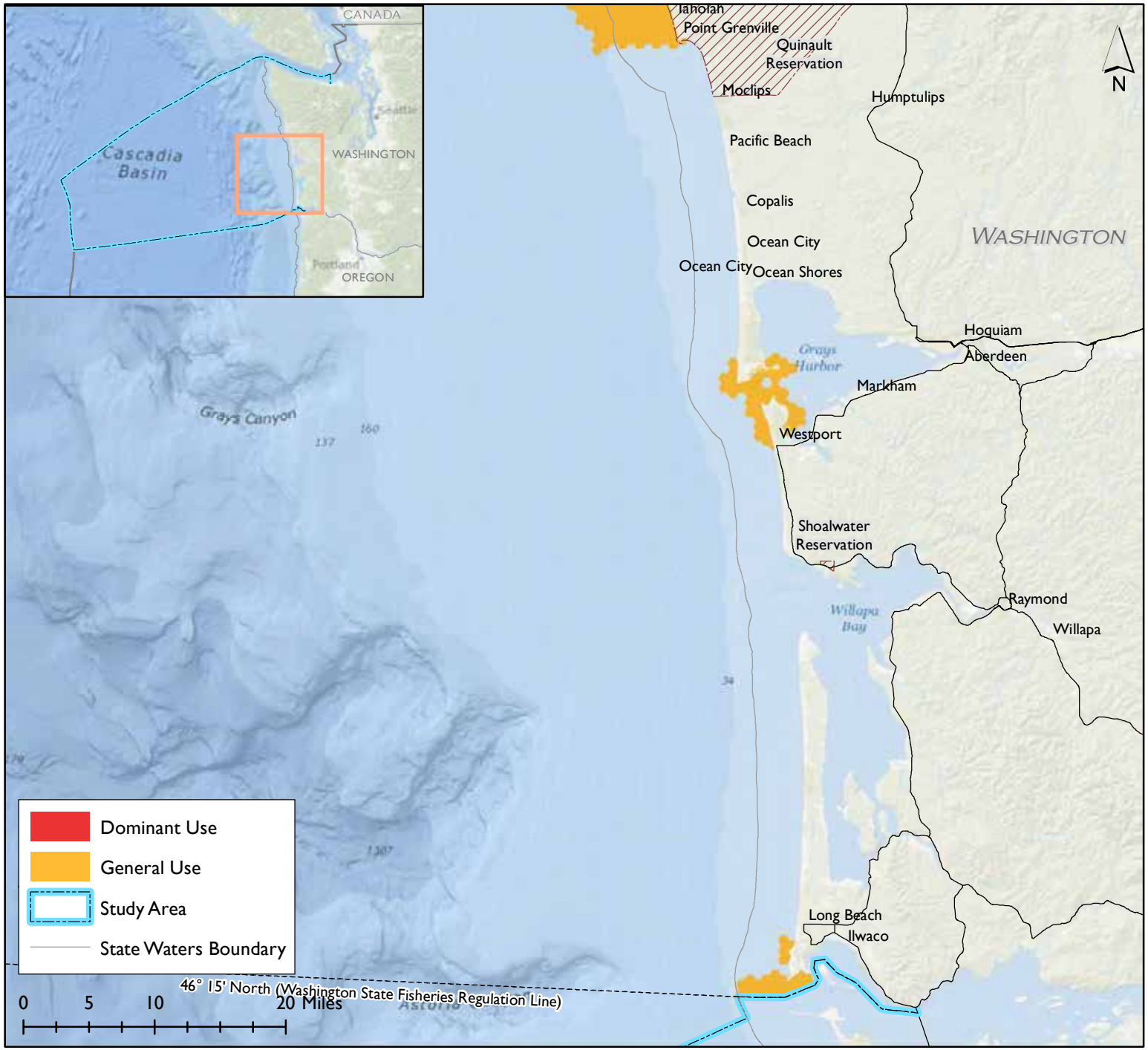

 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Kayak Fishing

Includes:
The use of hook and line fishing from kayaks or any other similar vessel to catch fishes and mobile invertebrates

Excludes:
All other forms of fishing

Use Notes:
Kayak fishing occurs along the shore throughout most of the study area, out to a distance of approximately 1.5 miles. The dominant use areas are closer to shore and are highly influenced by coastal access. In general, the use use has increased in the past decade.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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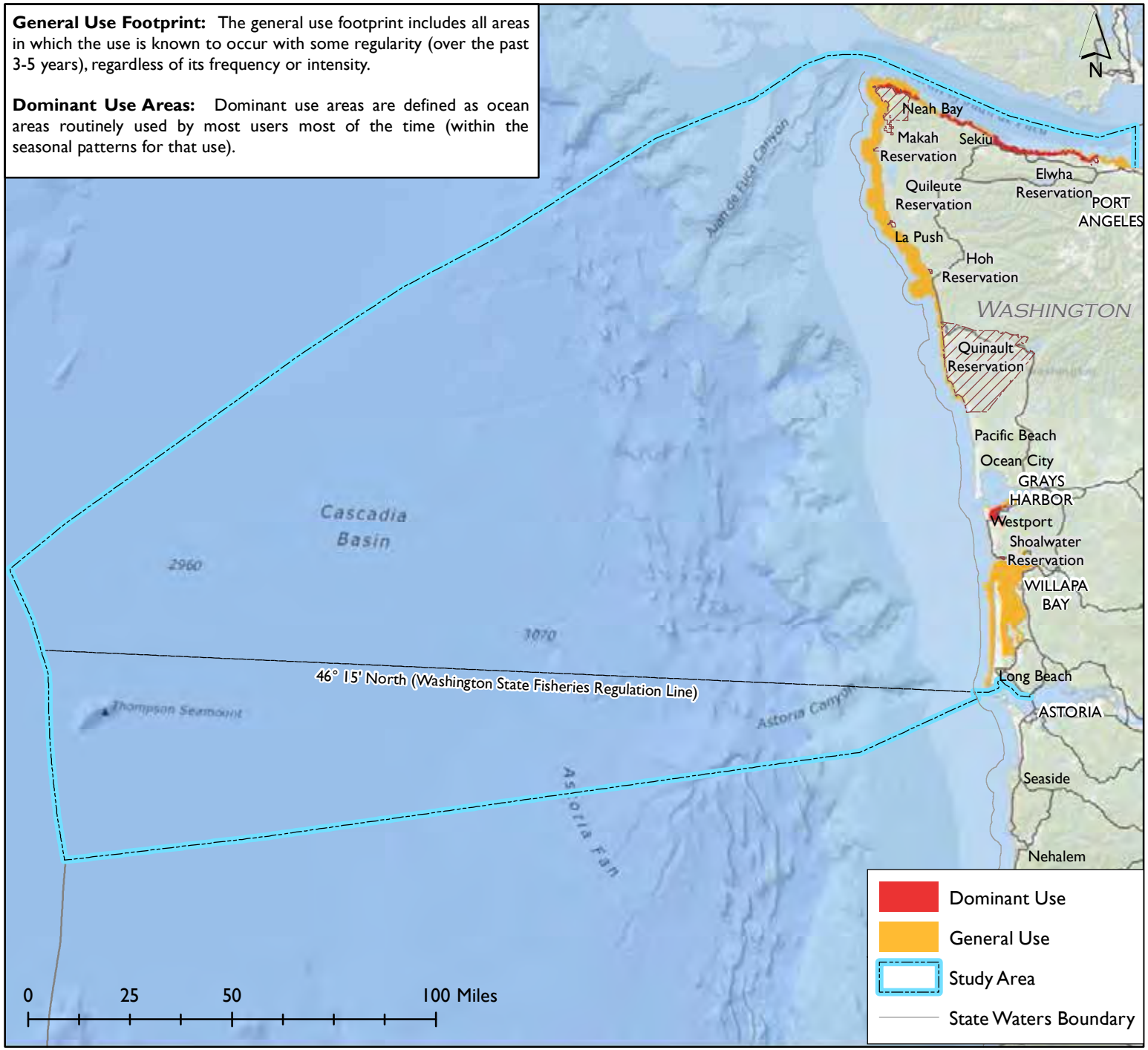

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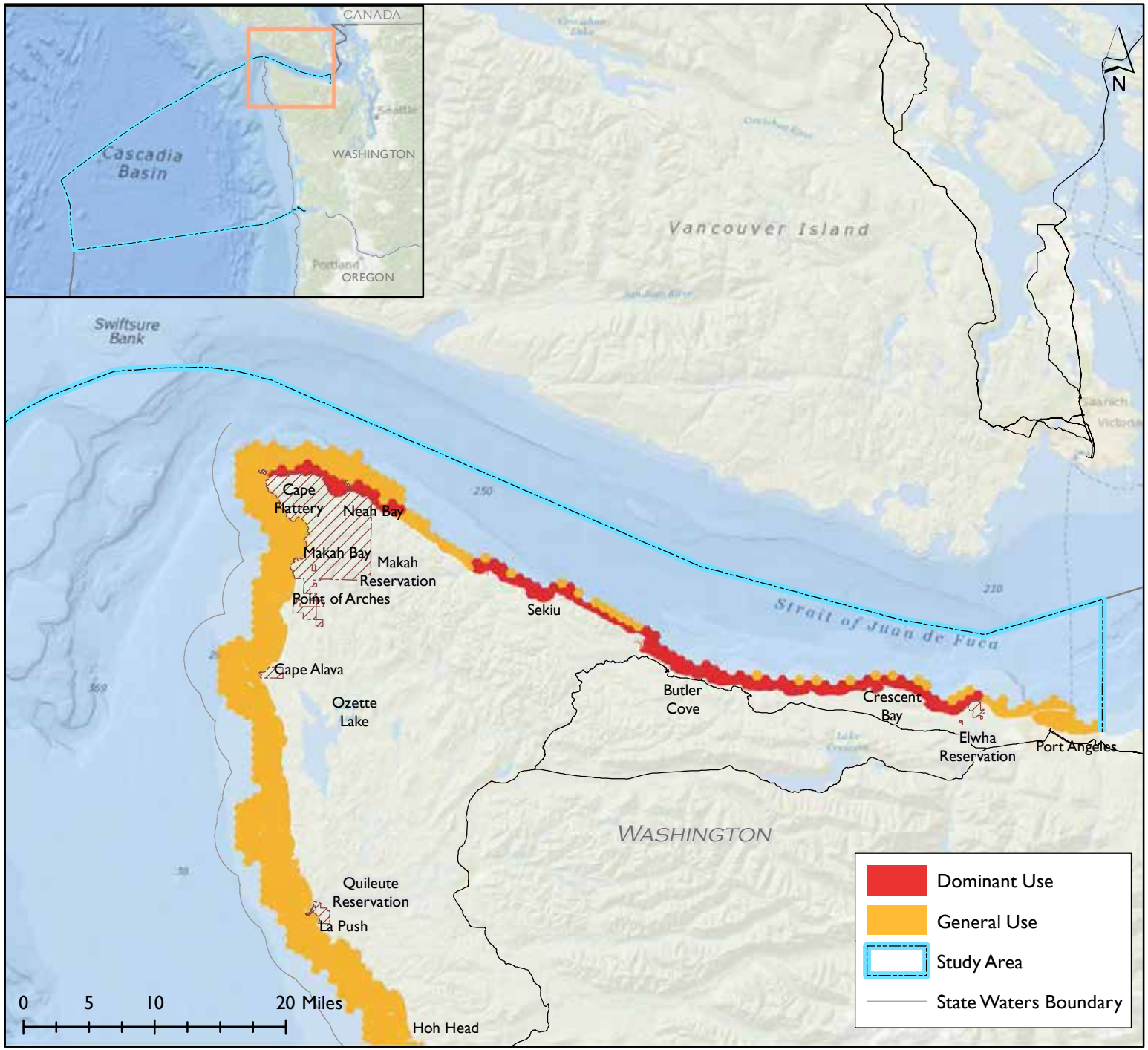

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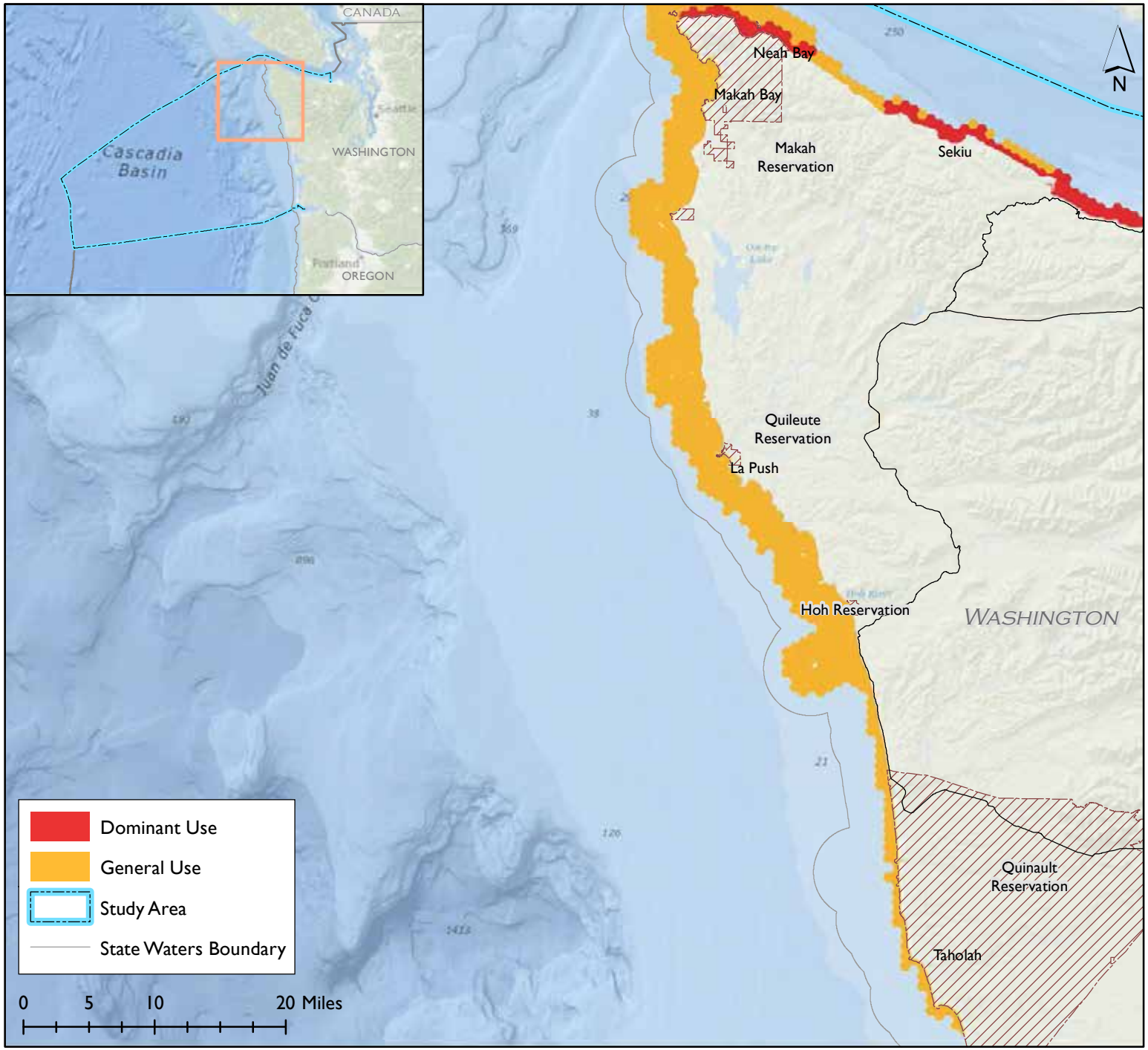

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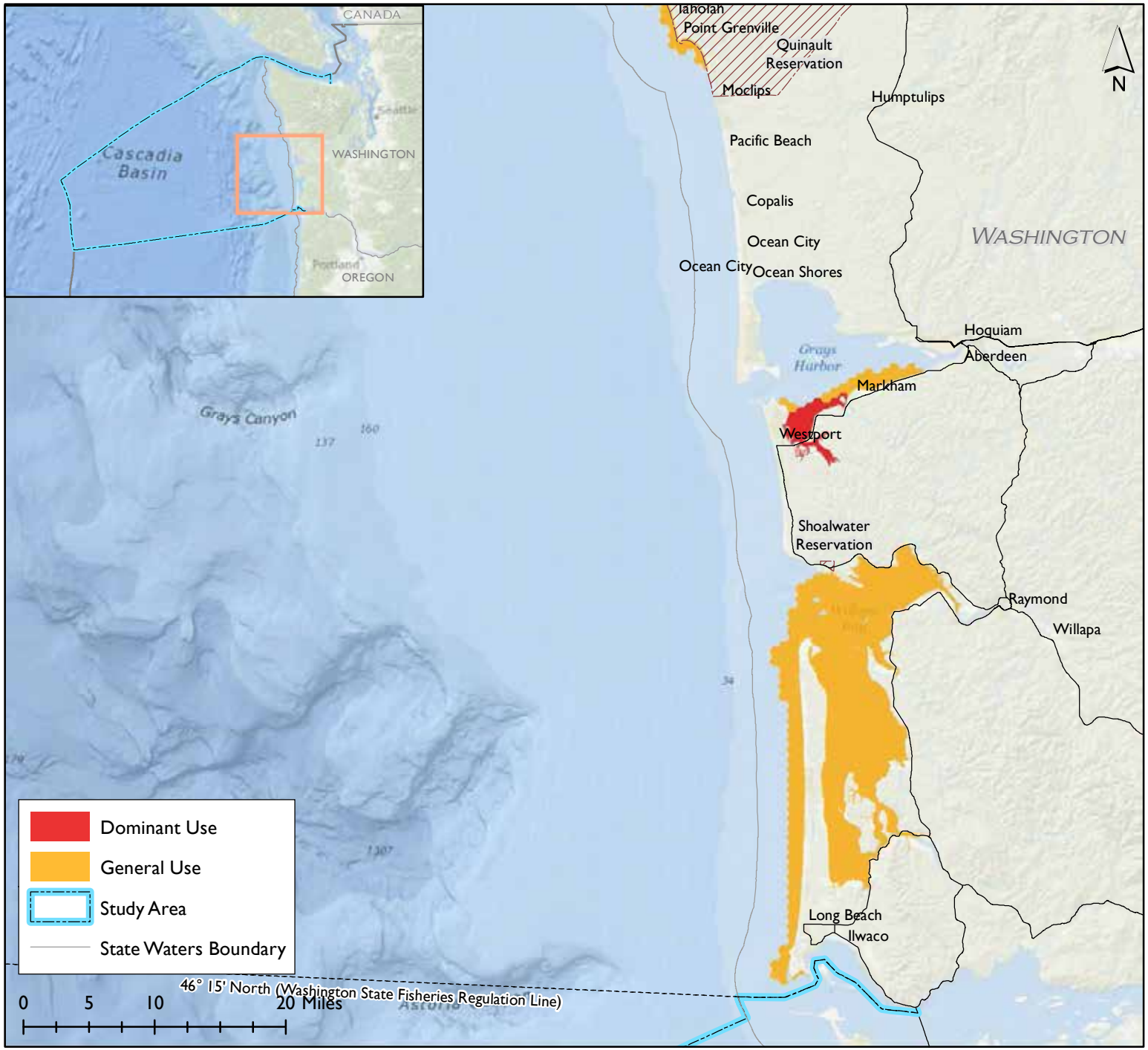

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Recreational Fishing From Shore

Includes:
Rod and reel, surf-casting, fishing from piers, jetties, crab traps, cast nets for recreational purposes

Excludes:
All other forms of shore-based fishing

Use Notes:
Recreational fishing from shore occurs throughout the study area. Use is focused along sandy beaches and the shores of the Strait. Use also occurs within bays and harbors and is more concentrated around the jetties, breakwaters and piers.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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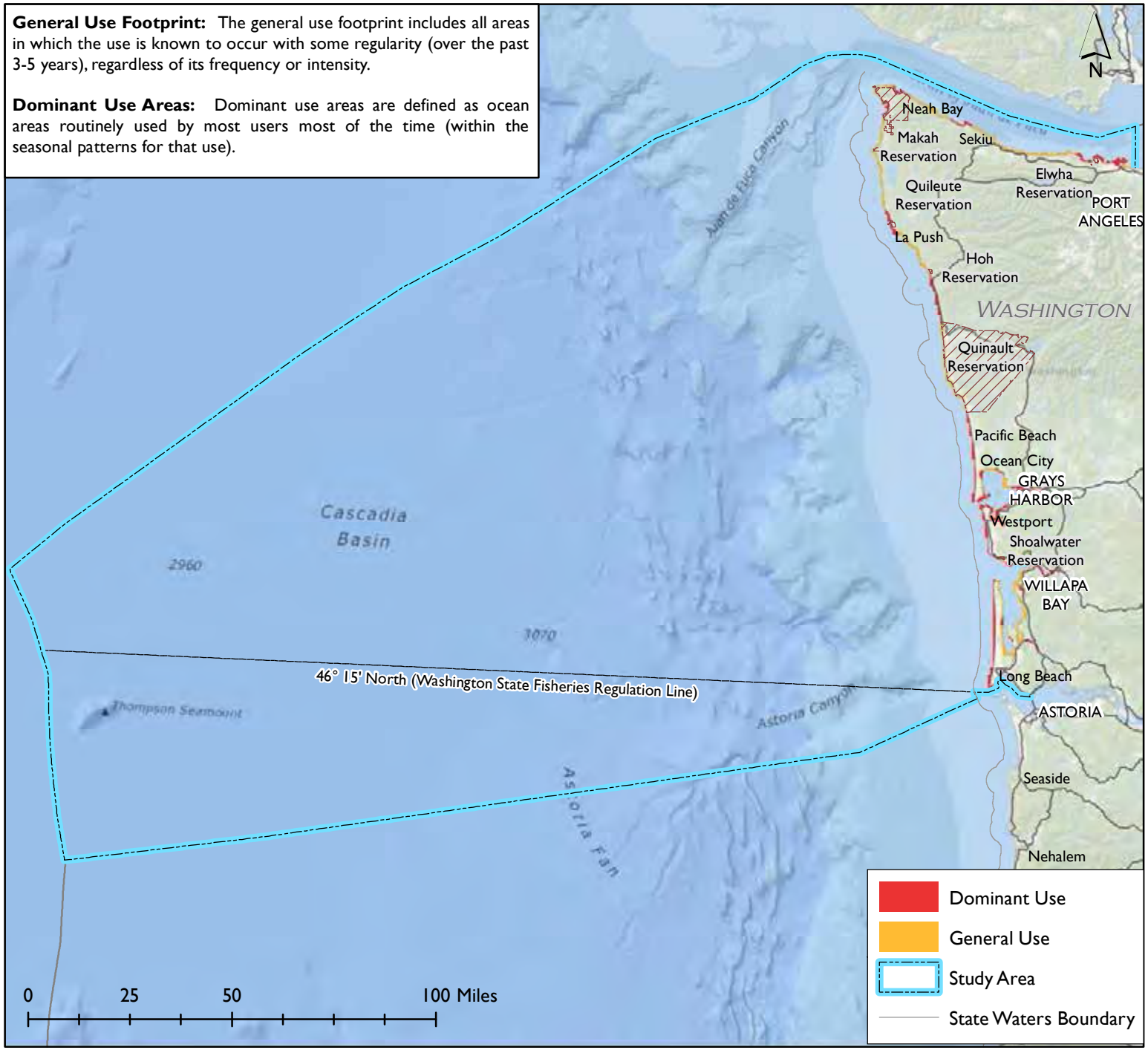

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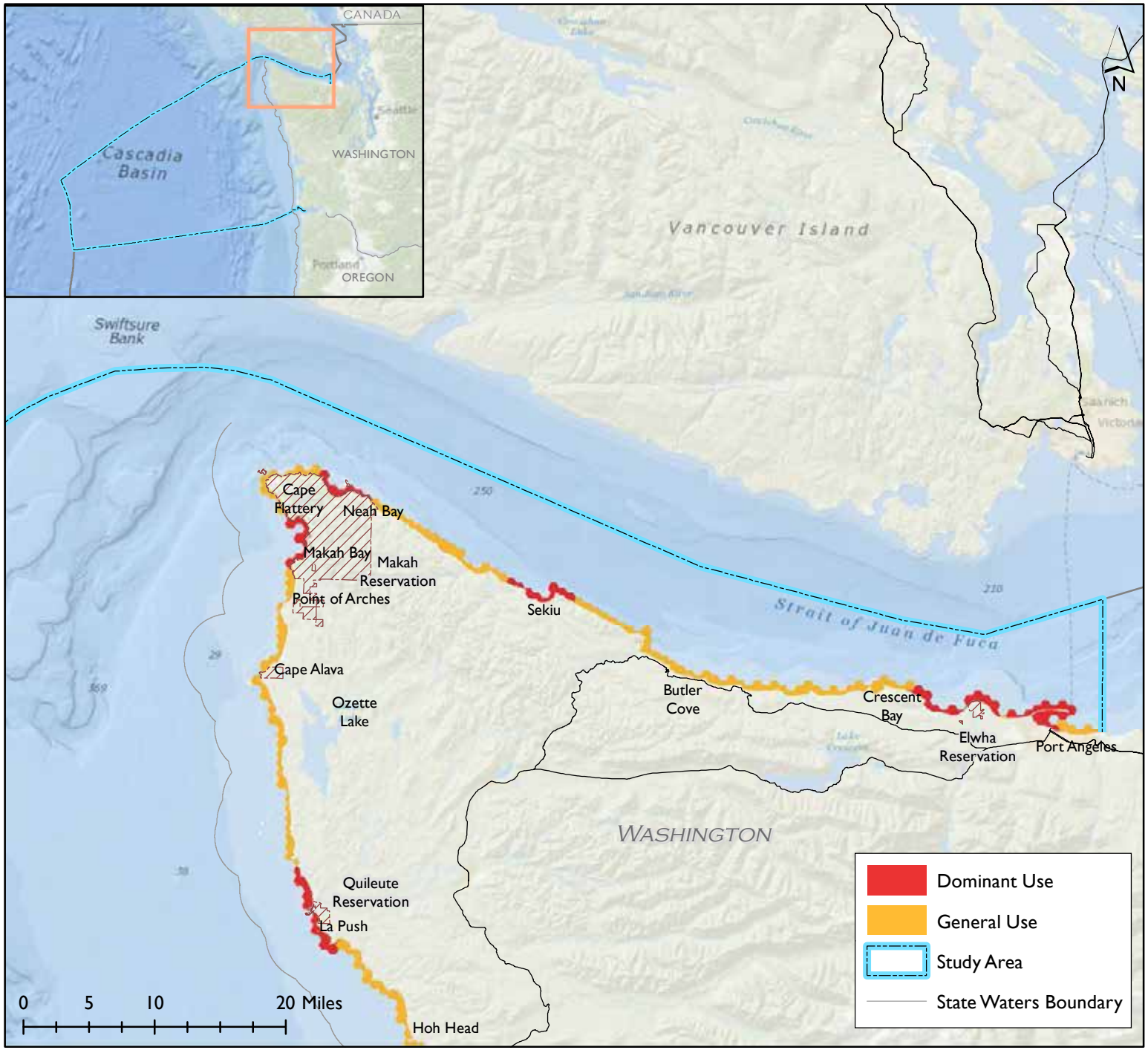

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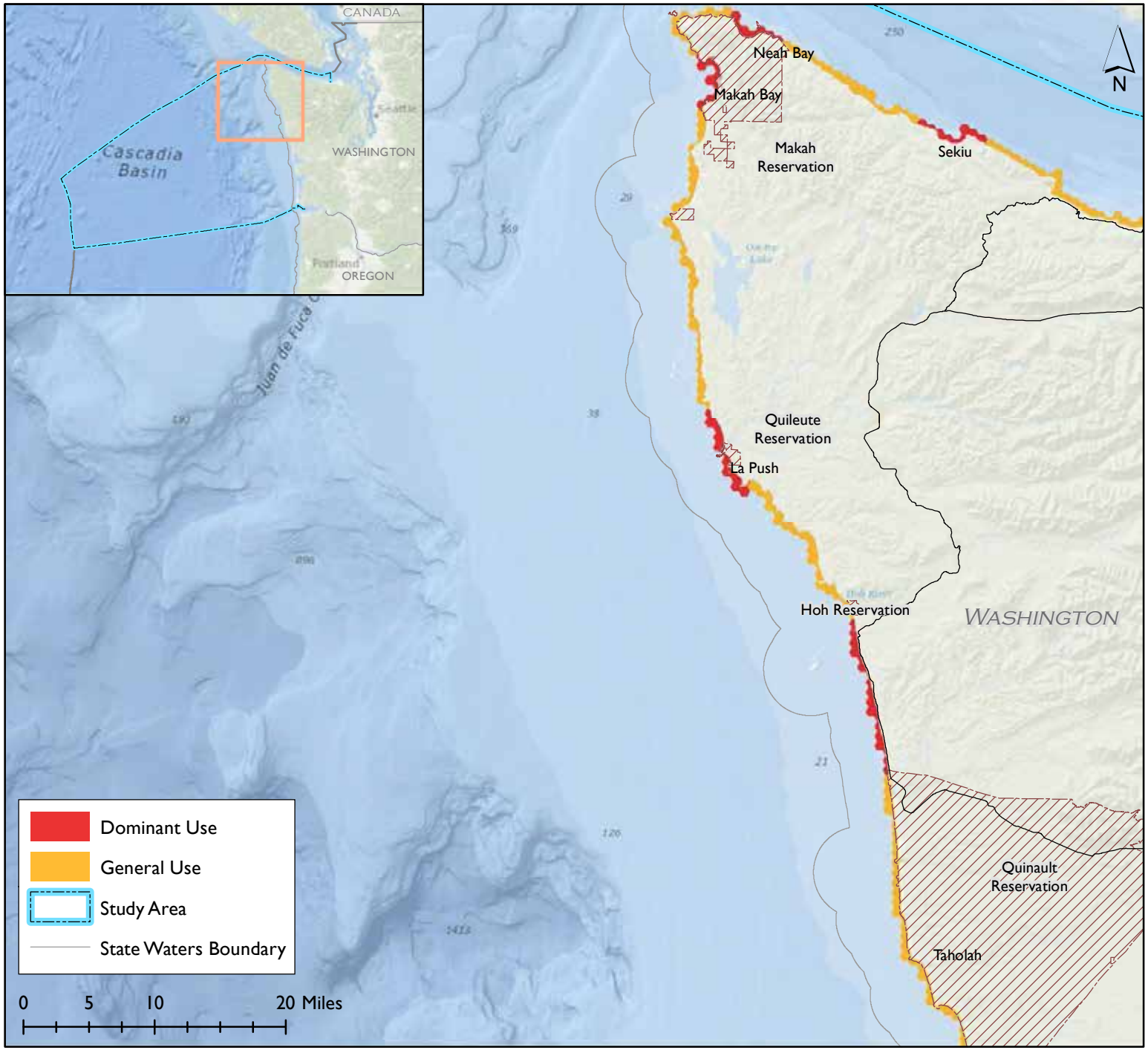

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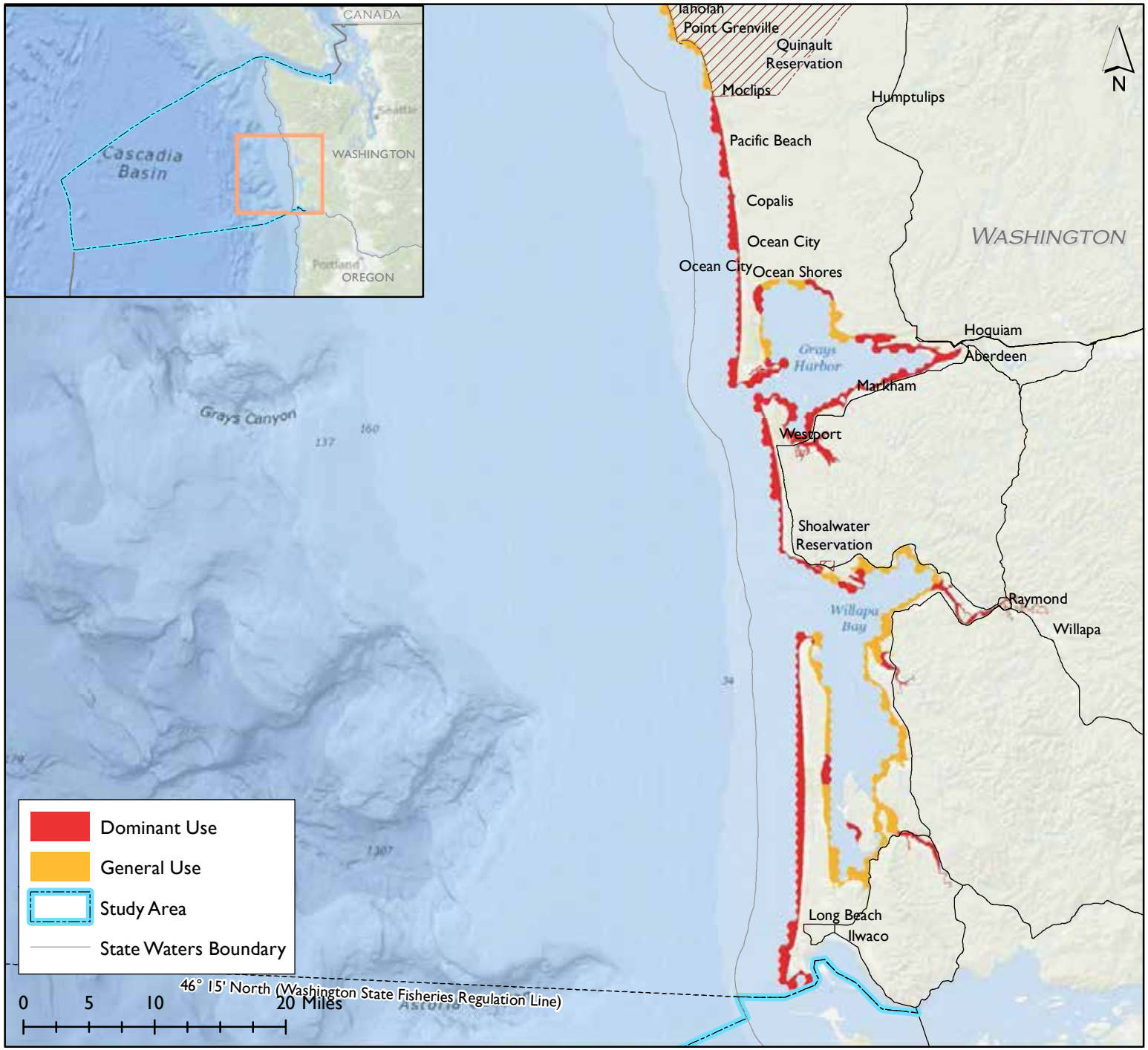

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Recreational Intertidal Harvest

Includes:
Recreational harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria

Excludes:
All other forms of intertidal harvesting

Use Notes:
Recreational intertidal harvest occurs throughout the study area for a wide range of clam species (razor, butter, horse, and manila clams) and crabs. The use is most dominant in the summer months, but does occur year-round. Impacts from invasive seagrass have affected clam beds in Willapa Bay in recent years, as have harmful algal blooms.

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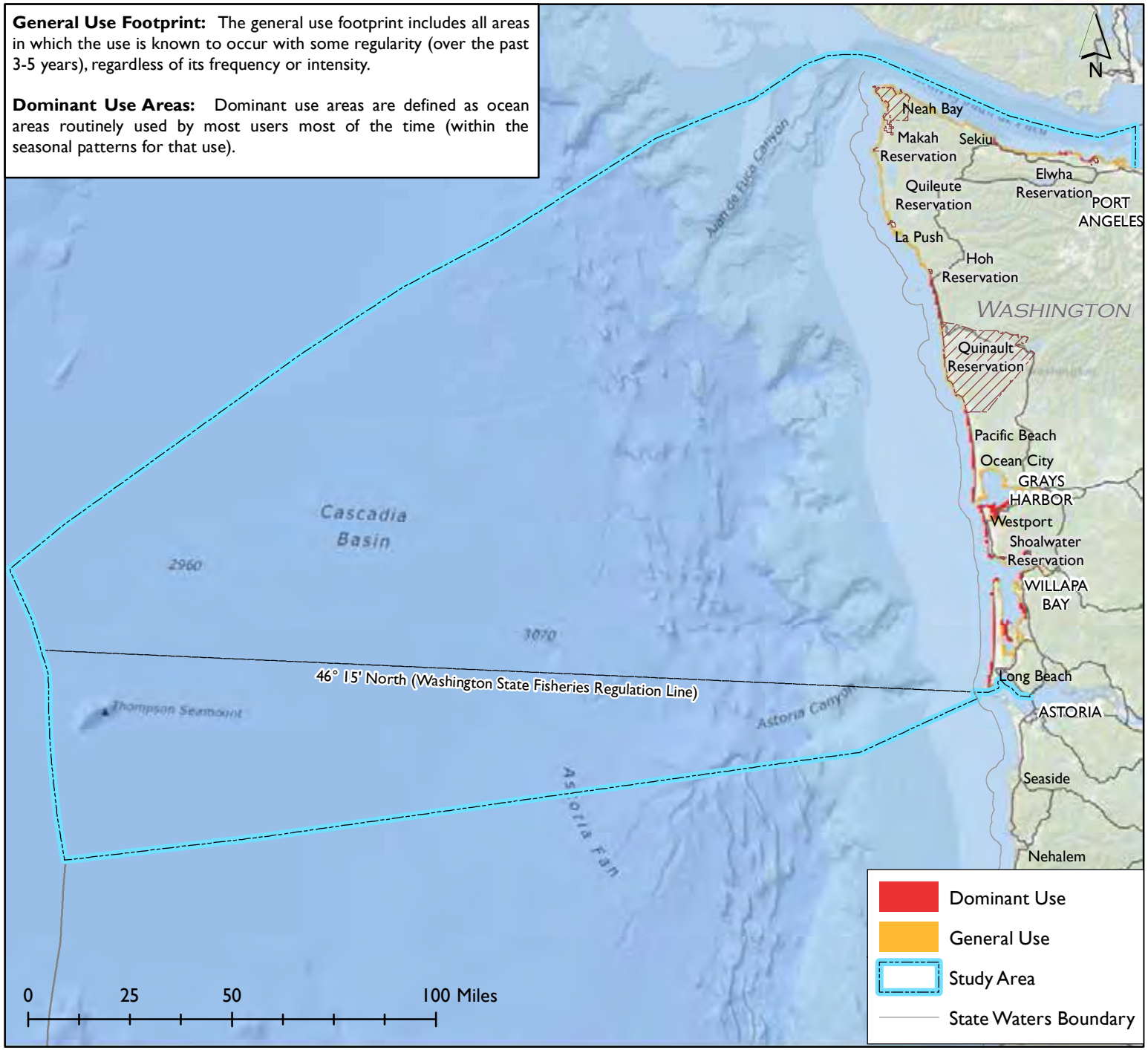

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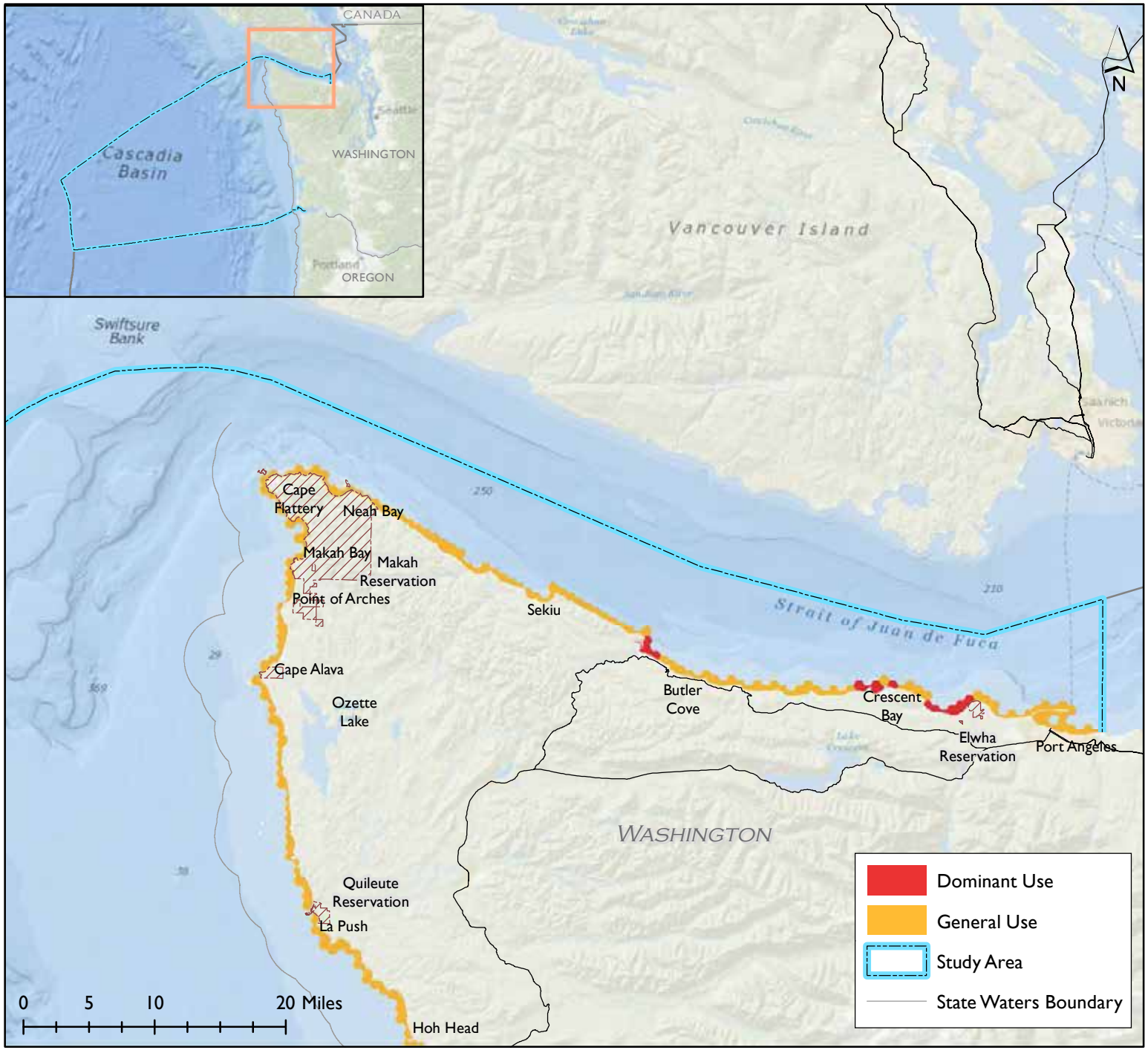

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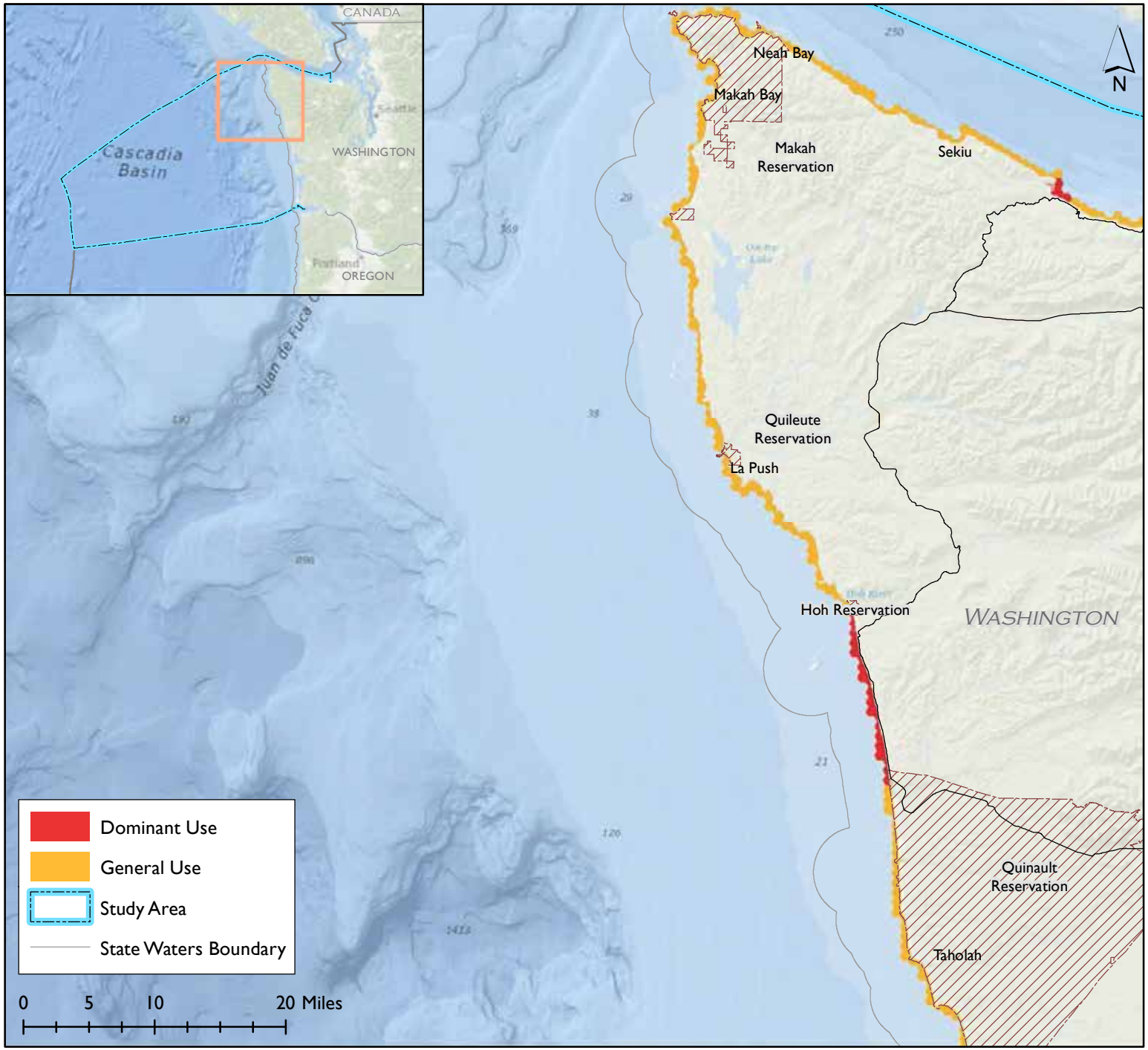

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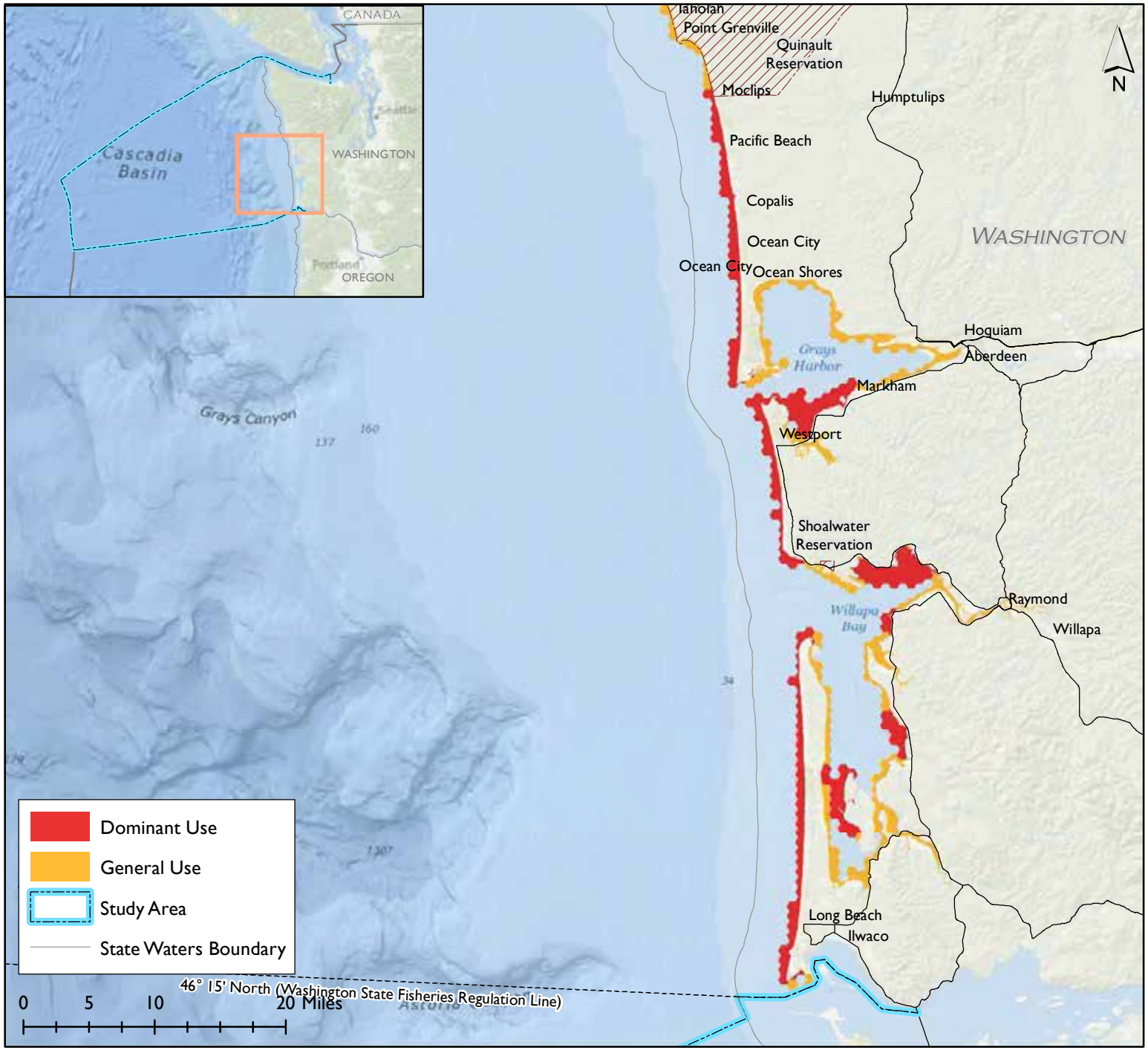

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Subsistence Fishing and Harvest

Includes:
Shore and boat-based fishing or hunting for vertebrates, birds, mammals and reptiles, harvest of seaweed or algae for subsistence purposes

Excludes:
All other forms of fishing

Use Notes:
Subsistence fishing, harvesting and hunting occurs to some degree throughout most of the study area, as a mixture of tribal and non-tribal use.

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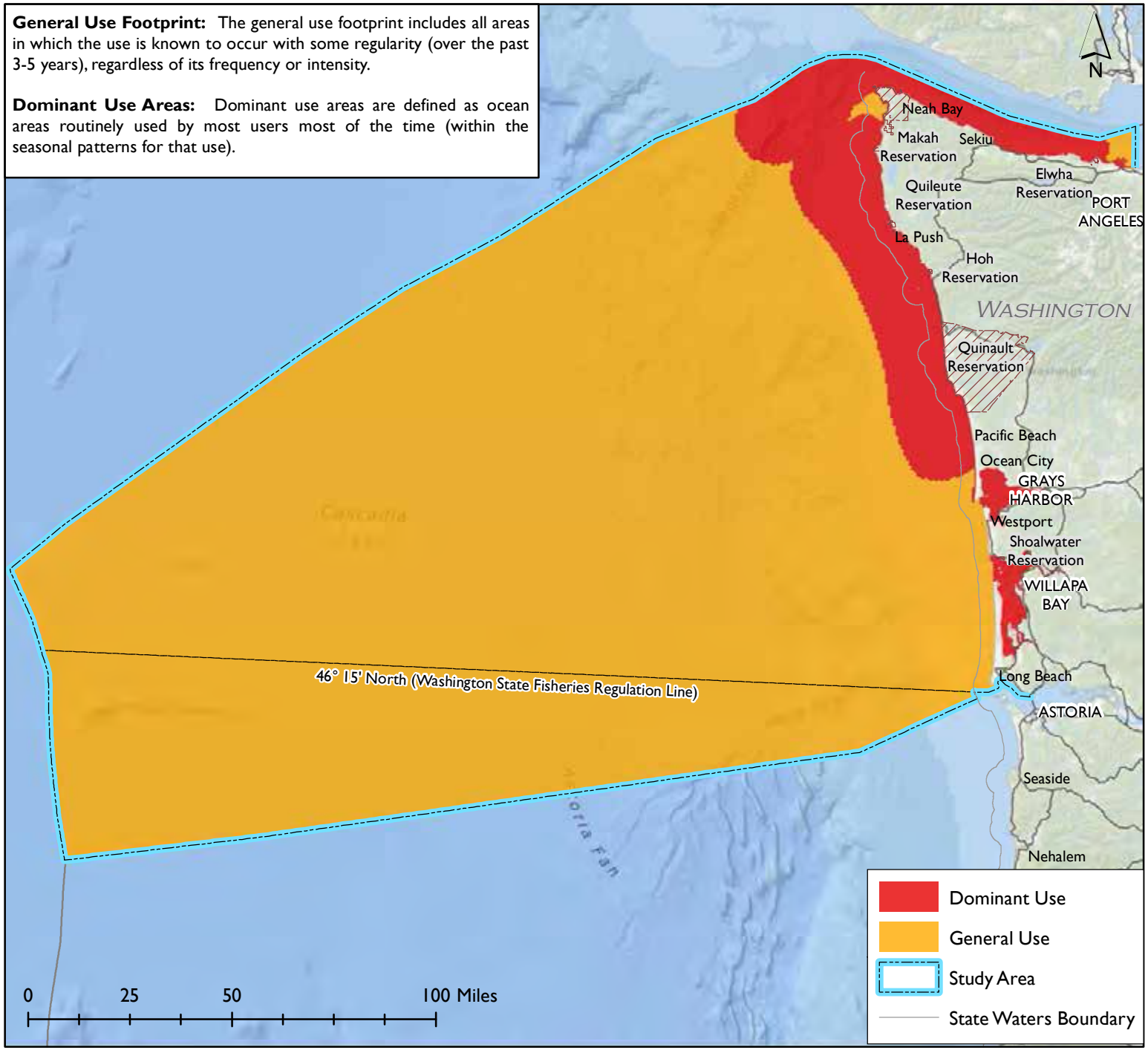

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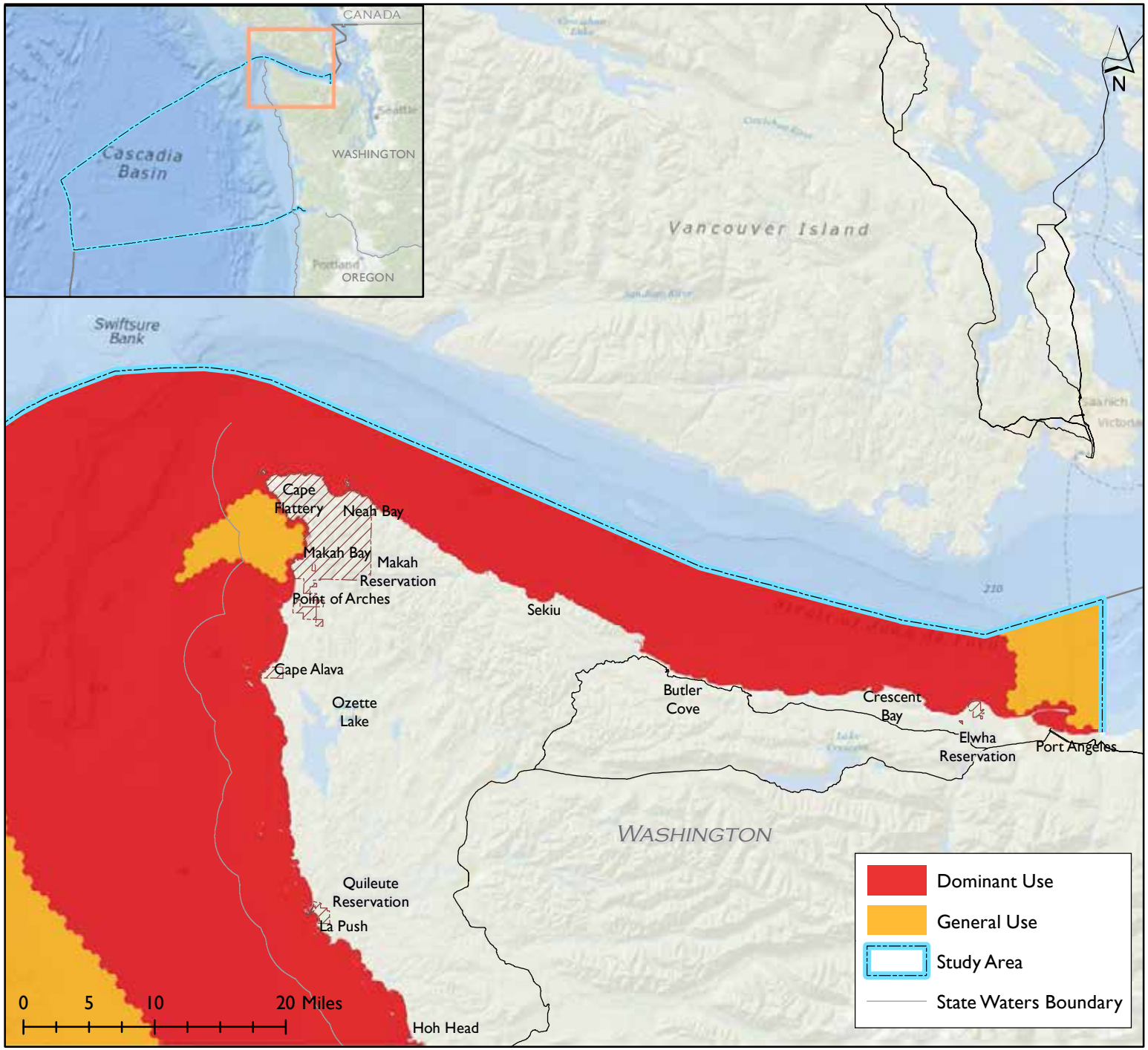

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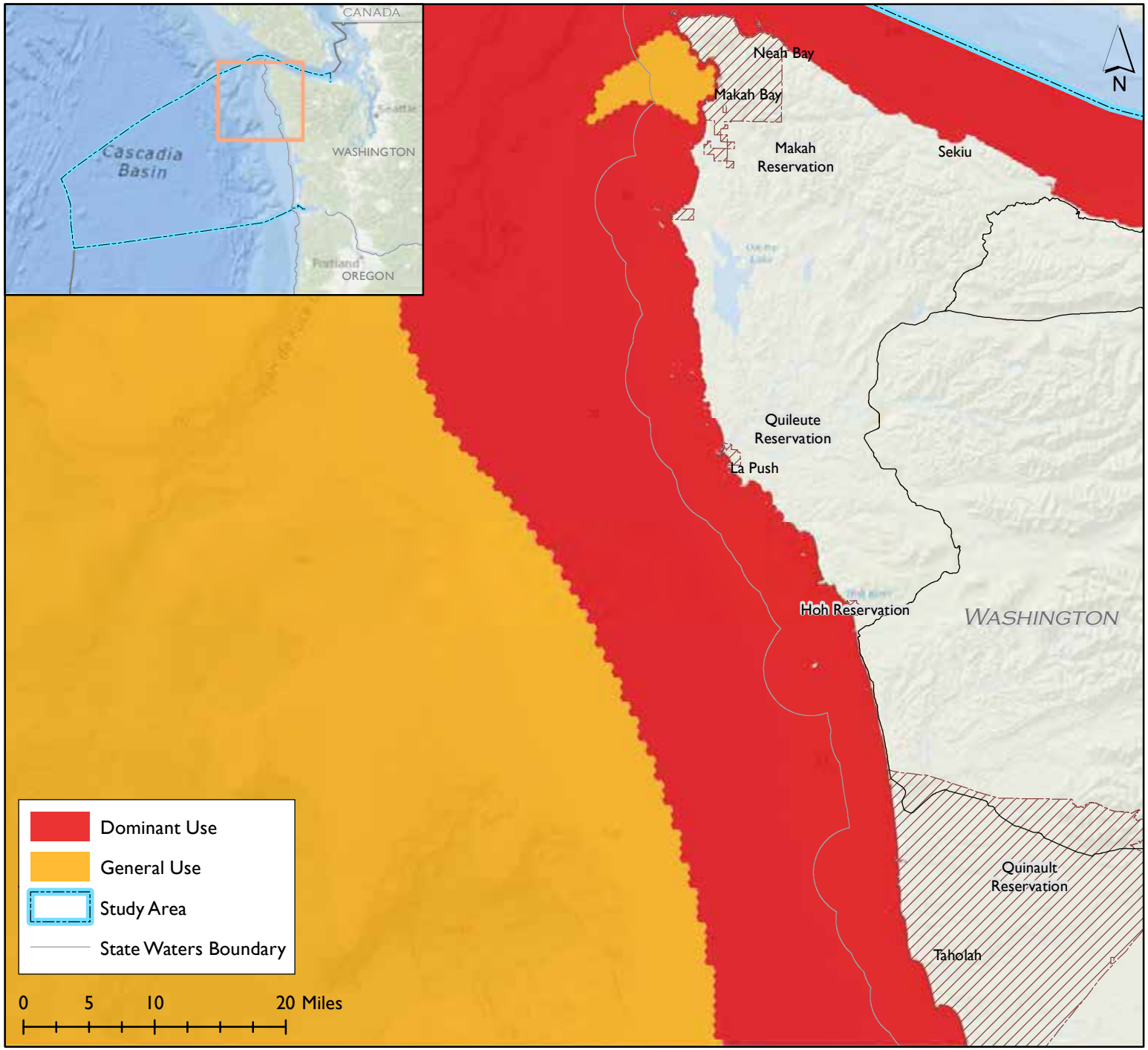

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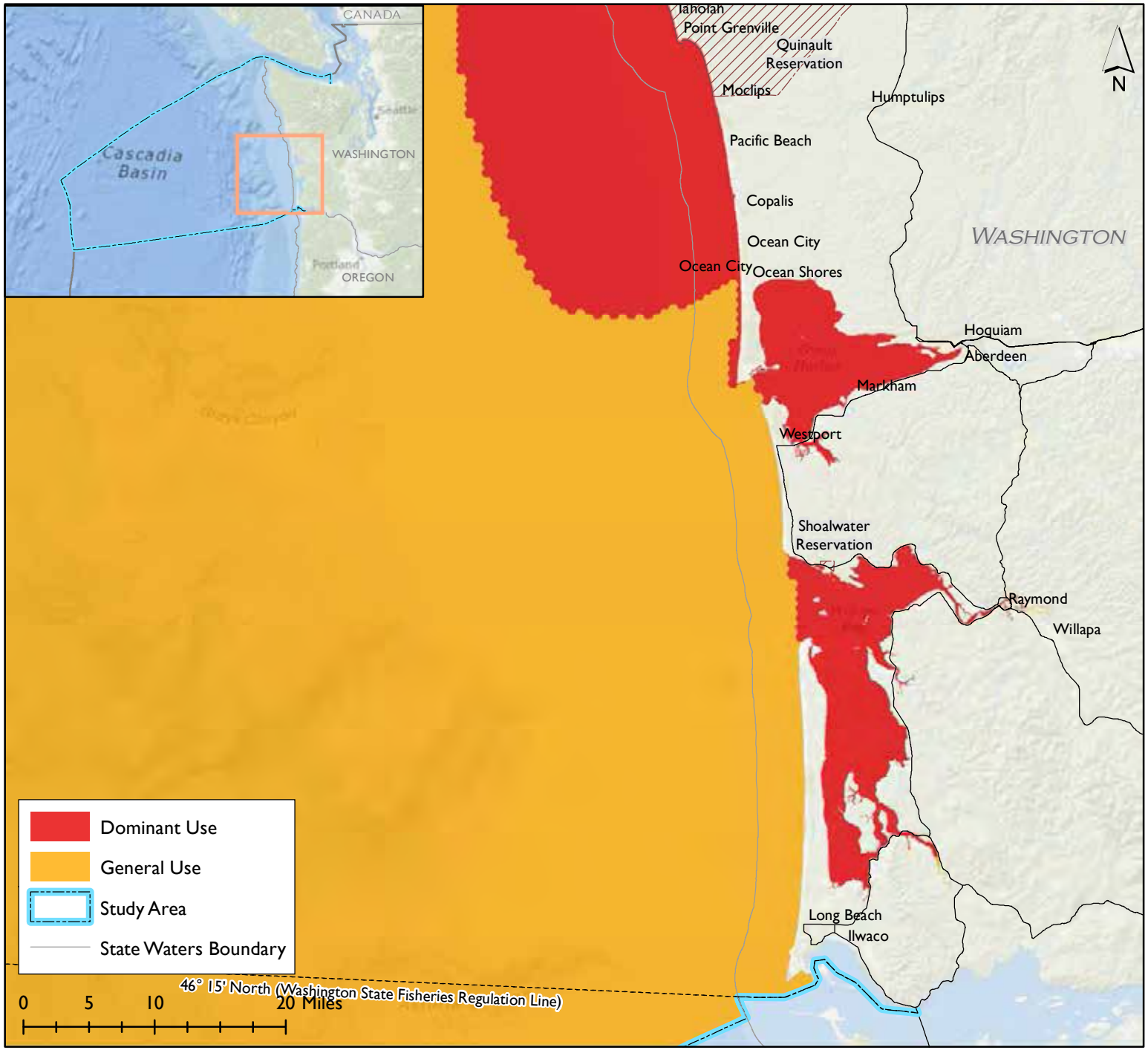

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Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

Use Notes:
Ocean dumping that occurs in the study area is mainly associated with dredge spoils near ports, harbors and river mouths. It can also include the dumping of fish waste and ballast water throughout the study area. More questionable is the illegal dumping of plastics and nuclear waste. The majority of the use occurs as dredge spoils in the EPA Region 10 ocean dumping sites.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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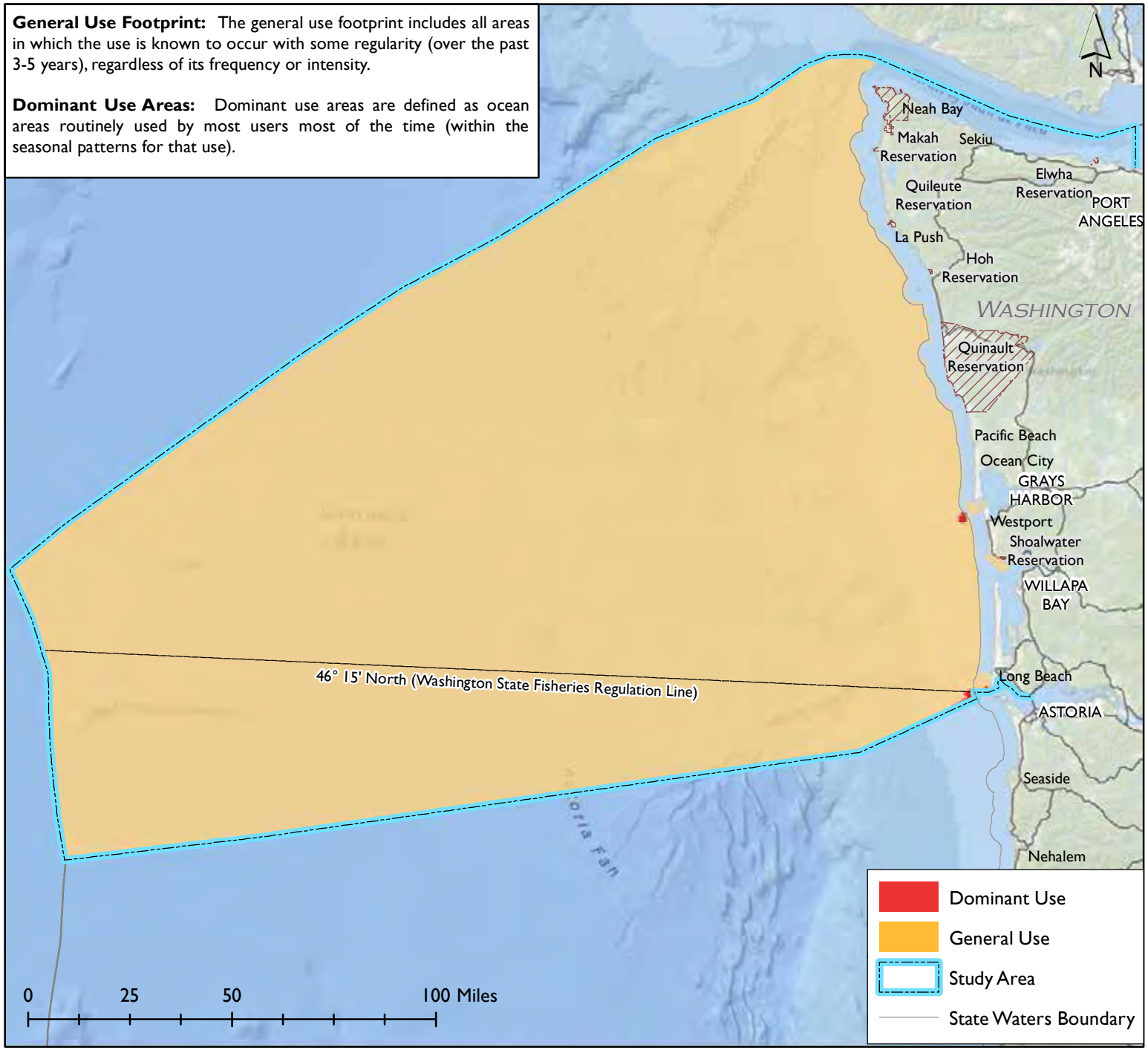

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

Use Notes:
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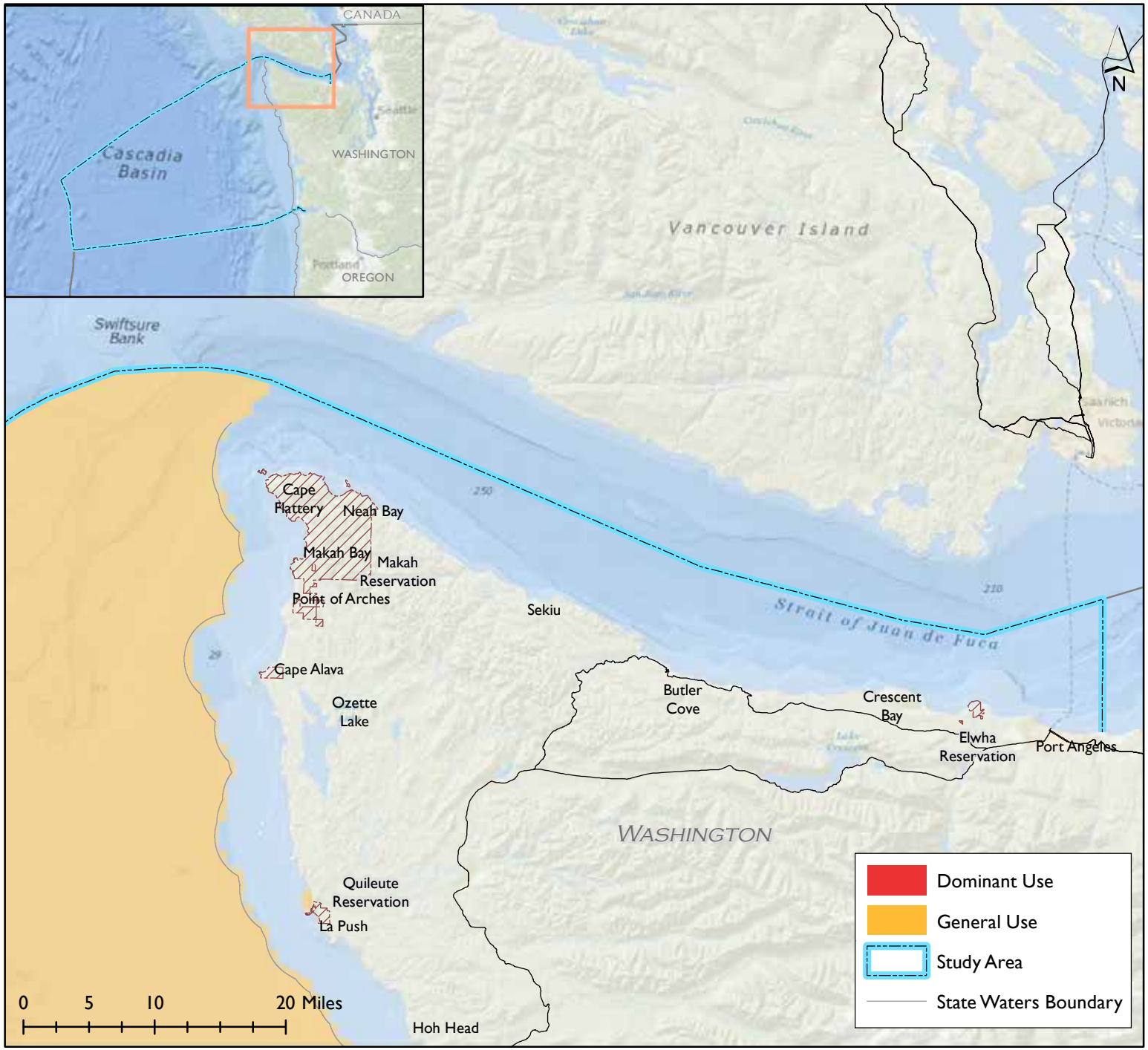

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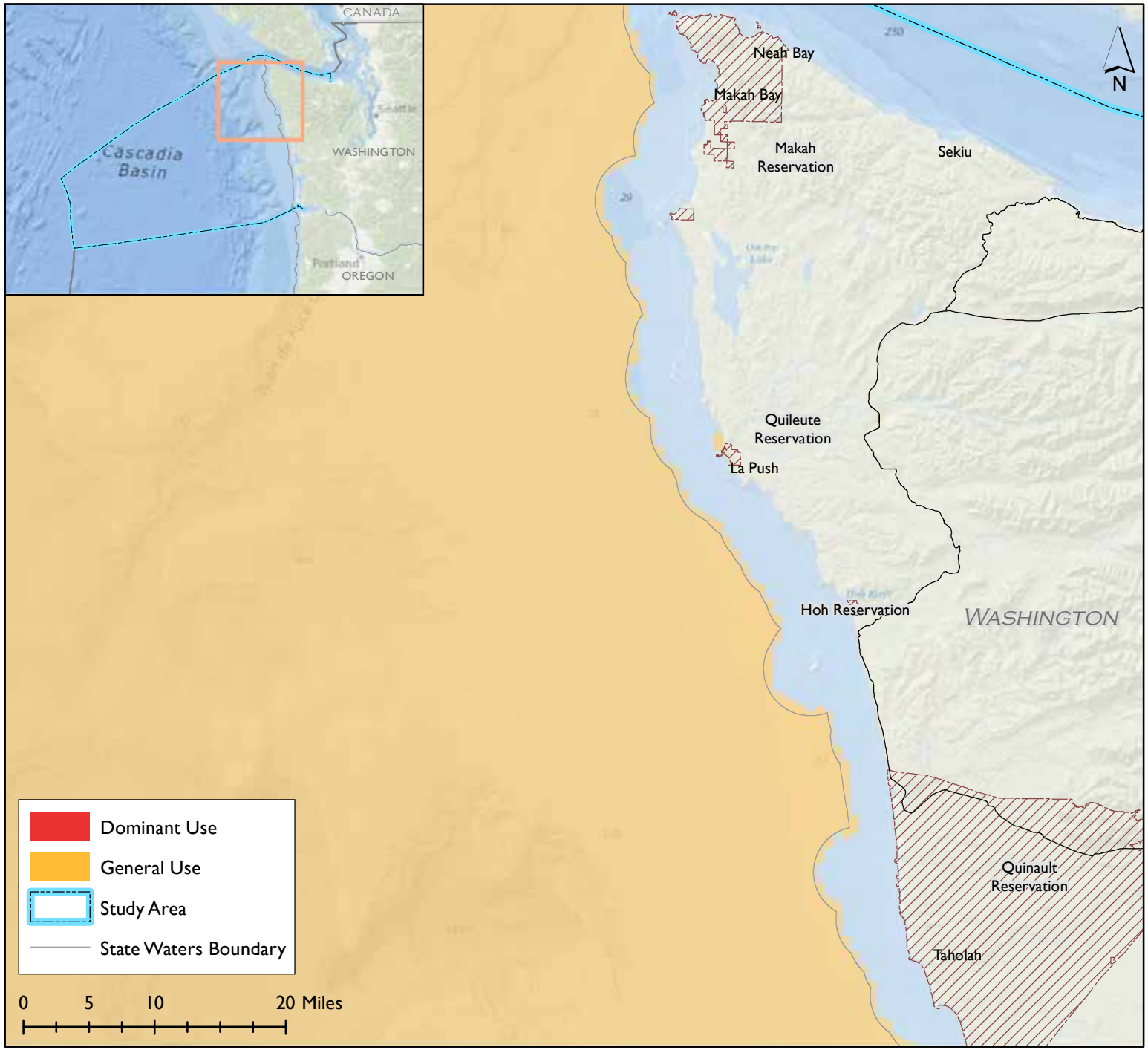

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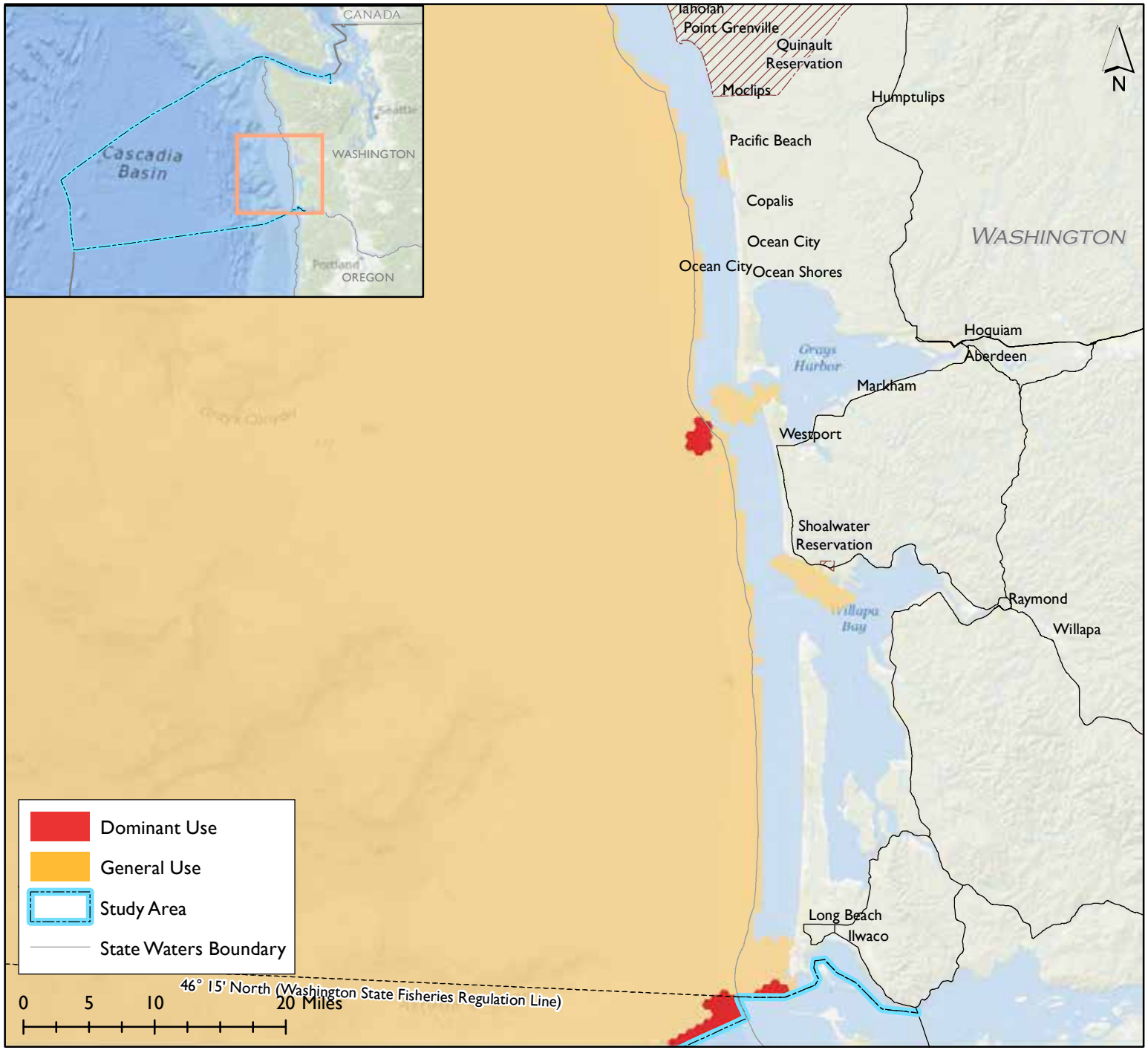

 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Mariculture

Includes:
Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages)

Excludes:
Aquaculture wholly pursued on land

Use Notes:
Mariculture occurs in a number of the coastal bays for oysters, clams, salmon and baitfish. Shellfish research beds are present in Neah Bay (geoduck) and Makah Bay (shellfish); bait pens are present in Grays Harbor; net pens (salmon) in Port Angeles.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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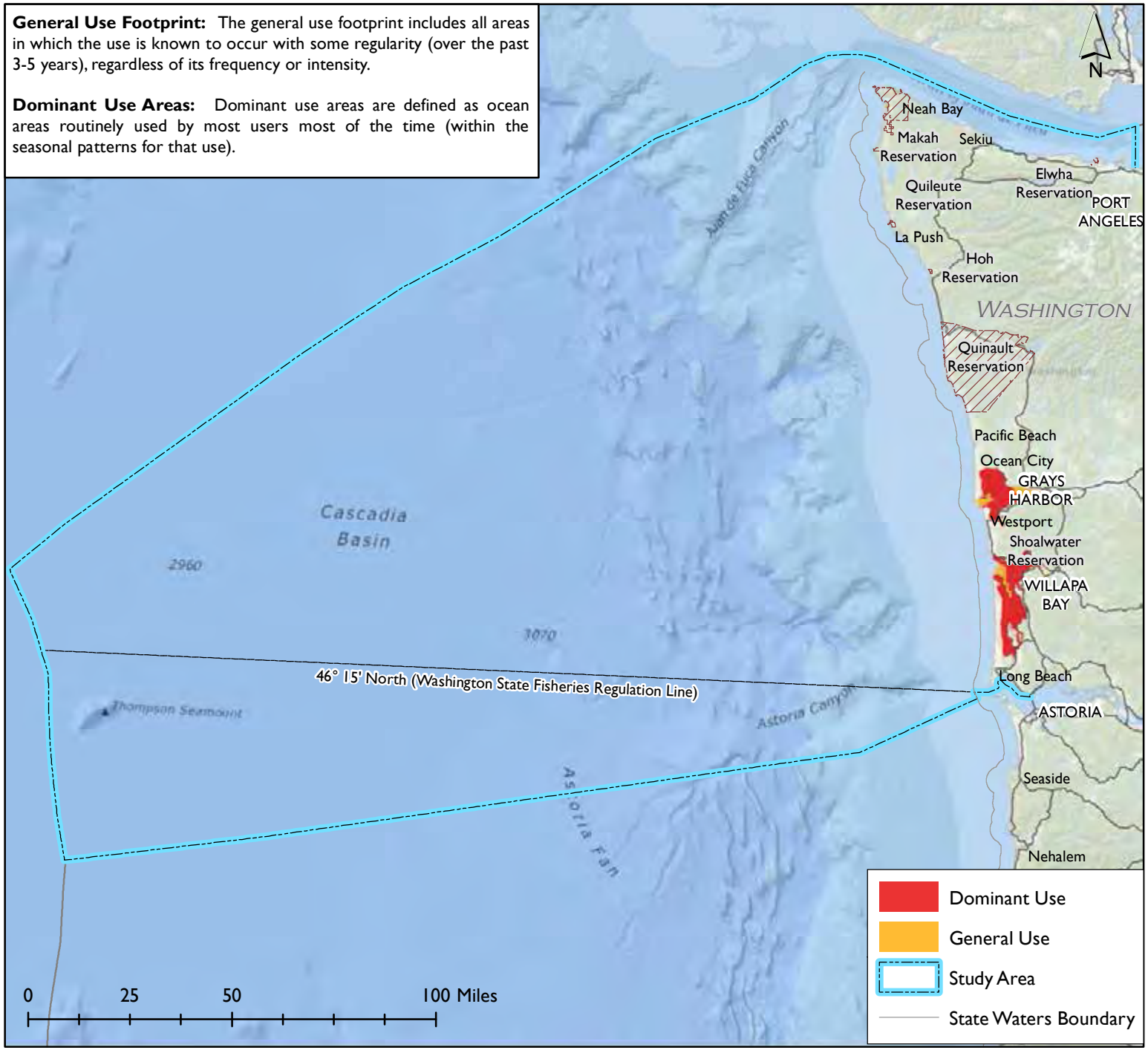

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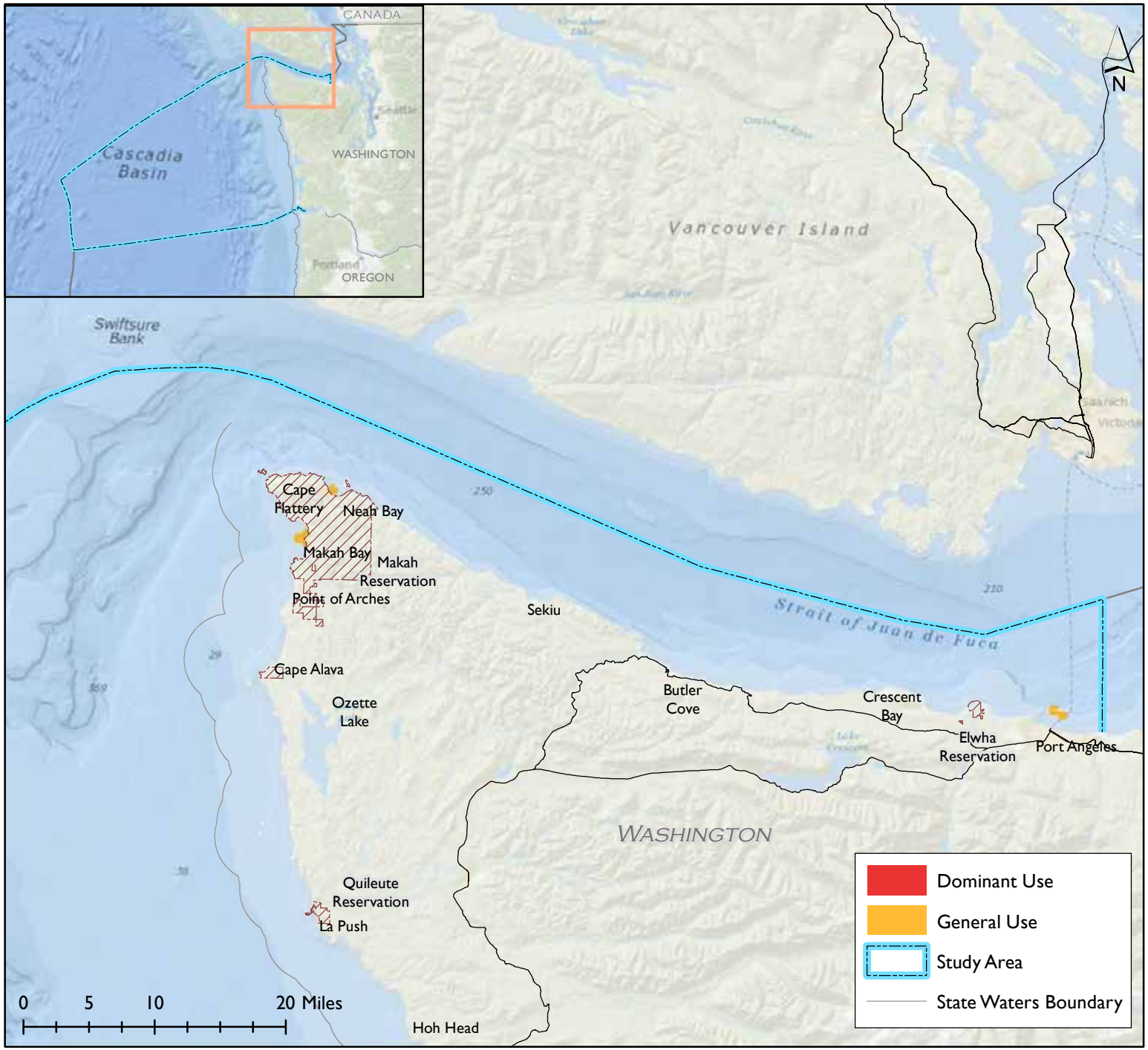

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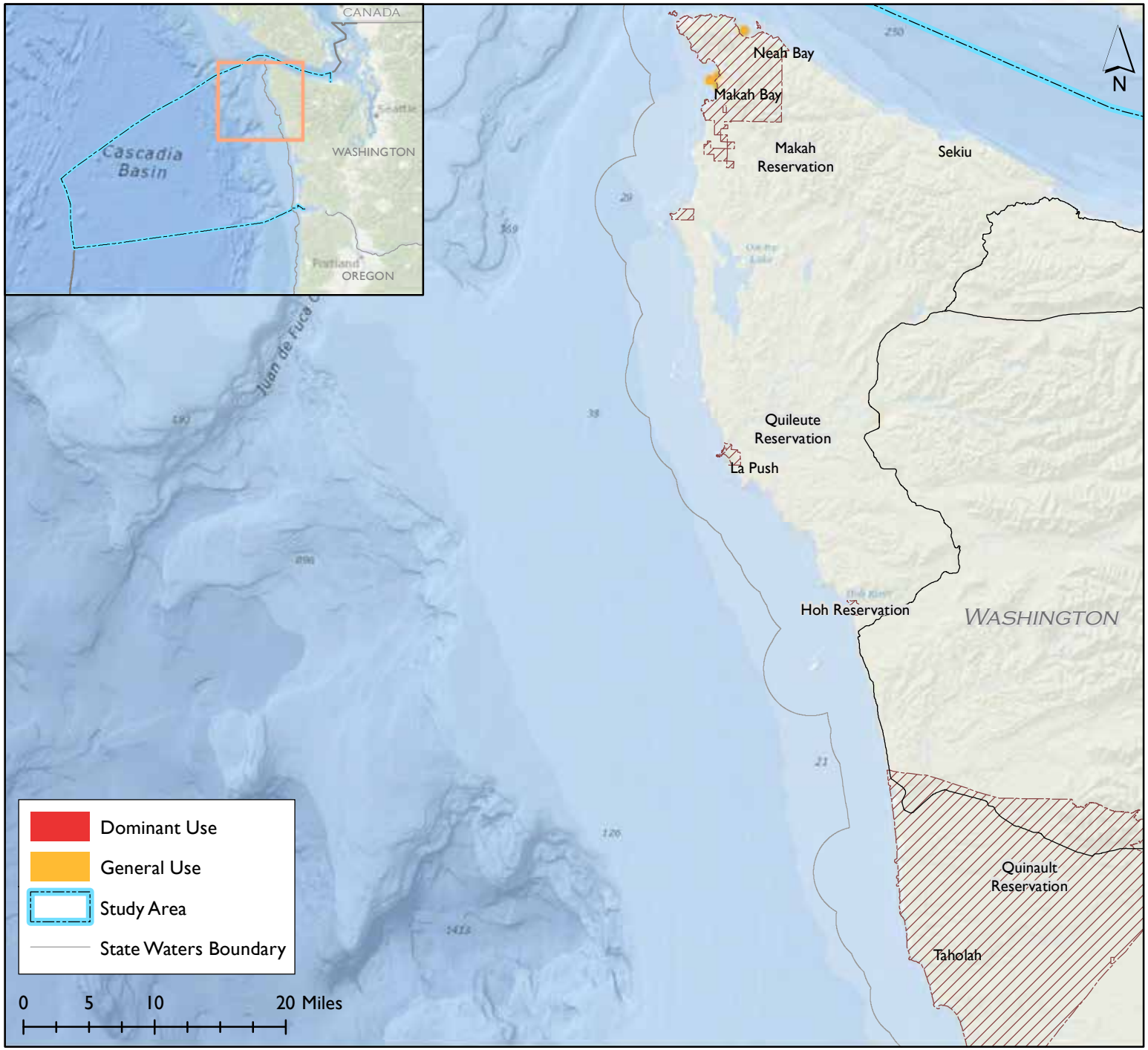

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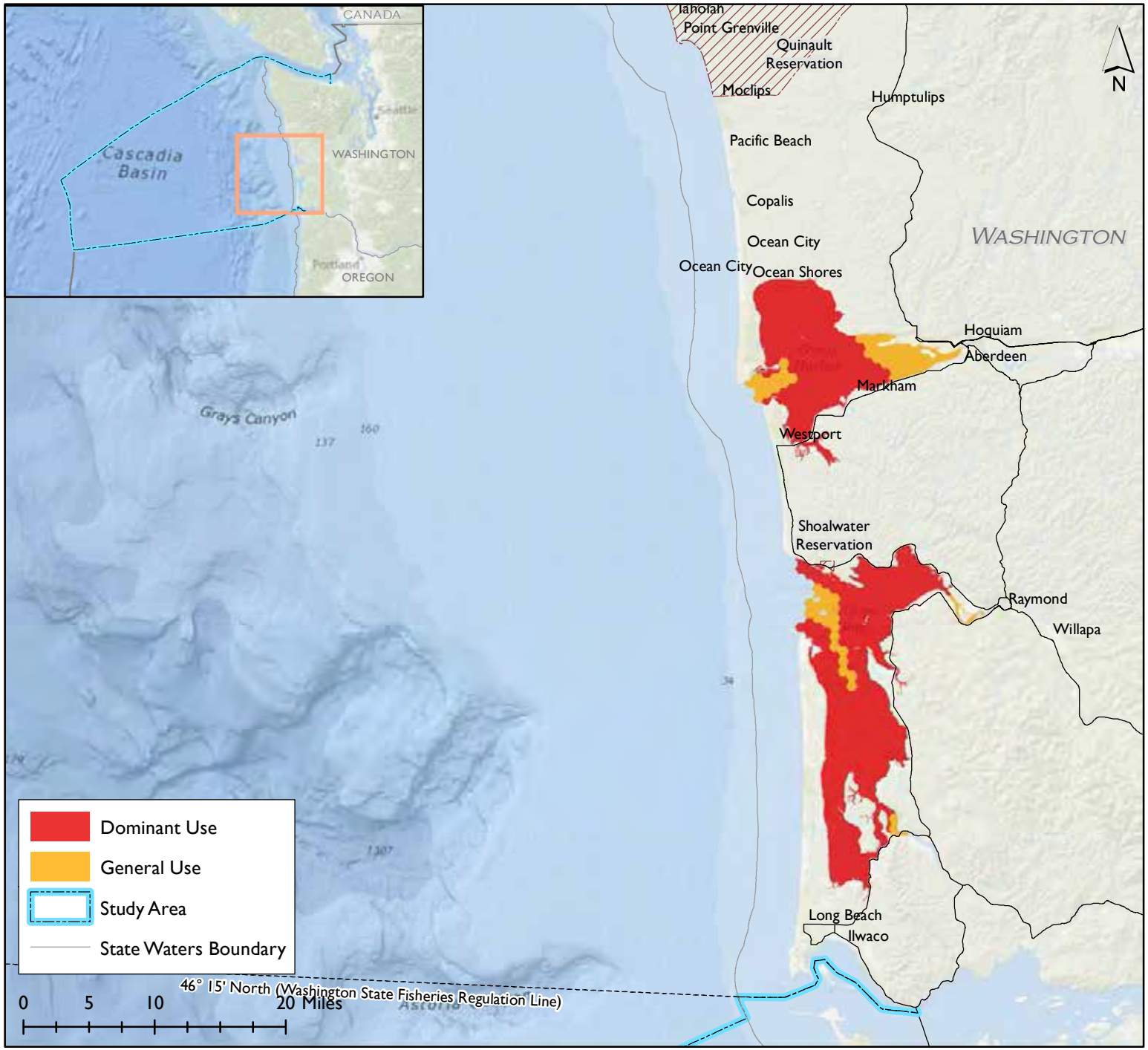

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Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Marine Debris

Includes:
The collection, monitoring and routine siting of marine debris, including targeted debris removal areas.

Excludes:
Any other form of ocean dumping

Use Notes:
Marine debris siting has increased significantly in recent years. Routine monitoring and collection of debris occurs at various locations throughout the study area. The use is concentrated after large storms and in response to community sitings of debris on beaches and floating debris in nearshore waters.

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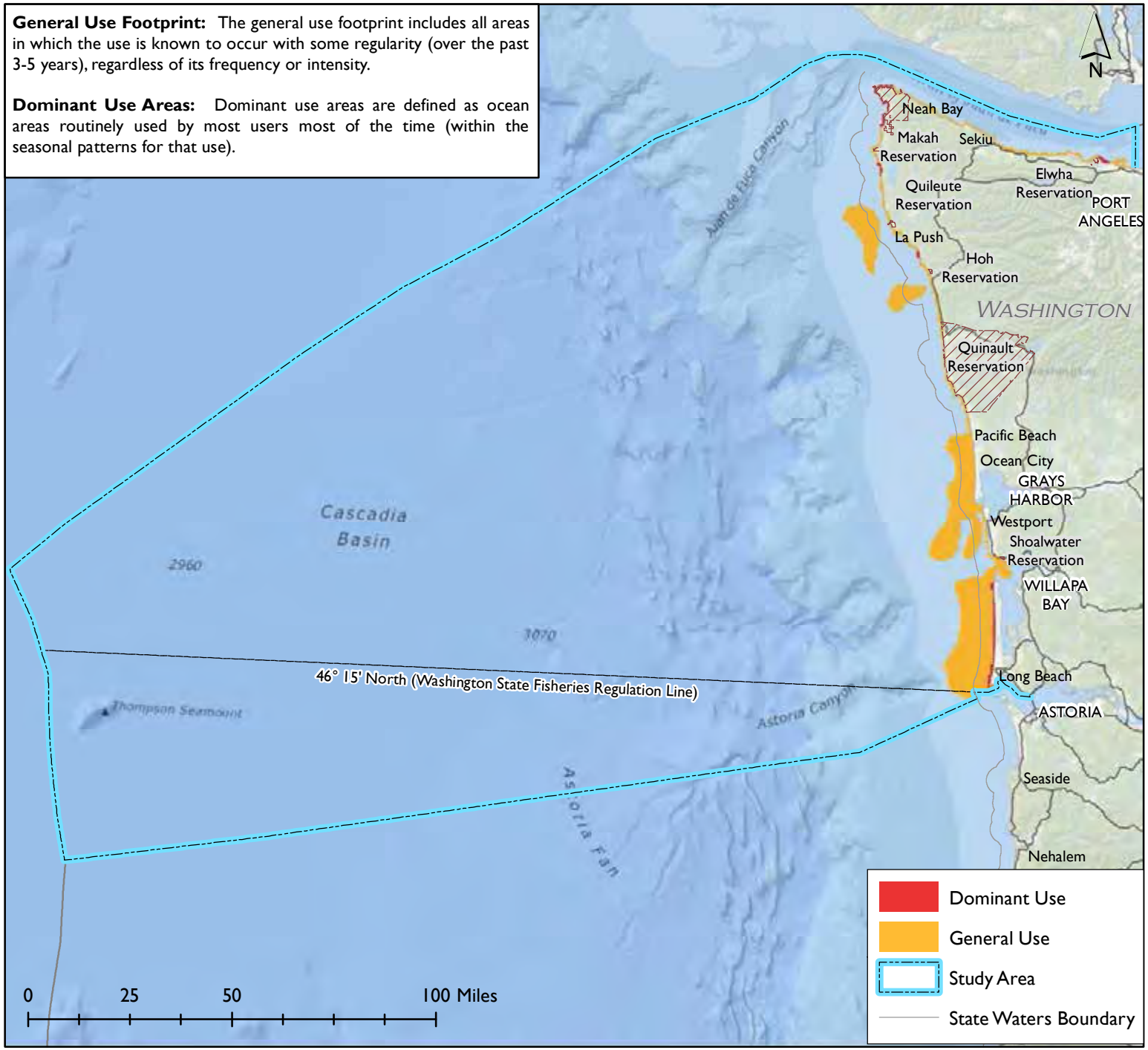

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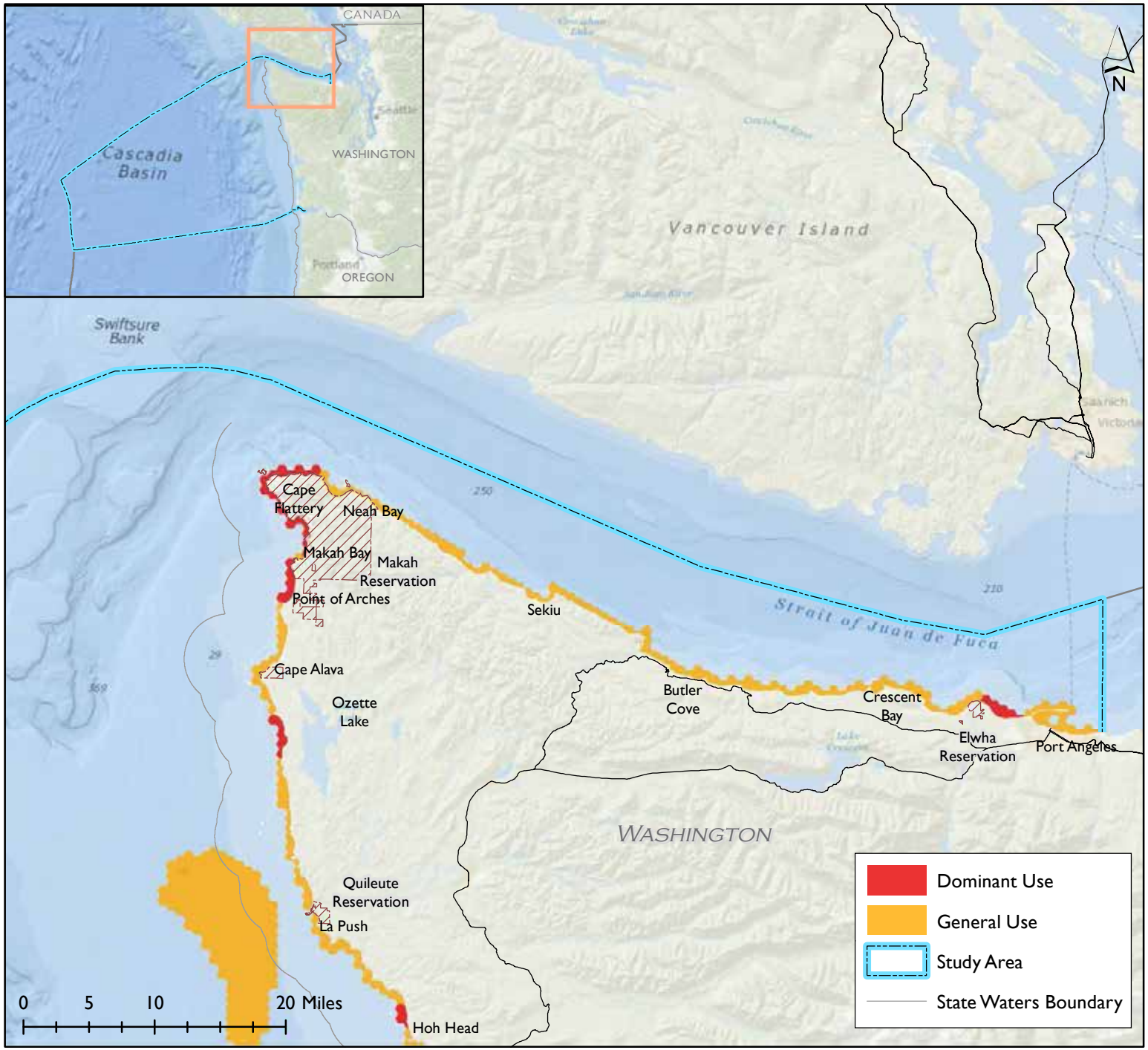

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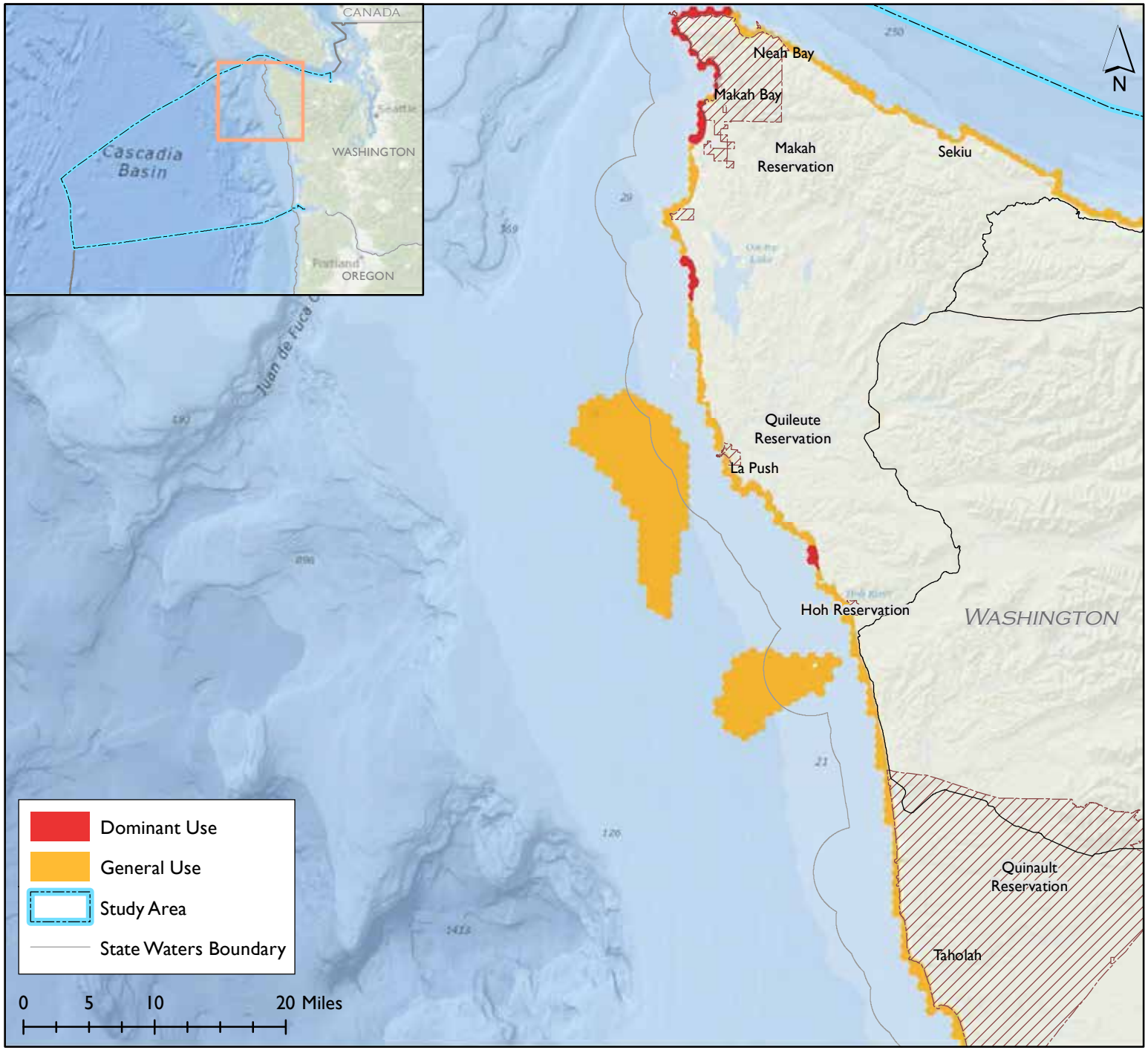

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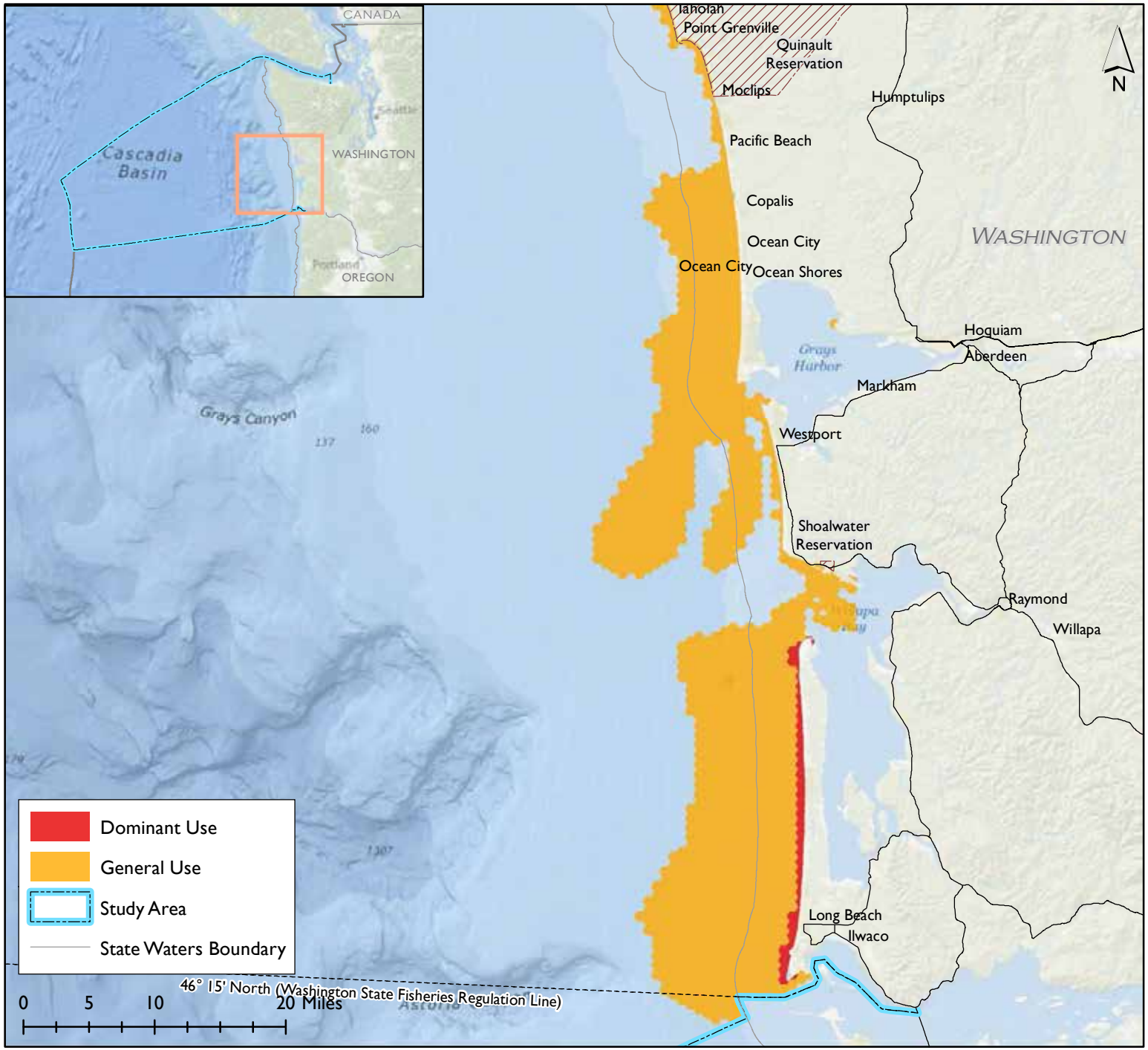

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Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, war games, and ordnance disposal

Excludes:
Wartime military operations

Use Notes:
Military operations occur throughout a majority of the study area. This includes areas for military training, rescue operations, exercises and ordnance disposal. Live fire testing is known to occur in the Quinault Underwater Test Range and throughout the Strait of Juan de Fuca. Military submarines and carriers transit through the area, staying mainly within the shipping lanes. Some military activities focus around Camp Rilea and the US Coast Guard bases at LaPush and Westport. Military research occurs around the Quileute canyon, basic training around Wade Island and rescue operations training in Sekiu and Clallam.

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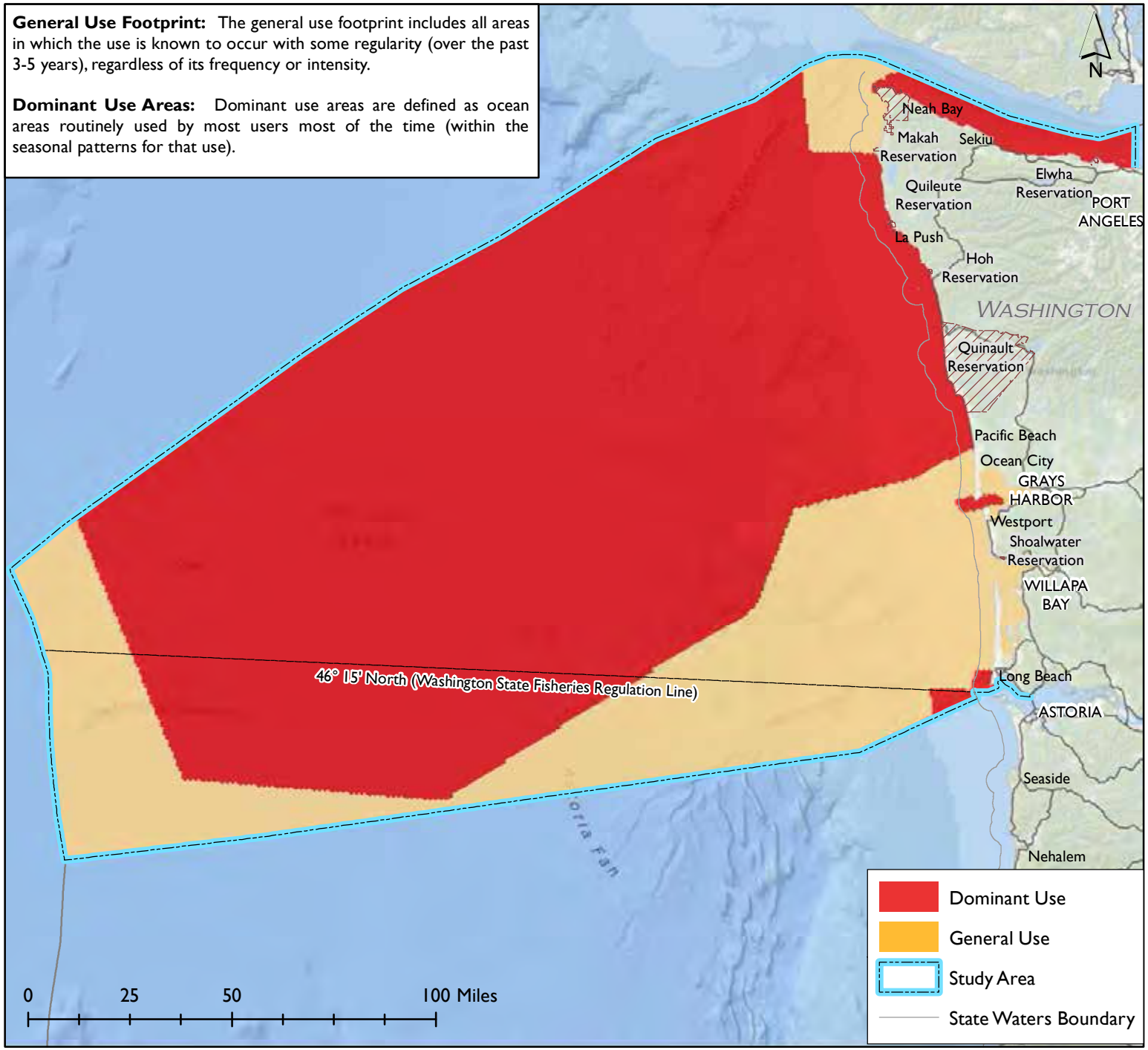

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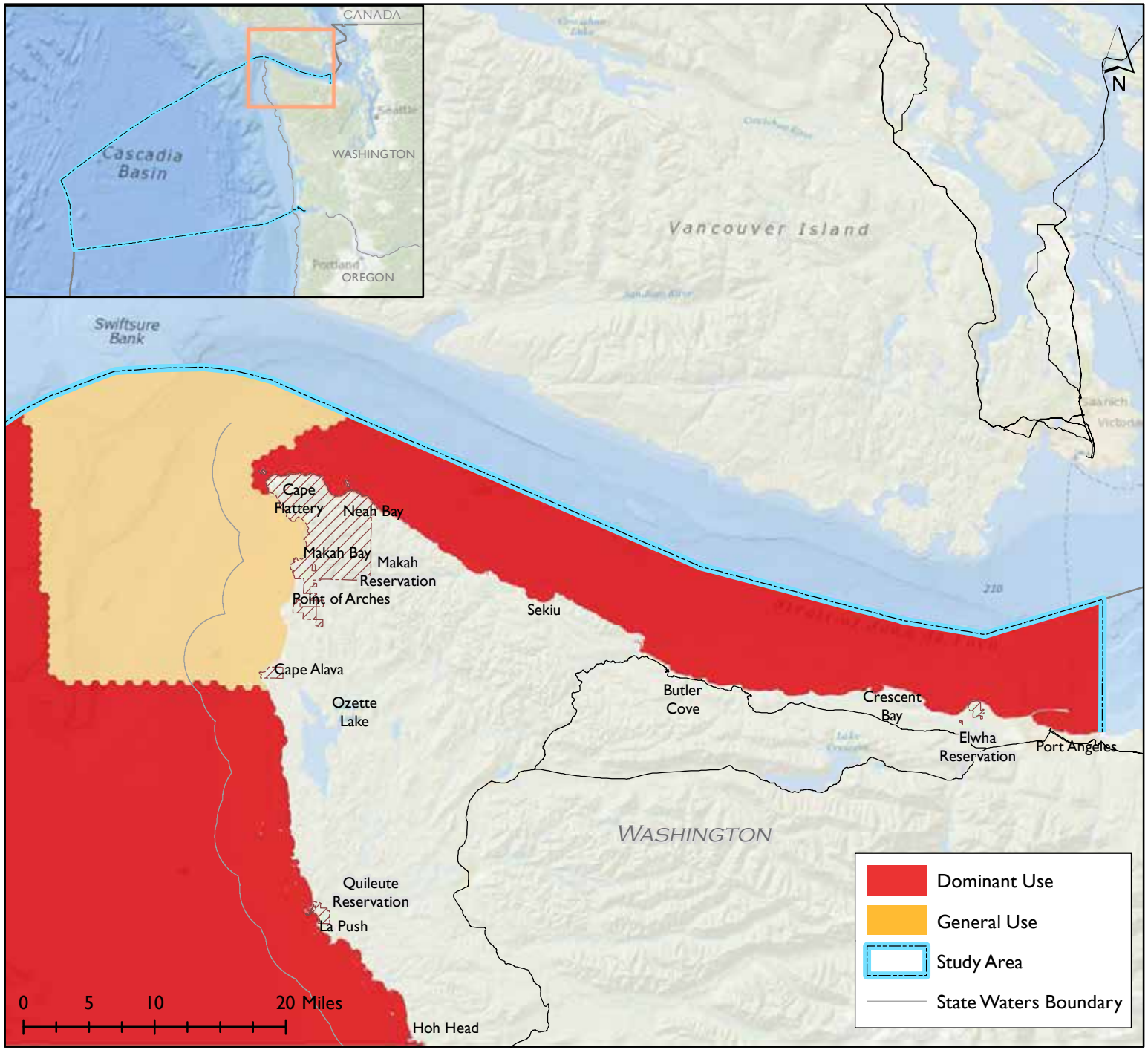

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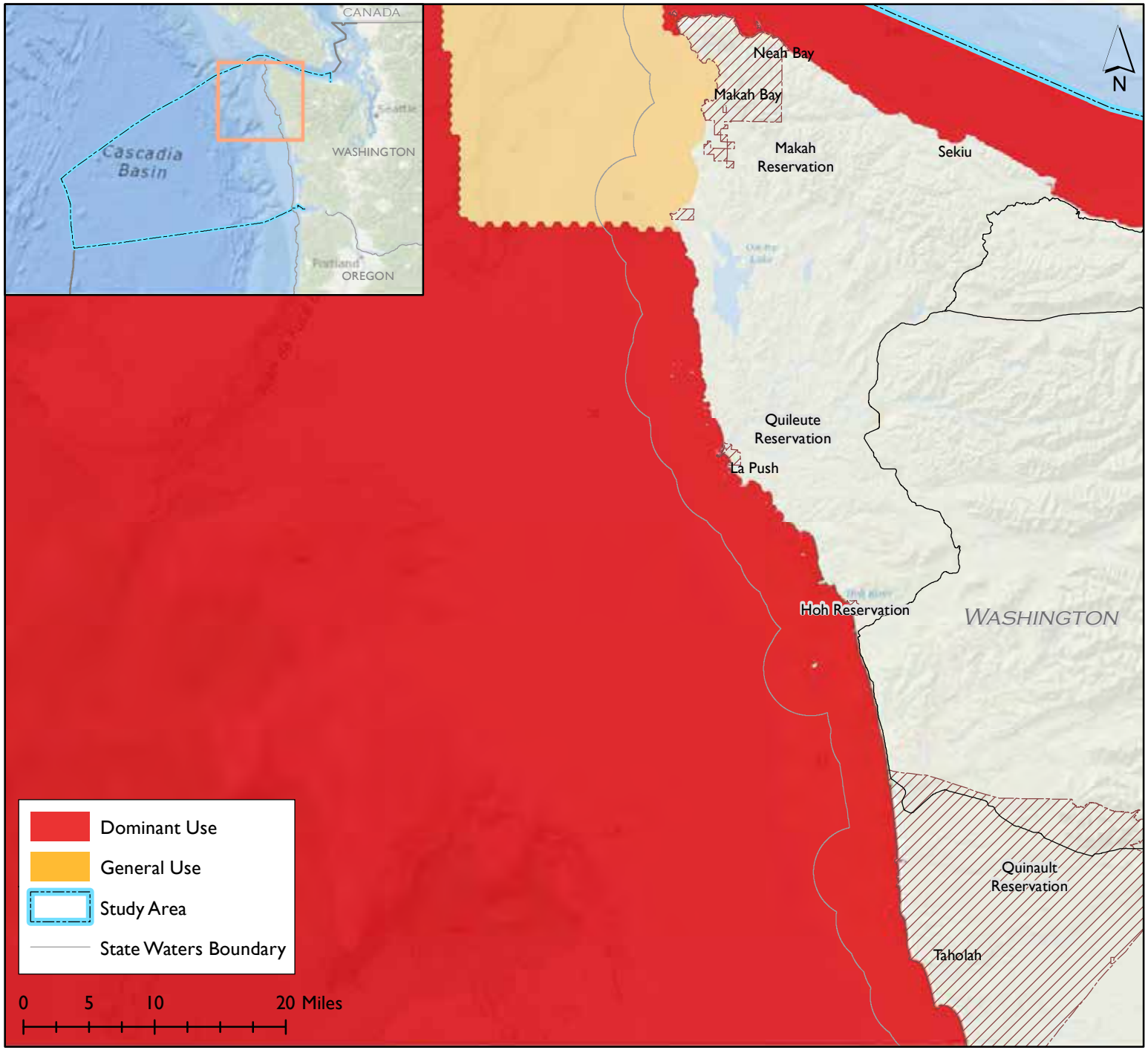

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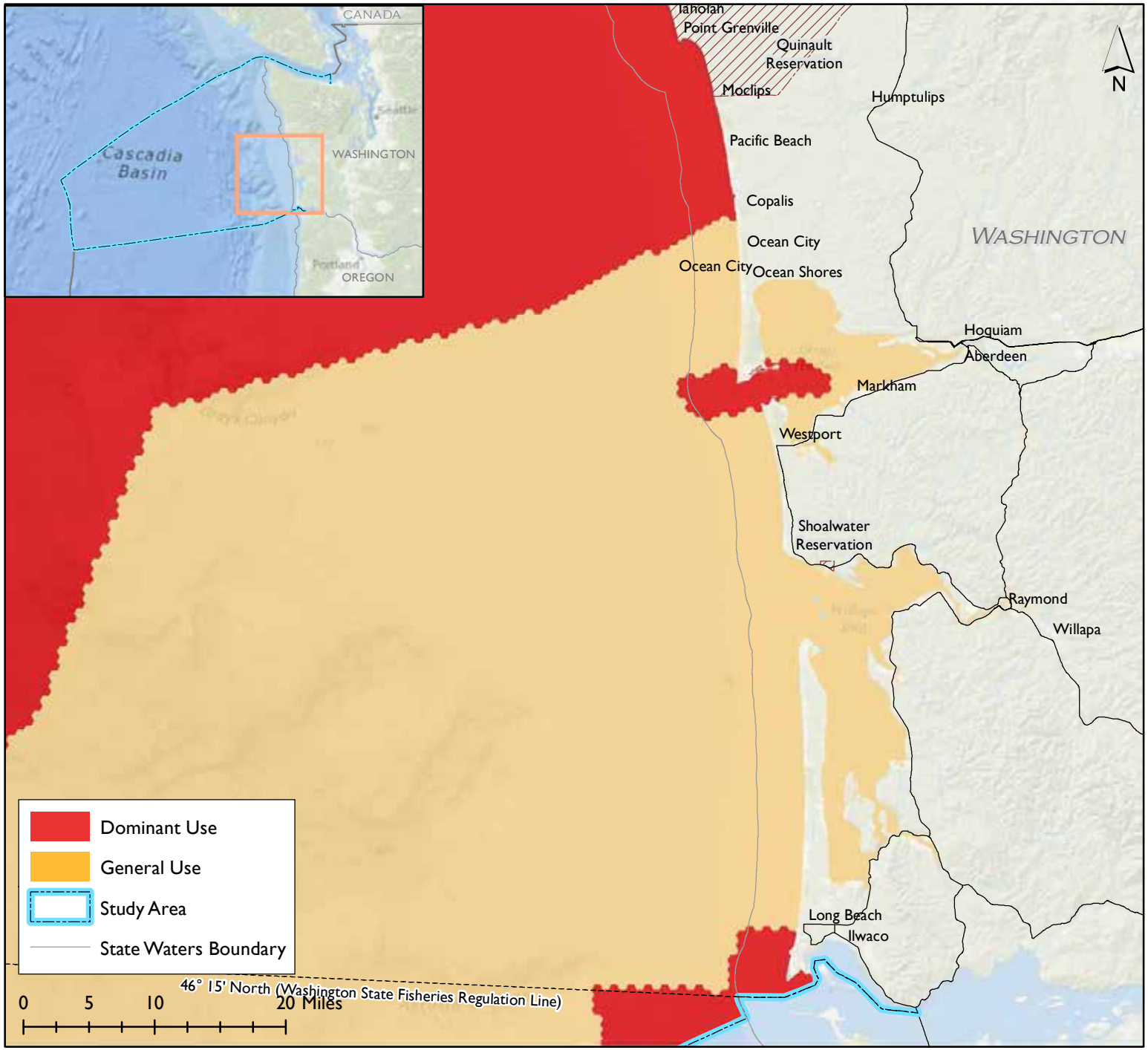

 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Mining and Mineral Extraction

Includes:
Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment

Excludes:
Energy production

Use Notes:
Mining and mineral extraction occurs as part of routine monitoring and maintenance of ports and harbors, through dredging activities. The use also includes some beach renourishment activities and gold mining along beaches for recreational purposes. Sand mining occurs around Ocean Park, and sand removal for cranberry bogs occurs in Grayland.

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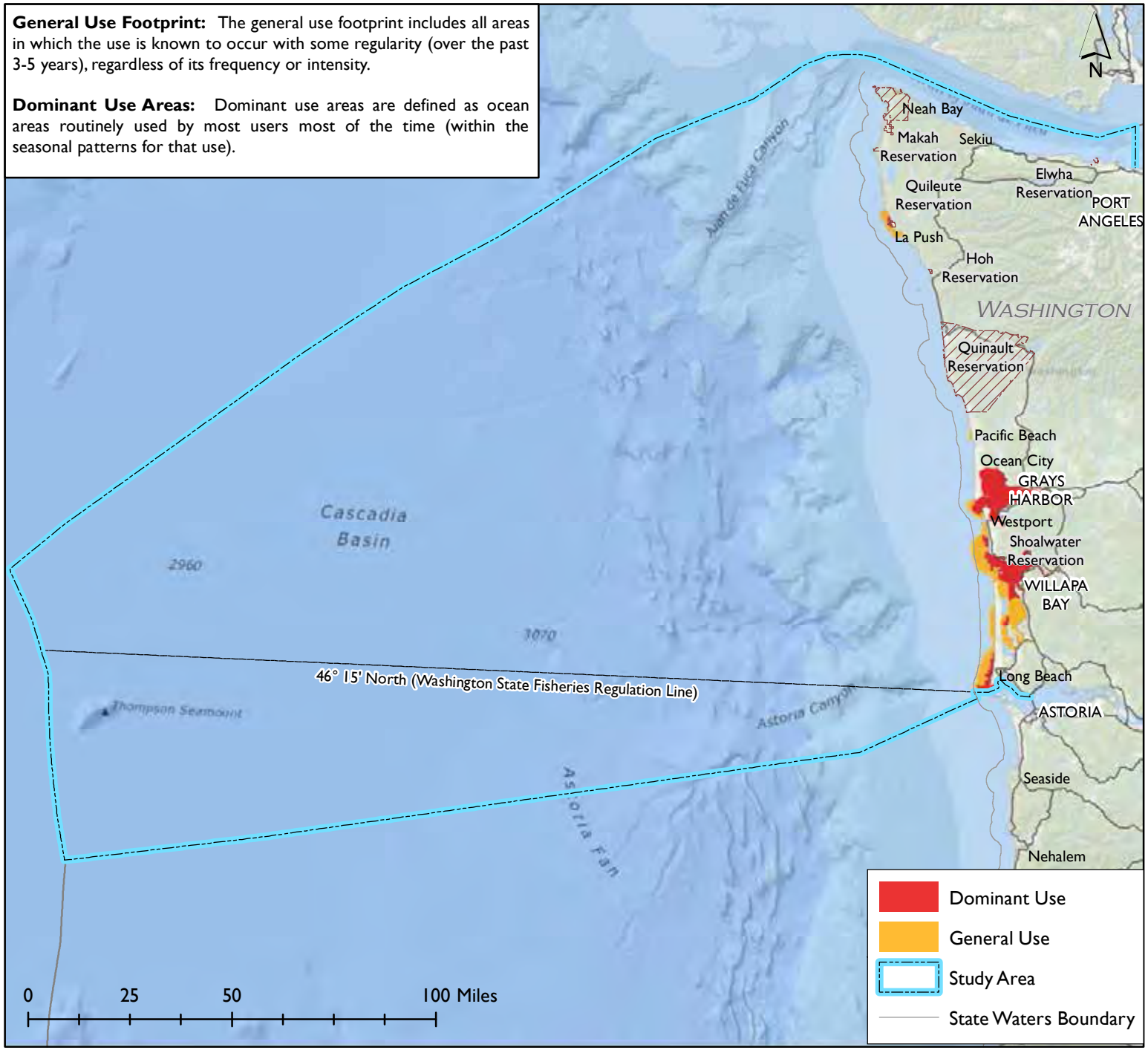

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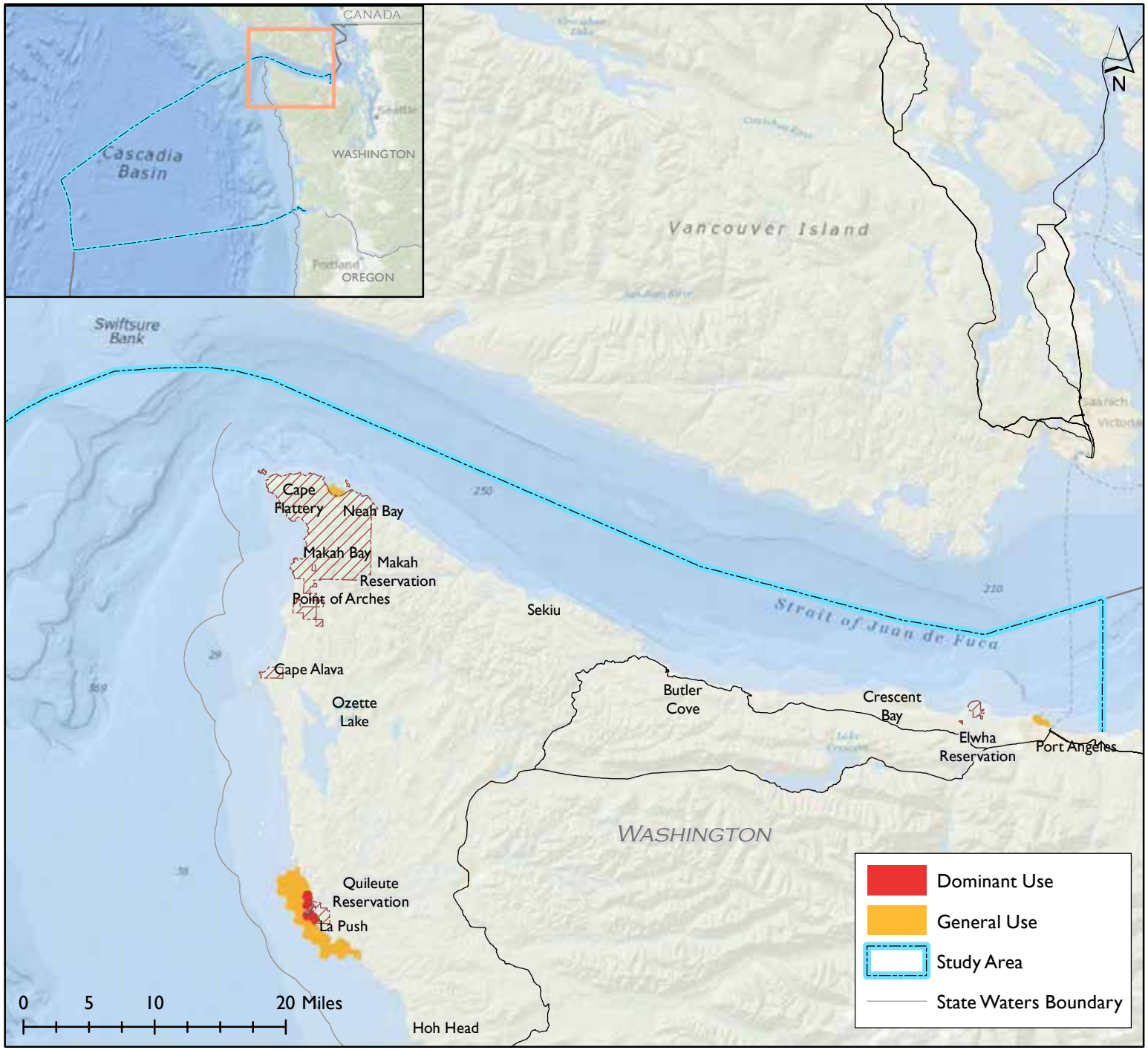

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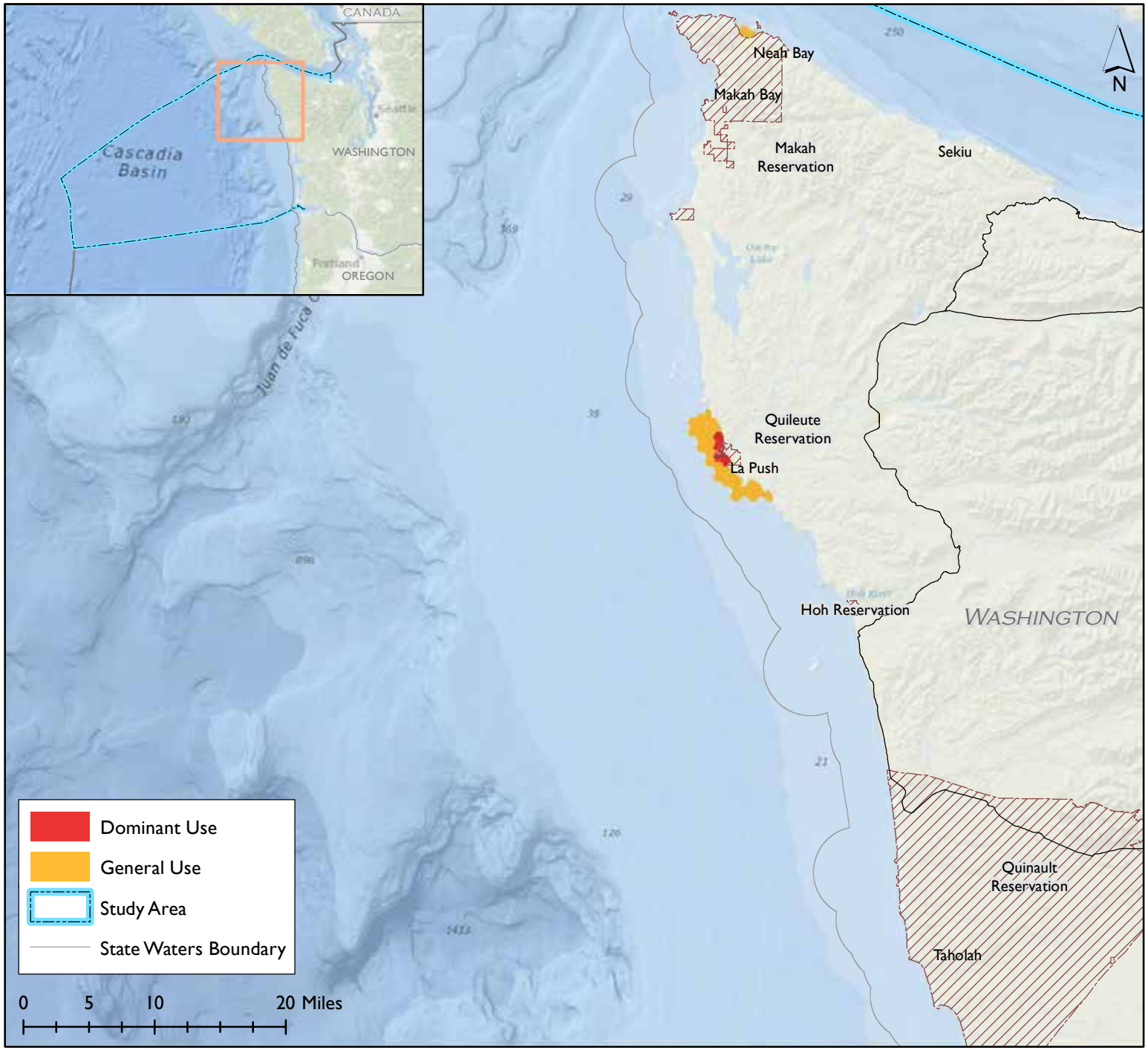

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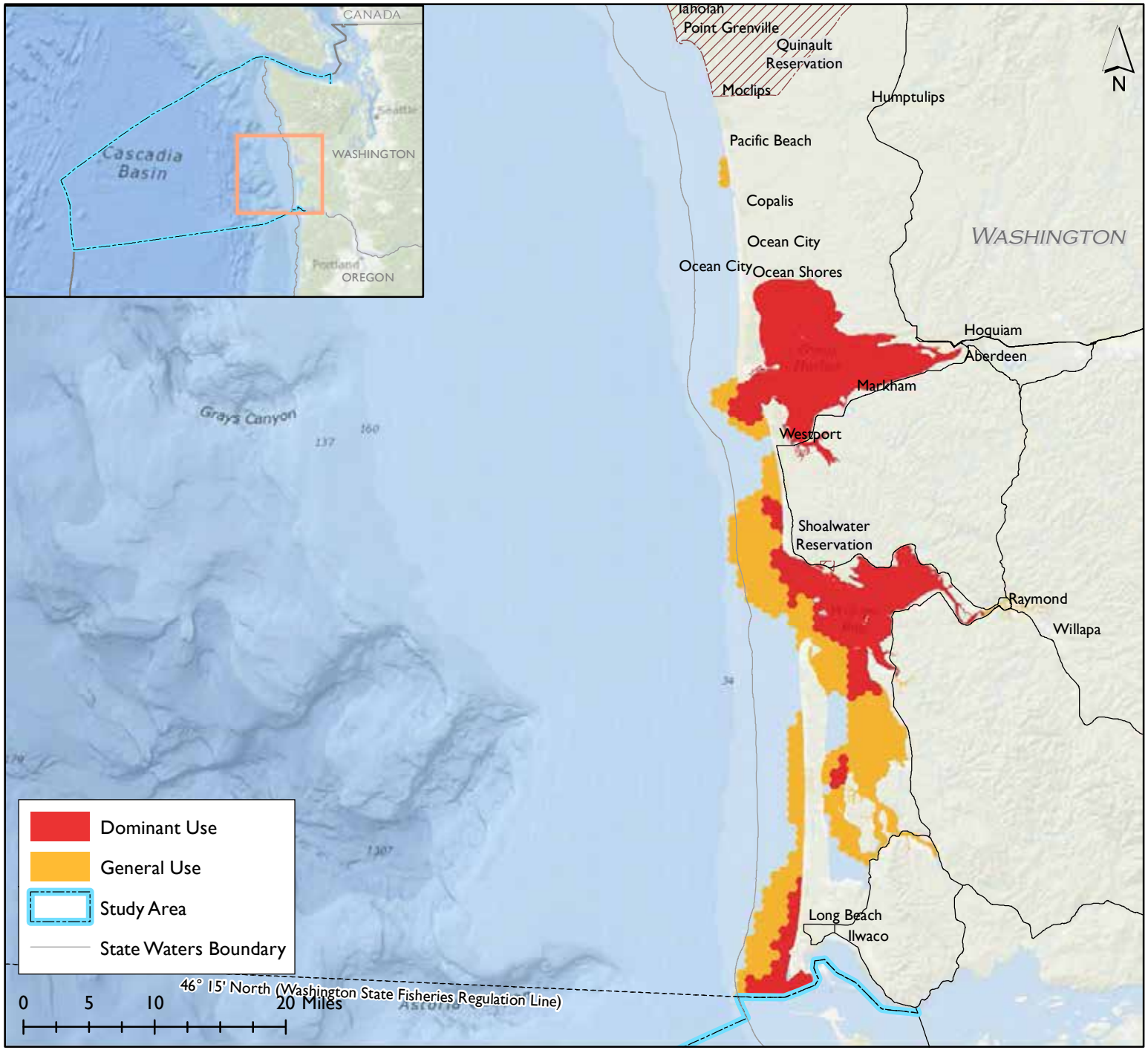

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Underwater Pipelines

Includes:
Any submerged pipe system used to transport oil, gas, sewage or other fluid

Excludes:
Underwater transmission cables

Use Notes:
Pipelines are present in the study area for sewage outfall. There are no oil pipelines in the area and no pipelines through the Olympic Coast National Marine Sanctuary.

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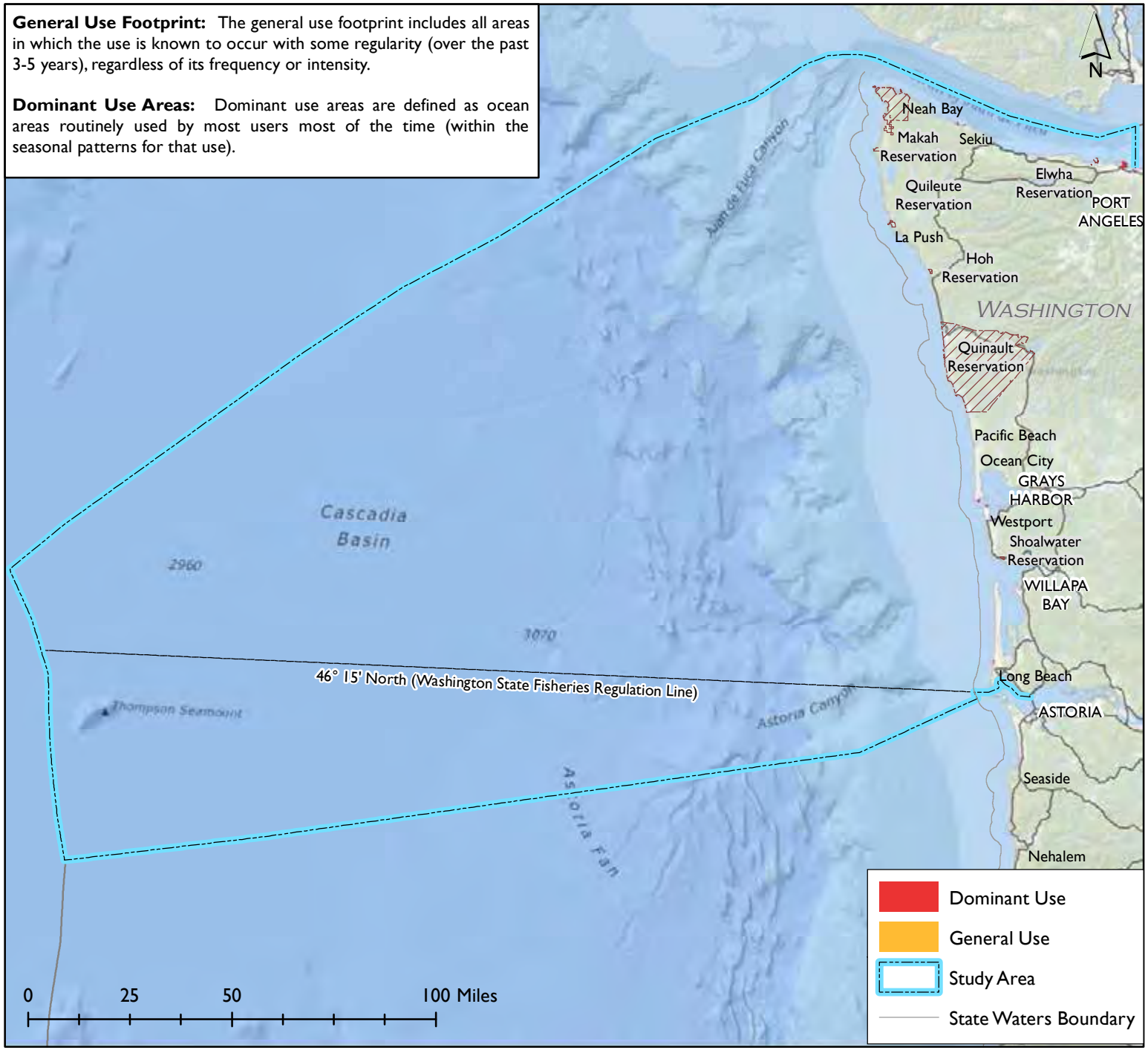

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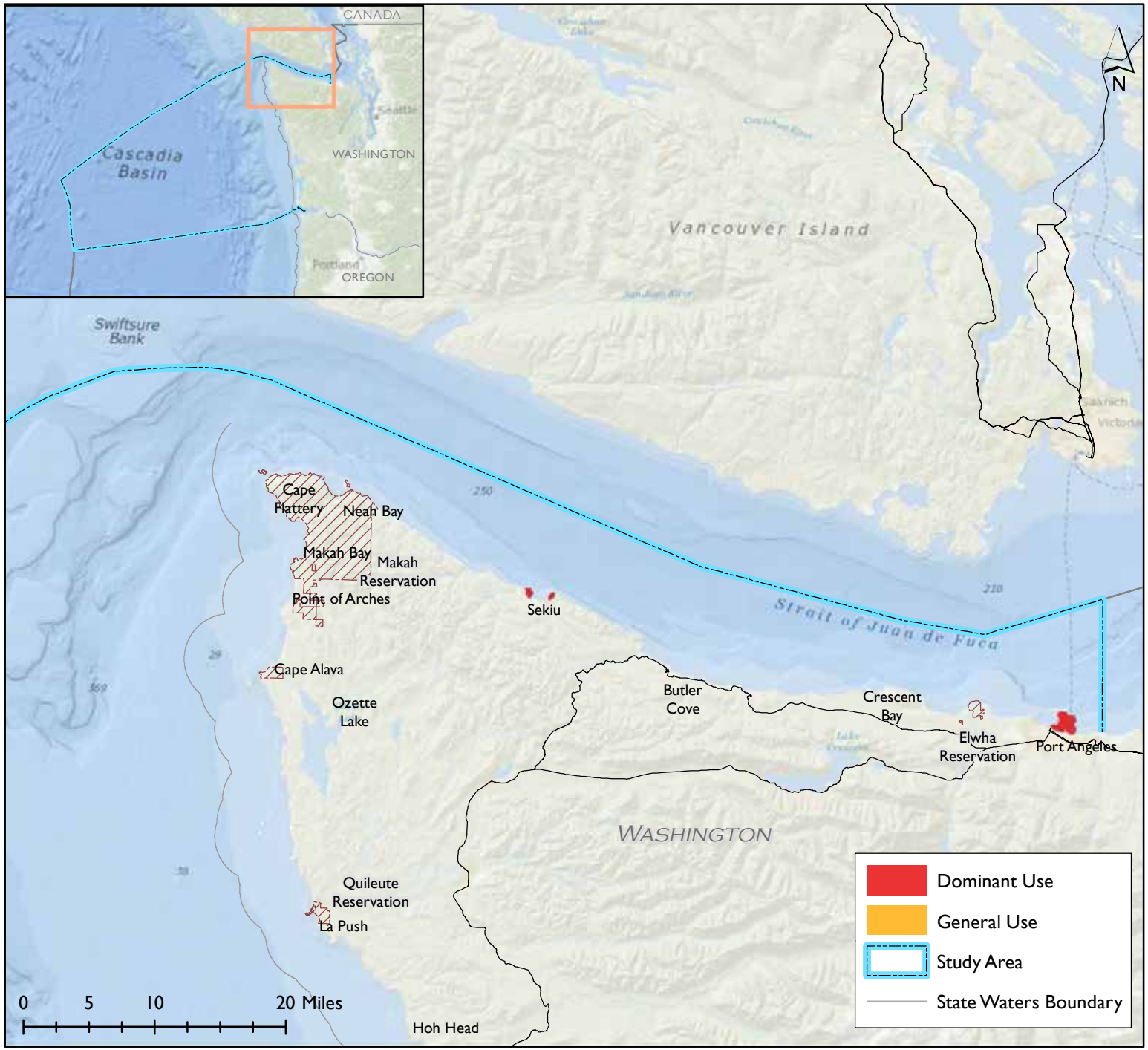

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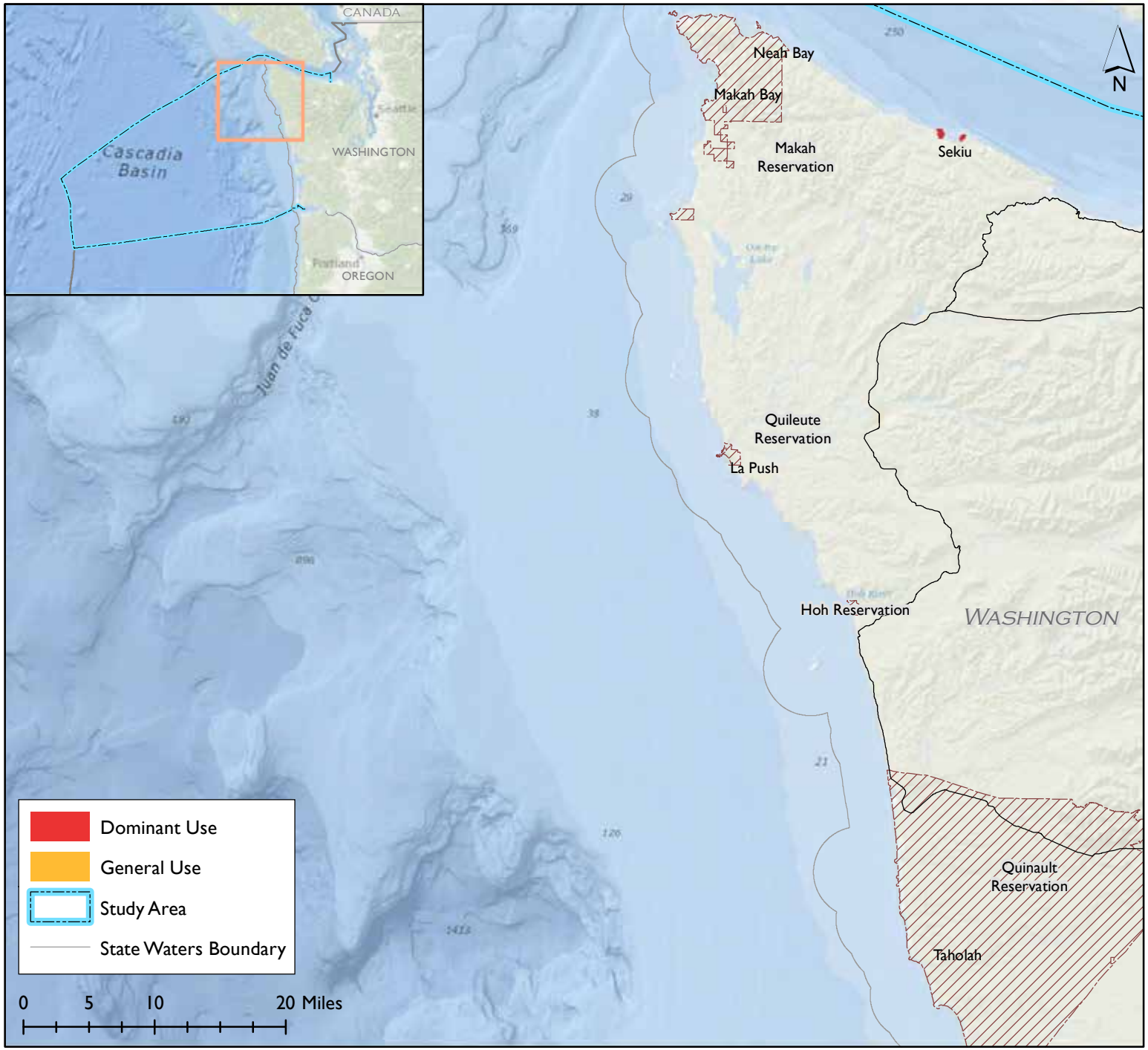

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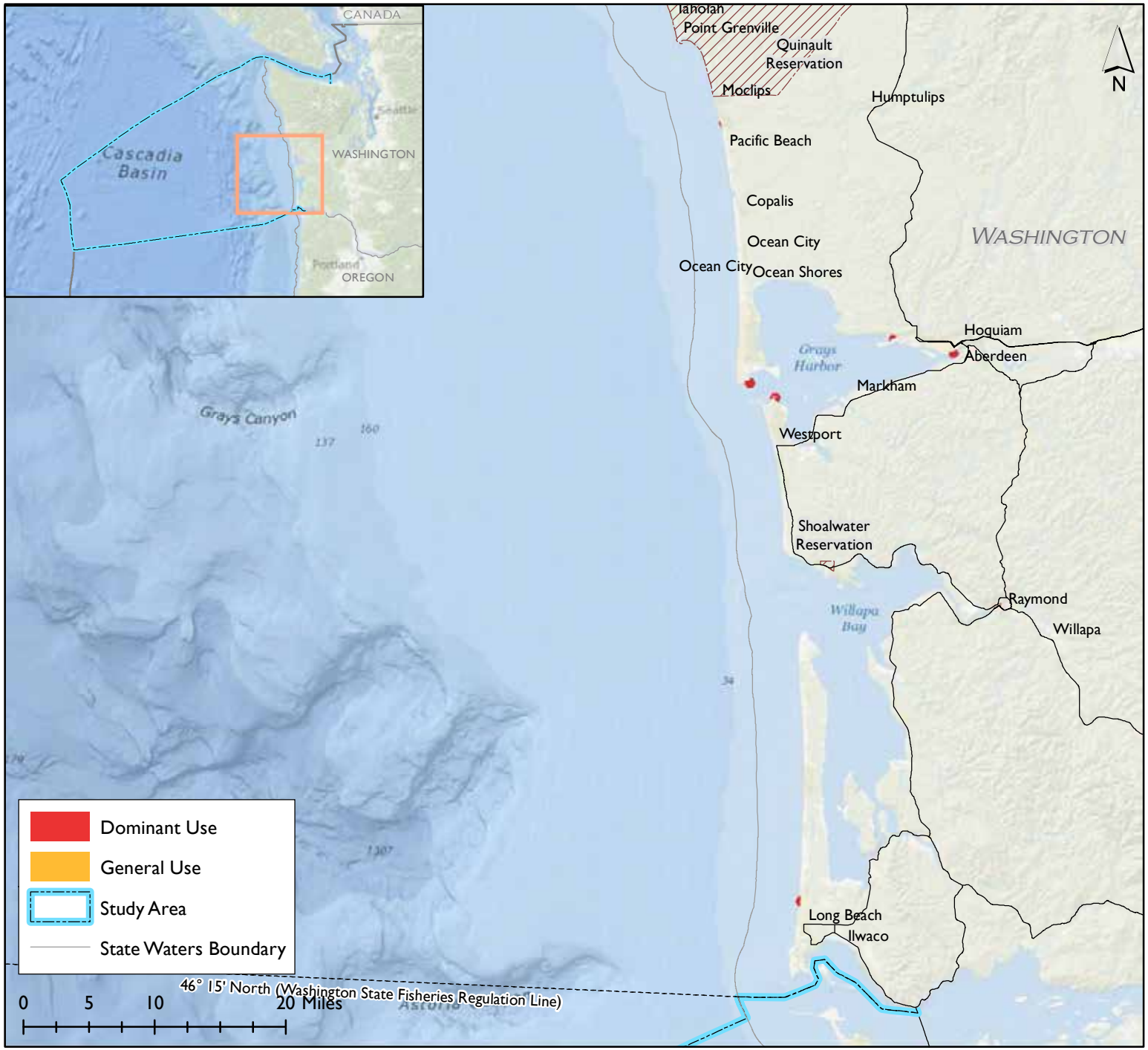

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Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Use Notes:
Renewable energy has been considered and tested in a number of locations in the study area, but currently there are no permanent renewable energy developments in operation. Interest has been shown in Makah Bay for wave energy and Willapa Bay for tidal energy, but neither project has moved forward. The community is concerned with visual impacts and affects on local economies, jobs, seabird populations, and local fisheries.

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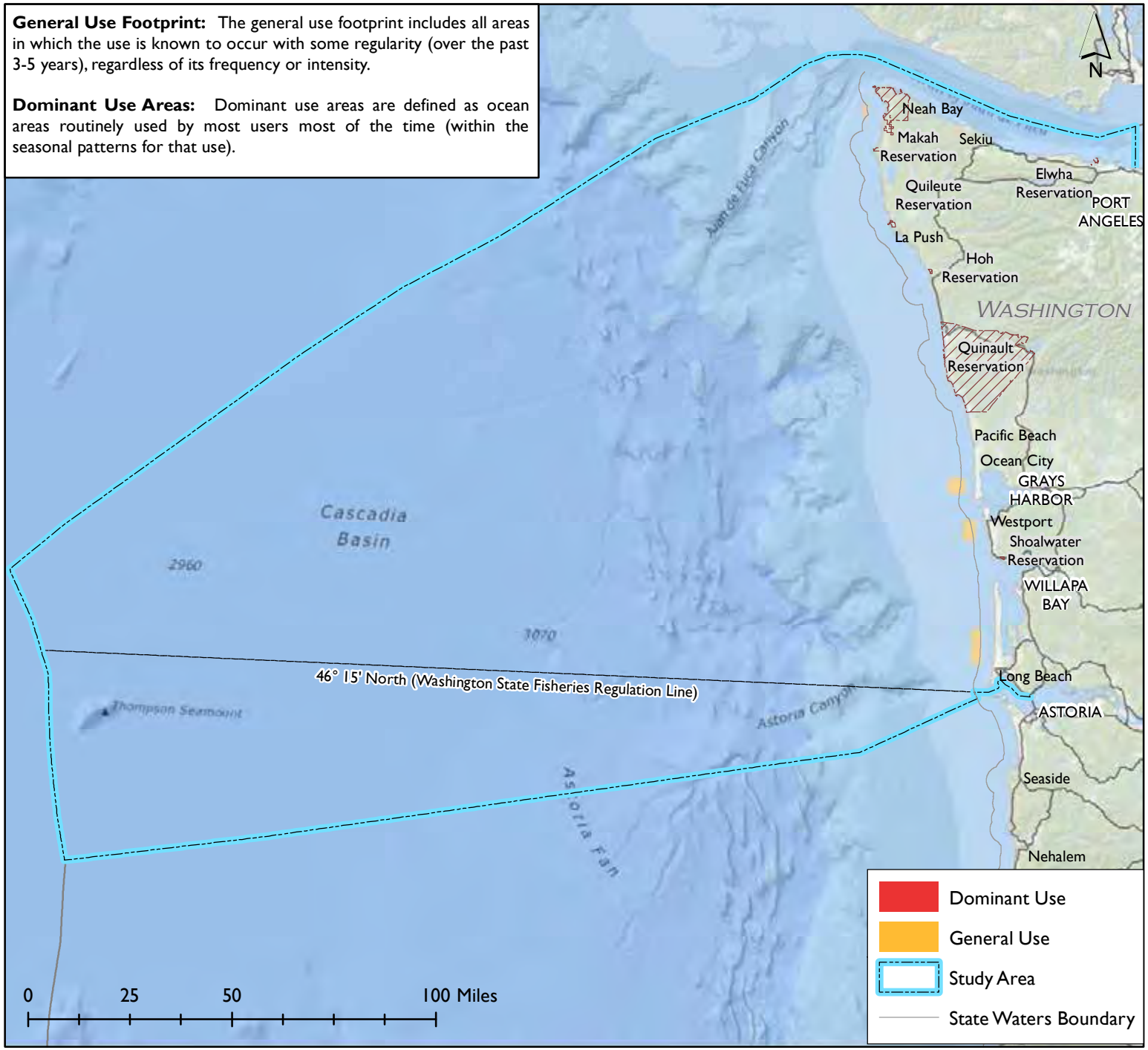

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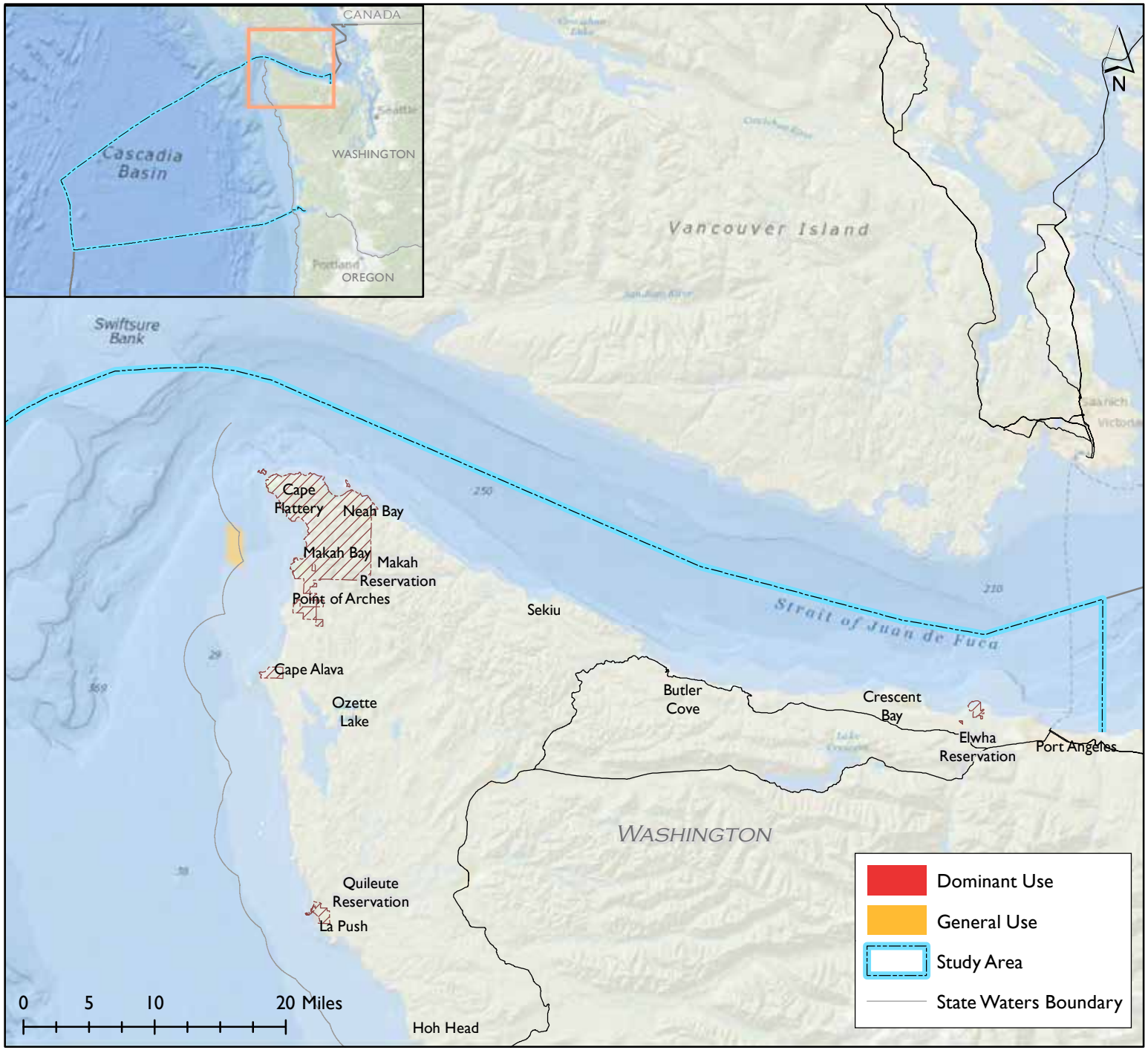

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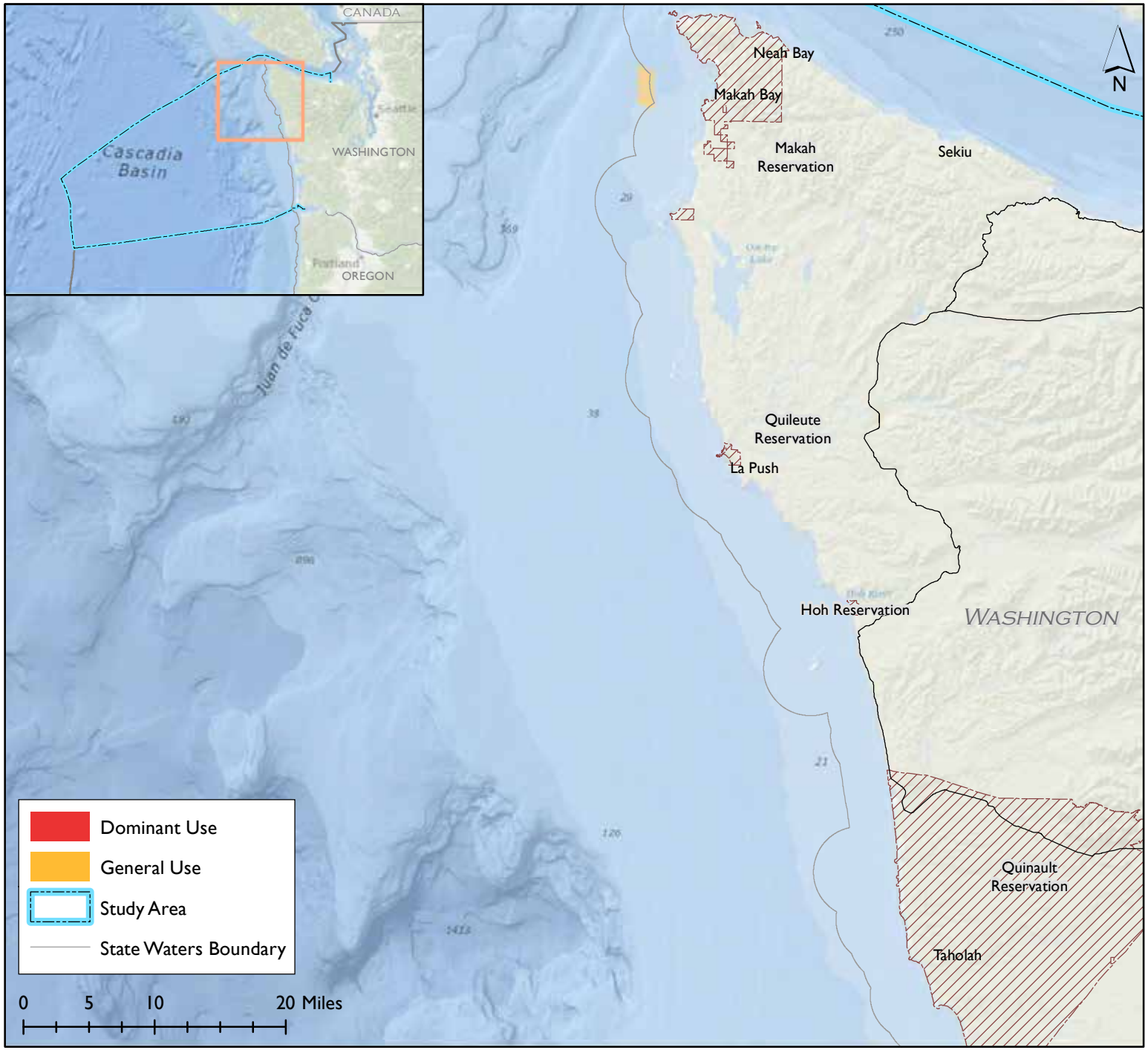
Renewable energy has been considered and tested in a number of locations in the study area, but currently there are no permanent renewable energy developments in operation. Interest has been shown in Makah Bay for wave energy and Willapa Bay for tidal energy, but neither project has moved forward. The community is concerned with visual impacts and affects on local economies, jobs, seabird populations, and local fisheries.



THE WASHINGTON OCEAN USES ATLAS

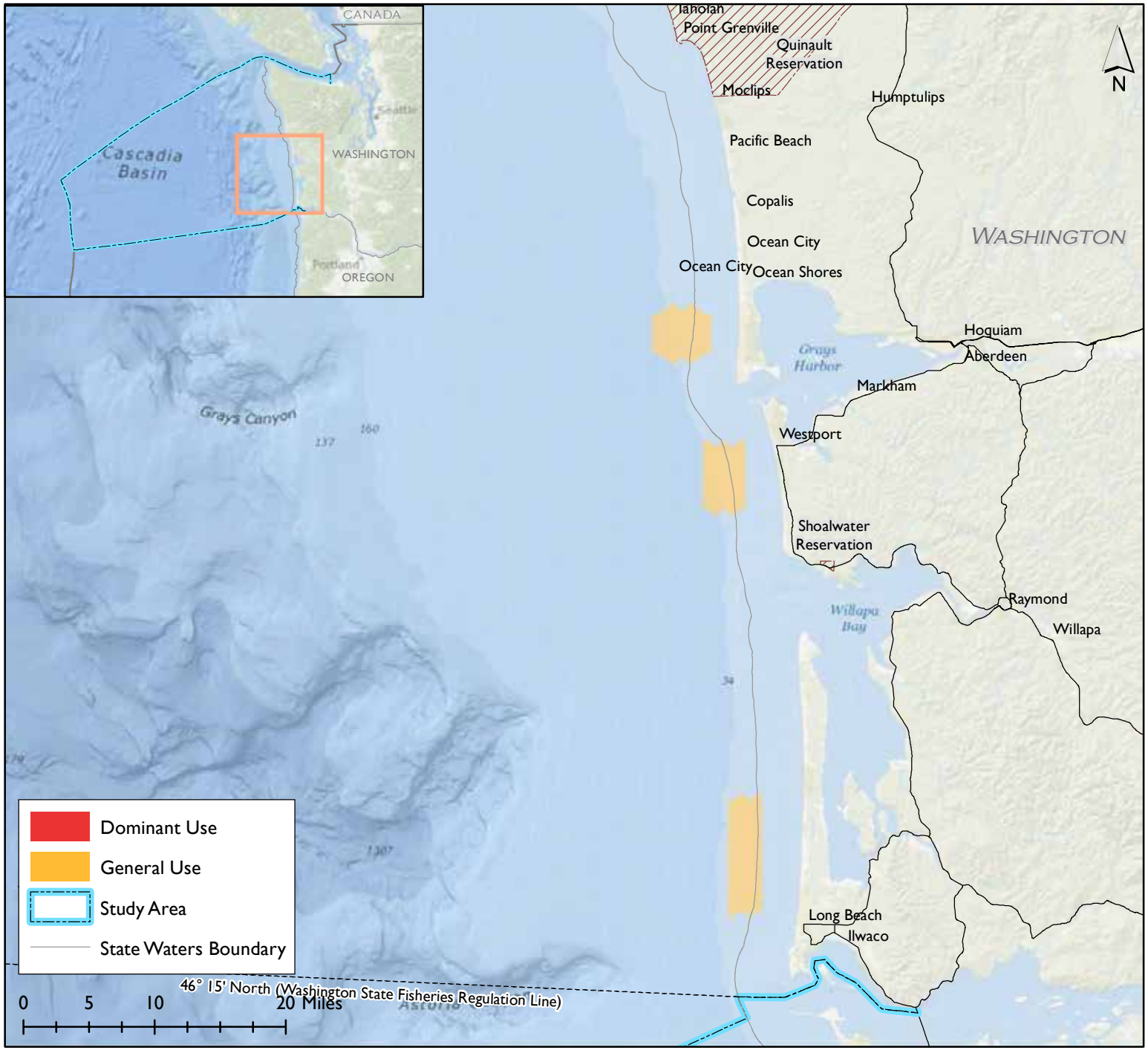
Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Use Notes:
Renewable energy has been considered and tested in a number of locations in the study area, but currently there are no permanent renewable energy developments in operation. Interest has been shown in Makah Bay for wave energy and Willapa Bay for tidal energy, but neither project has moved forward. The community is concerned with visual impacts and affects on local economies, jobs, seabird populations, and local fisheries.



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THE WASHINGTON OCEAN USES ATLAS

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Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Use Notes:
Commercial shipping occurs throughout the study area. Deep draft vessels follow traffic lanes inside of Cape Flattery. Outside the Strait, it depends on the point of origin or destination - generally north from entrance for Alaska or Far East, south of entrance for coastal trade. Cargo vessels transit generally around 25 miles from shore, tanker vessels around 50 miles from shore. Low sulfur fuel requirements (1% in August 2012 to 0.1% in 2015) will likely push traffic further offshore to 200 miles or greater. Commercial transit occurs year-round with anchoring in Port Angeles harbor. Regular ferry runs occur between Port Angeles and Victoria year-round. Vessel traffic is dominant in the tug lanes and channels, with heavy traffic around the entrance to the Strait and pilot station in Port Angeles.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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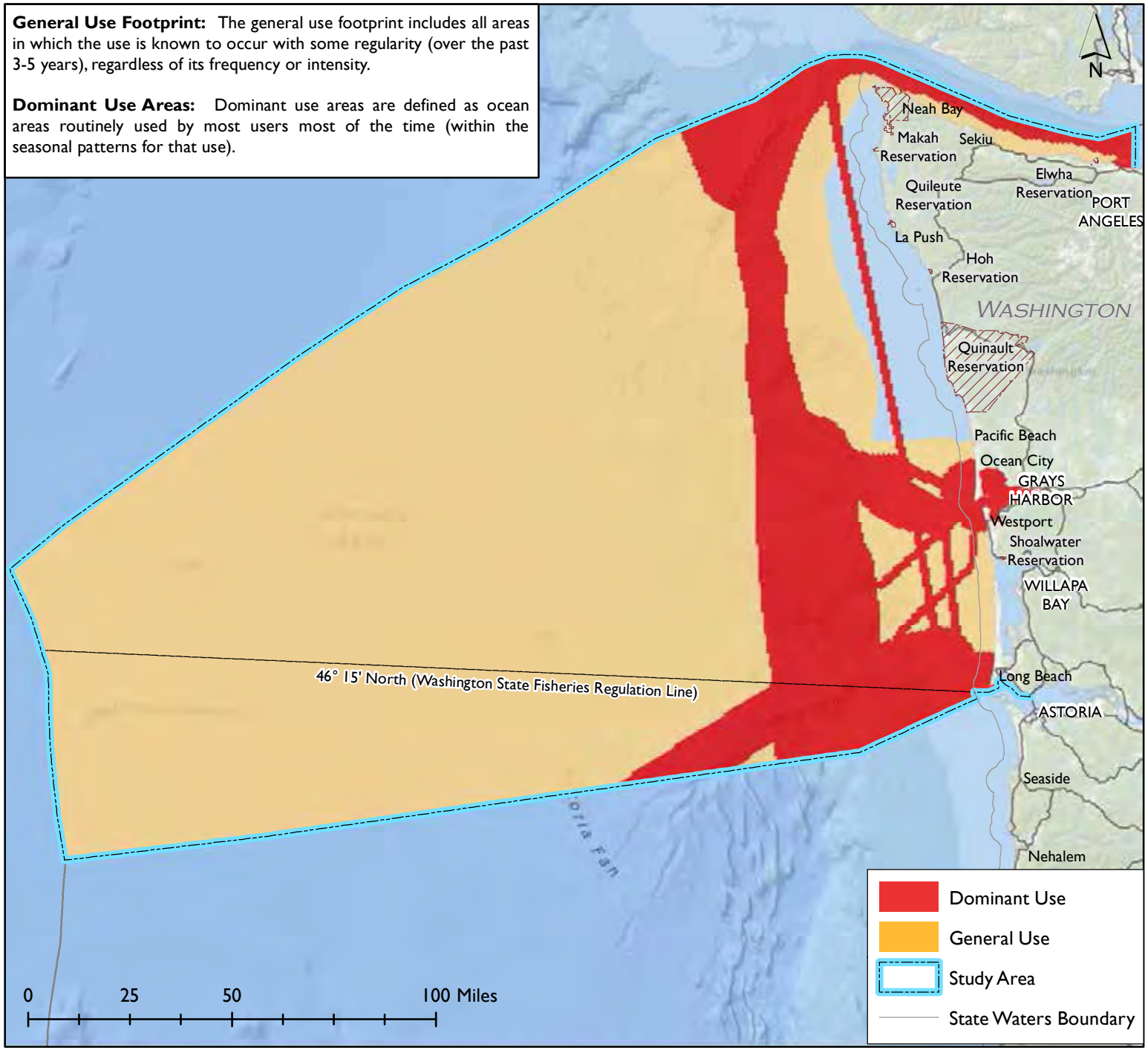

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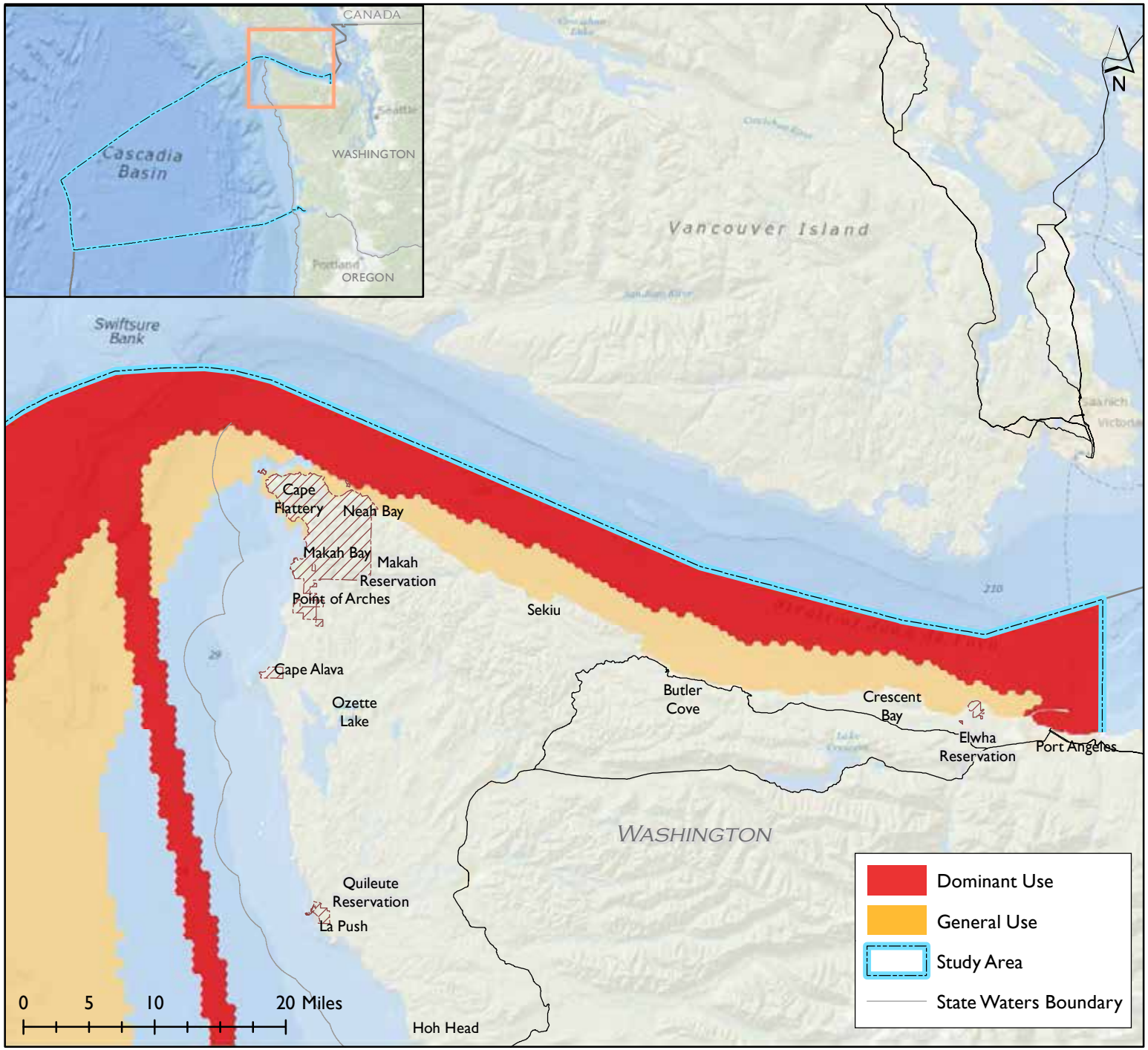

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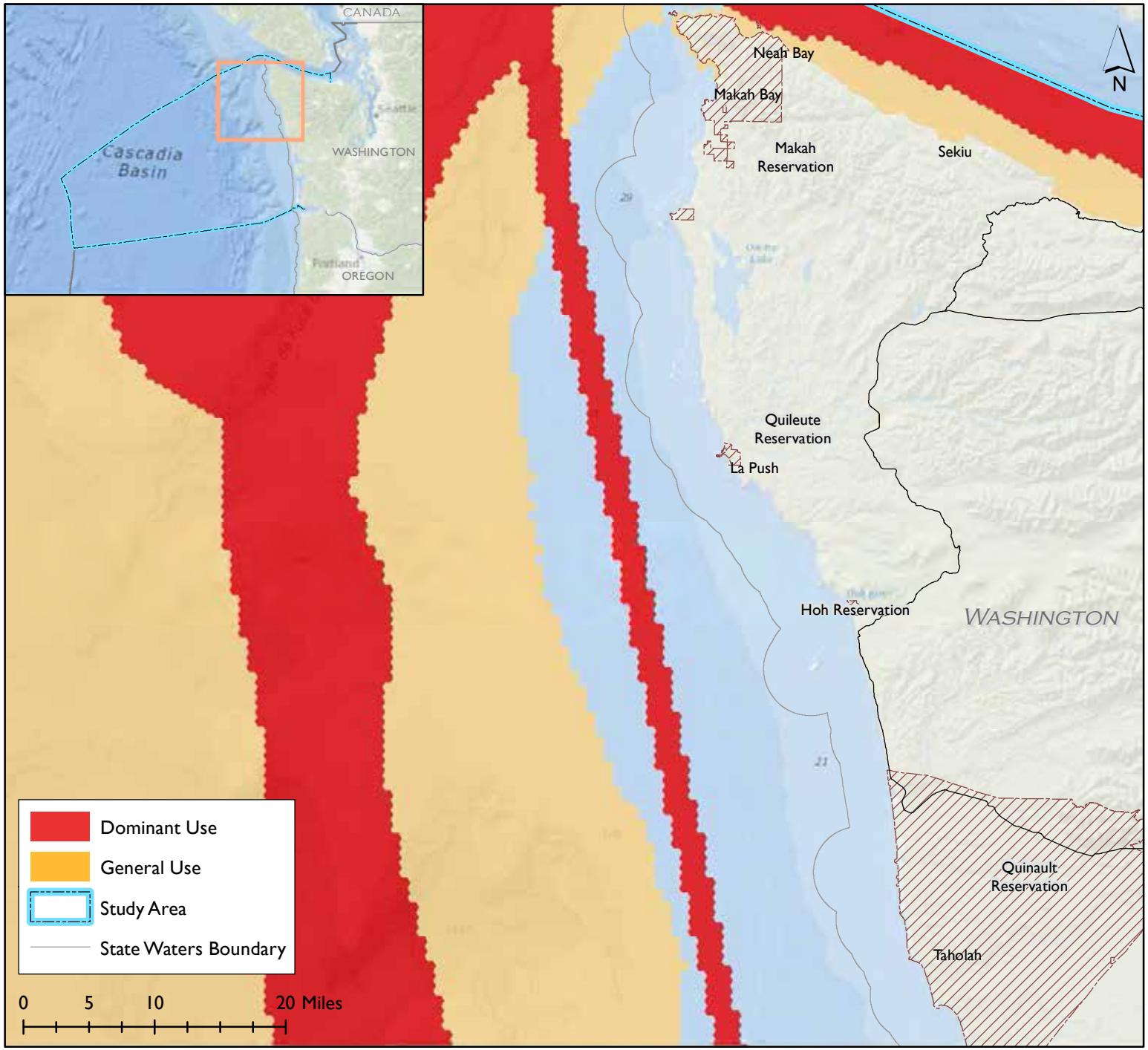

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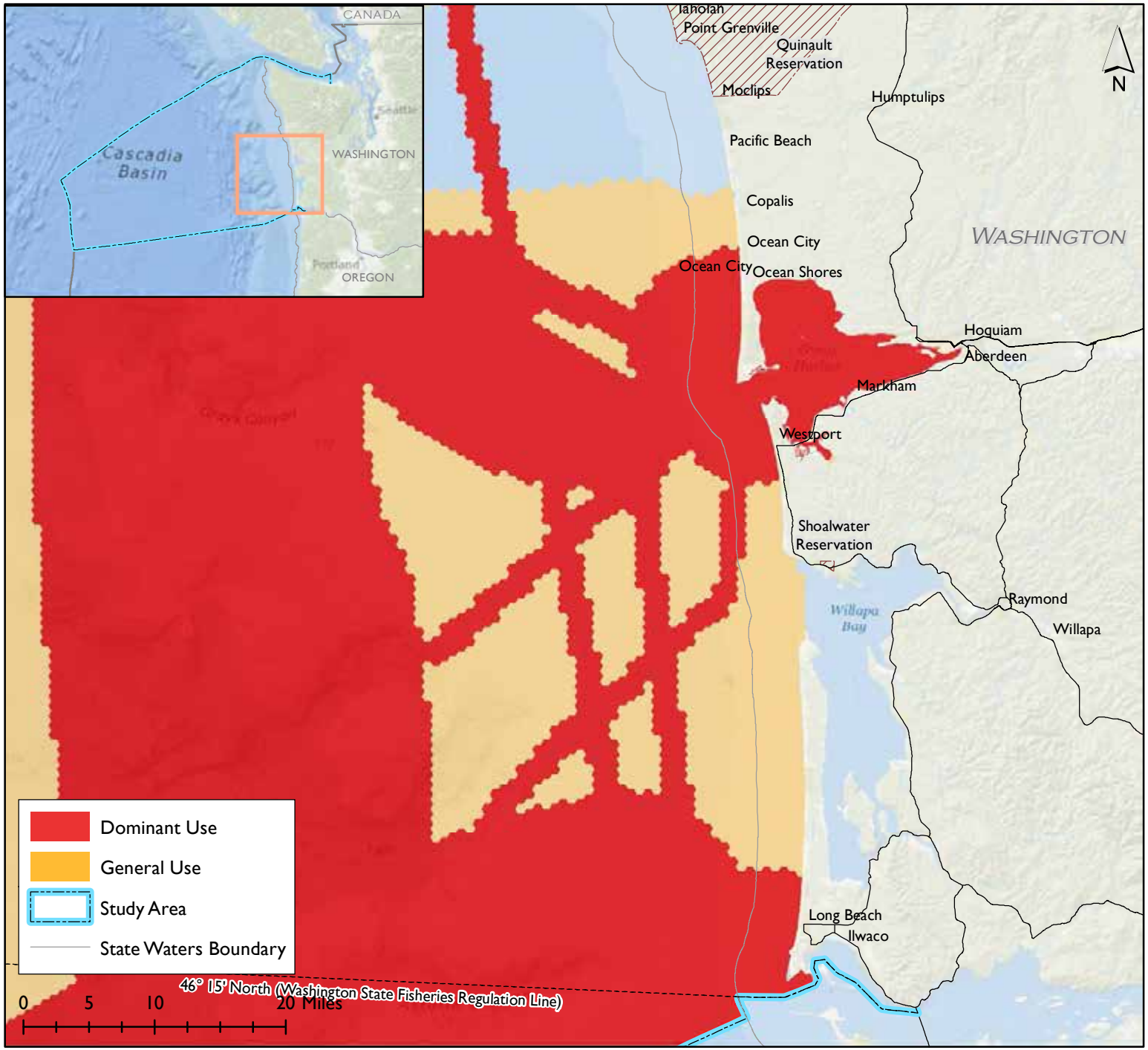

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Underwater Transmission Cables

Includes:
Cables installed on the seafloor to transmit data, communications, and electricity generated on land

Excludes:
Lost fishing gear, renewable electricity transmission cables

Use Notes:
Underwater transmission cables are present throughout the study area. They include a Navy listening cable off Pacific Beach, research cables off Neah Bay (may no longer be active), two Pacific crossing cables, ocean observing NEPTUNE and VENUS cables, as well as military cables off the Quinault Underwater Test range. There is an electrical transmission line planned along the coast of Washington, Oregon and California with coast tie ins in South West Washington and North West Oregon.

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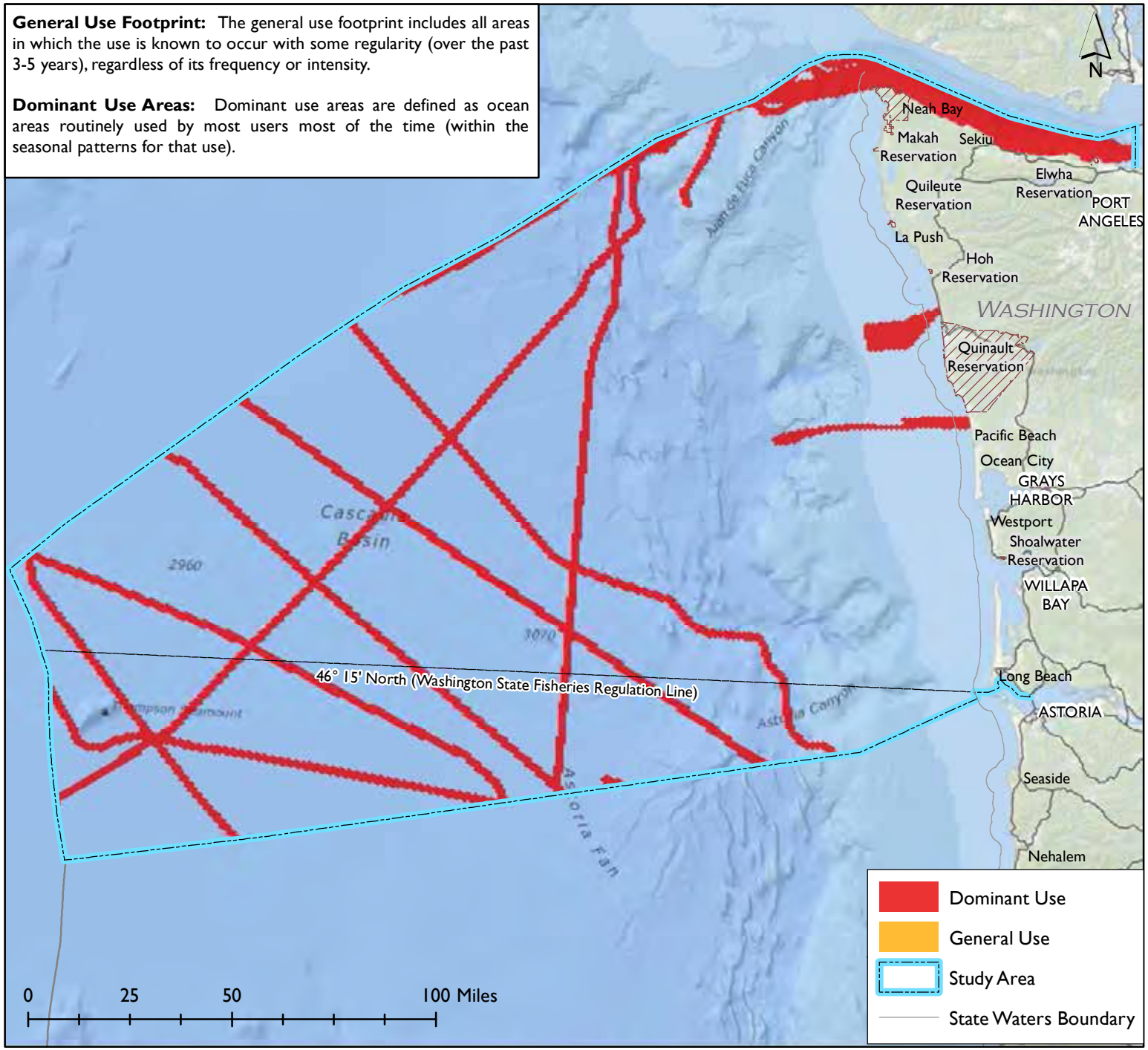

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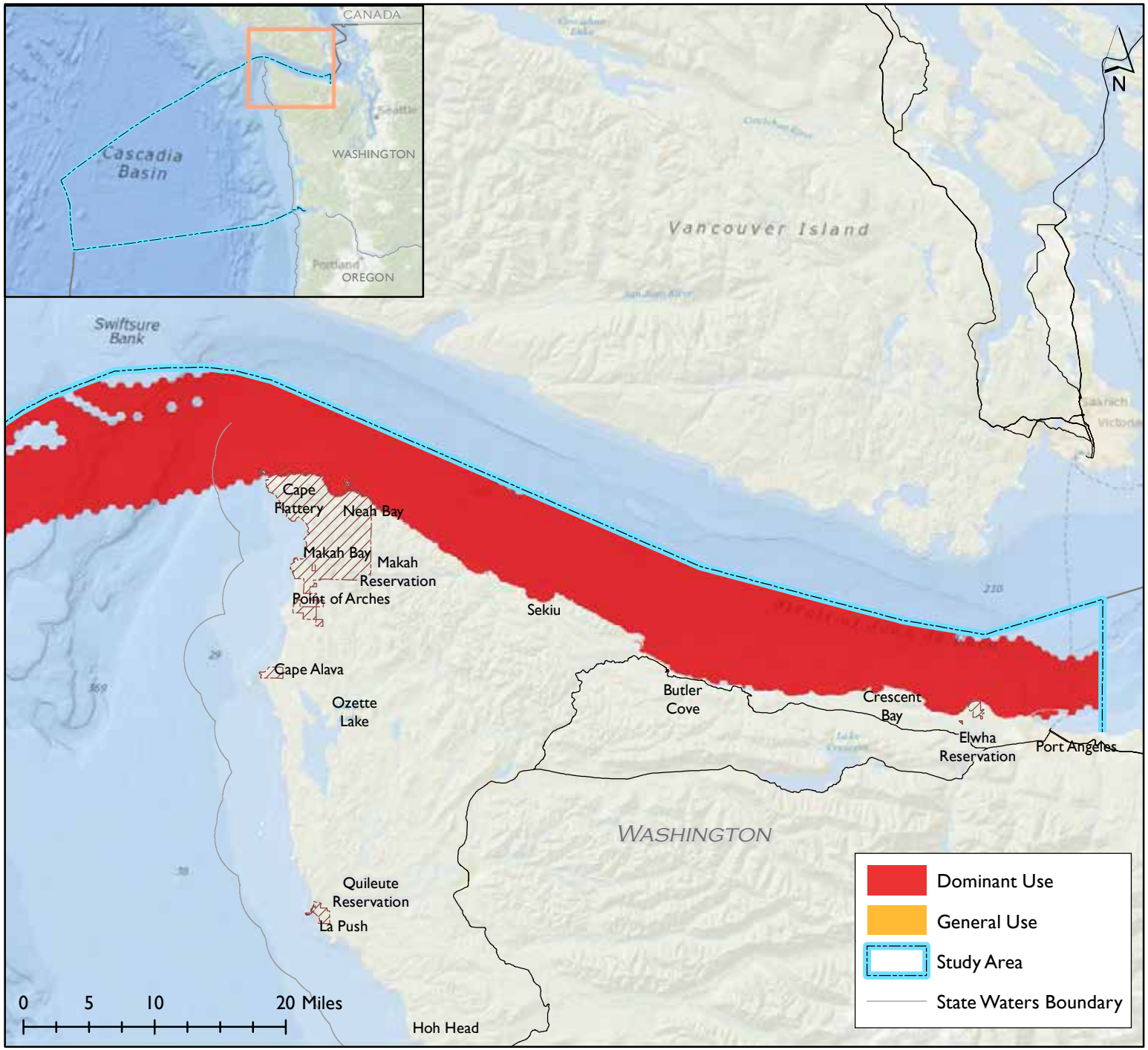

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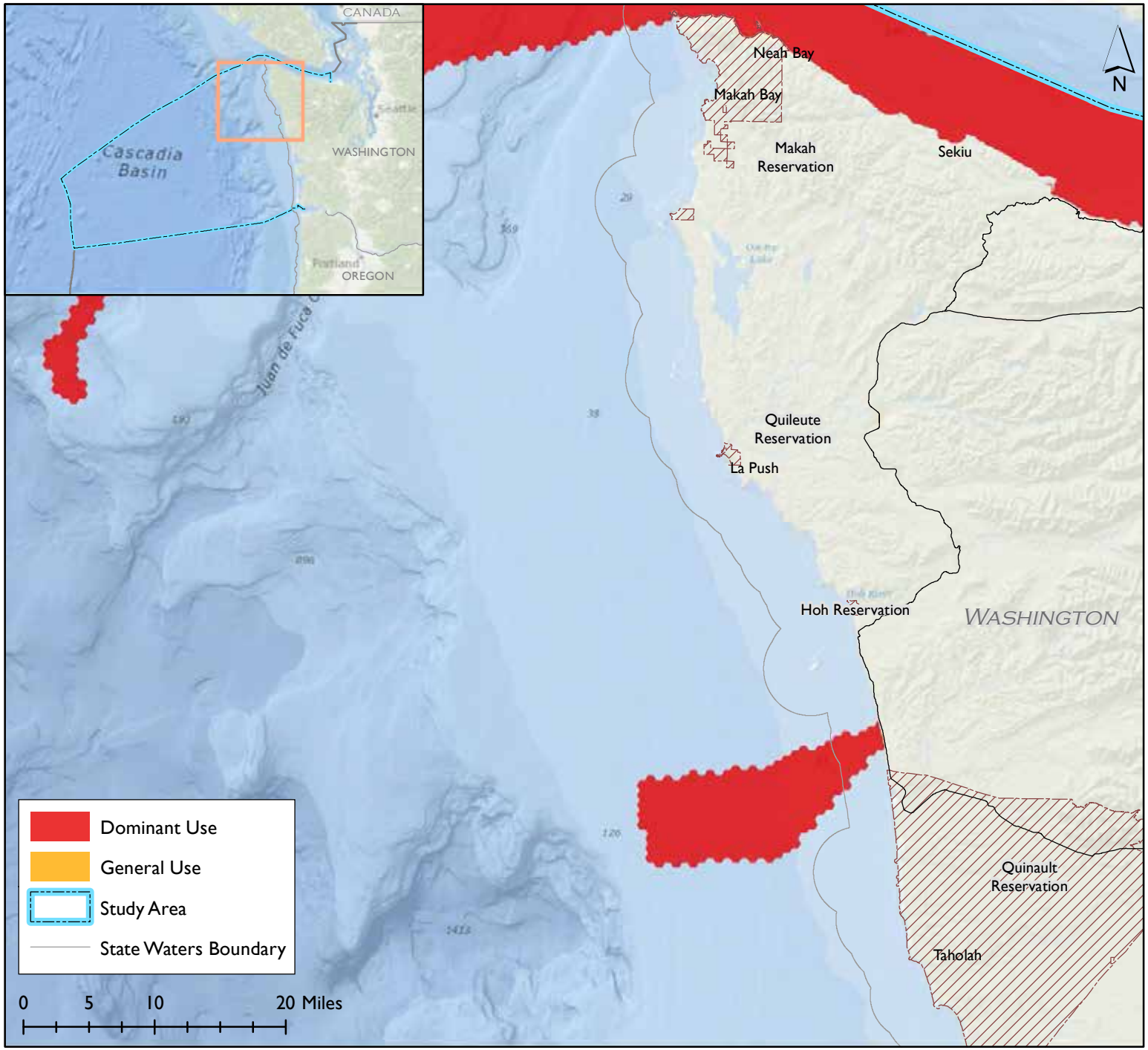

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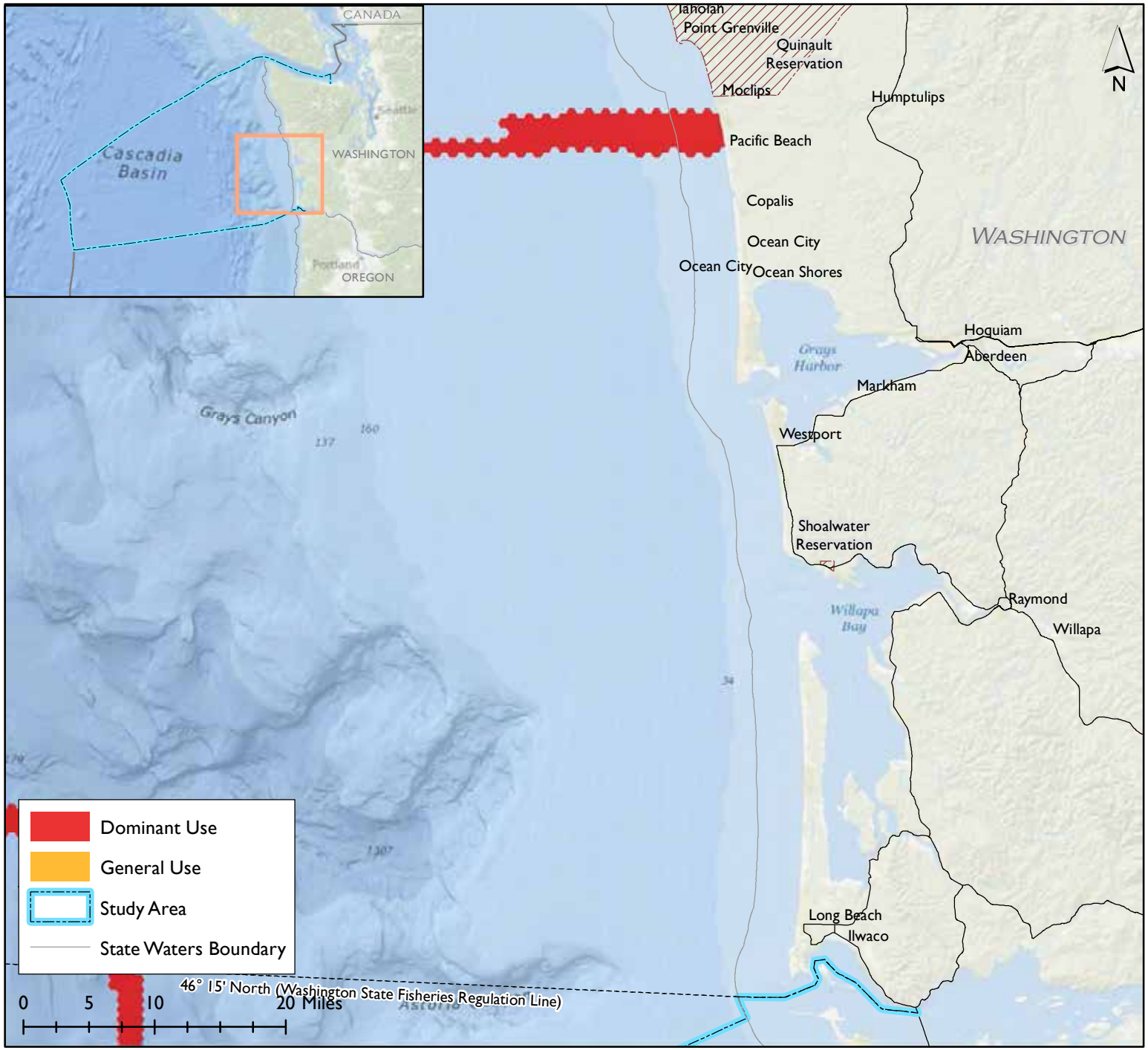

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Beach Use

Includes:
Walking, running, digging, resting, collecting of shells, wildlife viewing, driving on the beach, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding

Excludes:
Tide Pooling, Mining and Mineral Extraction, Surface Board Sports, Swimming, Harvesting from Shore, Coastal Aquaculture

Use Notes:
Beach use is a year-round activity that is most common on sandy beaches close to population centers. Use is more concentrated along the shoreline in the Olympic National Park and on public beaches for beachcombing after large storms. Day hiking and overnighting along the coastal trail contributes to this use year-round.

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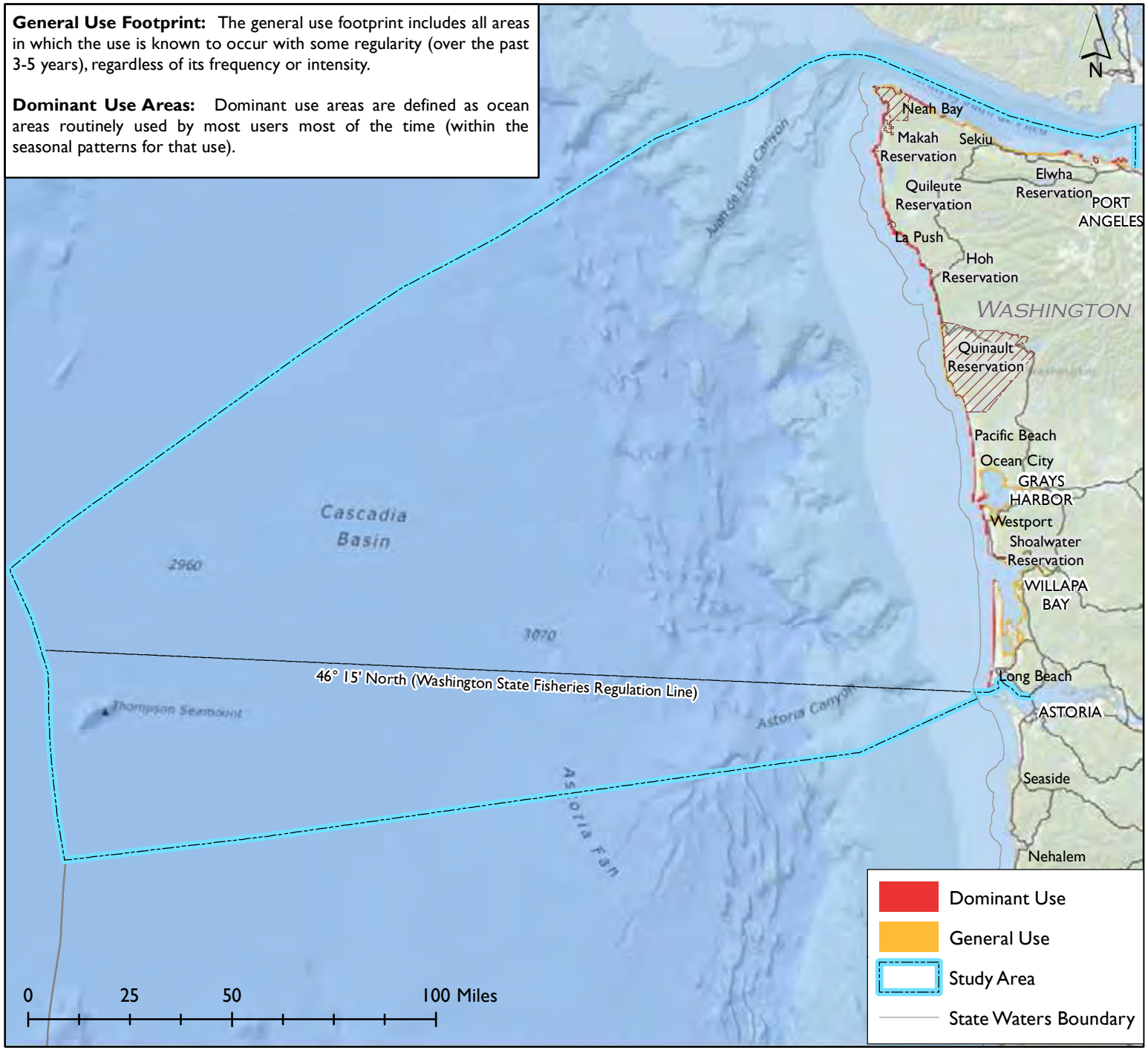

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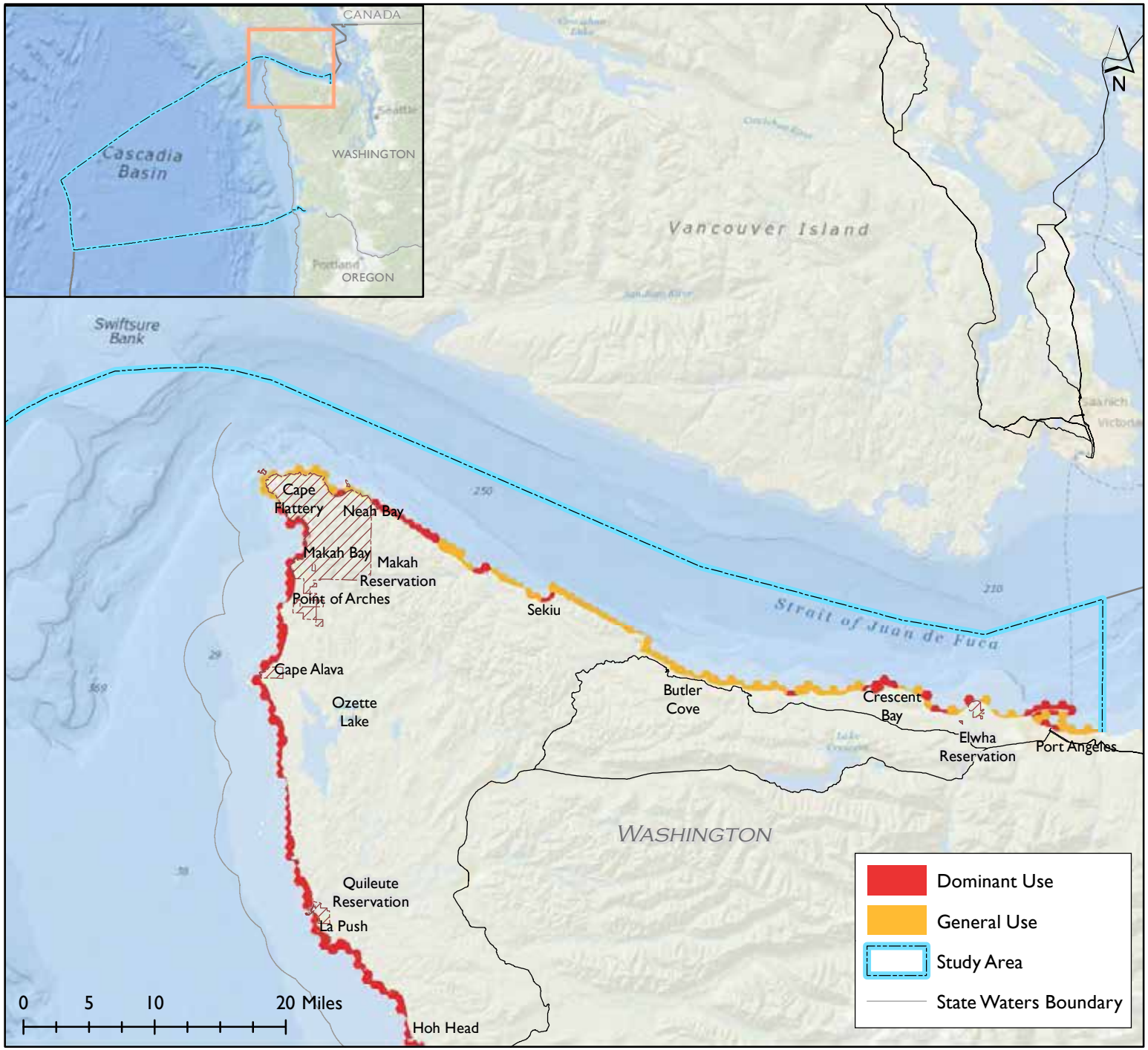

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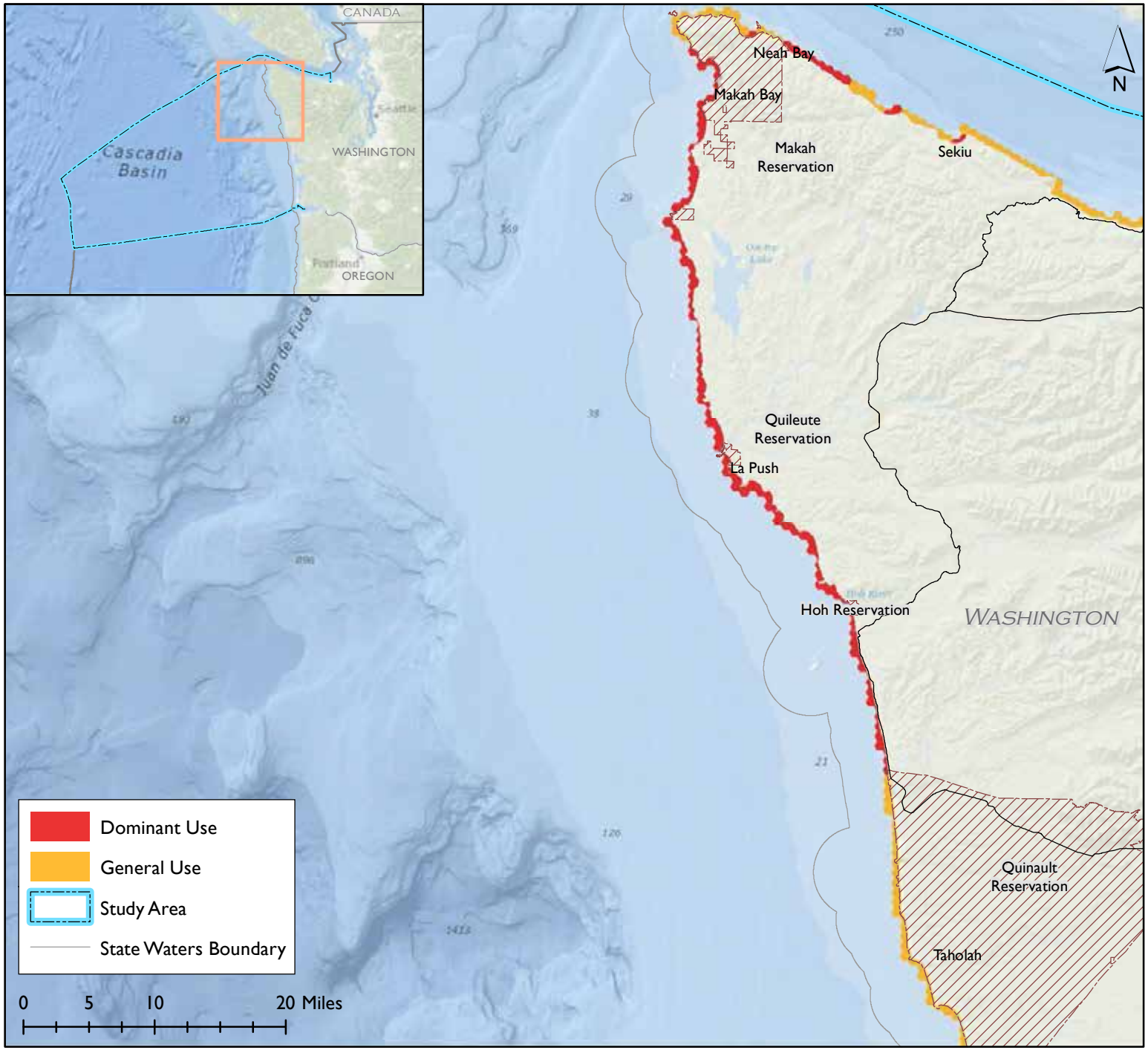

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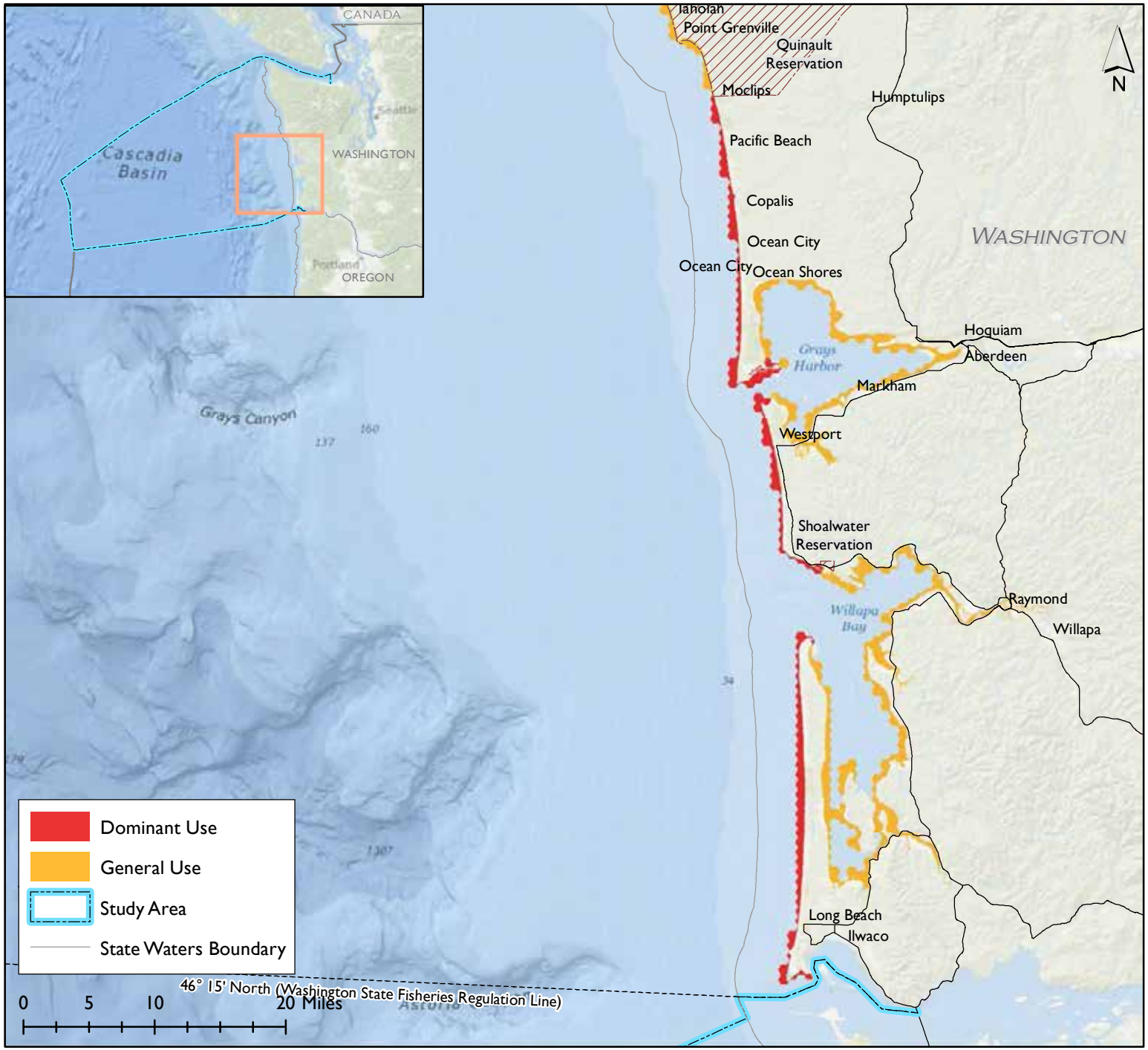

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Motorized Boating

Includes:
Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC)

Excludes:
Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing

Use Notes:
Motorized boating is not a common activity for purely recreational purposes (mainly related to wildlife viewing, fishing or other commercial pursuits). The use mainly occurs along the Strait and within bays and harbors for transit purposes.

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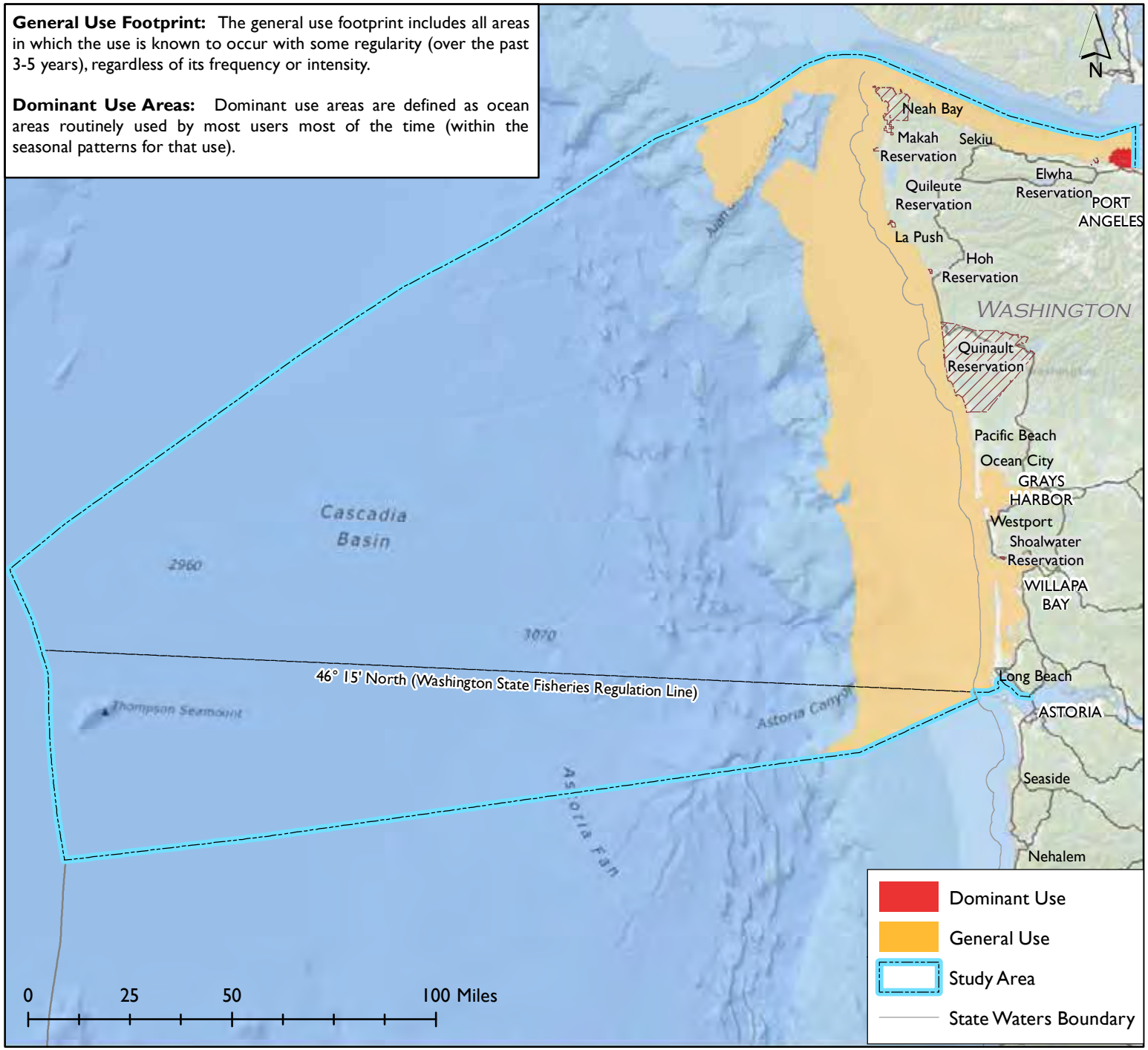

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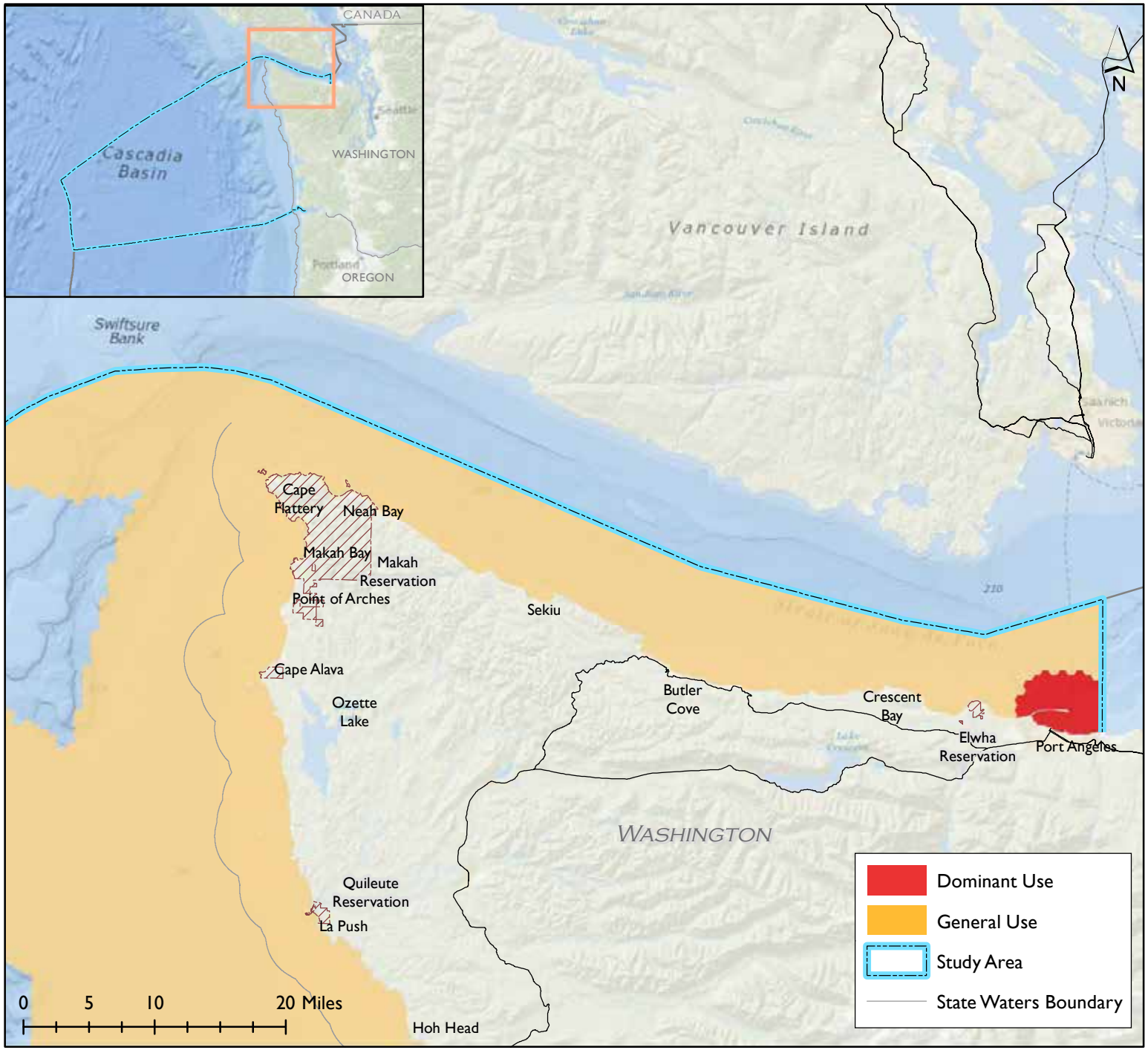

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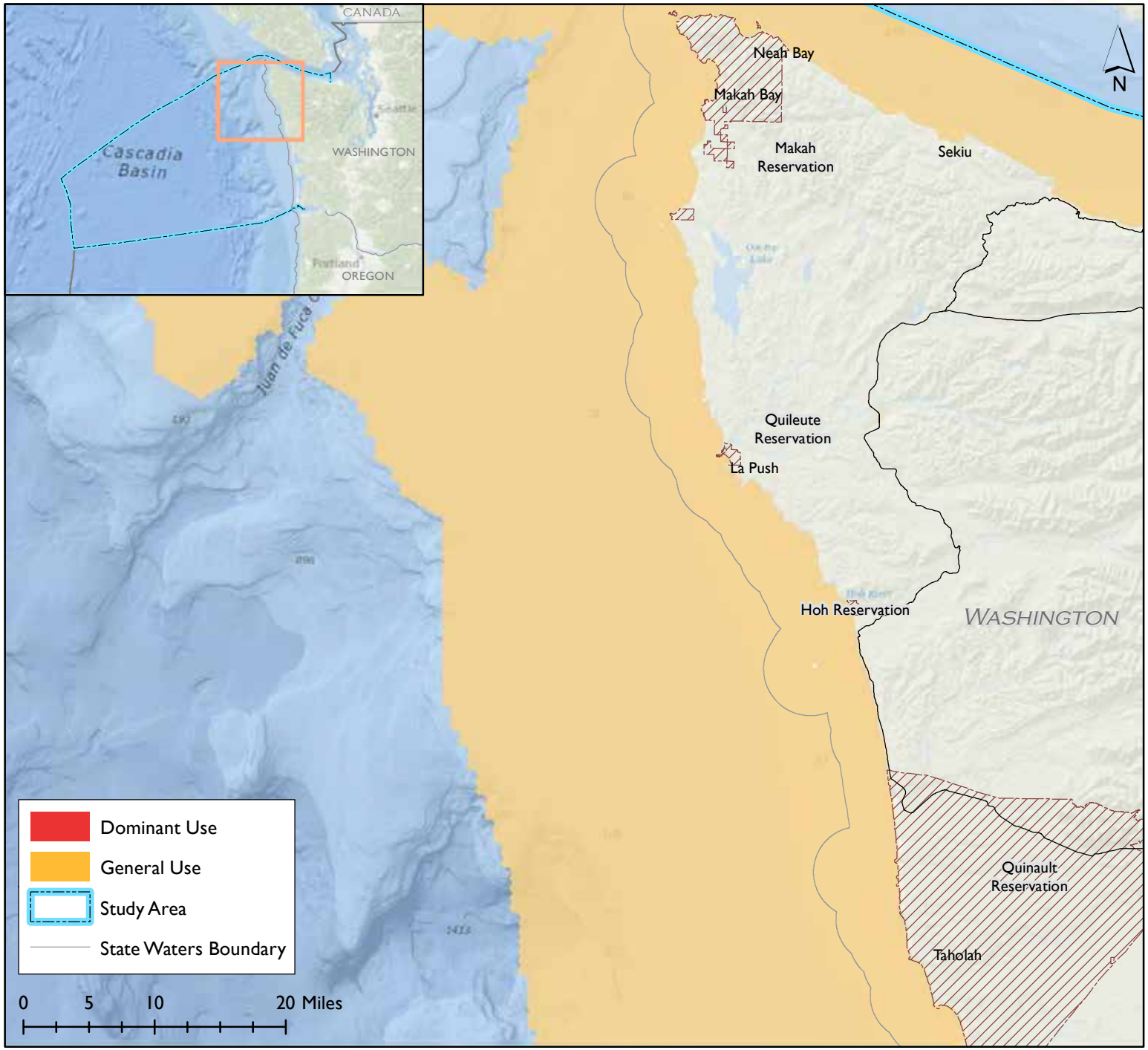

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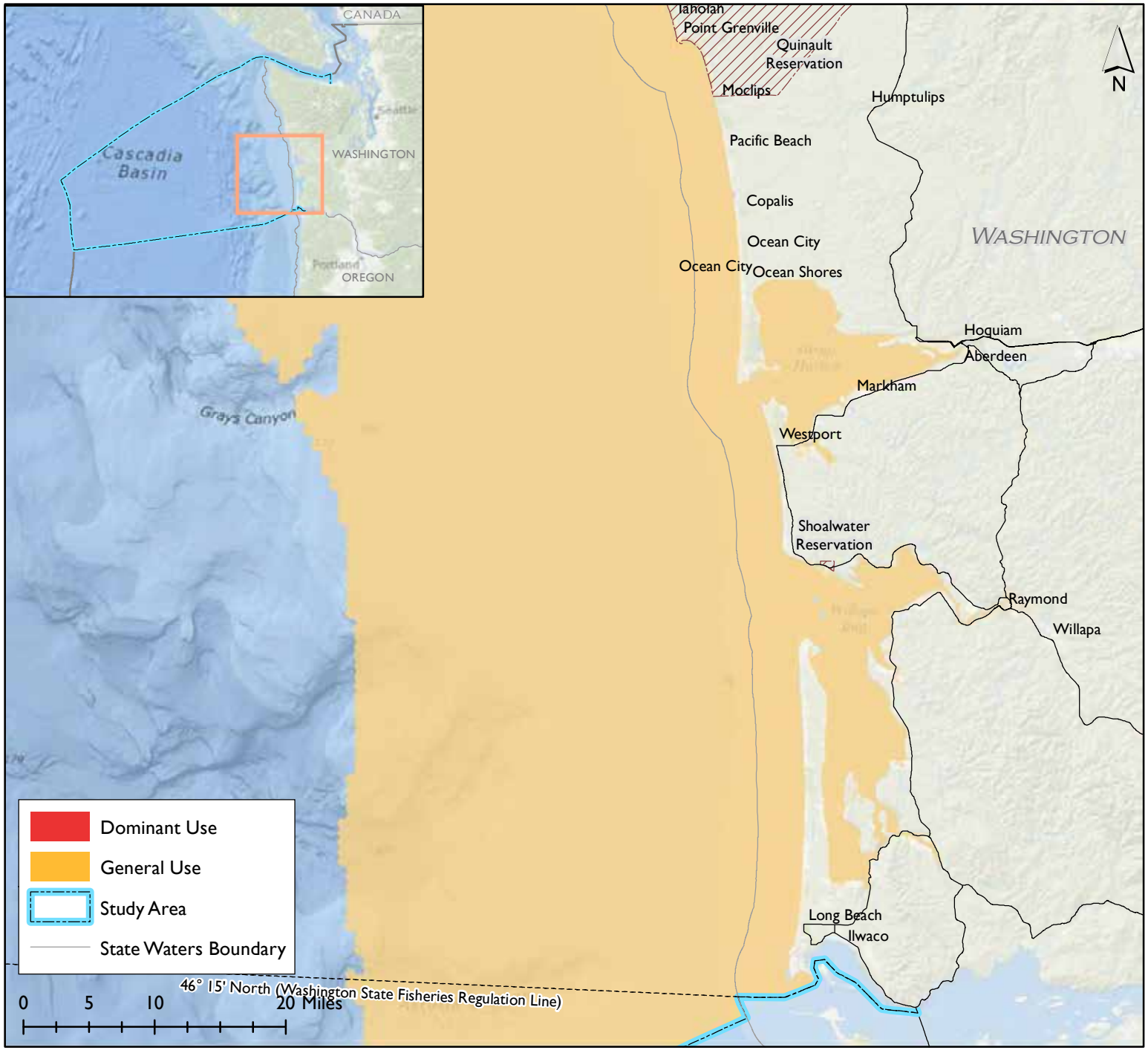

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Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships

Excludes:
Motorized Boating, Commercial Shipping

Use Notes:
Cruise ships are not a common use in this area and the activity is mainly for transit purpose. Approximately 20-30 ships per year come into Astoria and transit up or down the coast. Some stop in Grays Harbor, but most transit offshore north to Victoria. Cruise ships are observed most commonly in spring and fall and tend to stay at least 20 miles offshore and follow designated shipping lanes except when coming into port where they follow the traffic separation scheme. Some ships pass through the Strait of Juan de Fuca each year headed north to Alaska. They avoid passage through the Olympic Coast National Marine Sanctuary and the nearby Area To Be Avoided (ATBA). This use includes the ferry transit that runs five times daily between Port Angeles and Victoria across the Strait.

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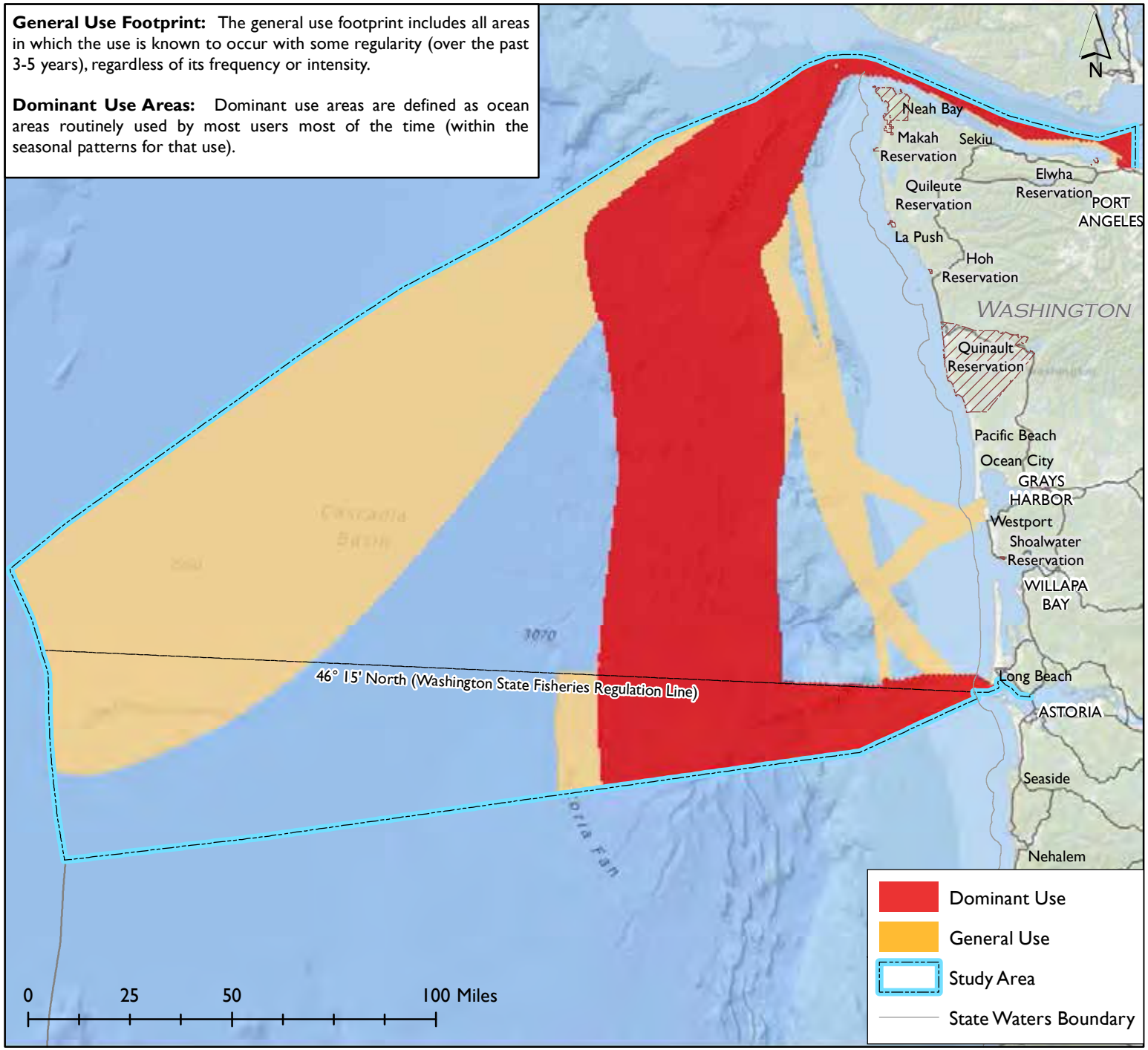

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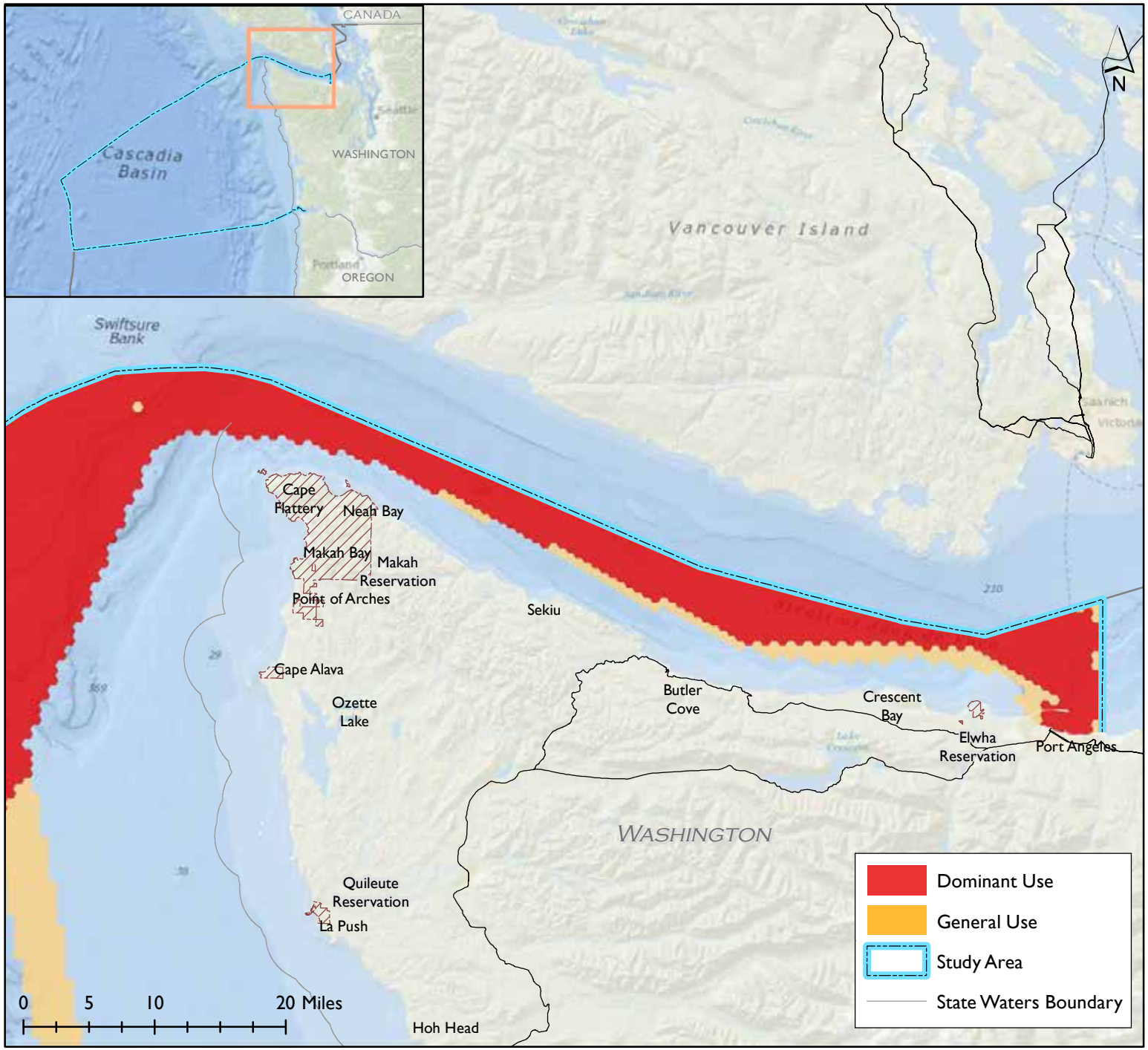

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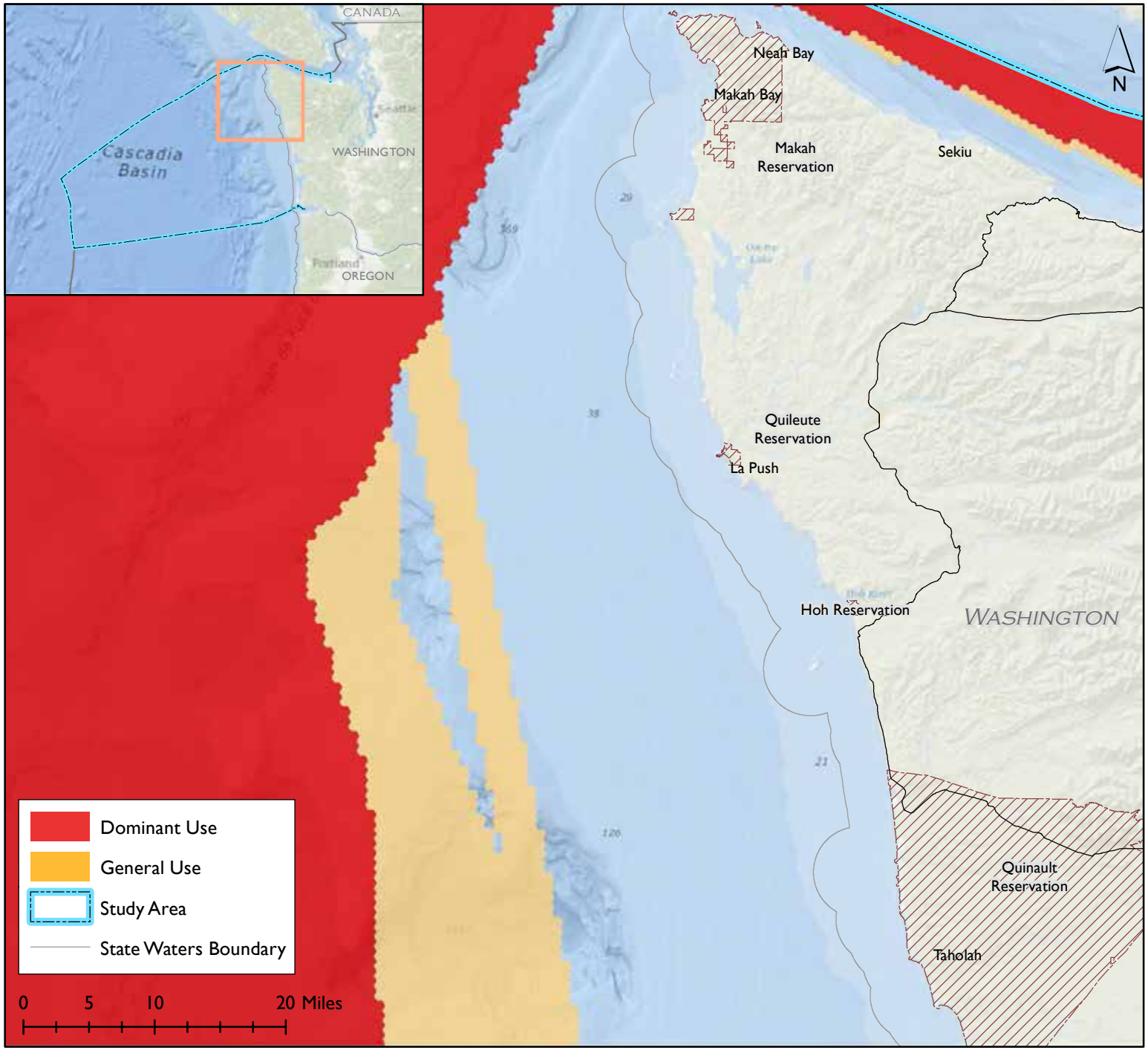

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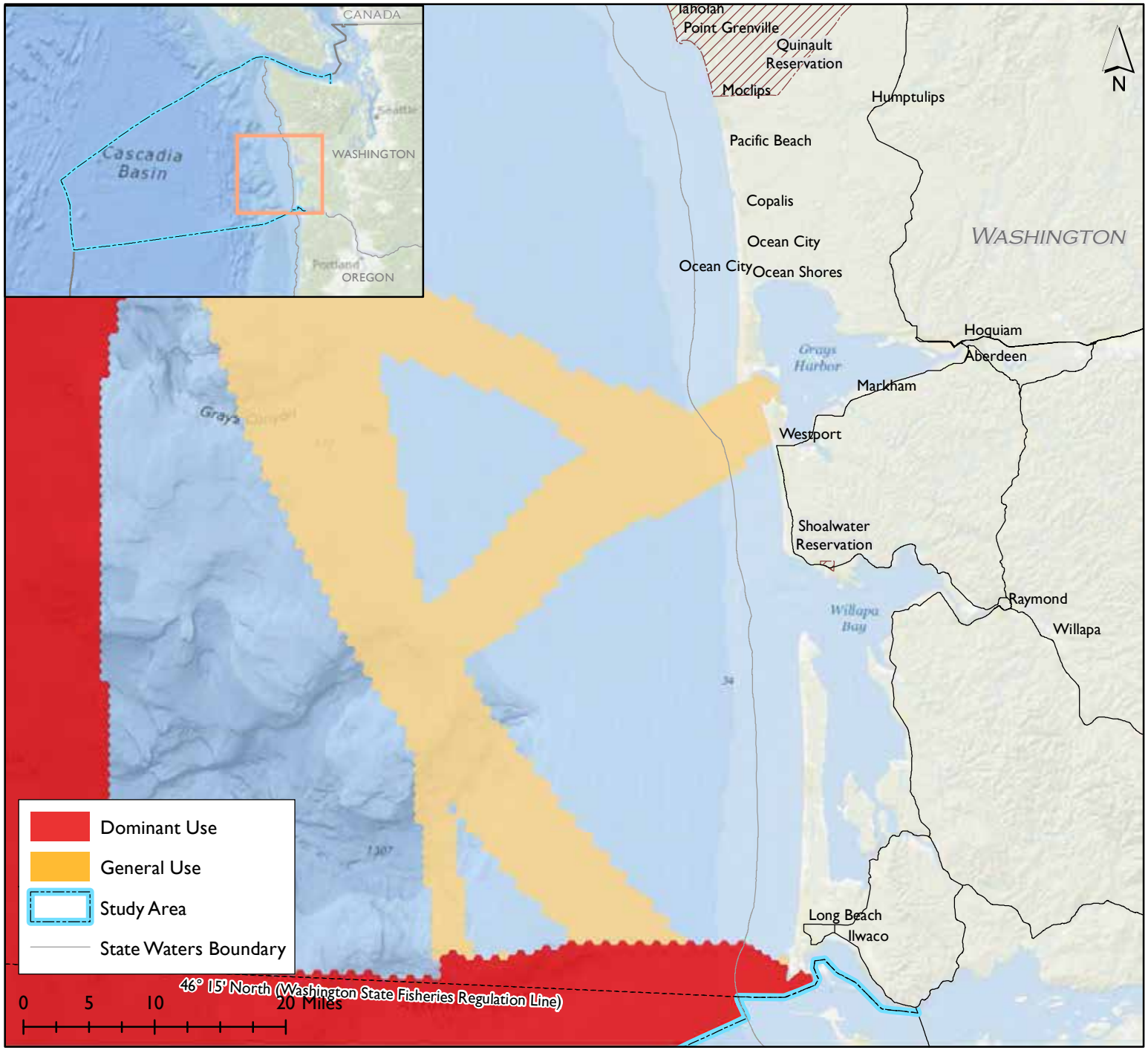

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Cultural Use

Includes:
Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance

Excludes:
All other uses and activities

Use Notes:
Cultural use is found all throughout the study area. This use includes tribal Usual and Accustomed Areas, shipwrecks, lighthouses, forts, archaeological sites, memorials, cemeteries and the viewshed along all ocean beaches.

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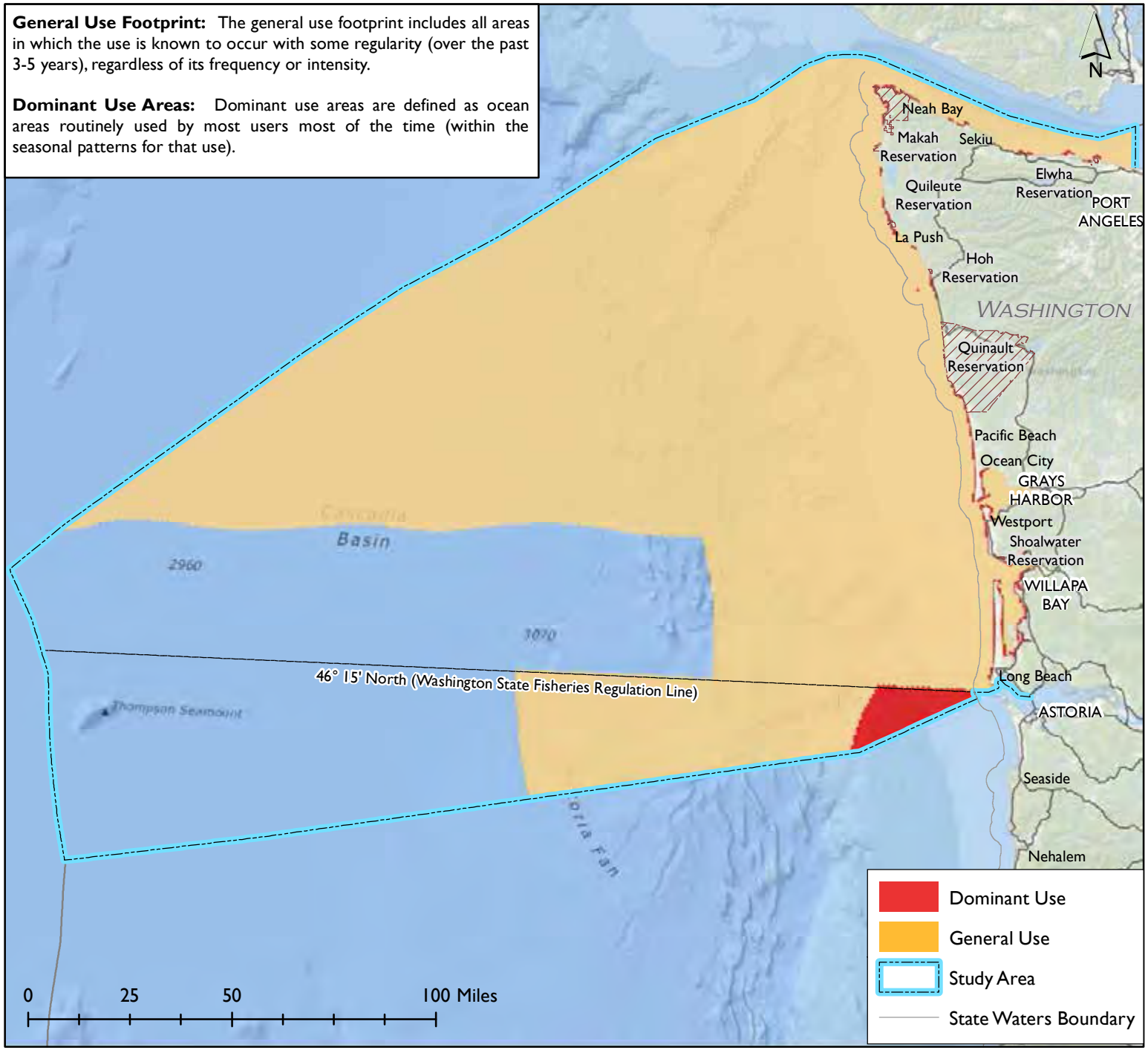

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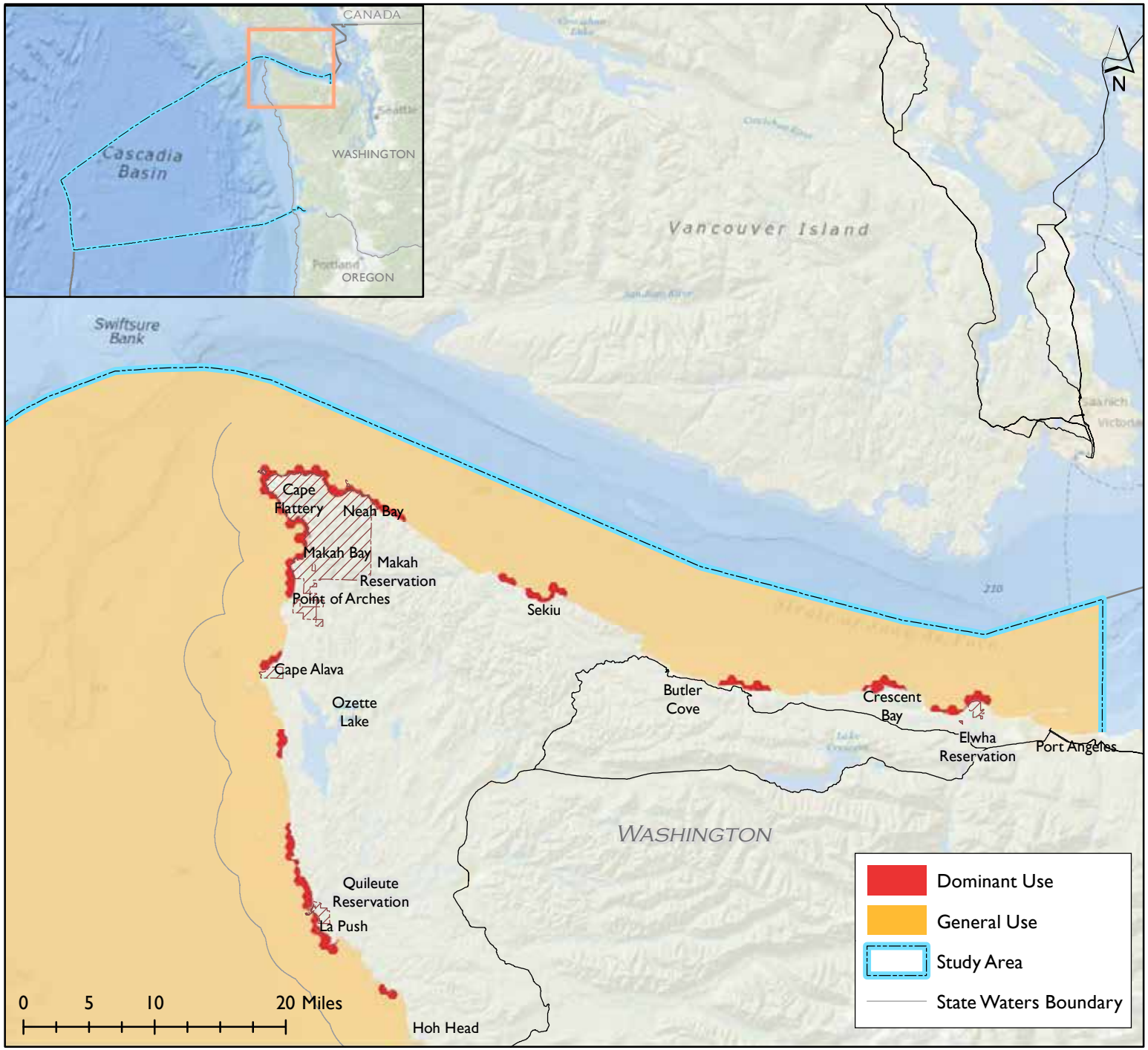

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Cultural Use

Includes:
Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance

Excludes:
All other uses and activities

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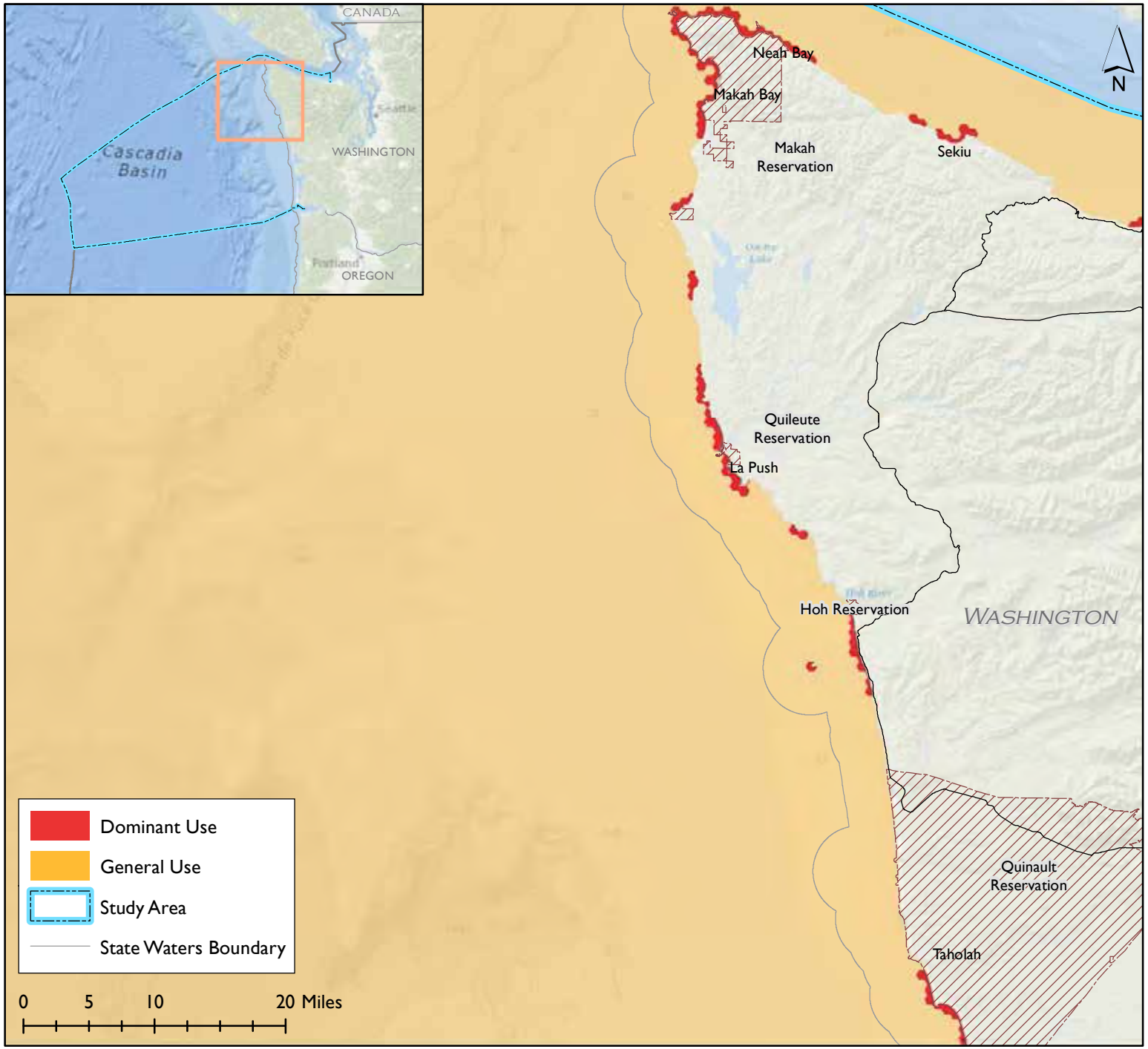

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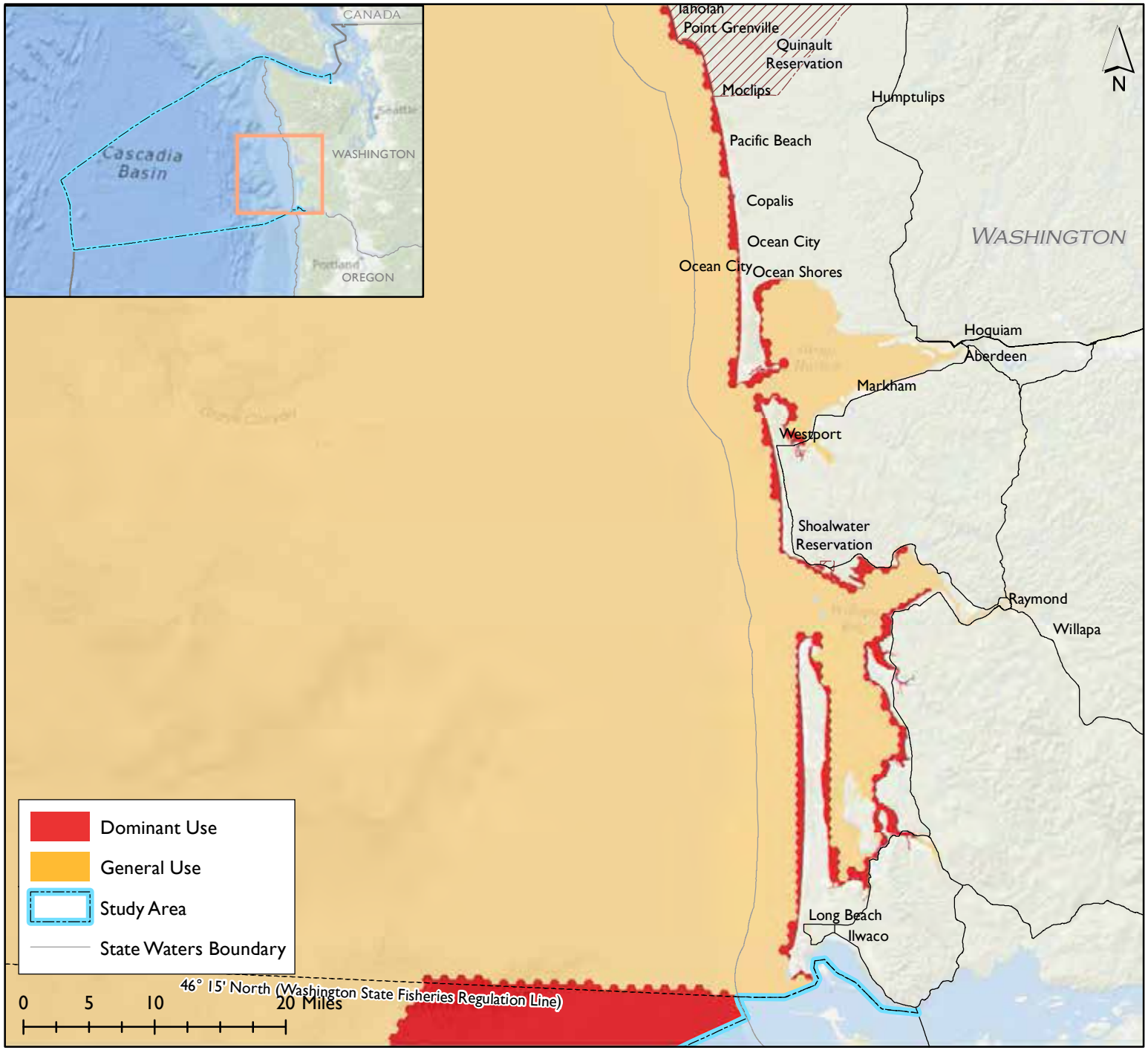

 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Paddling

Includes:
Kayaking, canoeing, rowing, outrigger paddling, stand-up paddling

Excludes:
Motorized Boating, Surface Board Sports

Use Notes:
Paddling is most common along the Strait de Juan de Fuca from Neah Bay to Port Angeles. The use can extend out to one mile from shore, but is more common within 0.5 miles. This use includes the tribal Canoe Journeys which occur along the coast every year.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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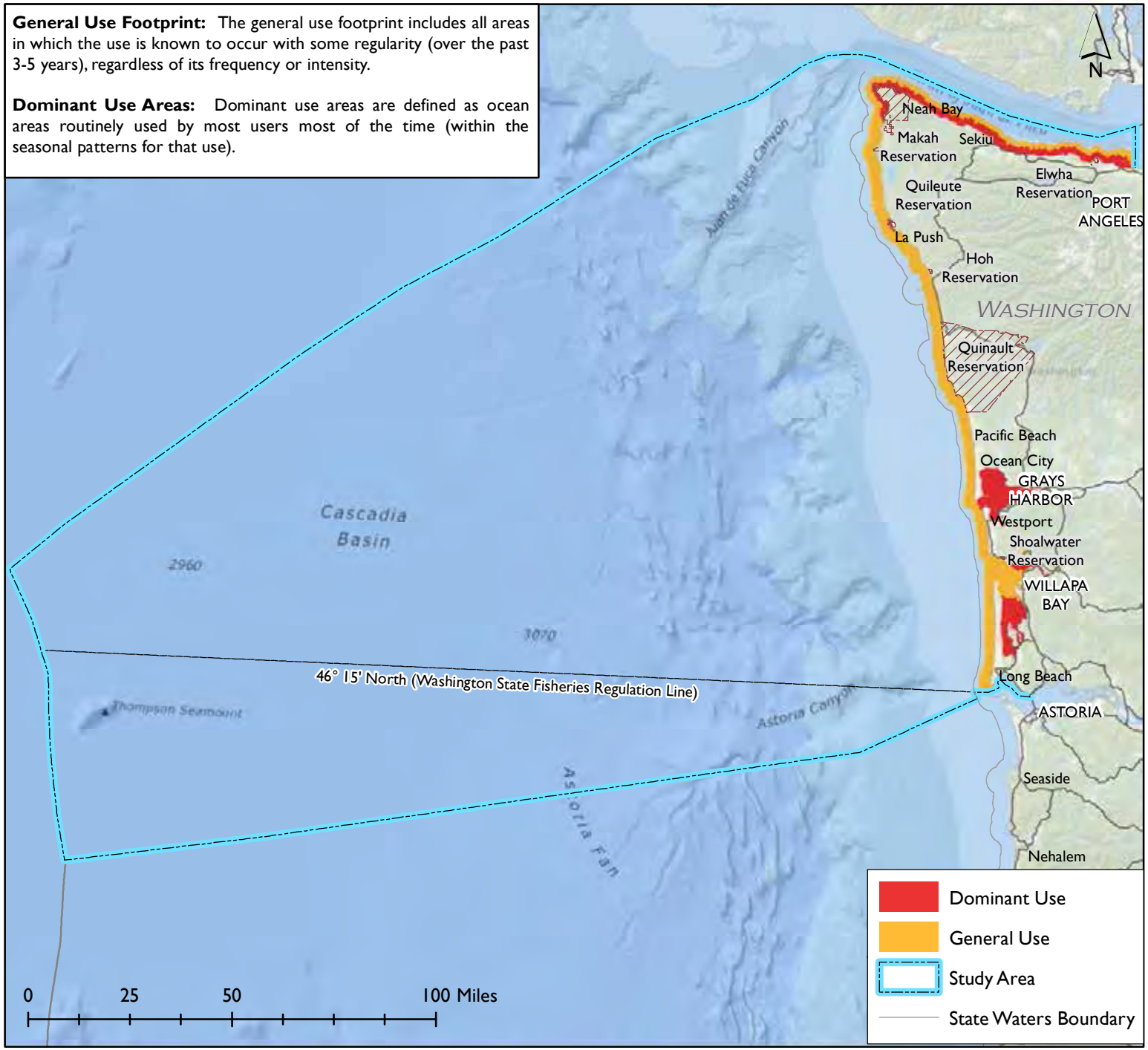

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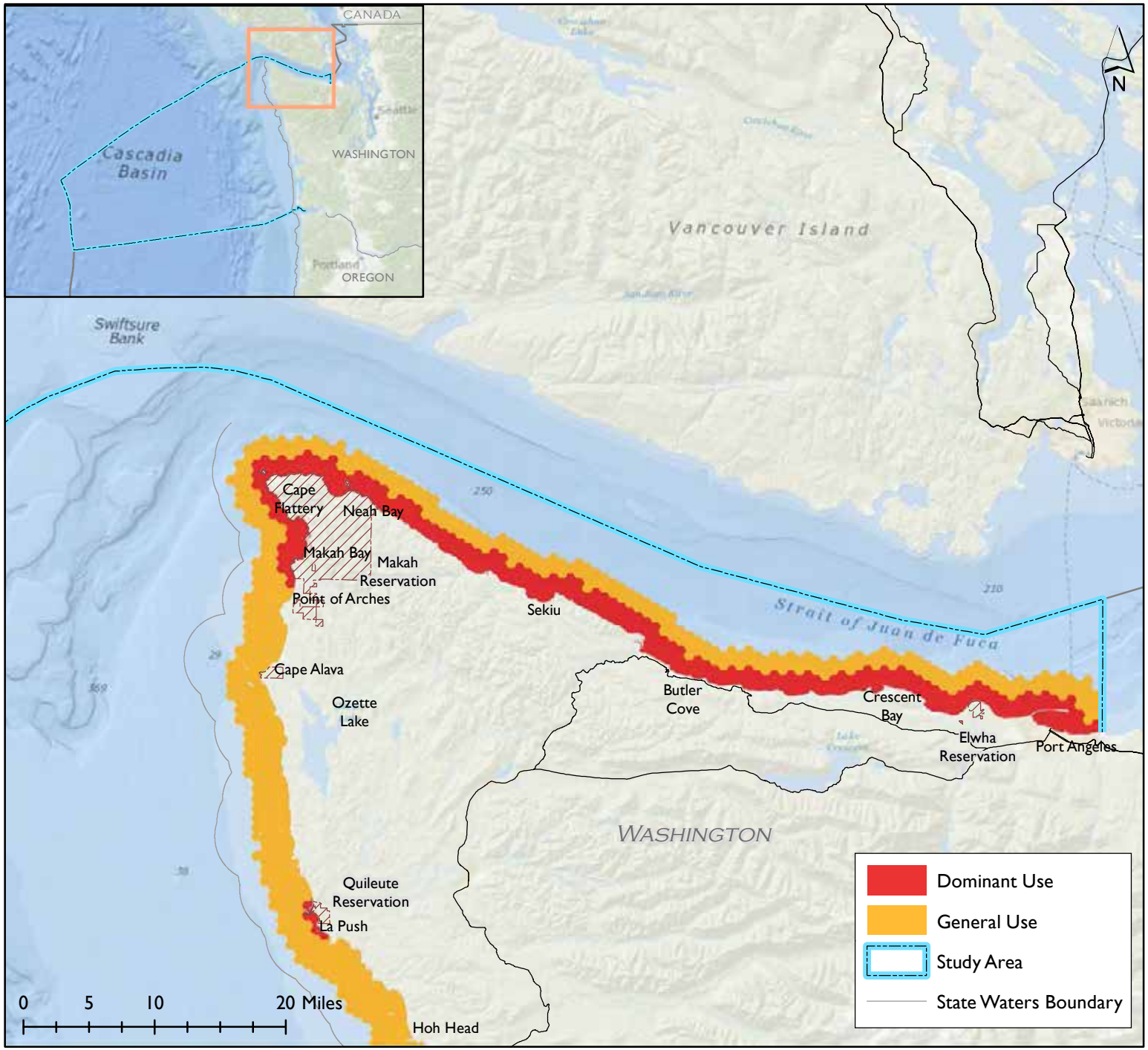

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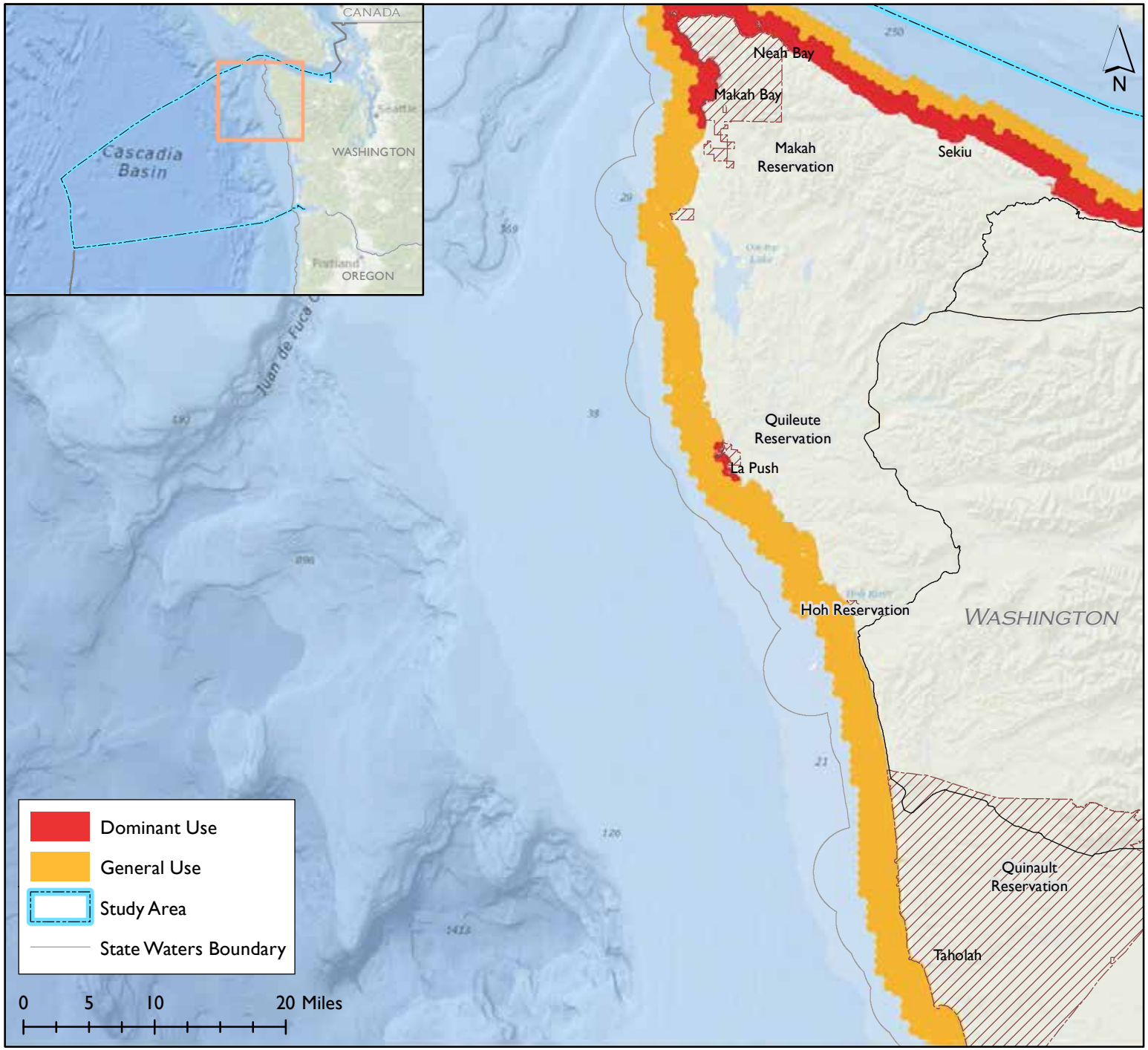

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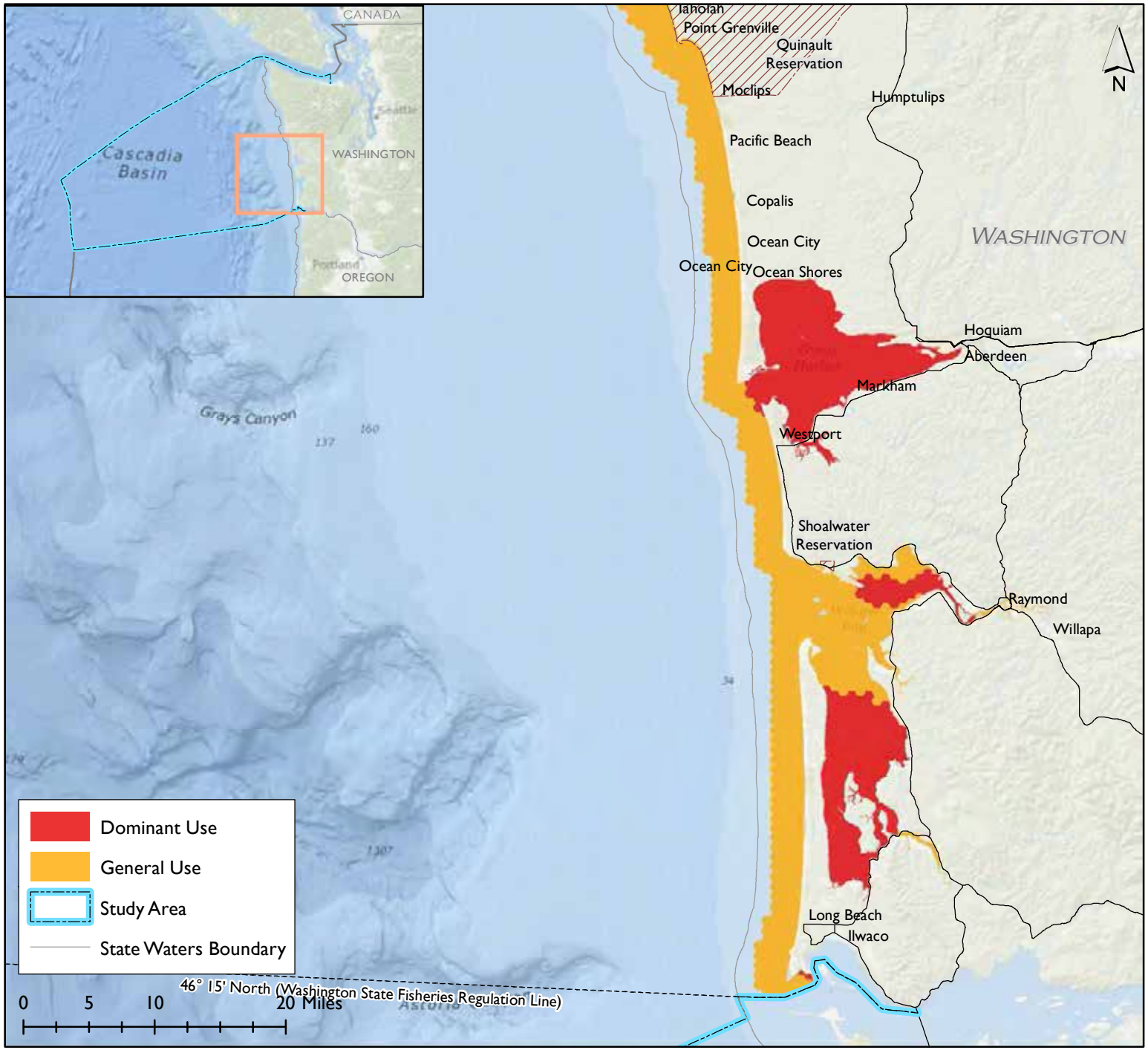

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Permanent Research Areas

Includes:
Sites, transects, and monitoring areas where routine research or monitoring is conducted

Excludes:
Motorized Boating, Commercial Shipping

Use Notes:
Permanent research sites are common all along the coast throughout the study area. This includes research sites that focus on mammal and seabird counts, erosion monitoring, sediment accretion, harmful algal blooms, shellfish populations, and dead bird surveys. Research moorings, naval research areas, oceanographic monitoring buoys and fishery survey tracts are also present. In recent years, more research has focused on the monitoring and removal of marine debris. The Washington Dept. Fish and Wildlife have permanent transect areas on Long Beach peninsula and other coastal razor clam harvesting beaches.

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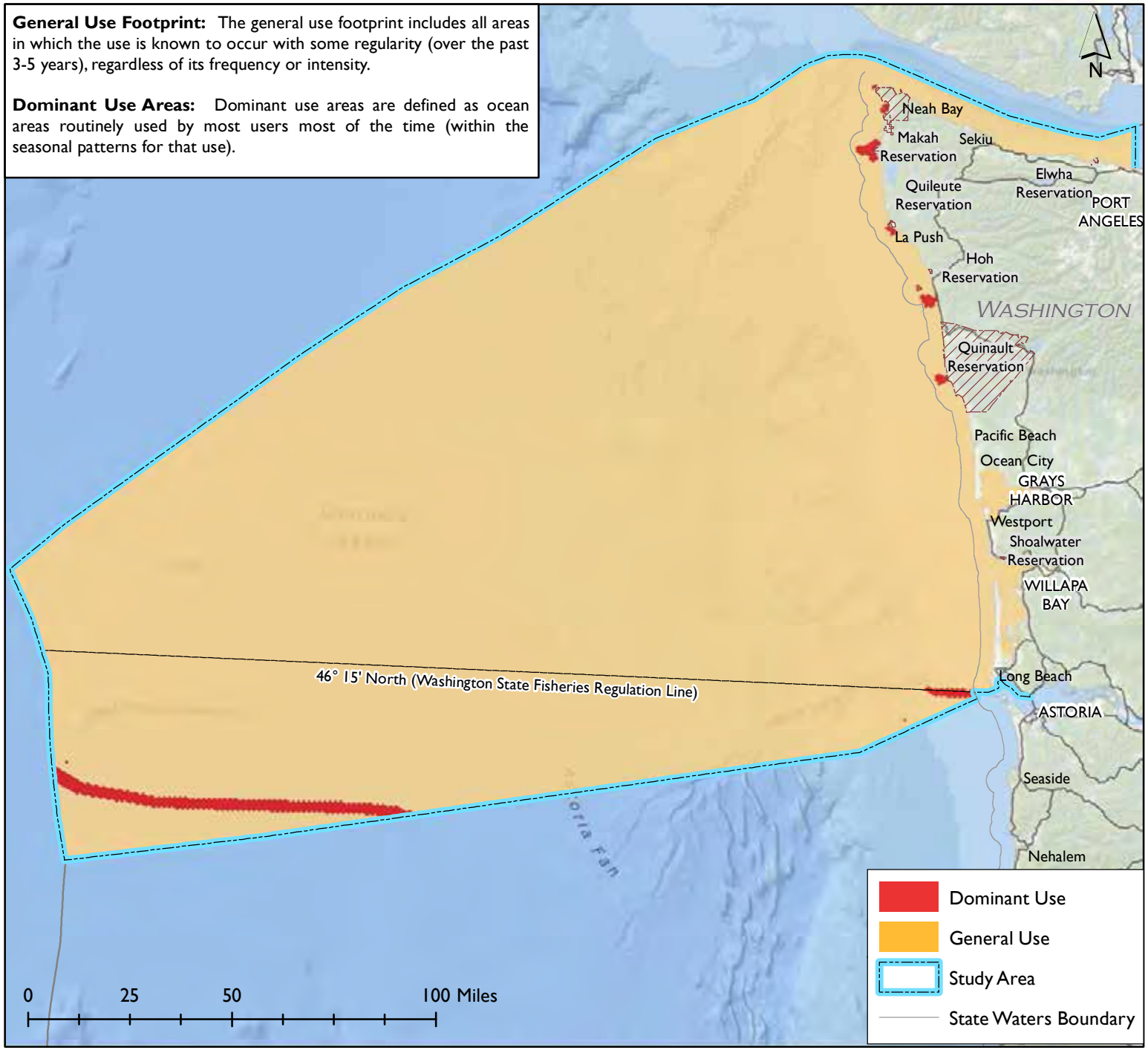

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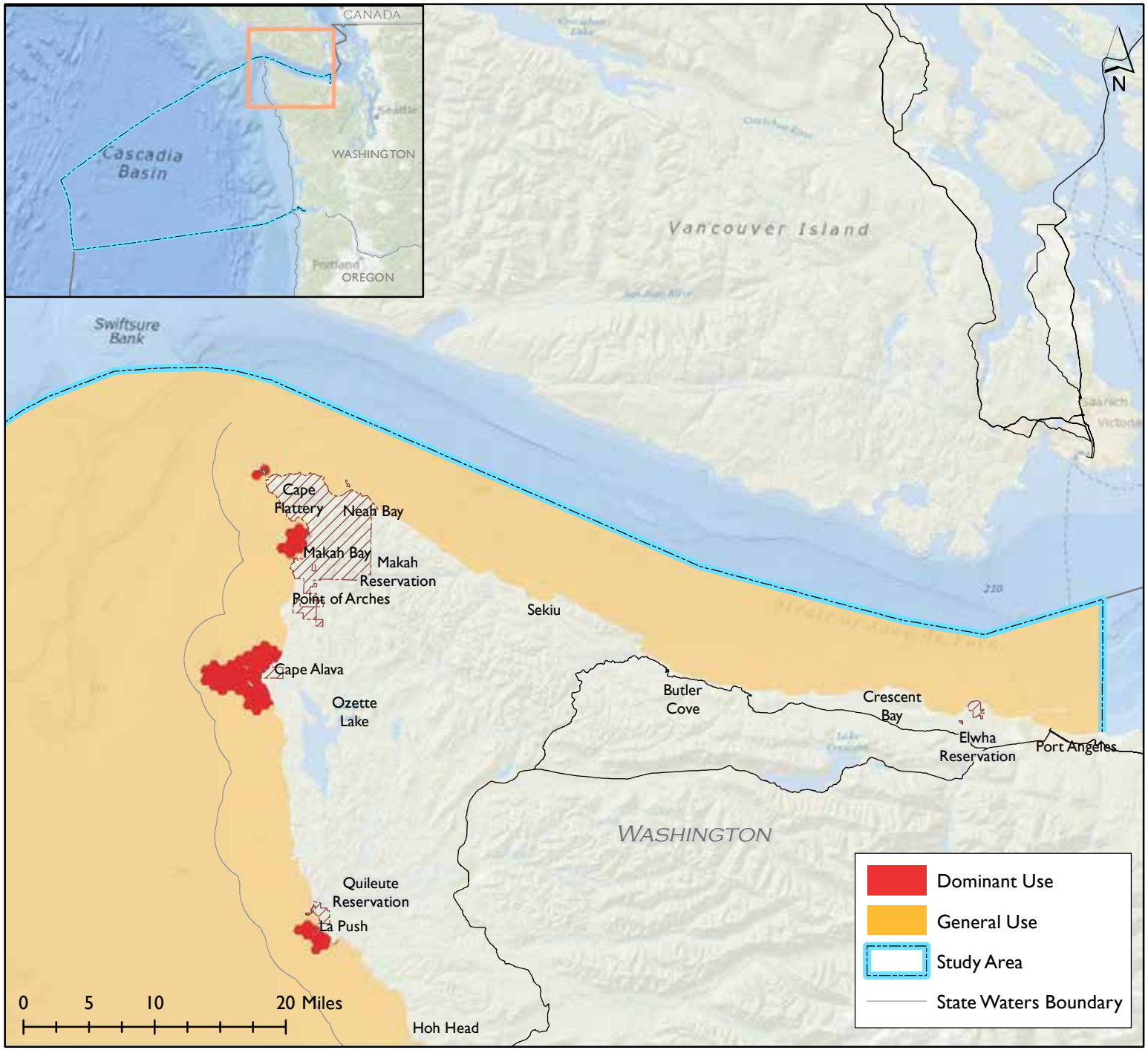

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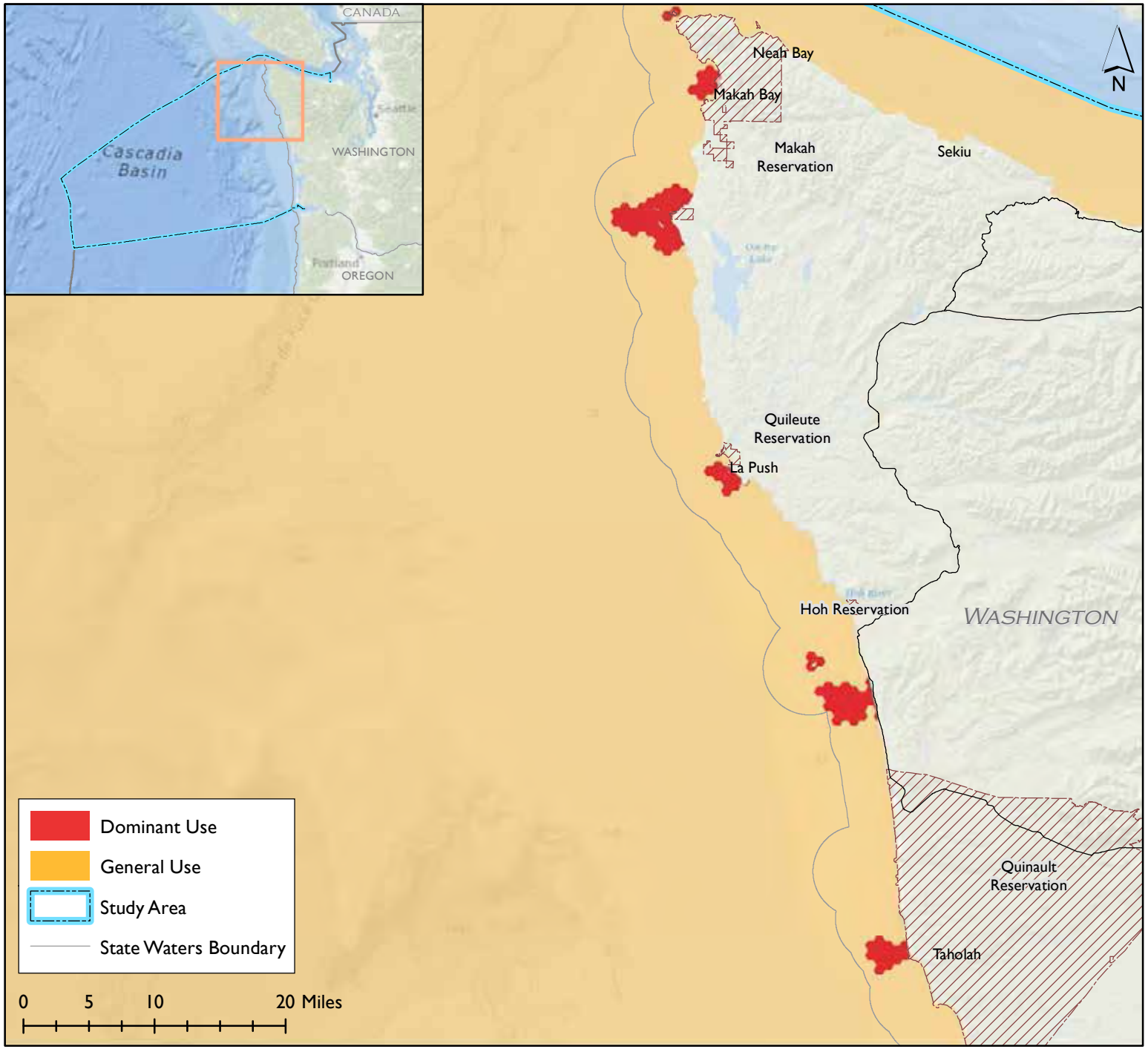

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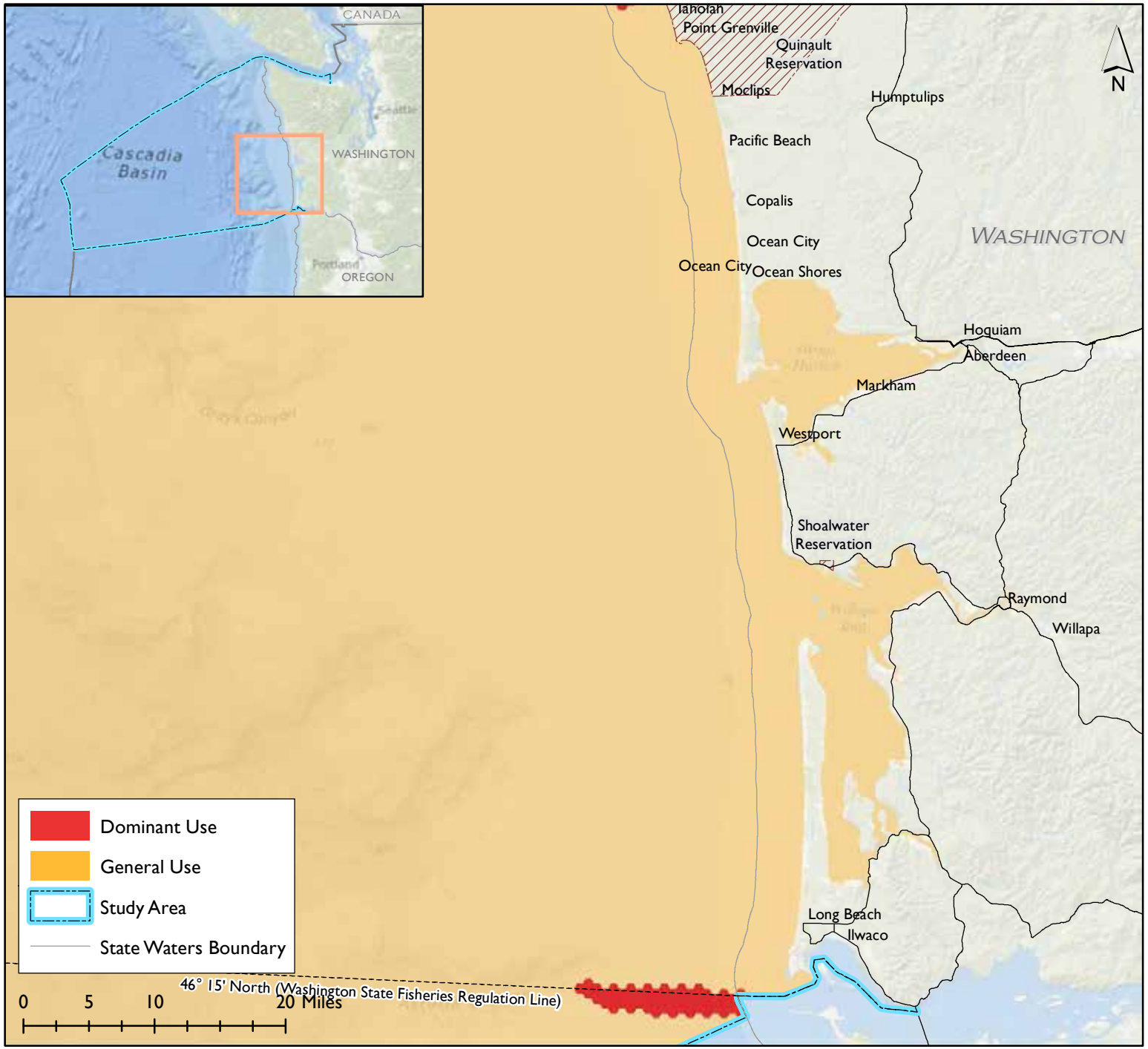

 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Sailing

Includes:
Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes

Excludes:
Motorized Boating, Paddling

Use Notes:
Sailing is most common in the Strait during the annual Swiftsure Yacht Race in May. Mostly transit sailing occurs along the outer coast with anchoring and refueling common in Neah Bay. Along the outer coast, the use tends to occur between 4-25 miles from shore except for boats coming into port. Some day use sailing occurs within the Strait, in Willapa Bay and around Port Angeles. There is an Annual regatta off Oysterville in Willapa bay, between the main channel and the high tide line.

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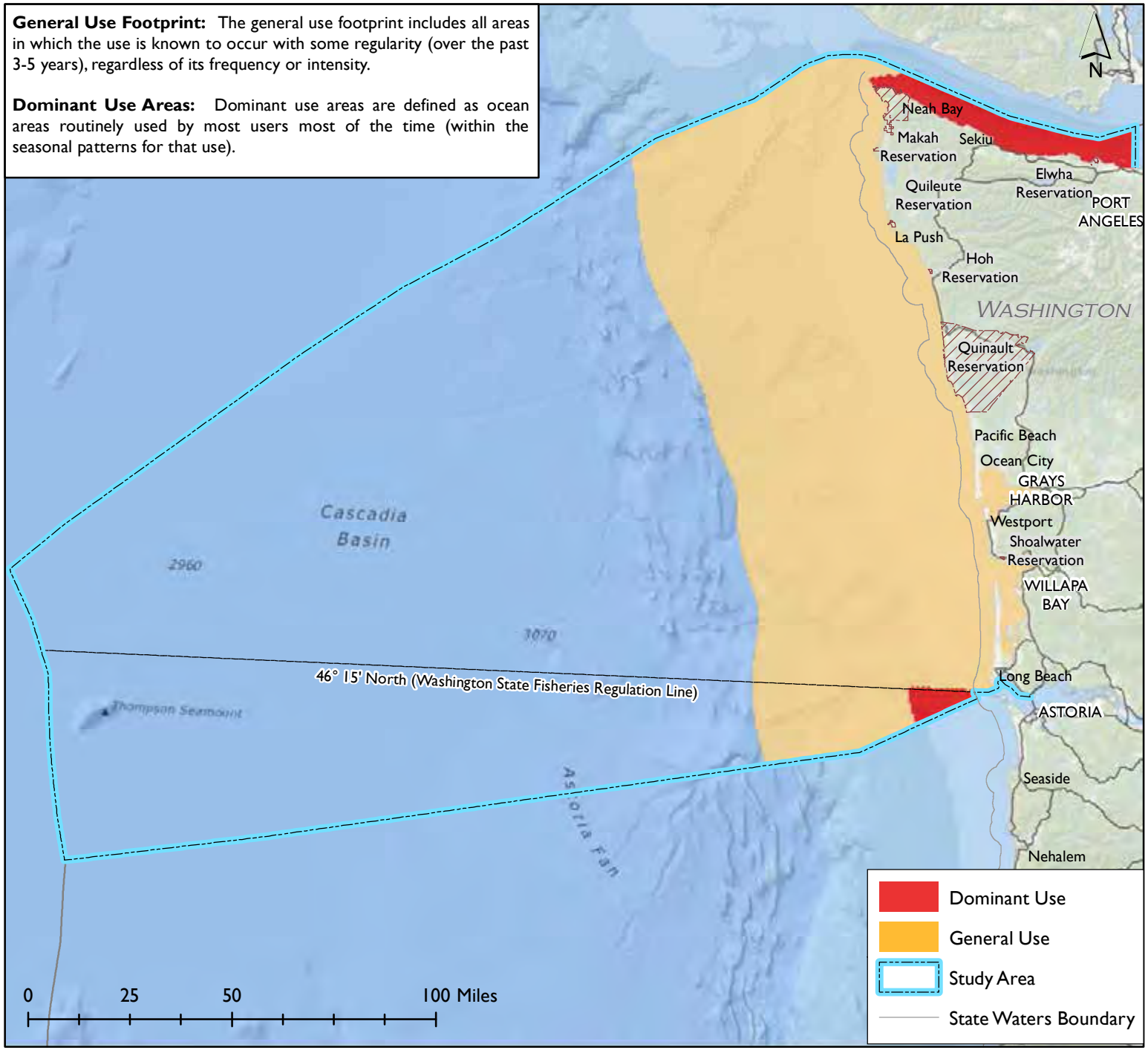

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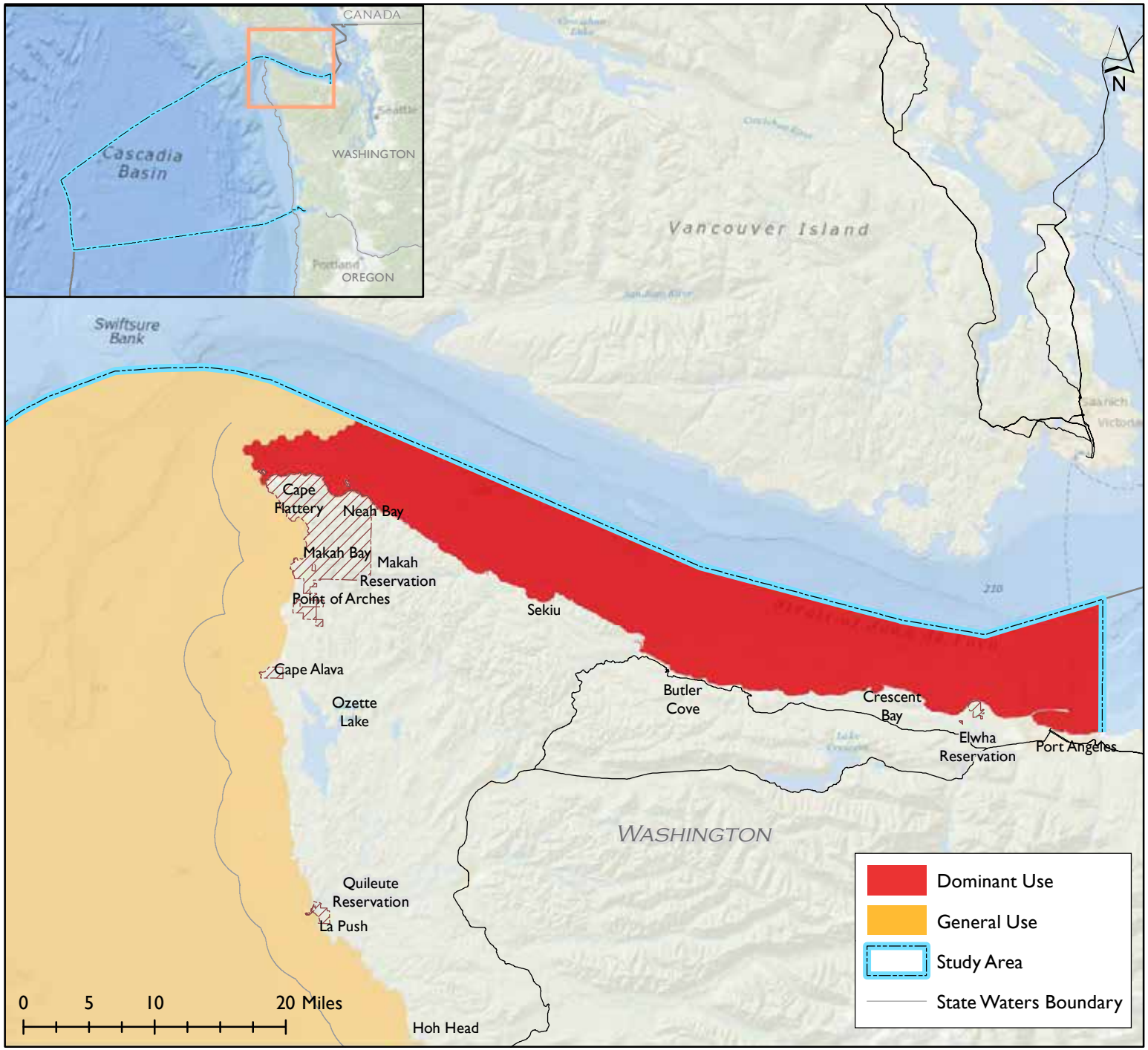

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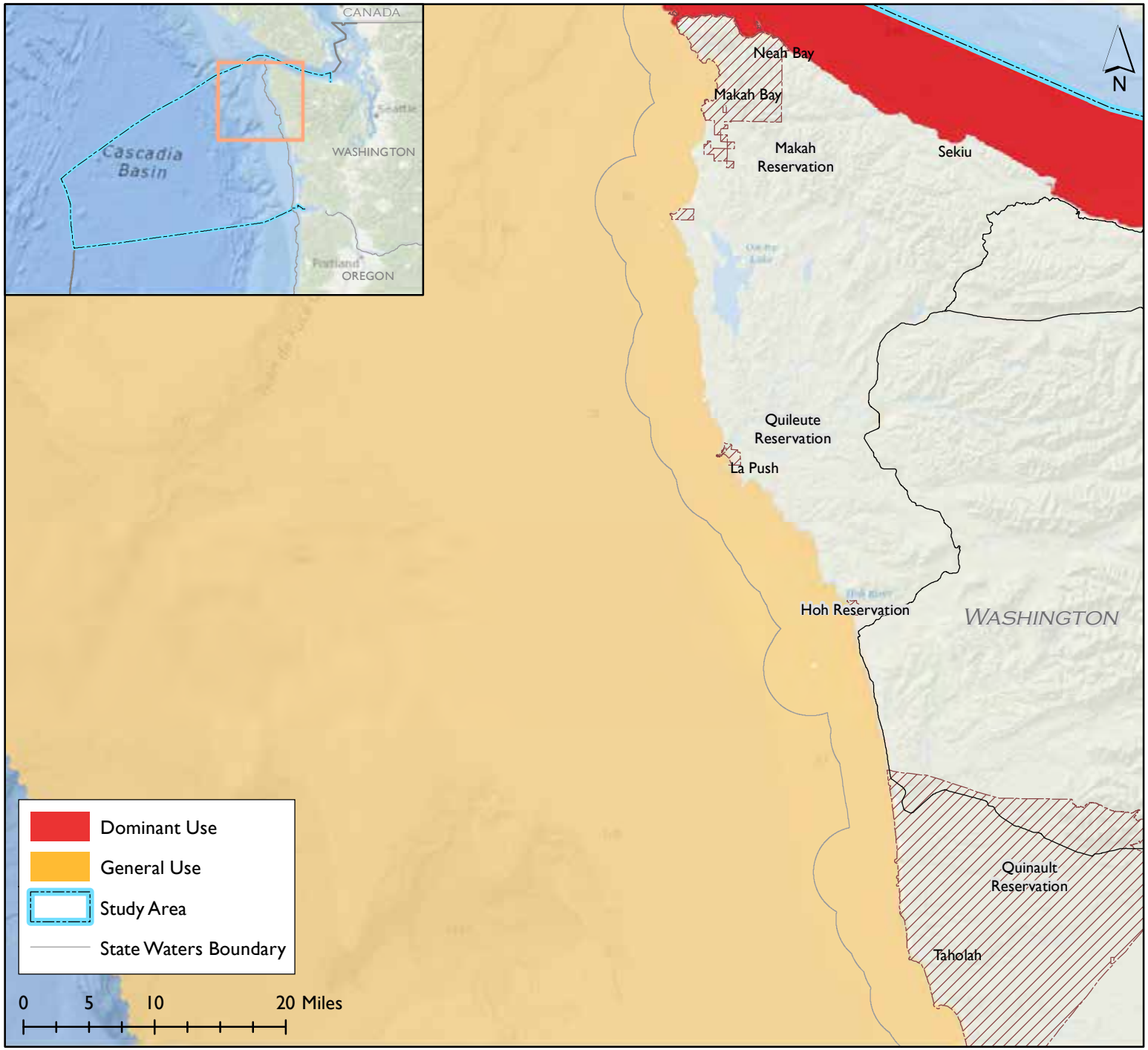

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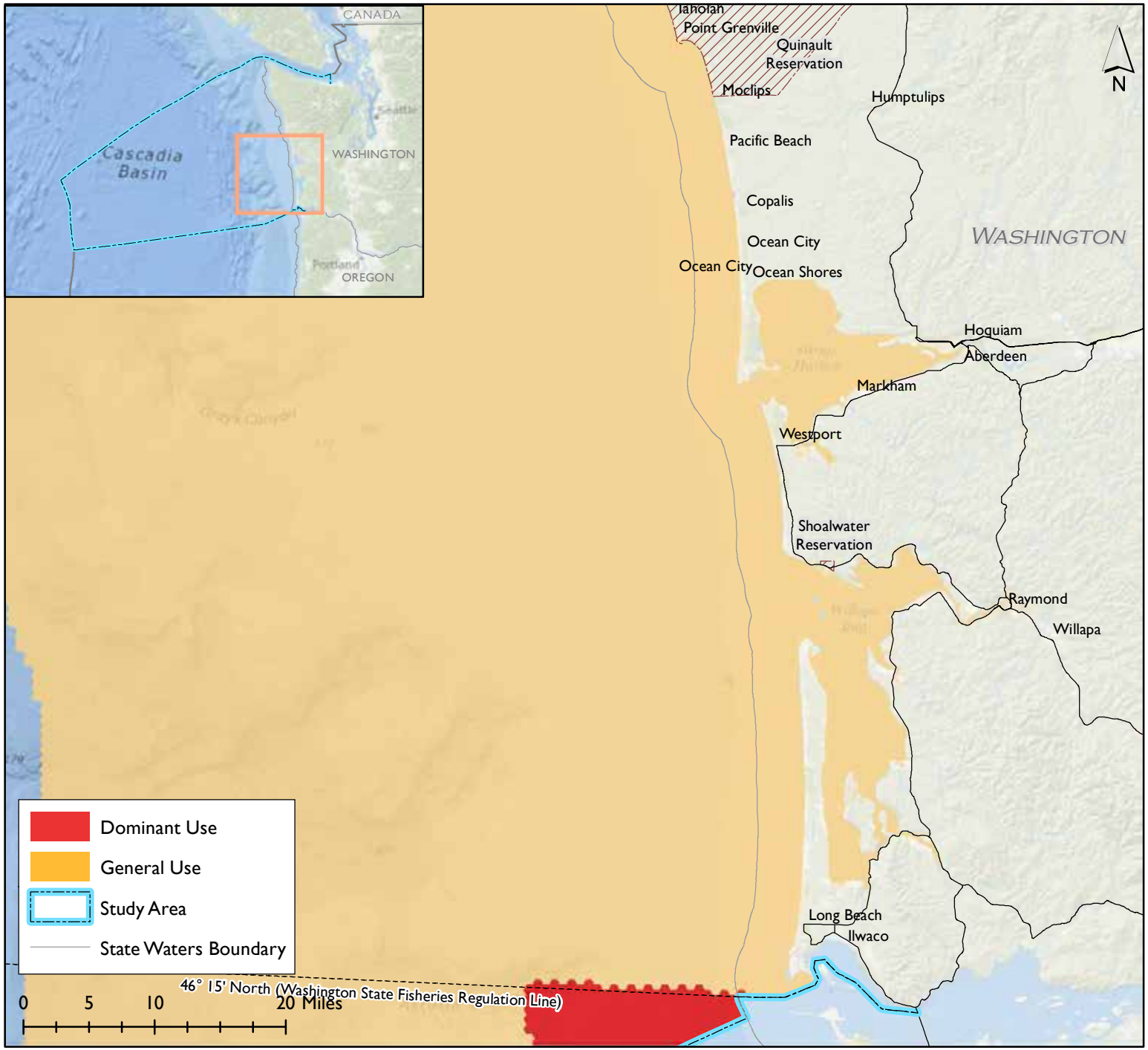

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

SCUBA/Snorkeling

Includes:
SCUBA diving, surface supply diving, snorkeling (free diving)
Excludes:
Swimming, Dive Fishing

Use Notes:
SCUBA occurs most commonly in and around the kelp beds near Neah Bay and along the Strait of Juan de Fuca at depths of 100 feet or less. Dominant use occurs from late summer into winter and focuses on shallower areas less than 60 feet. This use is not common on the outer coast with the exception of research or salvage purposes.

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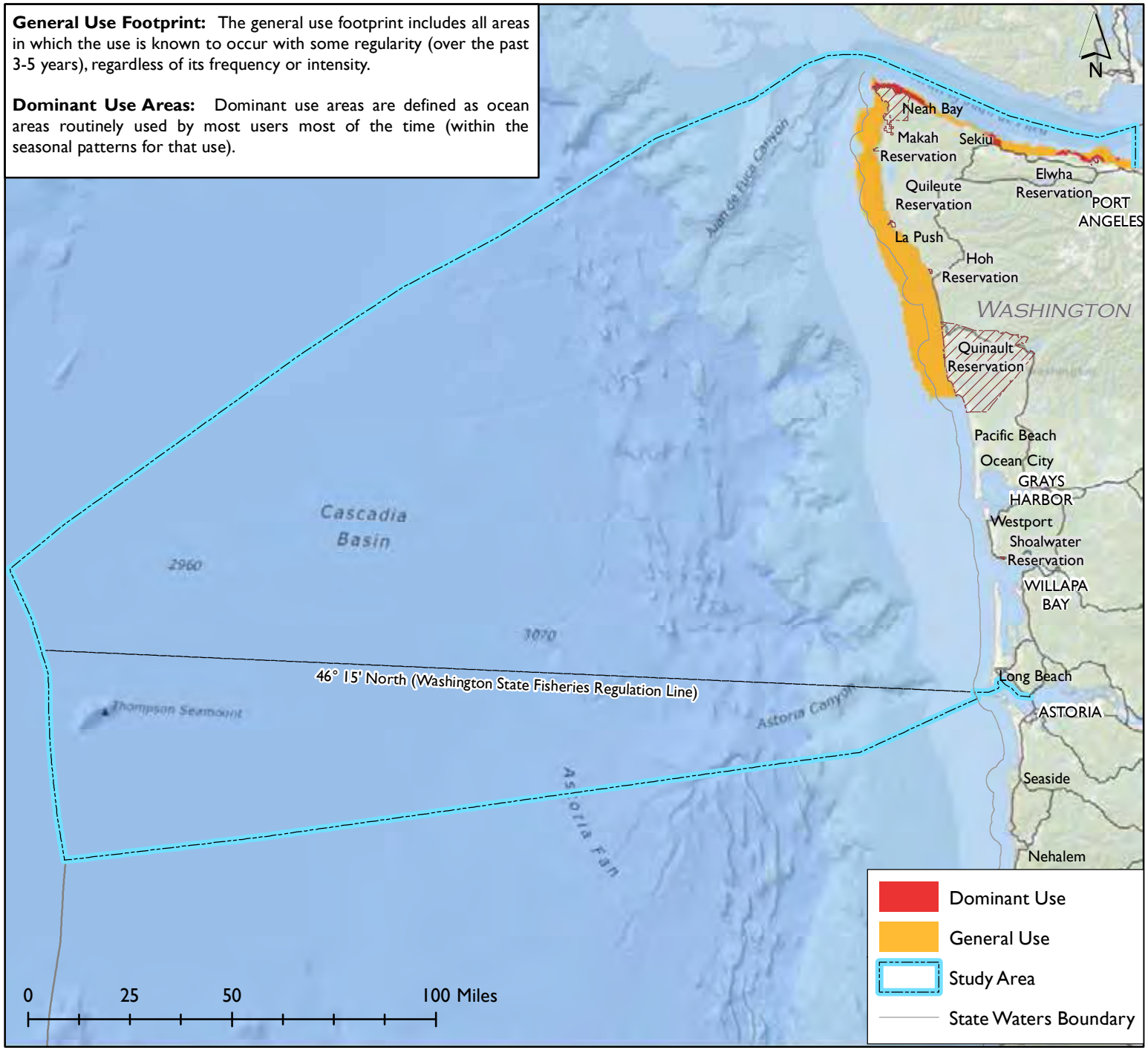

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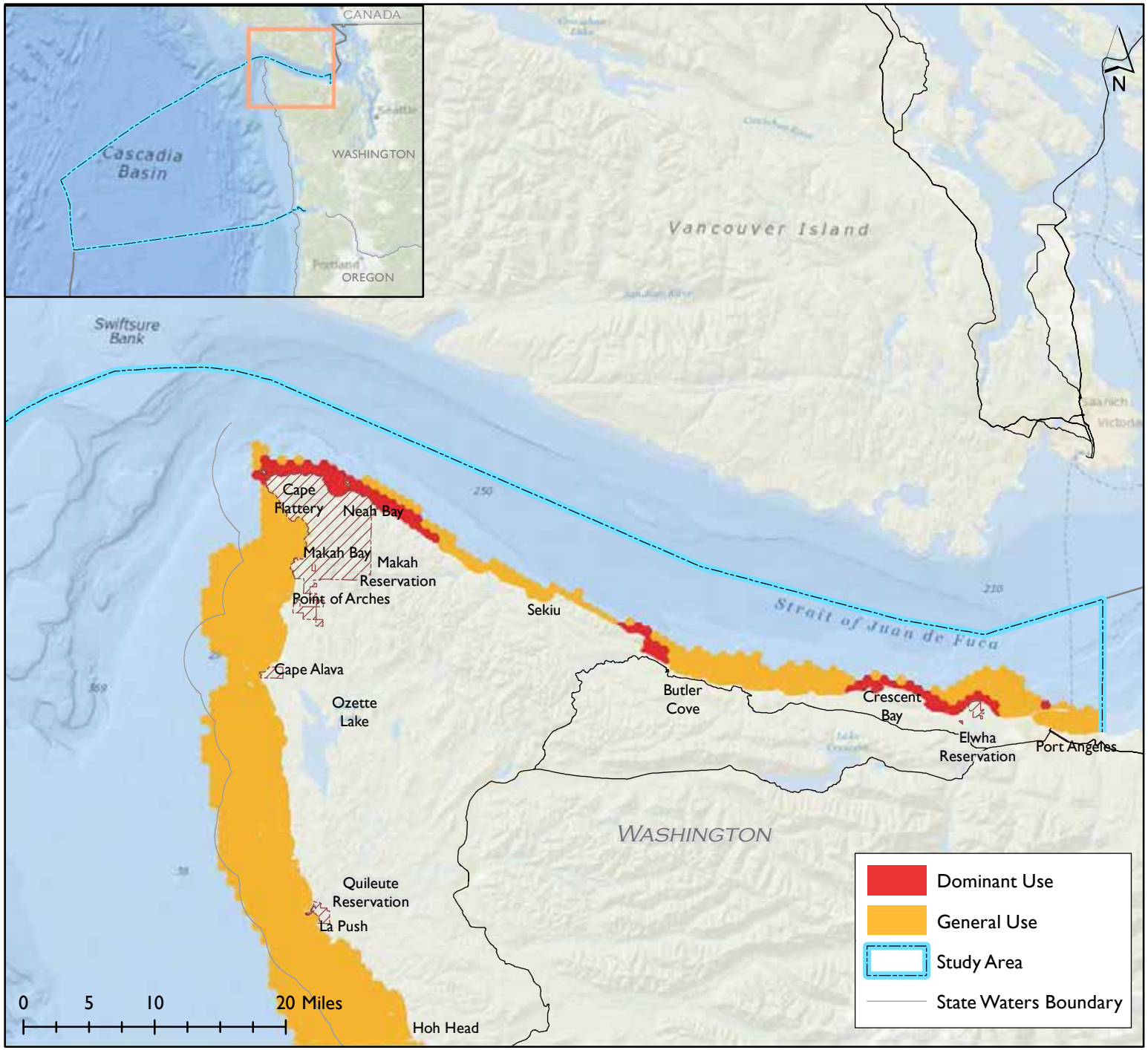

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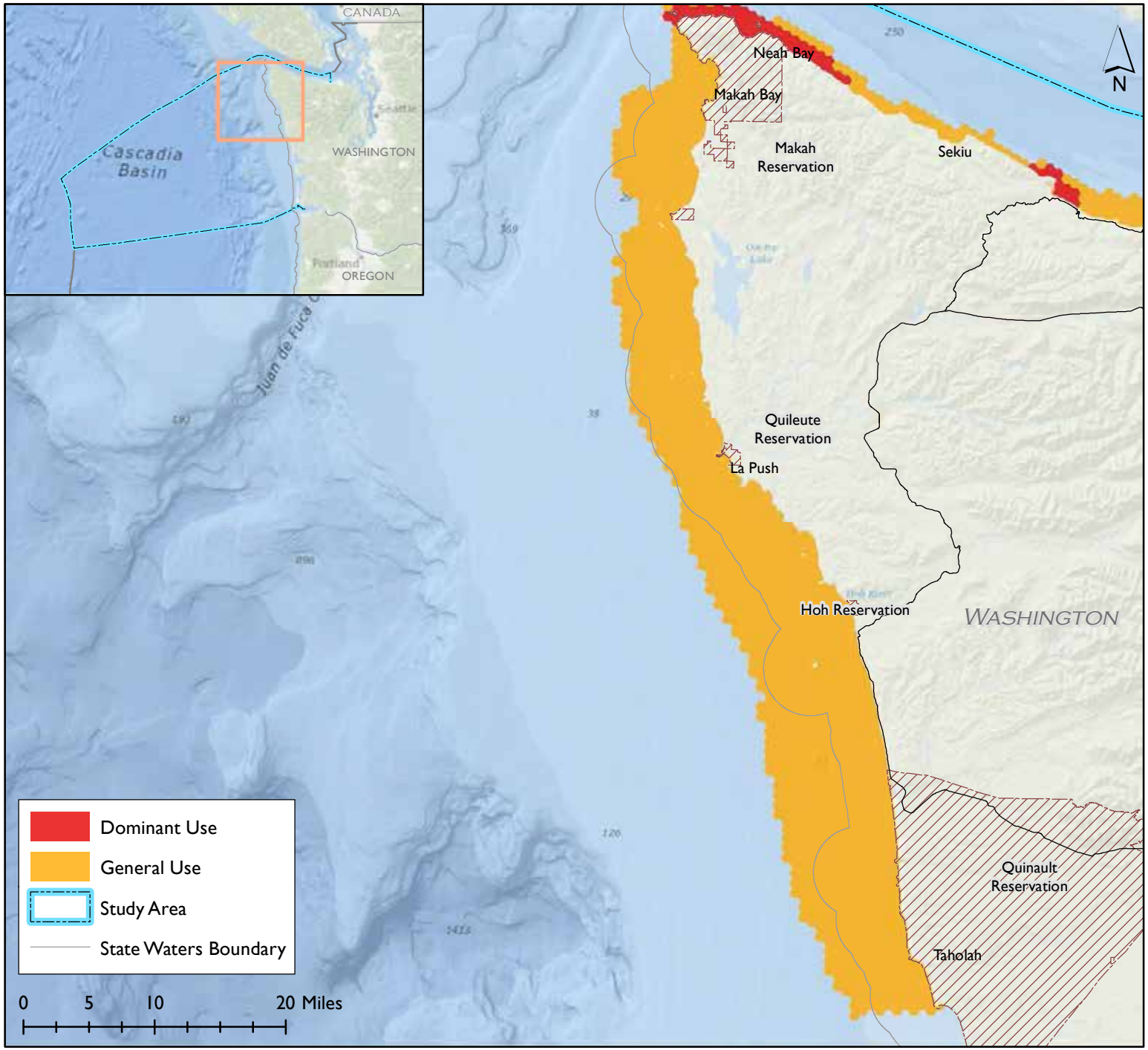

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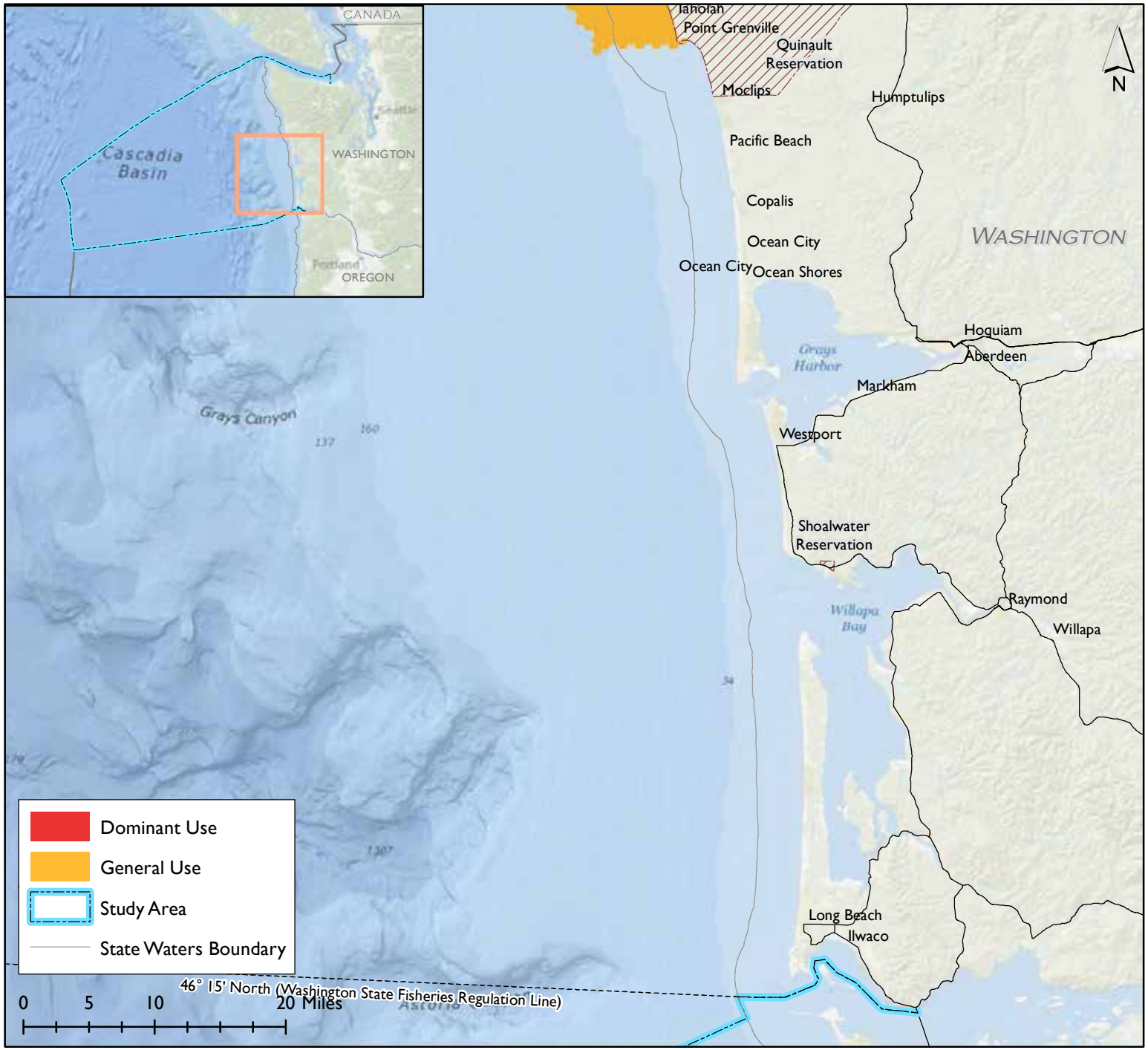

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THE WASHINGTON OCEAN USES ATLAS

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Surface Board Sports

Includes:
Tow-in and paddle-in surfing, wind-surfing, kite surfing, sailboarding

Excludes:
Paddling, SCUBA/Snorkeling, Swimming

Use Notes:
Surface board sports have shown an increase in activity in recent years with the introduction of stand up paddling (which now occurs in some harbors and bays). Overall the use is highly dependent on weather and ocean conditions, but does occur year-round. The use is influenced by coastal access, proximity to parking and location of surf breaks. The use tends to stay within one mile of the shoreline and extends into the mouth of the Columbia River.

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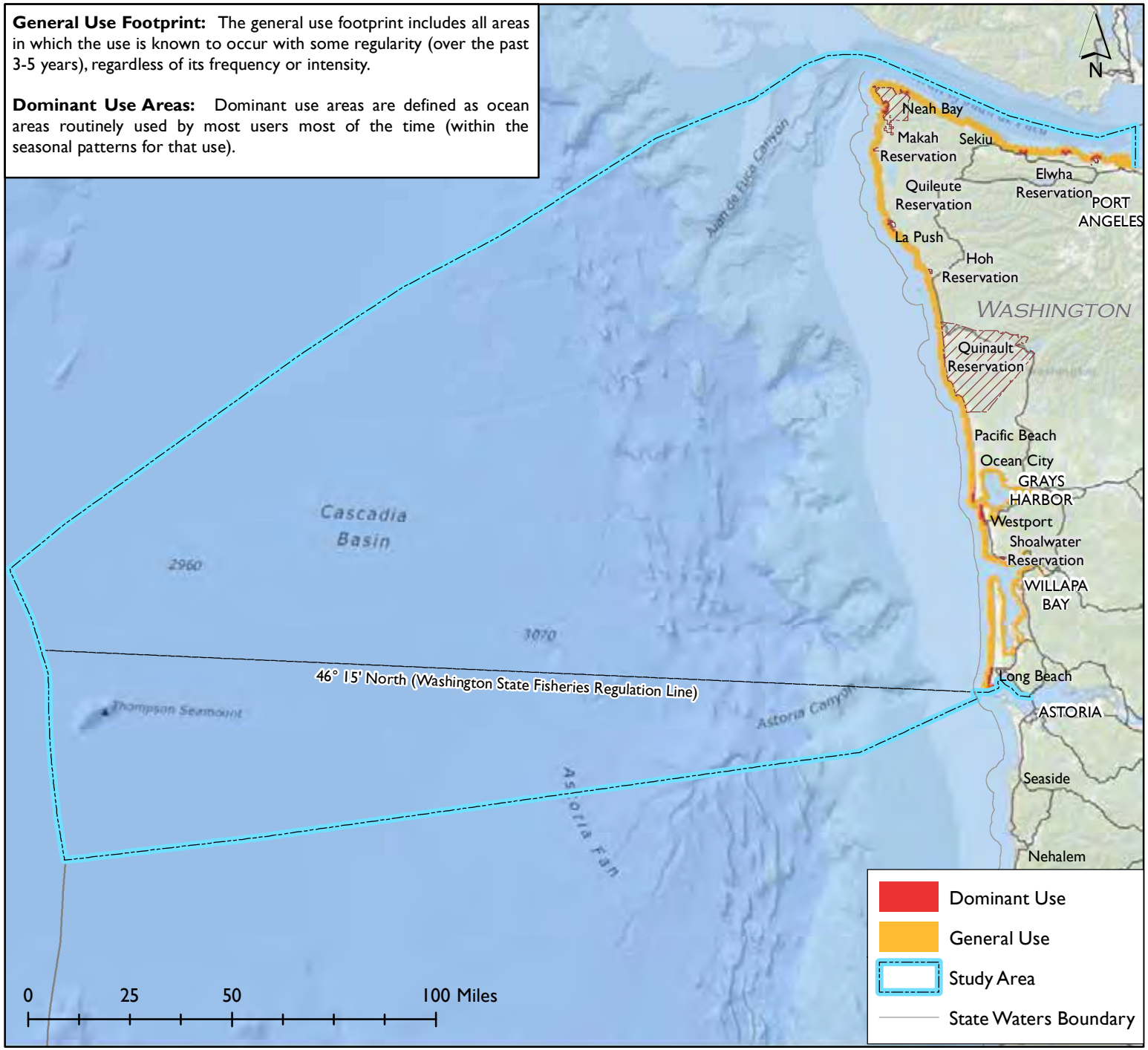

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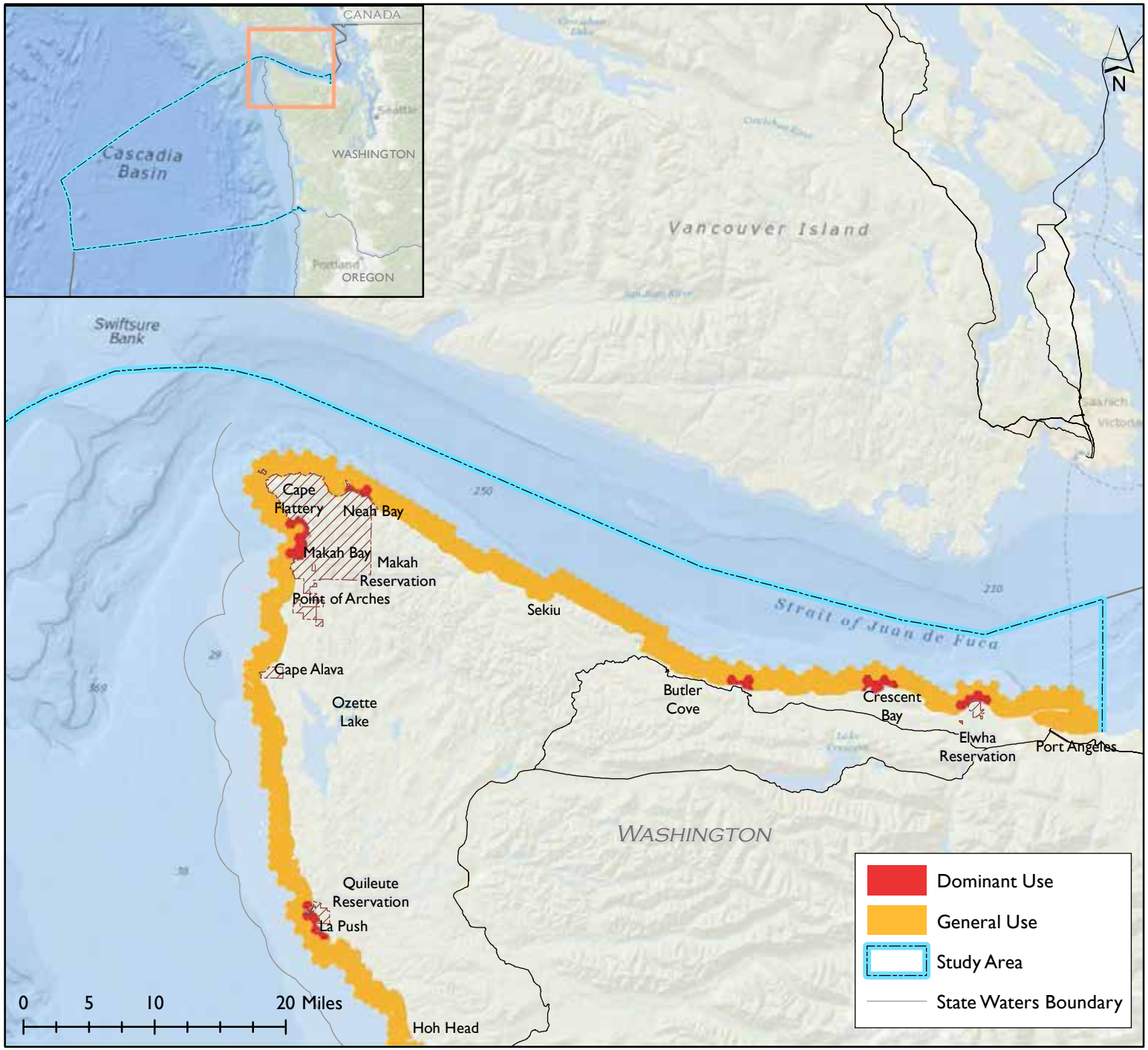

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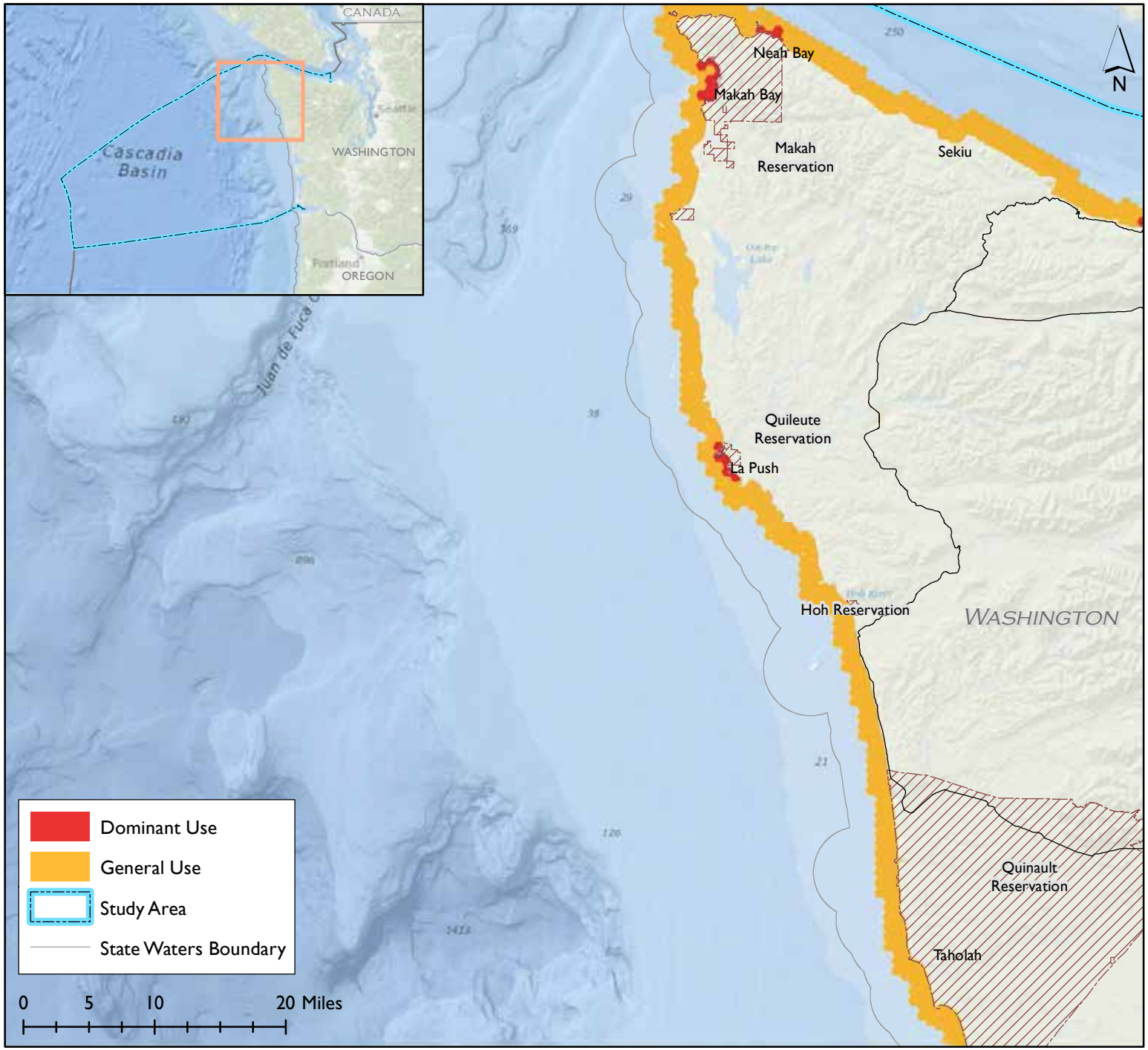

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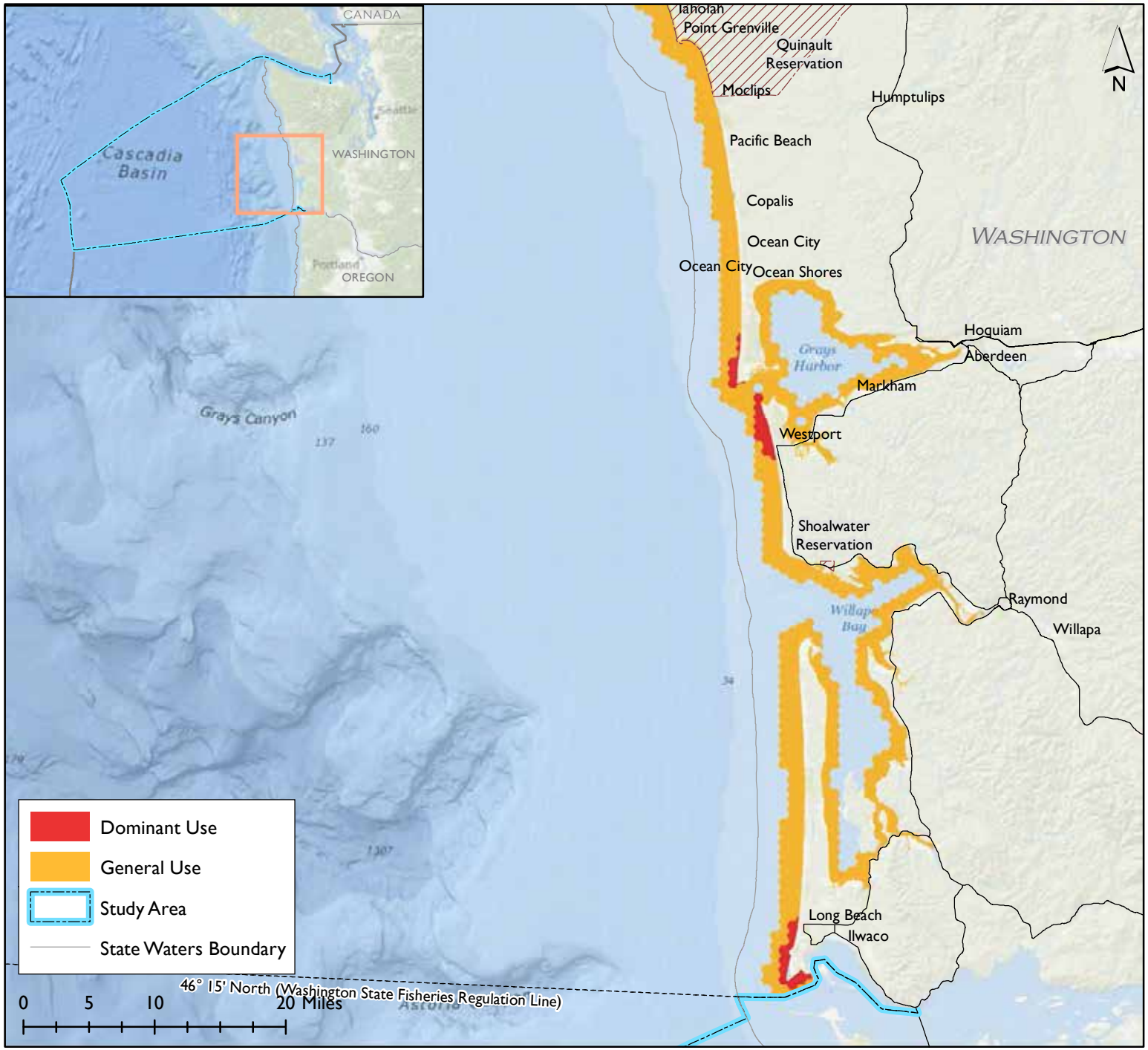

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THE WASHINGTON OCEAN USES ATLAS

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Swimming

Includes:
Short- and long-distance surface swimming and wading any distance from shore, body surfing

Excludes:
SCUBA/Snorkeling, Surface Board Sports

Use Notes:
Swimming occurs year-round throughout the study area, but is more common in summer. This use occurs predominantly along the sandy beaches, is generally confined to the nearshore (within approximately 100 yards of the tide line) and is highly dependent upon coastal access. The activity may be better defined as wading or playing in the surf zone, as it can be dangerous further from shore.

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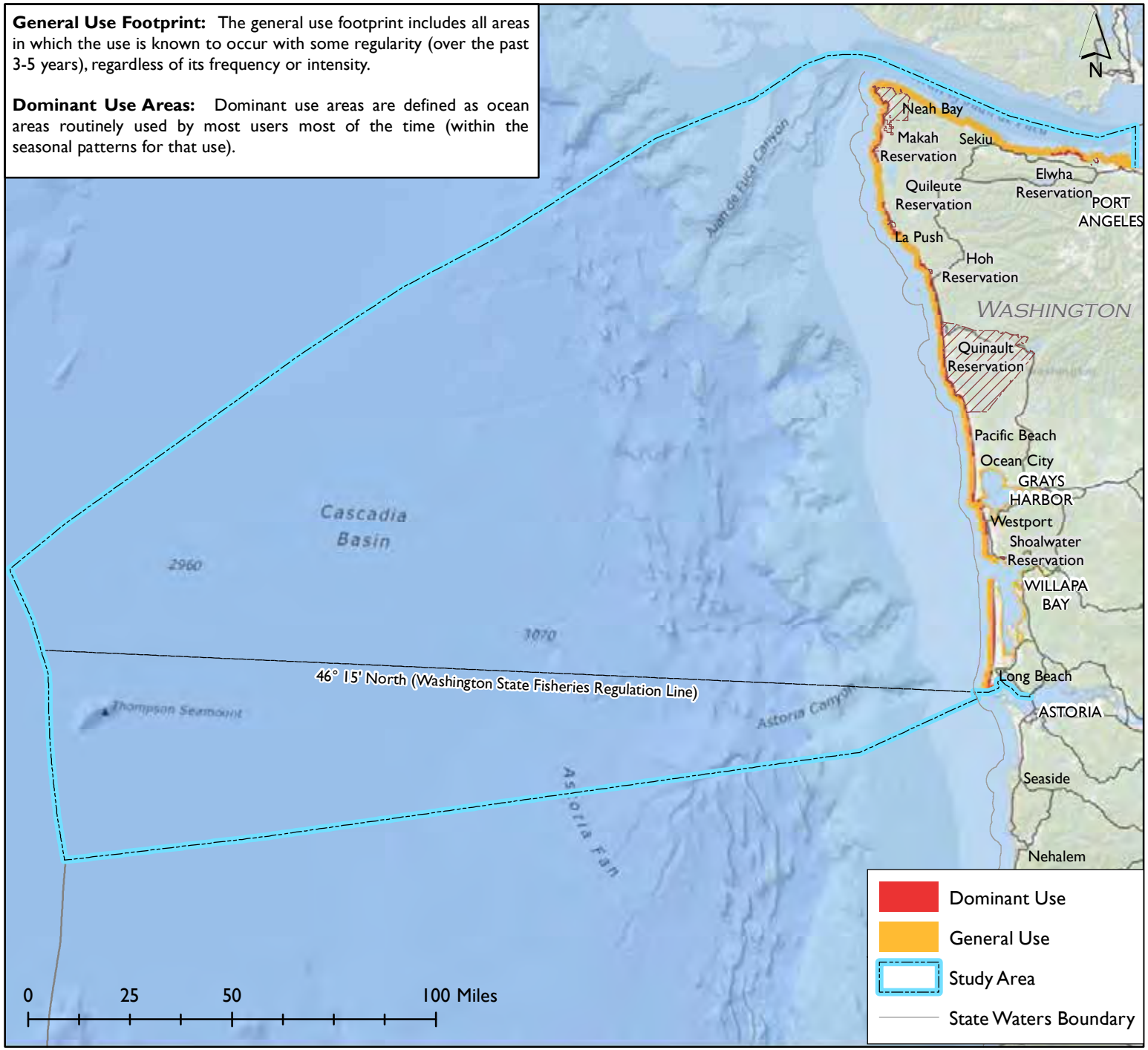

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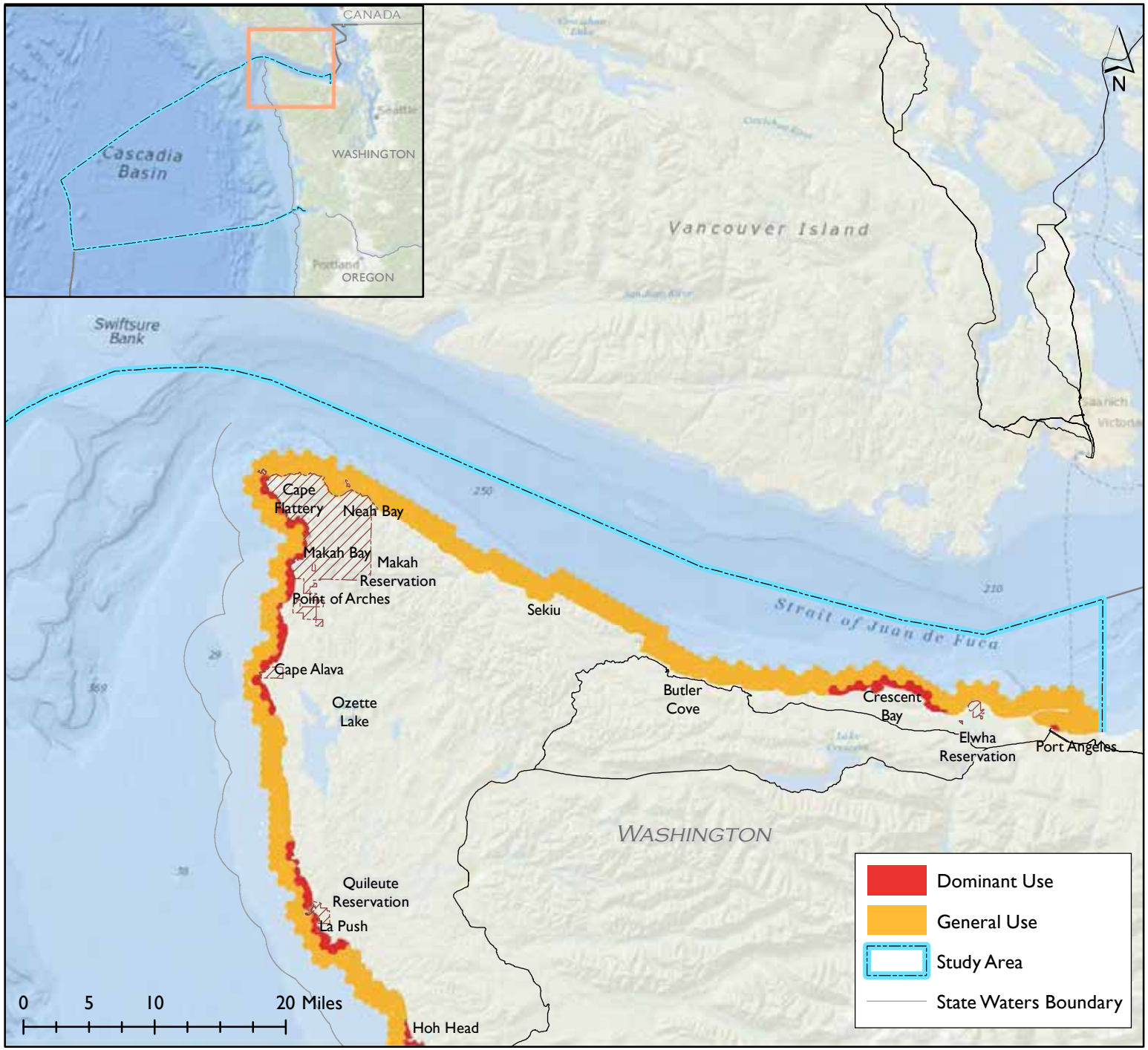

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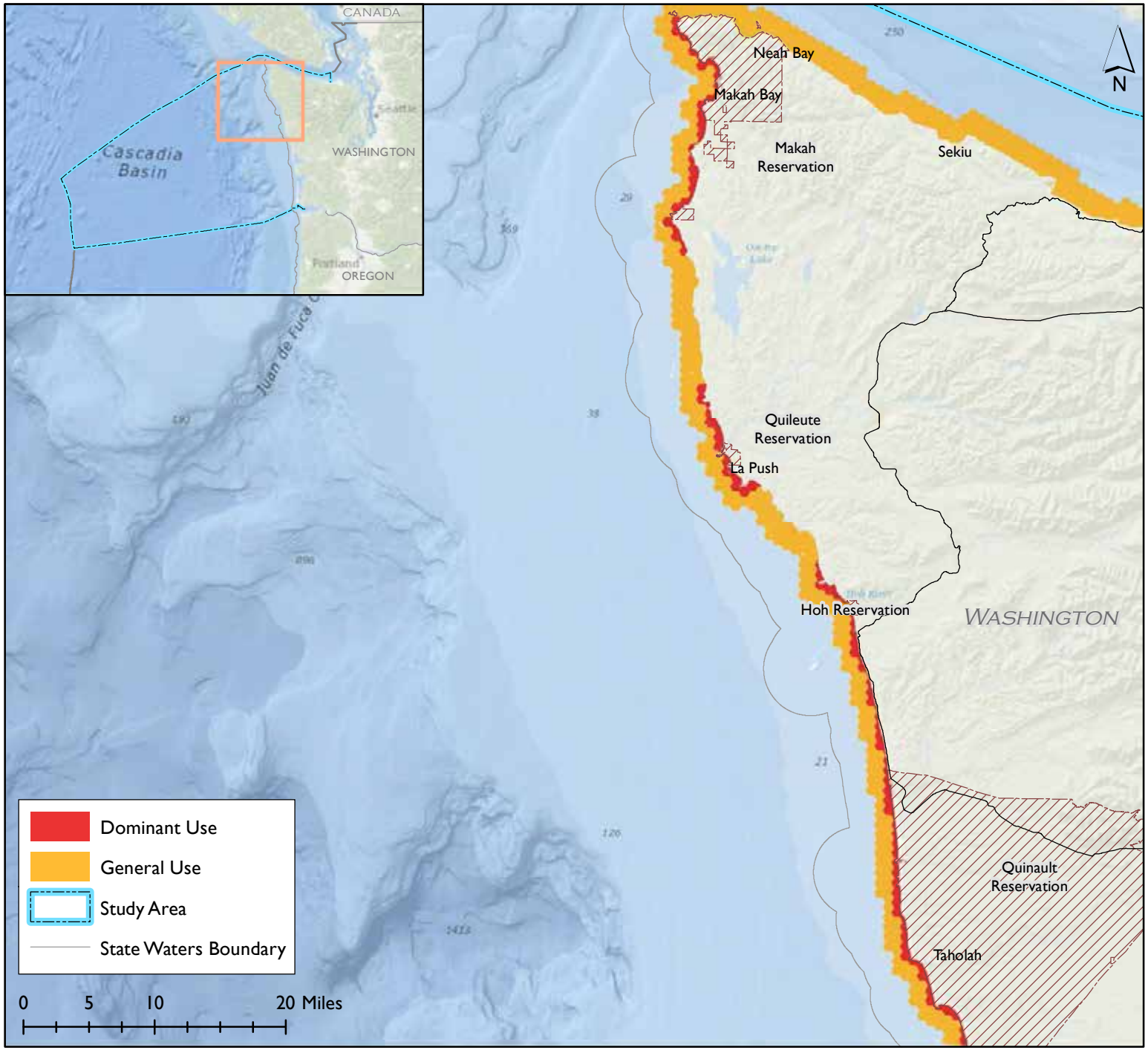


THE WASHINGTON OCEAN USES ATLAS

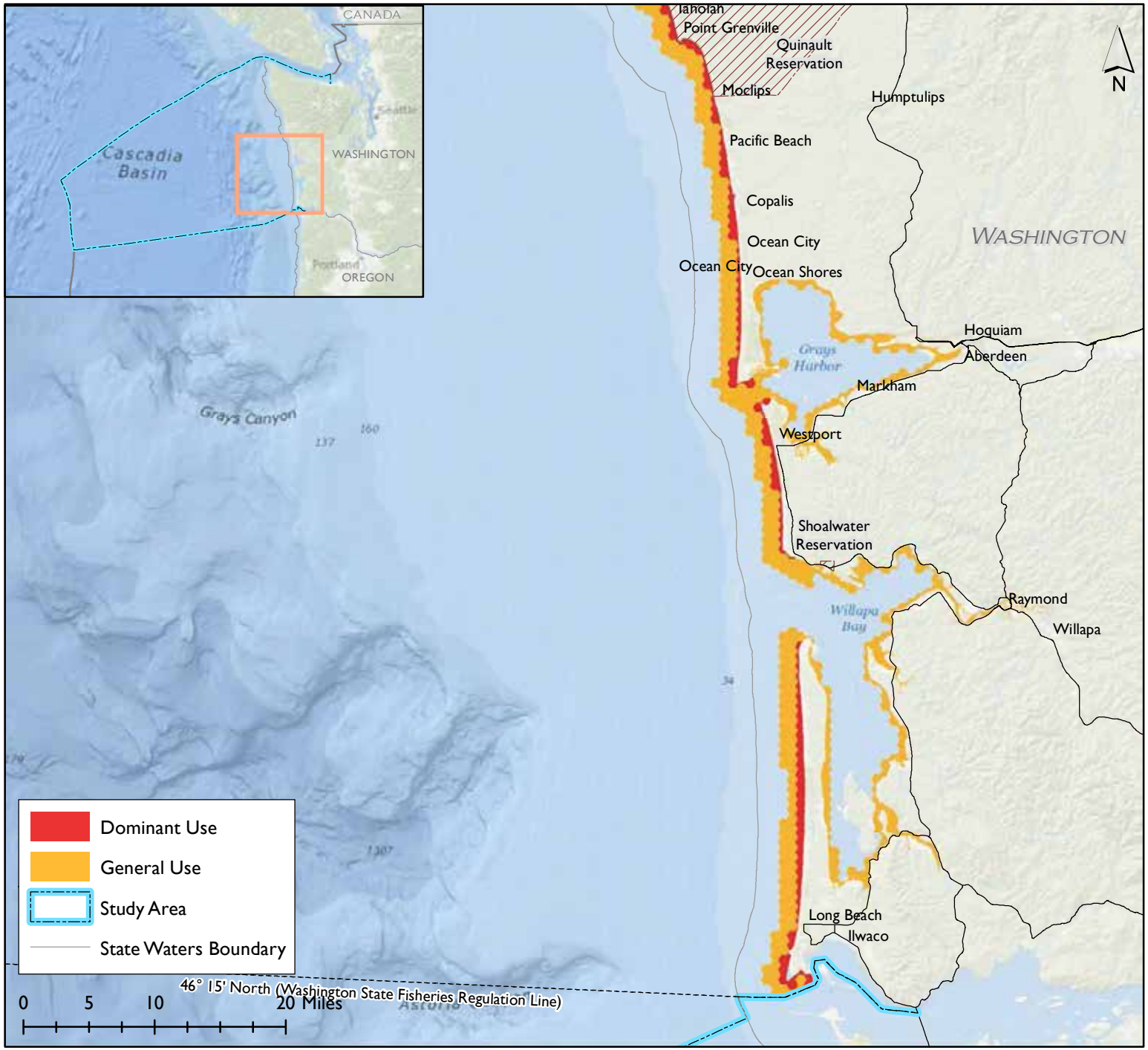
Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Swimming

Includes:
Short- and long-distance surface swimming and wading any distance from shore, body surfing

Excludes:
SCUBA/Snorkeling, Surface Board Sports

Use Notes:
Swimming occurs year-round throughout the study area, but is more common in summer. This use occurs predominantly along the sandy beaches, is generally confined to the nearshore (within approximately 100 yards of the tide line) and is highly dependent upon coastal access. The activity may be better defined as wading or playing in the surf zone, as it can be dangerous further from shore.



 Date: 5/11/2015

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Tide Pooling

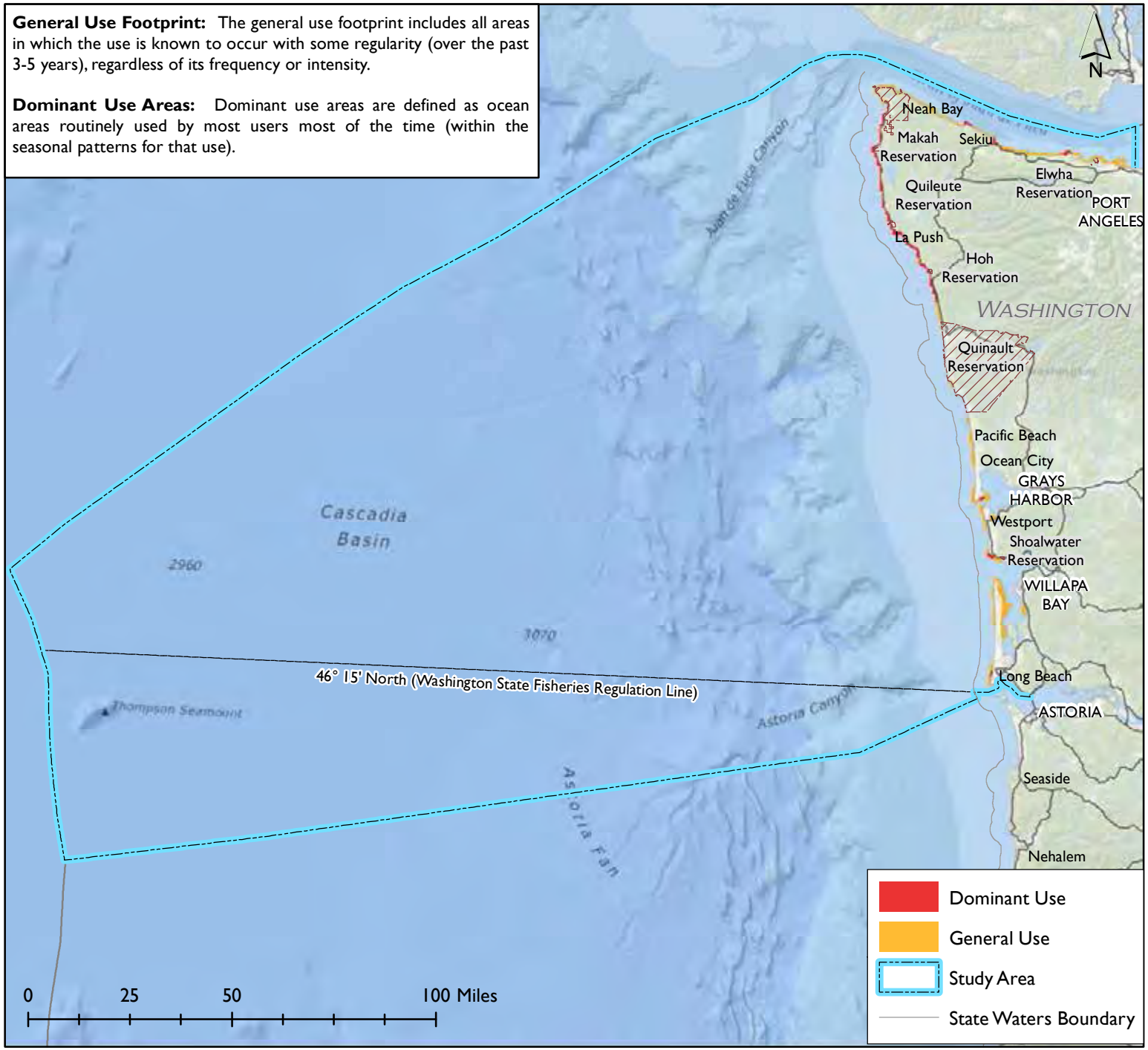
Includes:
Use of the intertidal zone between high and low tides for recreational, scientific or educational purposes

Excludes:
Harvesting from Shore, Shore Use

Use Notes:
Tide pooling is a year-round activity with increased use in the spring through the fall. Most dominant use occurs during minus tides. There is extensive public use of the tide pools in the Olympic National Park.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



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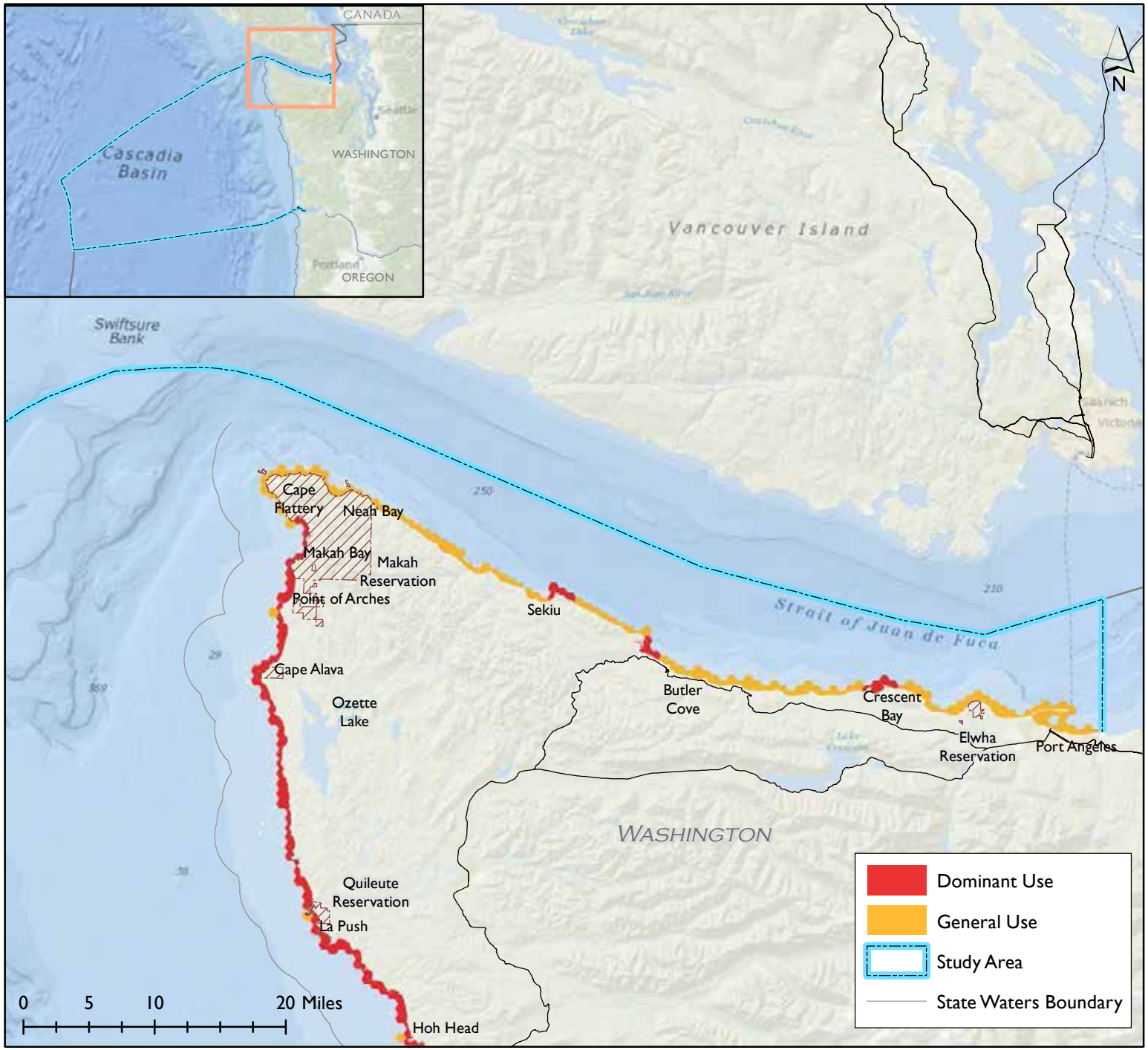

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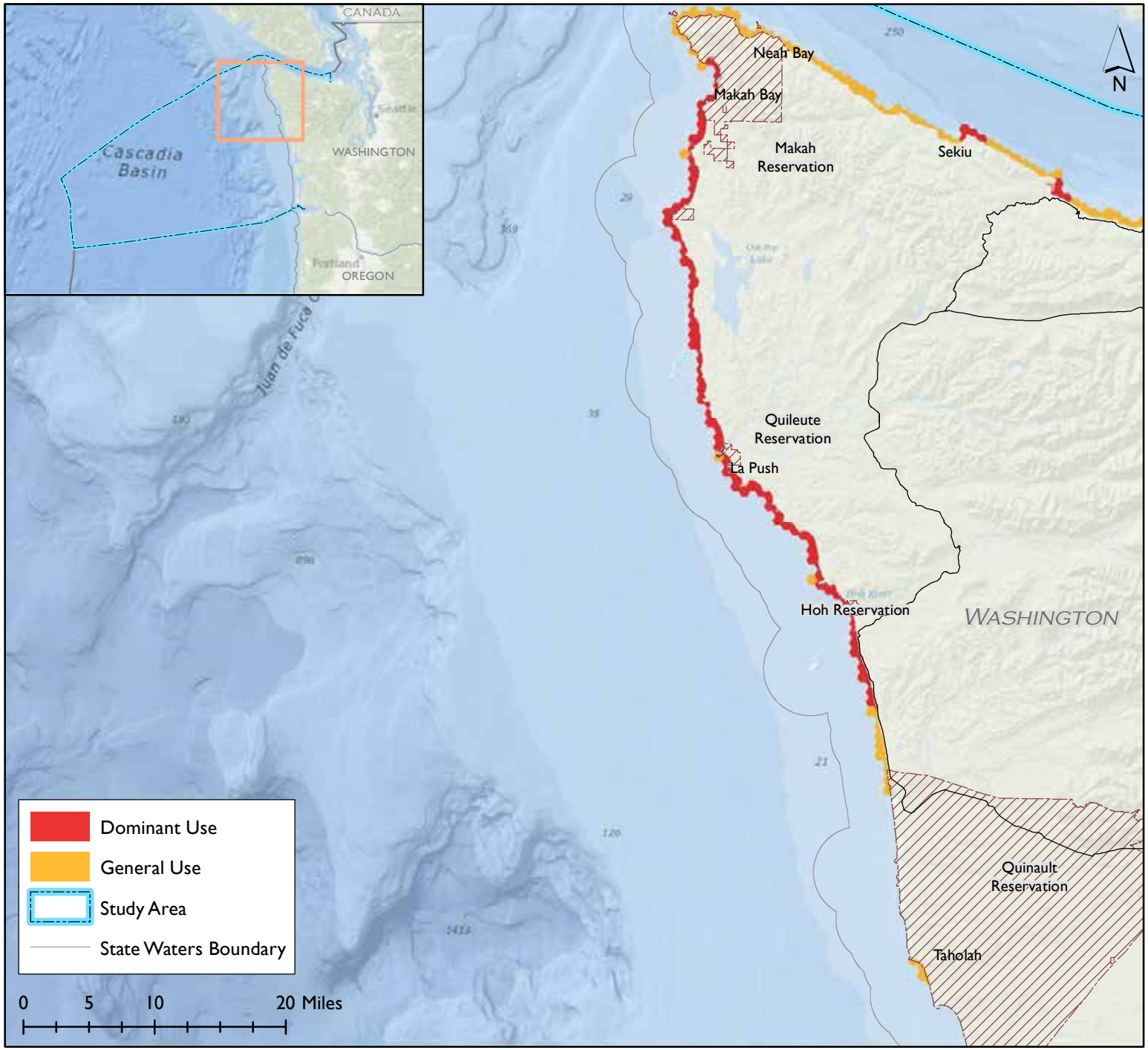

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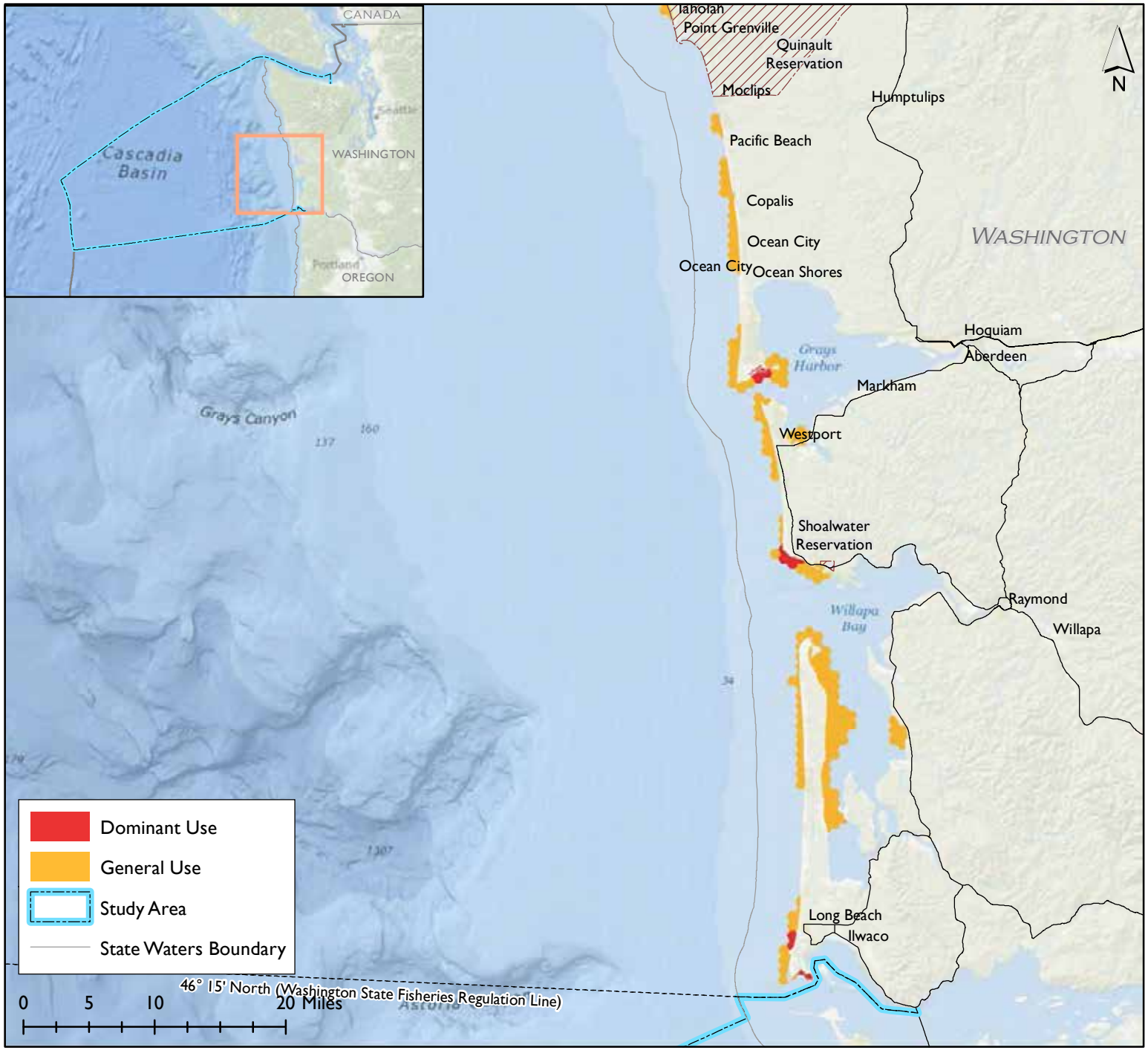

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THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Wildlife Viewing at Sea

Includes:
Boat-based wildlife viewing at sea, usually on a commercial vessel

Excludes:
Incidental wildlife viewing from shore or while at sea pursuing other uses

Use Notes:
Wildlife viewing at sea has shown some increase in recent years with increase in eco-tourism. Use tends to be seasonal, following seabird and whale migration patterns. Use is most dominant out of Westport and Neah Bay, but there are also wildlife boat tours out of Port Angeles, Ilwaco and LaPush.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.

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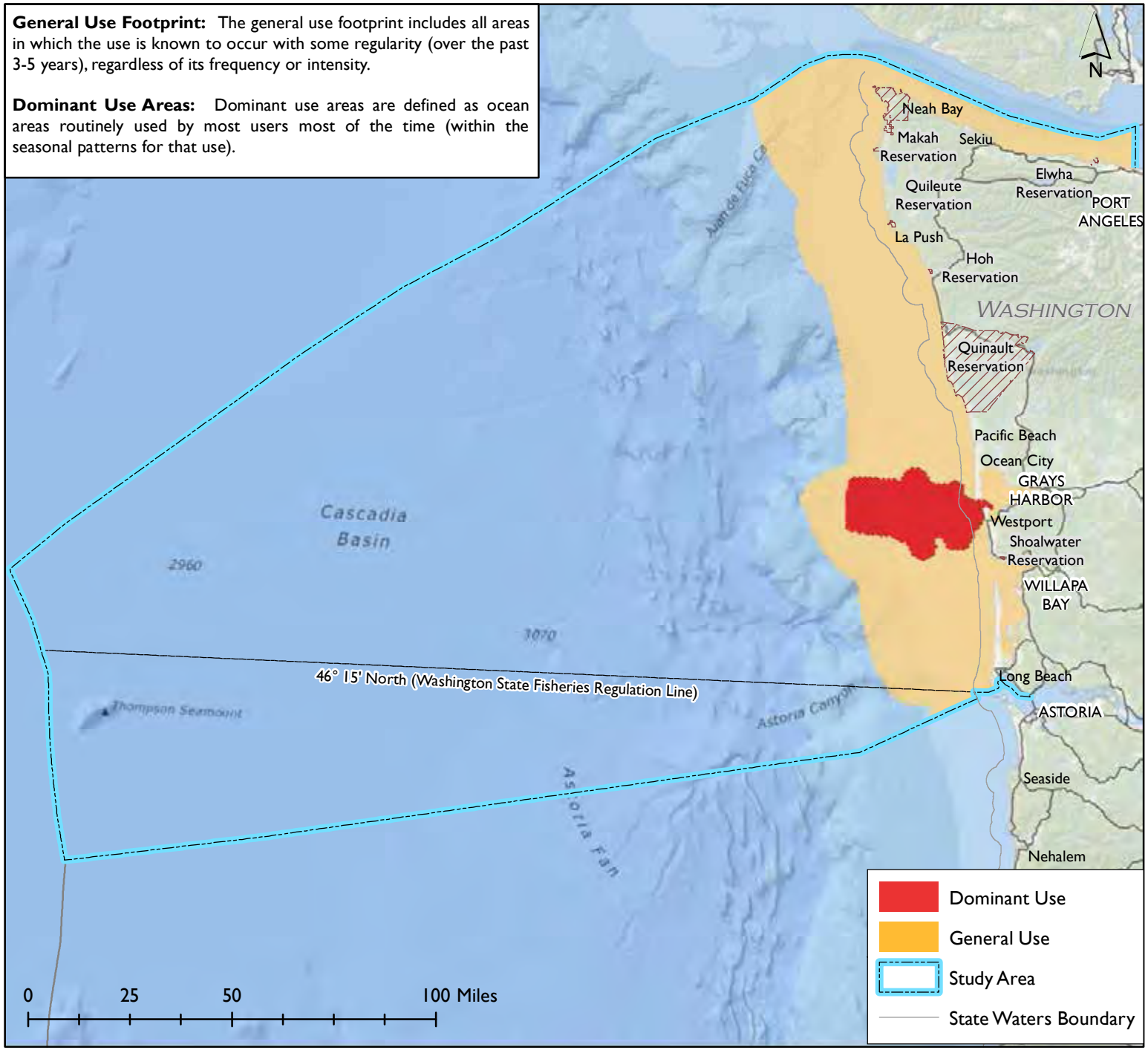

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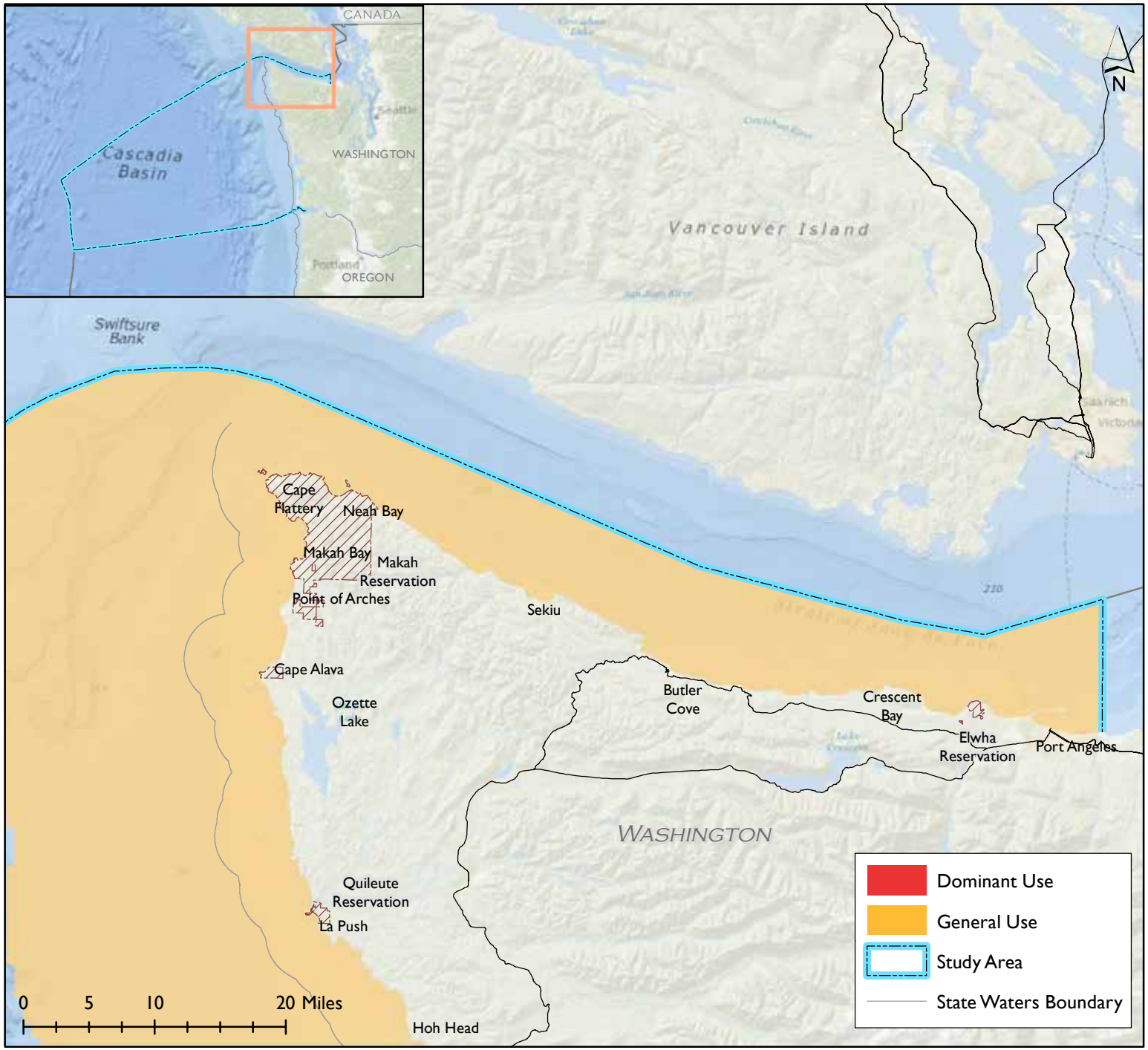

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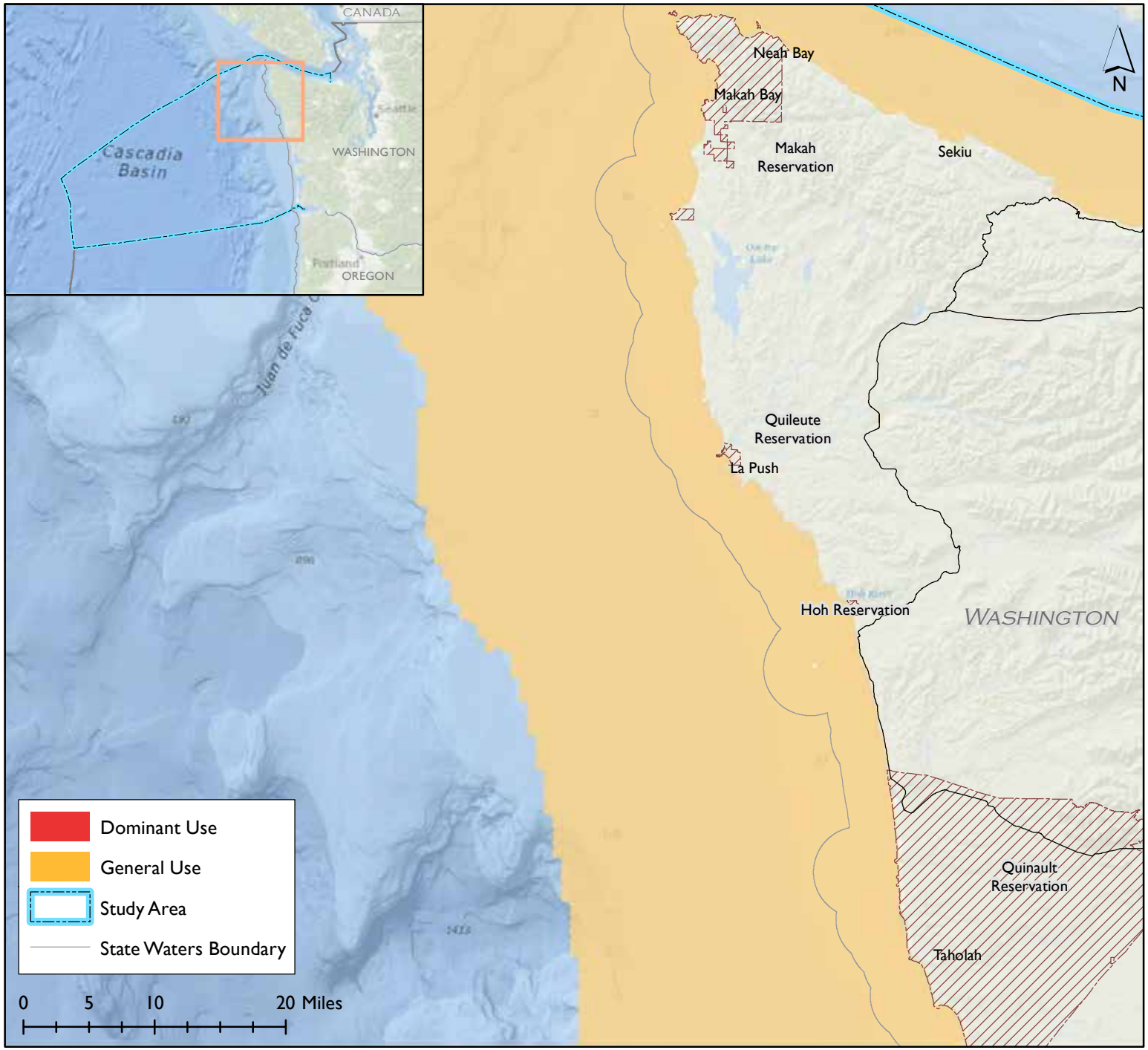


 Date: 5/11/2015

OREGON OCEAN USES ATLAS PROJECT
OCEAN USES MAP BOOK

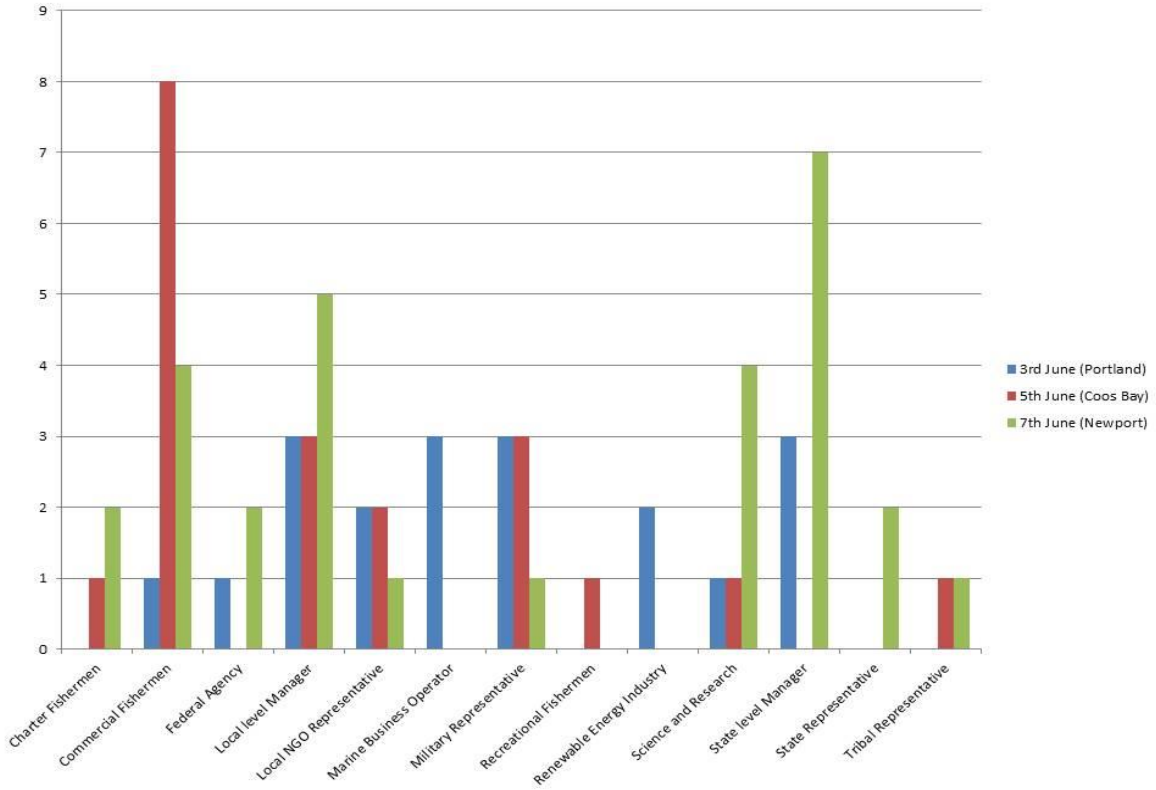
Introduction

This map book contains cartographic products derived from the Oregon Ocean Uses Atlas participatory mapping workshops conducted in Portland, Coos Bay and Newport, Oregon in June of 2013. These participatory mapping workshops were designed to collect spatial data from regional ocean uses experts and stakeholders for a wide range of activities that occur throughout the marine waters offshore of Oregon. Through facilitated discussion and hands-on digital mapping, workshop participants documented areas where uses occur, variation in use patterns and historical and/or community perspectives on how the use has evolved over recent years.

The Oregon Ocean Uses Atlas project is a collaborative effort between NOAA and the Bureau of Ocean Energy Management designed to collect spatial data on ocean uses on Oregon's Outer Continental Shelf to inform planning for potential offshore renewable energy development. The project was funded by the U.S. Department of the Interior, Bureau of Ocean Energy Management, through an Interagency Agreement with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

Workshop Attendance

The three days of participatory mapping workshops were facilitated by 7 staff from both NOAA Coastal Services Center and NOAA's Marine Protected Areas Center. Sixty eight participants attended from throughout the state, representing all use sectors. The participants spanned a wide range of expertise, as shown on the plot below.



March 2015

Targeted Uses

Participants were invited to map a total of 21 uses shown in the following list. After discussion, 5 uses were consistently deemed to occur outside of the study boundary by all participants and were not mapped. These uses were 1) Mariculture, 2) Mining and Mineral Extraction, 3) Underwater Pipelines, 4) Commercial Seaweed Harvest, and 5) Subsistence Fishing and Harvest. Maps for each of the collected uses are provided at various scales in this map book and include definitions for each use category.

Industry/Military Sector	Extractive Sector	Non-Extractive Sector
• Commercial Shipping • Ocean Dumping • Mariculture • Military Operations • Mining and Mineral Extraction • Renewable Energy • Underwater Pipelines • Underwater Transmission Cables	• Commercial Fishing with Benthic Fixed Gear • Commercial Fishing with Benthic Mobile Gear • Commercial Pelagic Fishing • Commercial Seaweed Harvest • Recreational Fishing from Boats for Benthic Species • Recreational Fishing from Boats for Pelagic Species • Subsistence Fishing and Harvest	• Cruise Ships • Cultural Use Areas • Motorized Boating • Permanent Research Areas • Sailing • Wildlife Viewing at Sea

Generalized Workshop Process

At the start of the workshop, participants were assigned to a work group and an associated mapping station. With guidance from facilitators, participants were asked to draw use areas based on their knowledge and observation of where this type of activity is known to occur. For some uses, existing data were presented and participants were asked to review and, if necessary, modify the existing data for completeness and accuracy. Each use was explicitly defined (see use descriptions on maps) and participants were asked to map the general use footprint and dominant use areas, as described below. Participants were also asked to record relevant supplemental information (e.g., seasonality, social and cultural significance, historical patterns) that was compiled and added to the final use maps. The basemaps included several select Fine Grained Mapping Areas that appear to be most prospective for renewable energy development based on expressed interest and technical criteria for development (e.g., energy resource availability, distance from a port). Participants were asked to provide fine-grained information on ocean uses in these Fine Grained Mapping Areas, if possible, to improve the quality and availability of data in these areas and inform potential development decisions. The following provides detail for type of information collected for each use category:

- **General Use Footprint:** The general use footprint includes all areas in which the use is *known to occur with some regularity* (over the past 3-5 years), regardless of its frequency or intensity. The general use footprint does not include areas where the use may occur once or twice or where it might *conceivably* occur now or in the future.

- **Dominant Use Areas:** Dominant use areas are defined as *ocean areas routinely used by most users most of the time* (within the seasonal patterns for that use). Dominant use areas must be drawn within the general use footprint. Participants were asked to work together to draw dominant use areas as they occur throughout the study region.

- **Supplemental Use Data:** Participants were asked to provide supplemental information on the *ocean use information form*. For some uses, participants noted specific locations on the map where variation of the use occurs (e.g. fishing for special events, night vs. day fishing). This information was compiled and added to the use maps in the notes section.

Tribal uses of the ocean were not mapped explicitly, though tribal chairs and/or their designated representatives were formally invited by BOEM to participate in the mapping workshops. The sharing of tribal use information was dependent upon each tribe's determination of whether the mapping workshops were an appropriate forum for sharing such information. Any tribal use information shared during the workshops was incorporated into the defined use categories. Thus, the atlas data and map products do not explicitly depict tribal use.

Maps

Data compiled during the workshop were processed to create maps documenting the use patterns as drawn by the workshop participants. The following maps show patterns for each use mapped in the workshops and include the general use footprint and dominant use areas, as well as a compilation of the supplemental data provided by participants throughout the mapping process. In creating the use maps, note the following protocol used to create the general use footprint and dominant use areas.

The ***general use footprint*** includes **ALL** areas that were mapped as general use by **ANY** of the groups that mapped that particular use over the three days of workshops.

The ***dominant use areas*** shown on the maps include **ONLY** those areas that were mapped as dominant by a **MAJORITY** of the groups that mapped that particular use over the three days of workshops.

The maps have been reviewed by workshop participants and other ocean uses experts prior to publication. Revisions and modifications were made to some of the draft maps based on the collective participant feedback. For access to the spatial data (including detailed metadata on processing, review and revisions) please visit NOAA's Digital Coast (coast.noaa.gov/dataregistry/).

Contacts

If you have questions about this project, please contact:

Mimi D'Iorio
Project Lead
Mimi.Diorio@noaa.gov

Sara Guiltinan
Project Officer
Sara.Guiltinan@boem.gov

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

Wildlife Viewing at Sea

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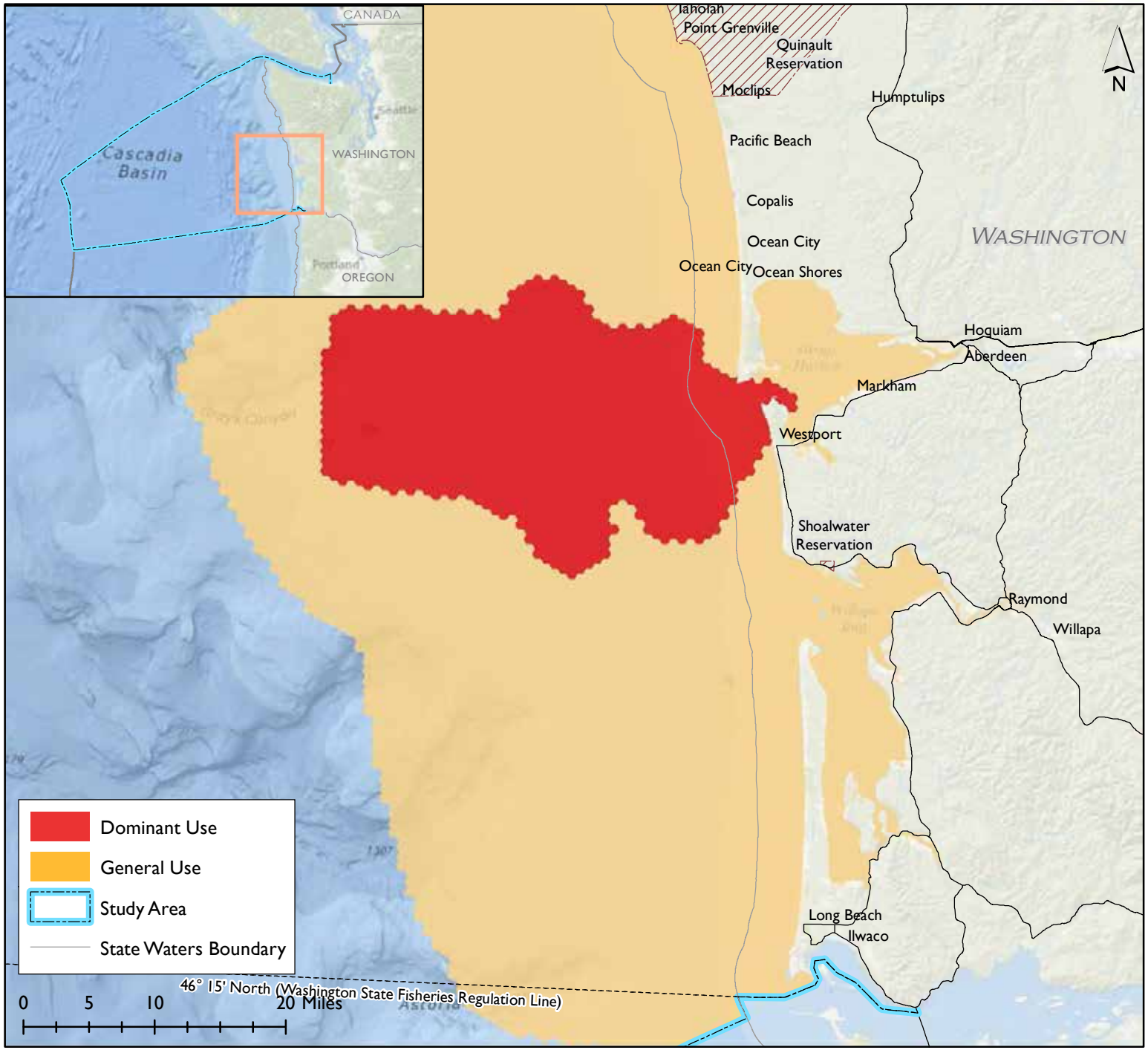
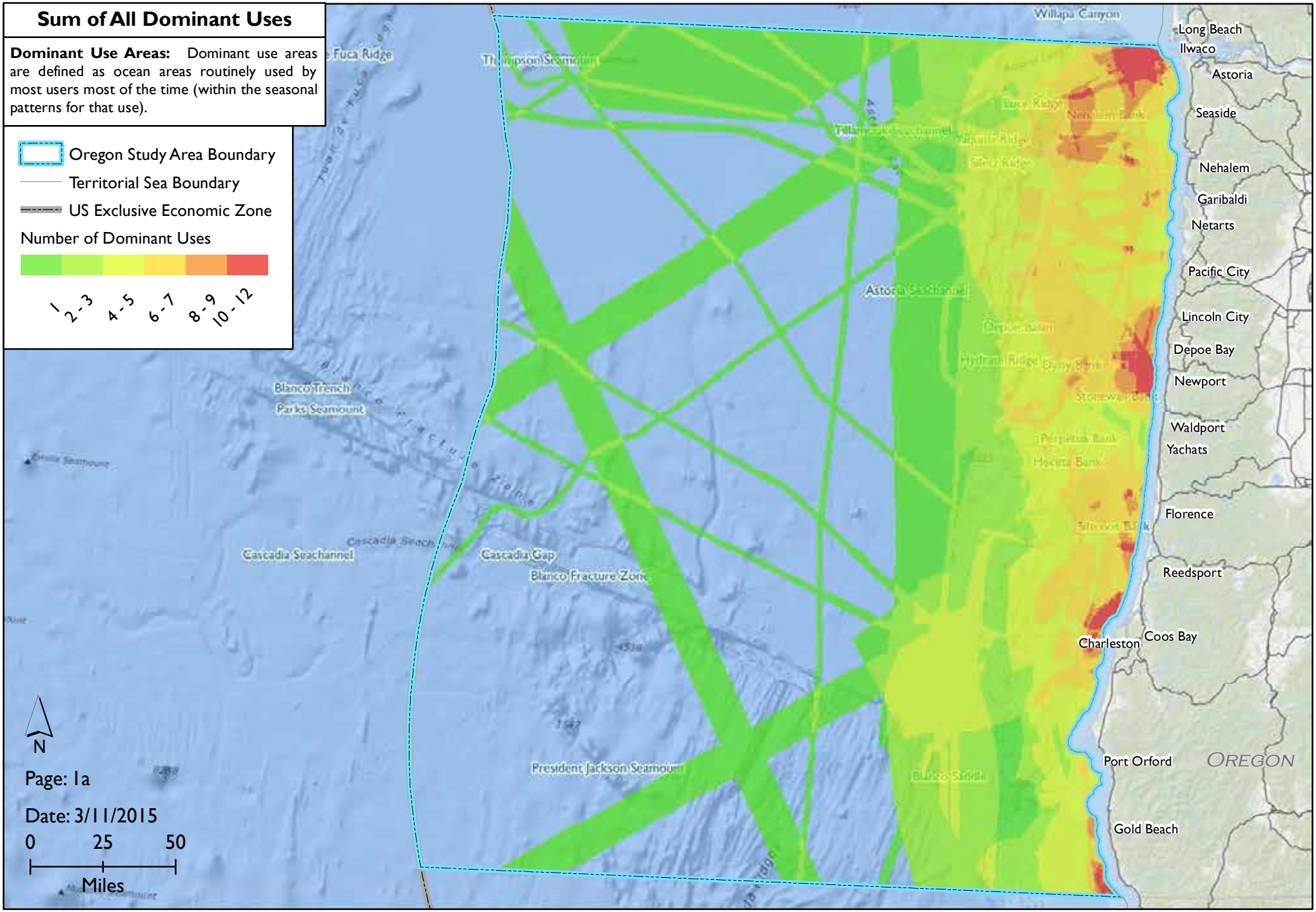


 Date: 5/11/2015

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas



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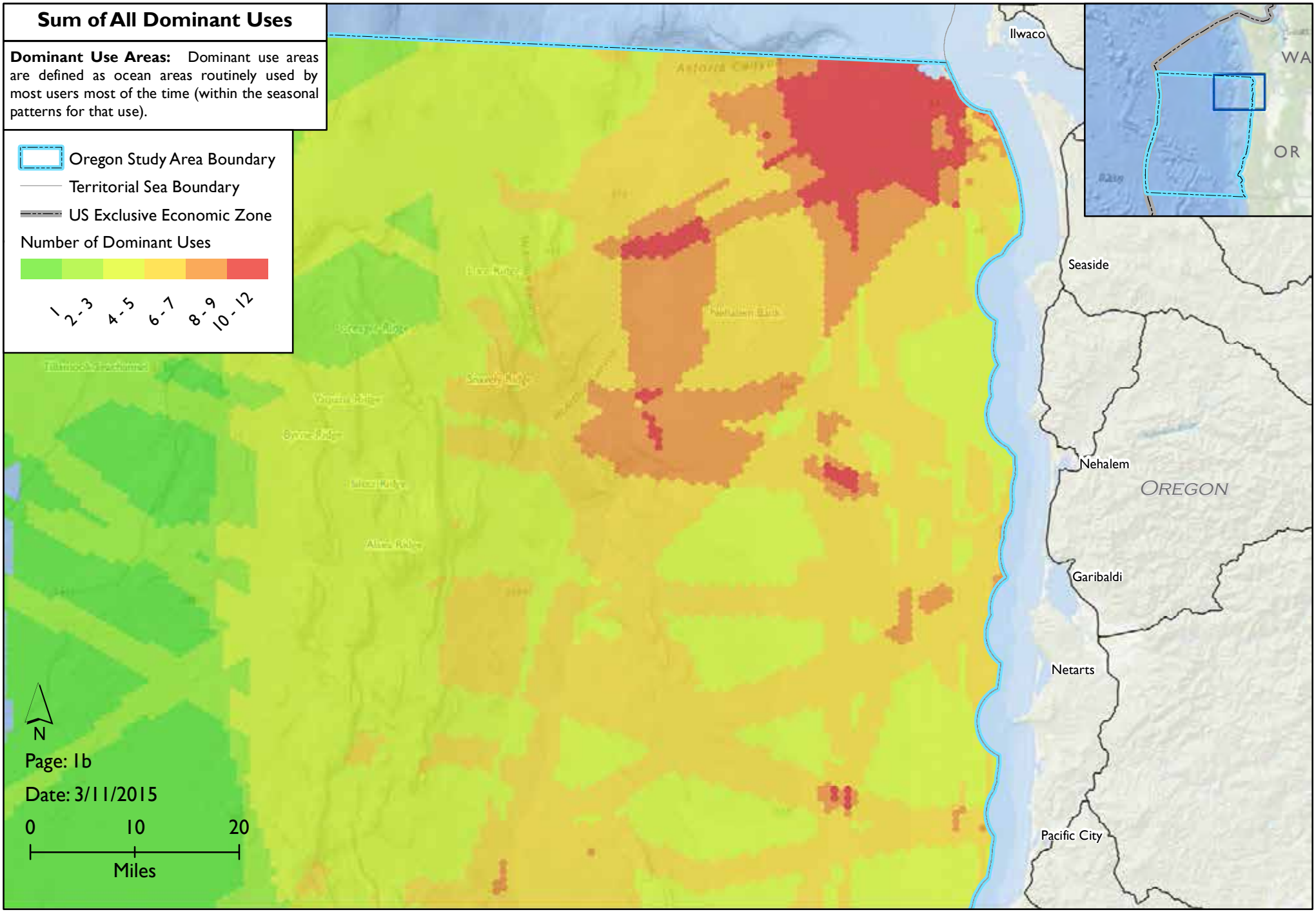

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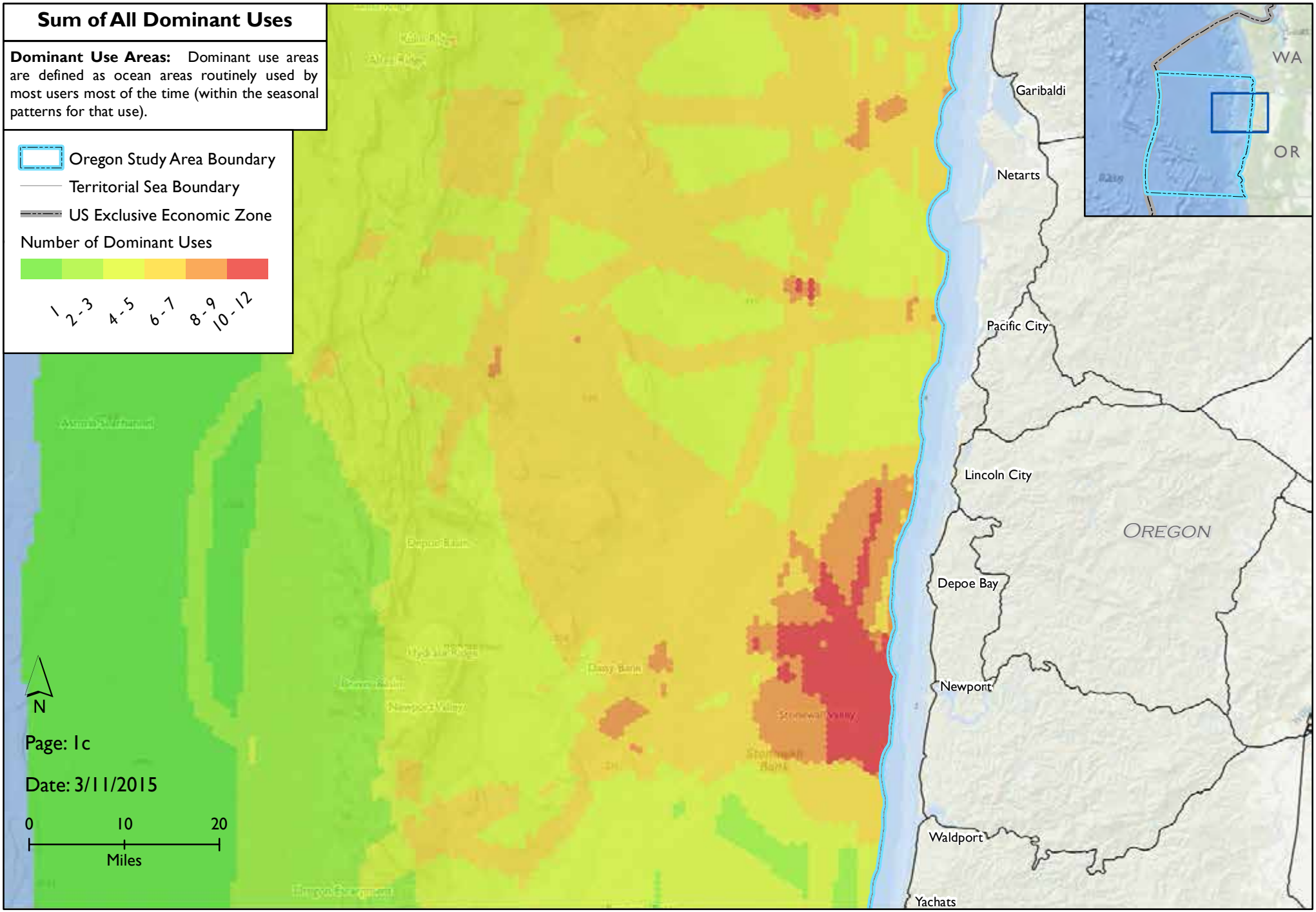

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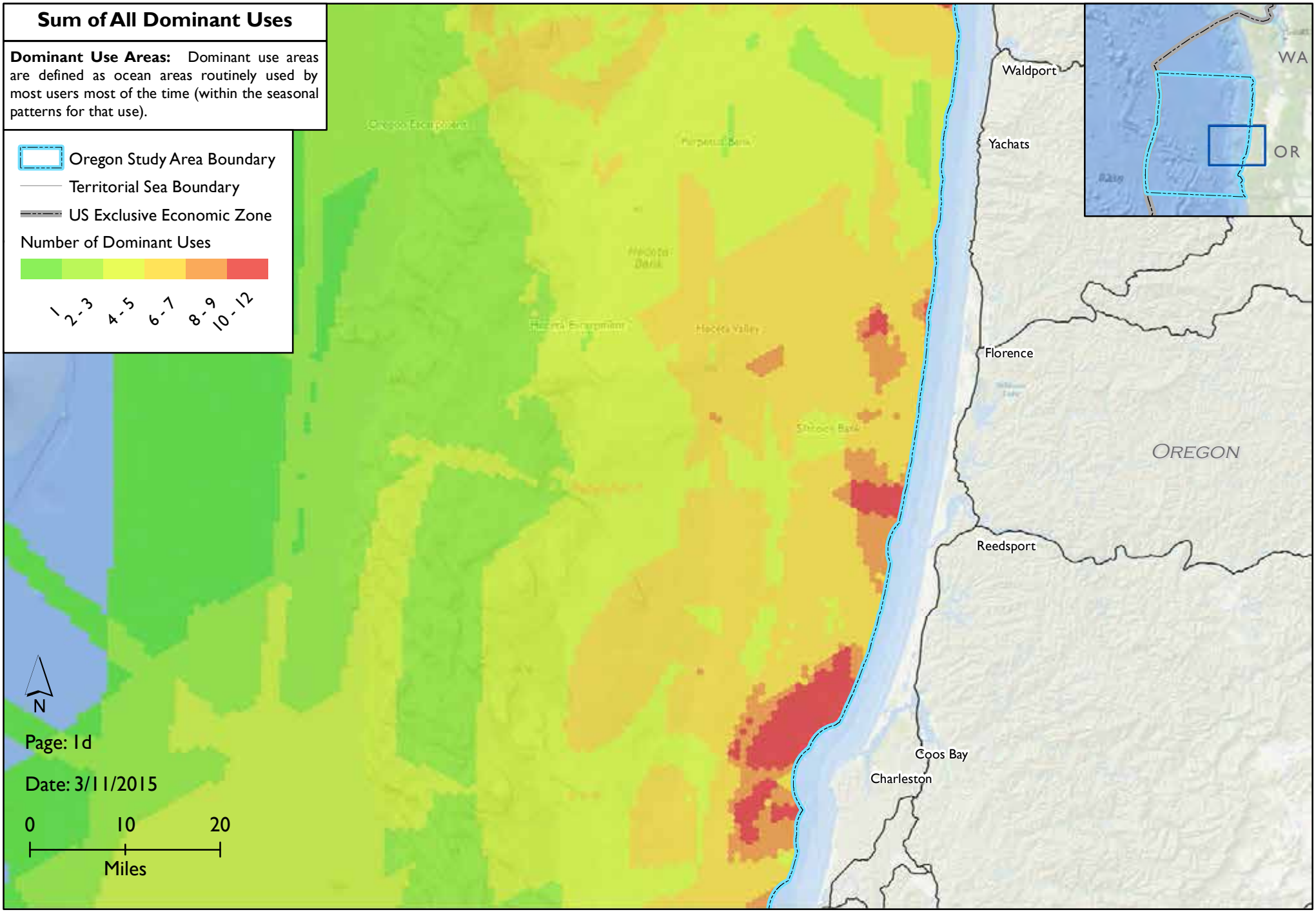

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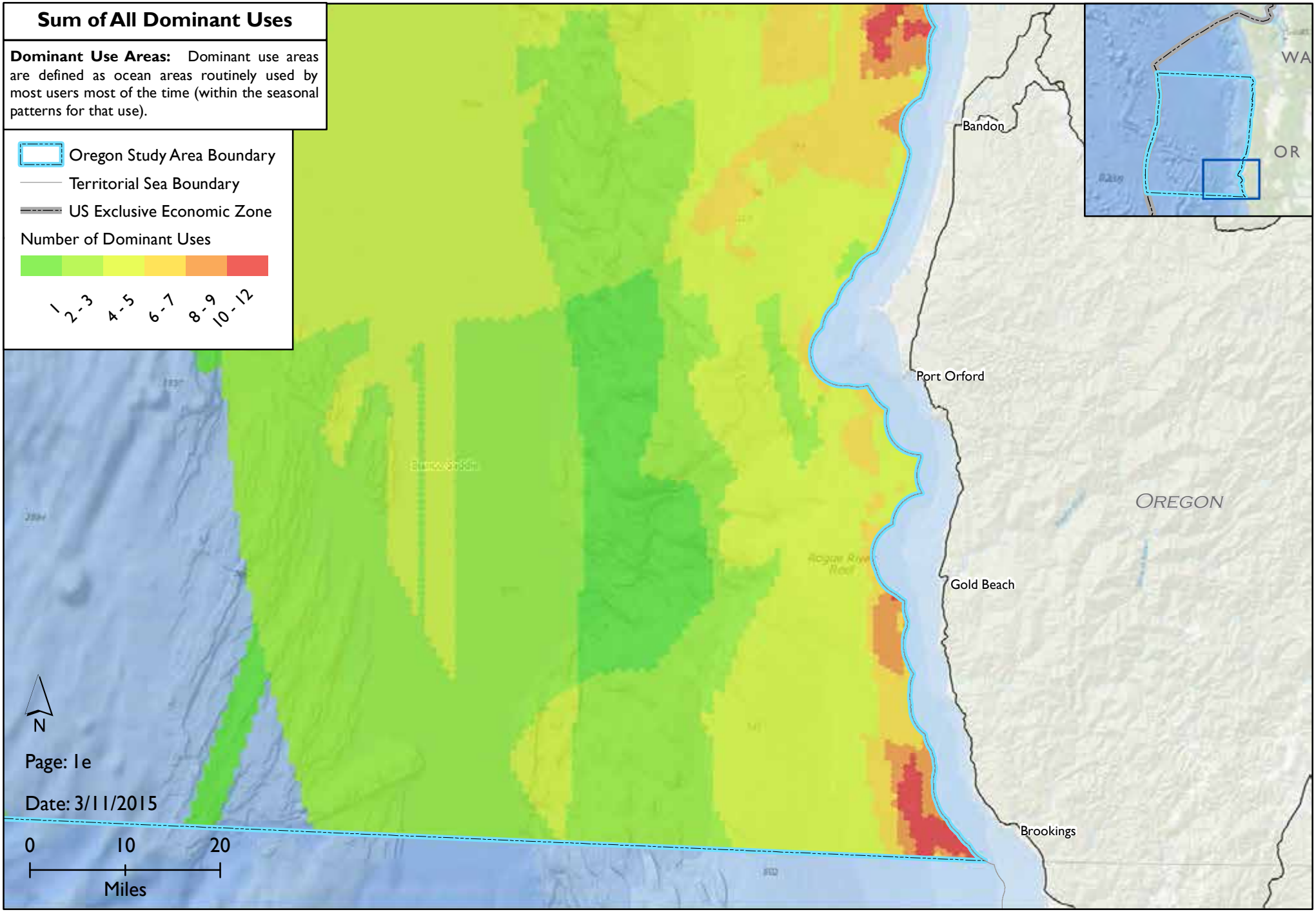

THE OREGON OCEAN USES ATLAS

Commercial Fishing with Benthic Fixed Gear

Includes:
Gear Types: Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types
Fisheries: Benthic fishes and invertebrates (Crab, Halibut, Sablefish, and Hagfish)
Excludes:
All other forms of Fishing

Use Notes:
Commercial fishing with benthic fixed gear occurs seasonally. Crabbing occurs December – August. Other species such as Halibut are harvested from spring – fall. Sablefish and Hagfish (or Slime Eel) are harvested year-round. This includes use by fishermen from California and Washington venturing into Oregon waters. Most fishermen fish within a day's travel of their home port to limit fuel costs. Vessels are variable in size; smaller boats tend to stay close to their home ports and larger boats will range coast-wide. Crab boats catch Dungeness Crab (highest value fishery in Oregon) using pots around 1 – 150 fathoms. Most commercial Dungeness Crabbing occurs in the first 8-10 weeks of the season, but the remainder of the season is still very important for local crabbing boats. Occasionally, Box Crab are harvested in Oregon, but markets are extremely limited. Traps and pots are also used for a limited Spot Prawn fishery with just 5 permits issued in Oregon. Benthic long lines with hooks are used in the capture of Halibut and Sablefish. Sablefish are also harvested using long lines with pots and Hagfish are caught exclusively using long lines with fixed barrels.

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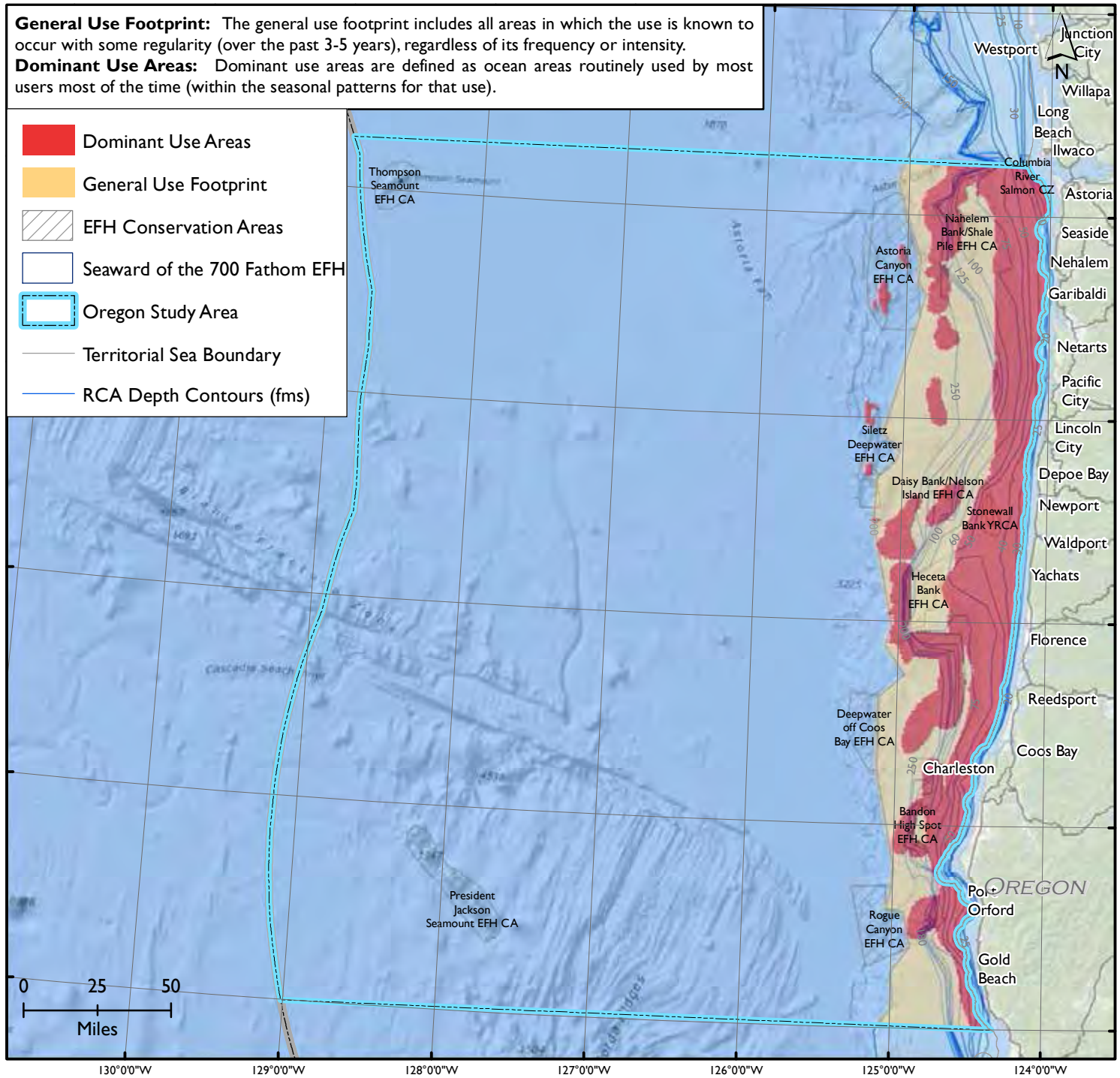

 Date: 3/11/2015

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Fixed Gear

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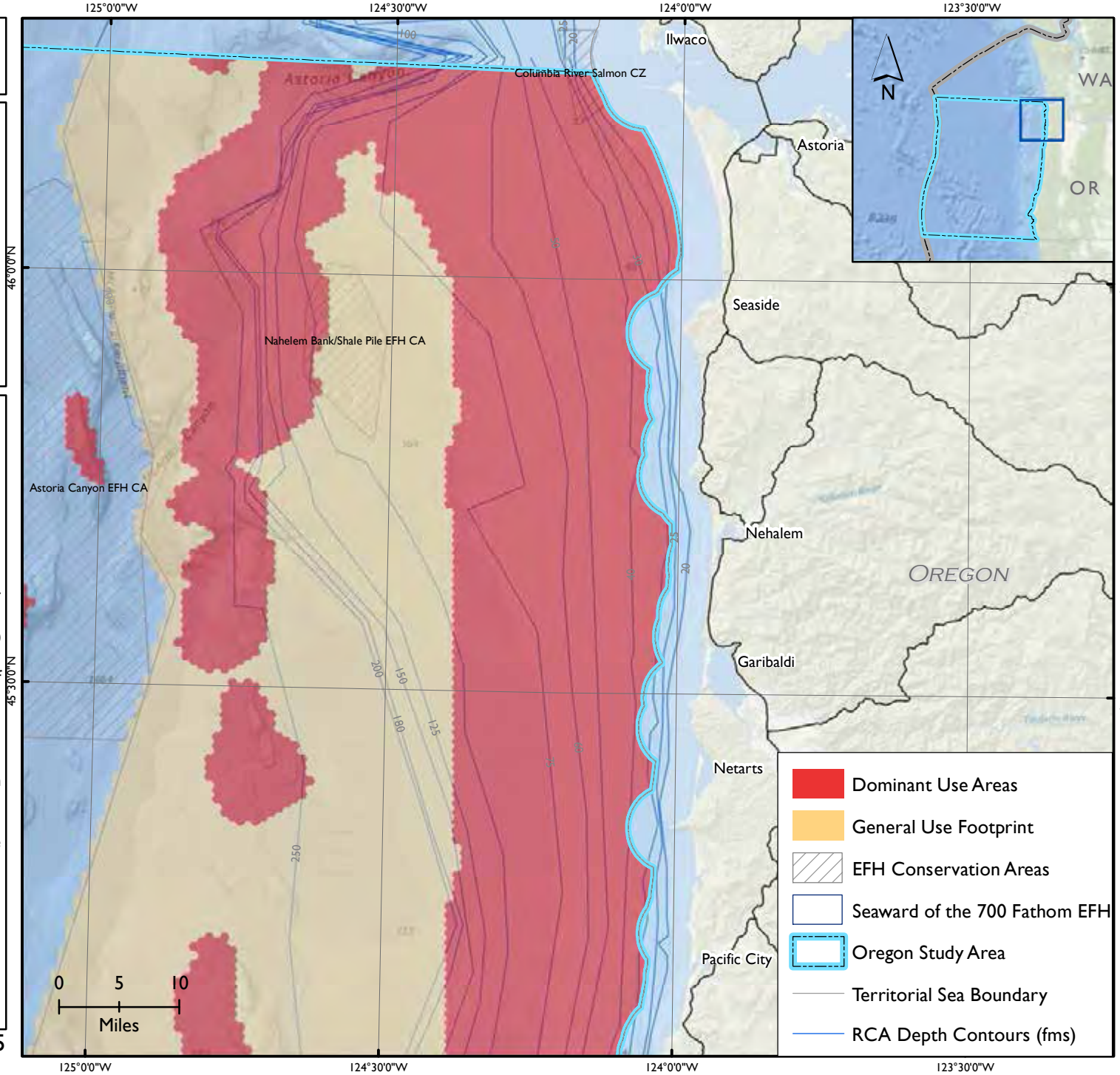

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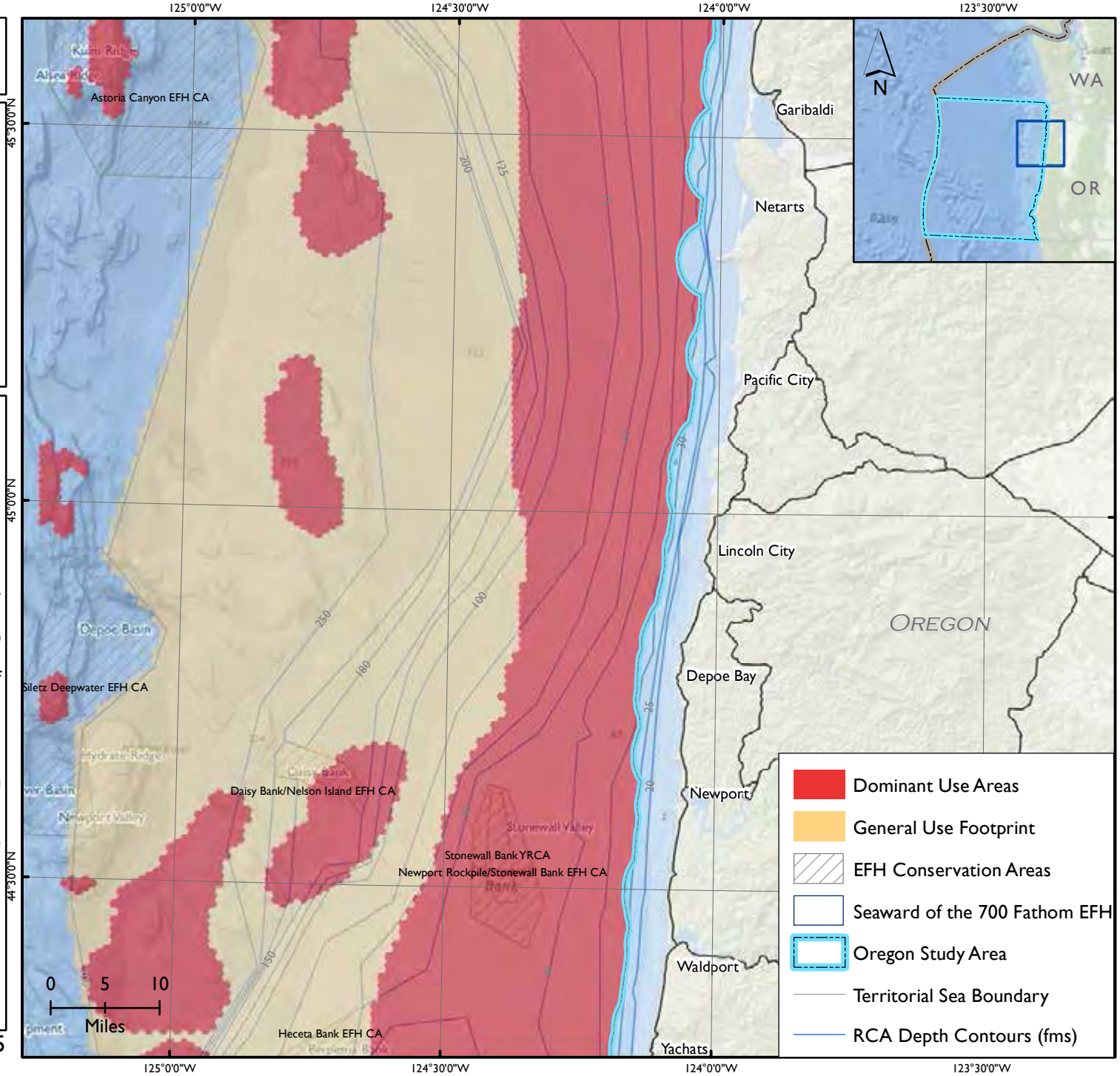

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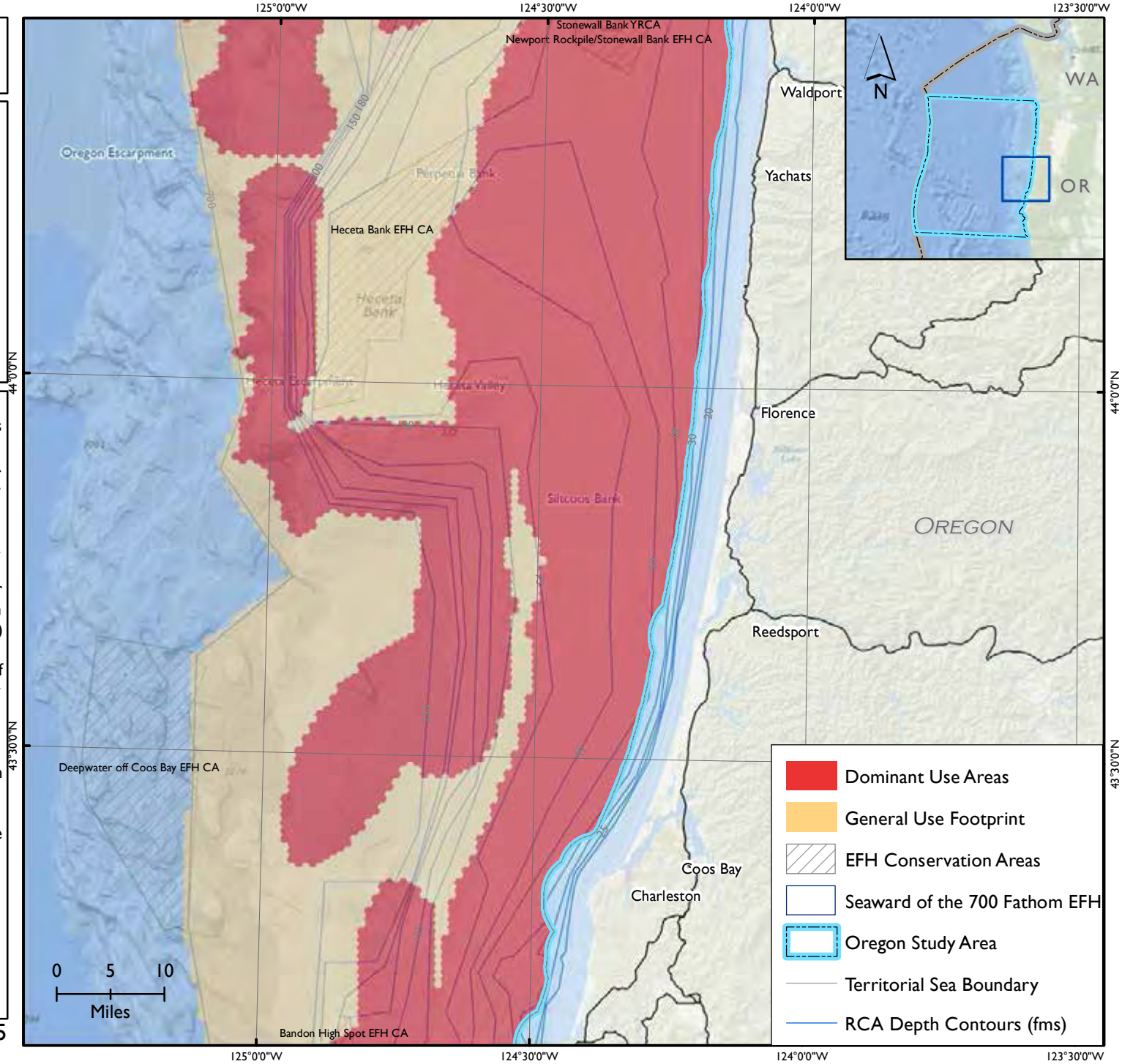

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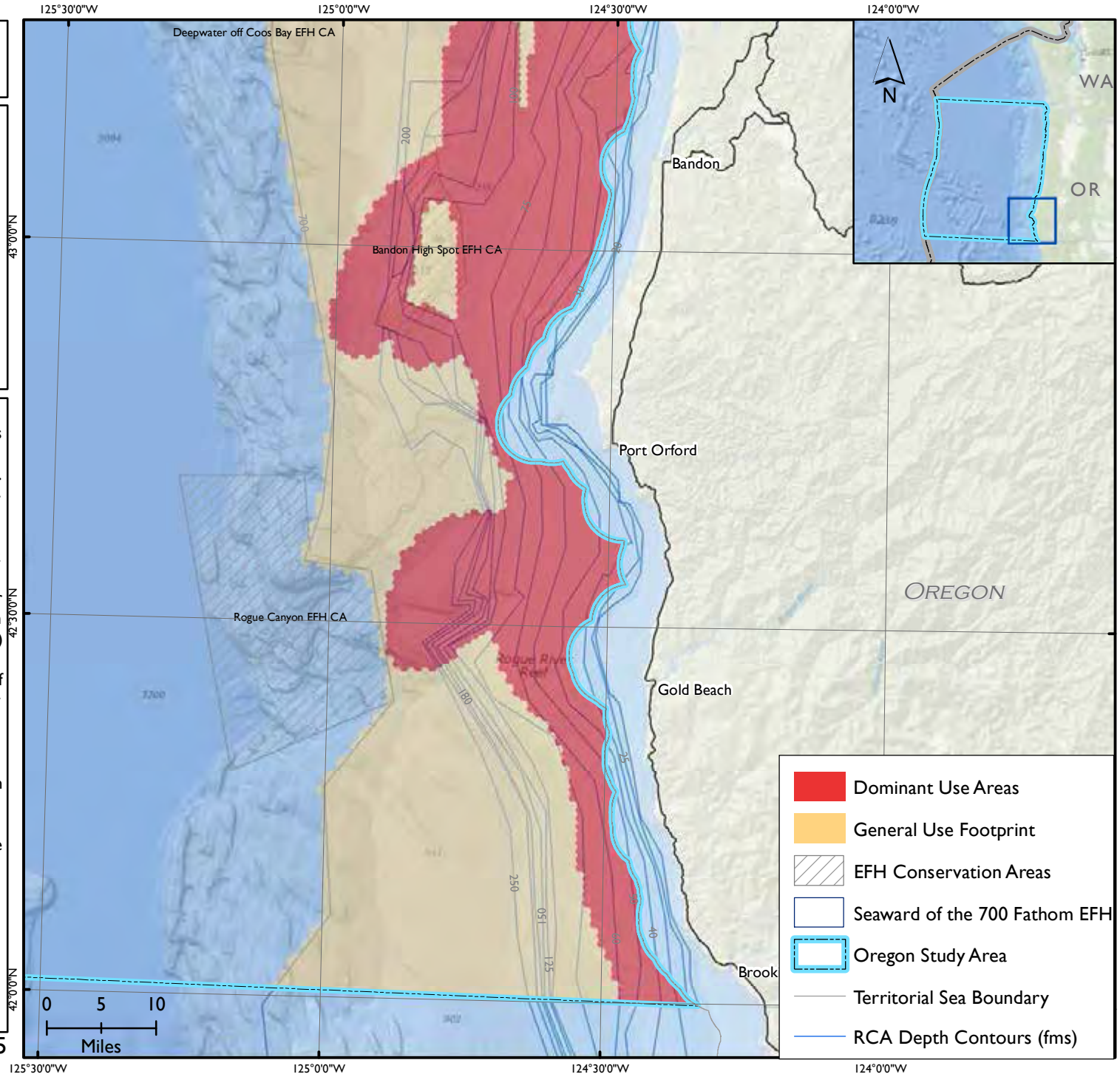

 Date: 3/11/2015

THE OREGON OCEAN USES ATLAS

Commercial Fishing with Benthic Mobile Gear

Includes:
Gear Types: The use of rod and reel, trolling, trawling, dredging, and other mobile gear
Fisheries: Benthic fishes and mobile invertebrates (Groundfish, Pink Shrimp, Rockfish, Lingcod, Cabazon, Scallops and Squid)

Excludes:
All other forms of Fishing

Use Notes:
Since 2006, bottom trawling has been prohibited seaward of 700 fathoms because of this area's designation as a Groundfish Essential Fish Habitat (EFH) Conservation Area. Additional closures such as the Rockfish Conservation Areas have been in place since 2002. The main benthic mobile gear types used are hook and line (Rockfish, Lingcod and Cabezon) and trawls (Groundfish). Most hook and line fishing occurs 1 – 3 NM offshore. Trawling is very intensive on the entire upper continental slope. Trawlers run up to 60 miles out to fish and are not limited by proximity to harbors. Groundfish and Pink Shrimp are the main benthic mobile gear fisheries. Groundfish are fished commercially and recreationally May 1 – September 30, inside 30 fathoms. Almost all Pink Shrimp (90%) are caught at 30 – 160 fathoms on muddy bottoms. There is a dinglebar gear fishery for Lingcod that yields up to 400 lbs at a depth of around 20 – 30 fathoms, although currently Lingcod are more often caught using a hook and line. The commercial Lingcod fishery is seasonally regulated. Other fisheries in the study region include Scallops (caught at 10 – 70 fathoms) and Squid (Humboldt at 70 – 700 fathoms and Market at 10 – 100 fathoms by trawling).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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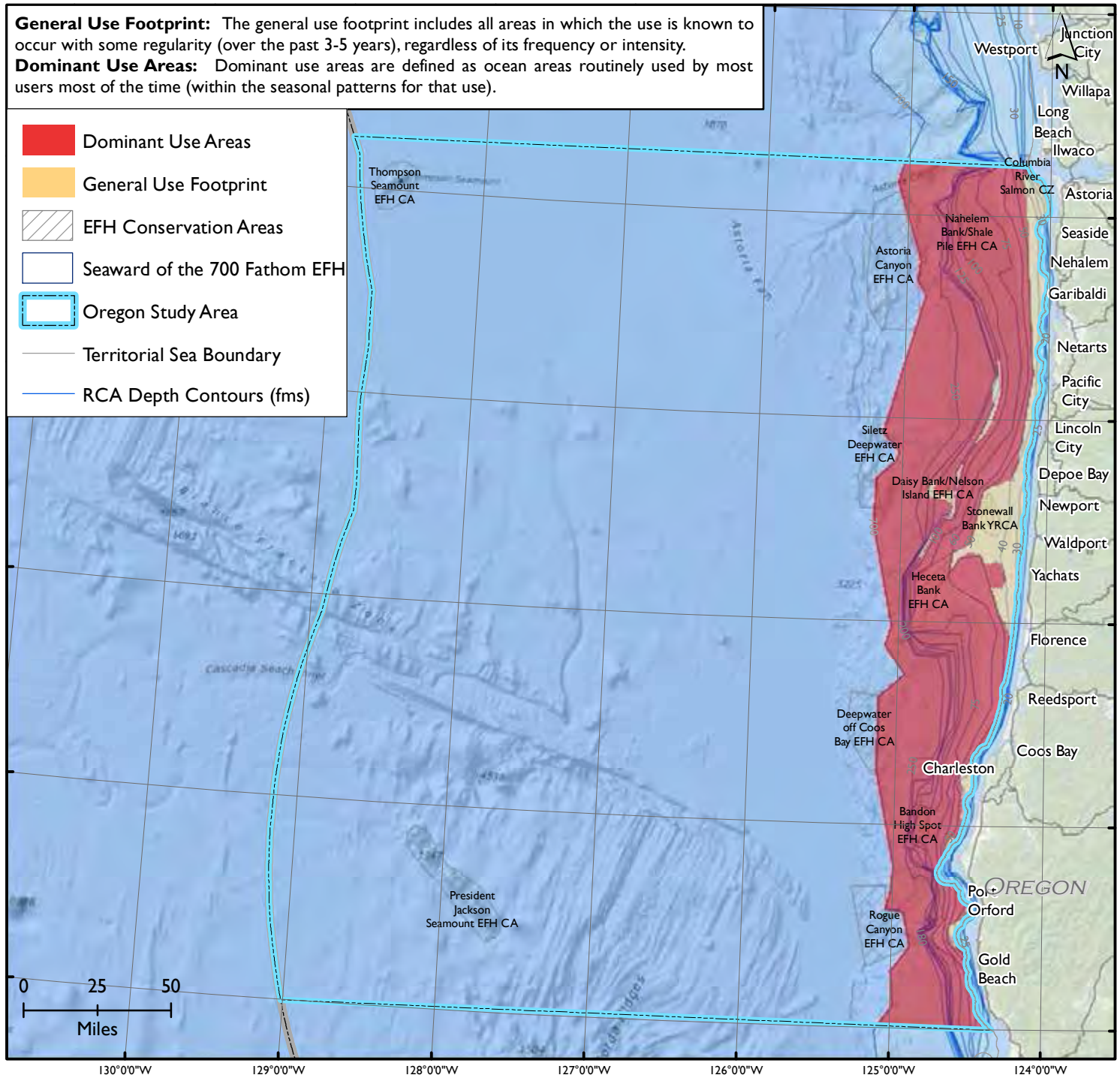

 Date: 3/11/2015

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Mobile Gear

Includes:
Gear Types: The use of rod and reel, trolling, trawling, dredging, and other mobile gear
Fisheries: Benthic fishes and mobile invertebrates (Groundfish, Pink Shrimp, Rockfish, Lingcod, Cabazon, Scallops and Squid)

Excludes:
All other forms of Fishing

Use Notes:
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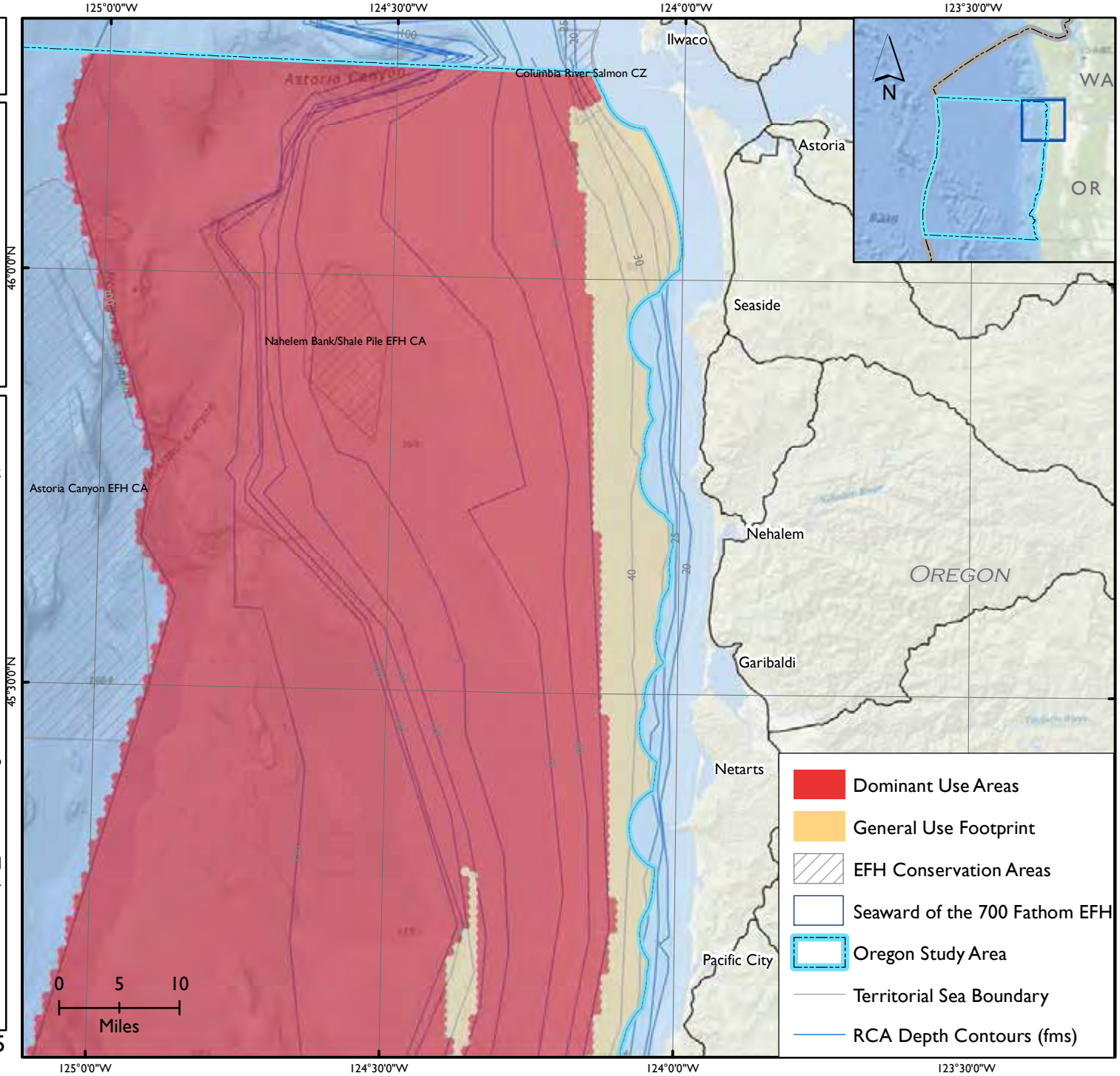

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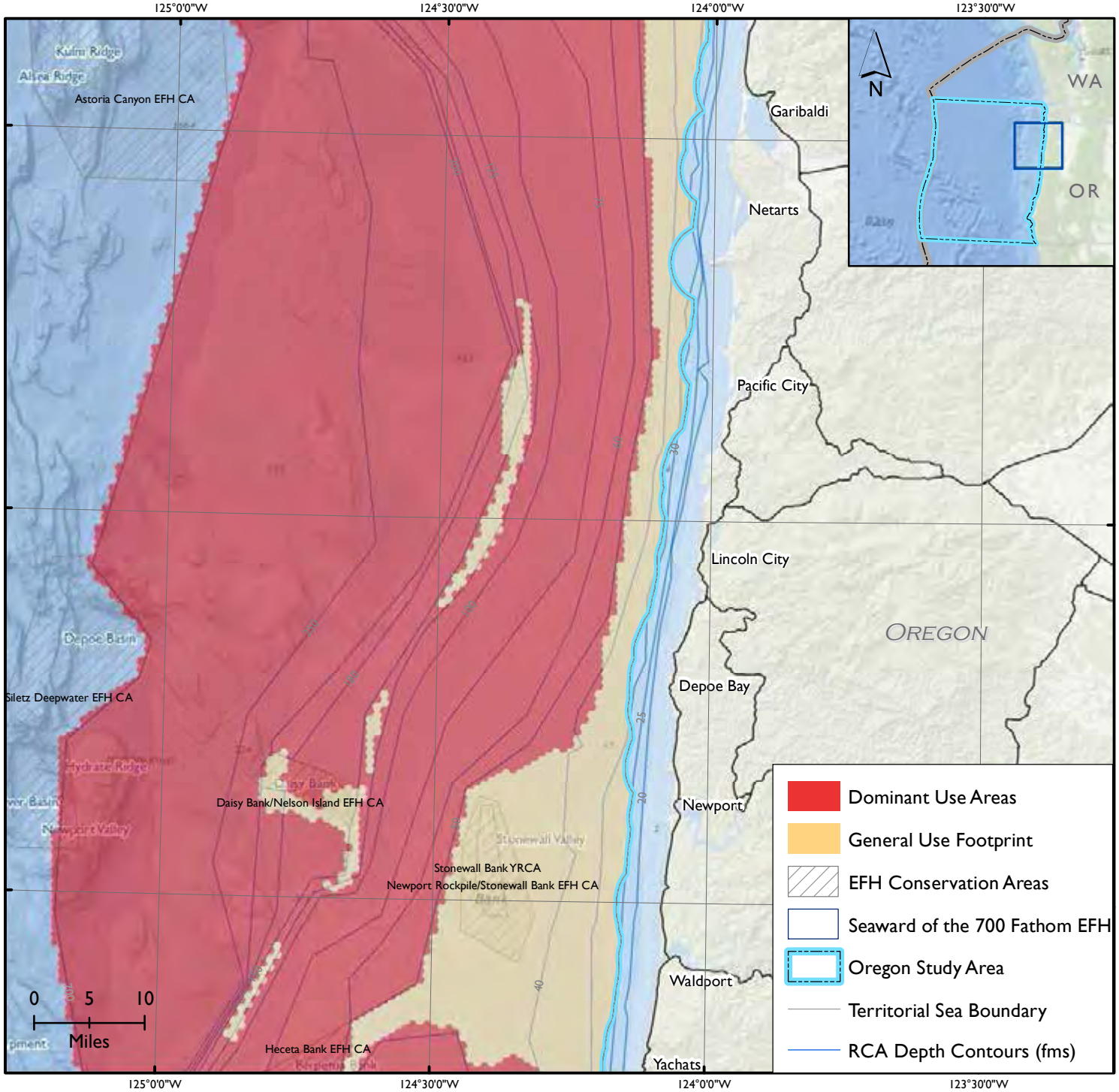

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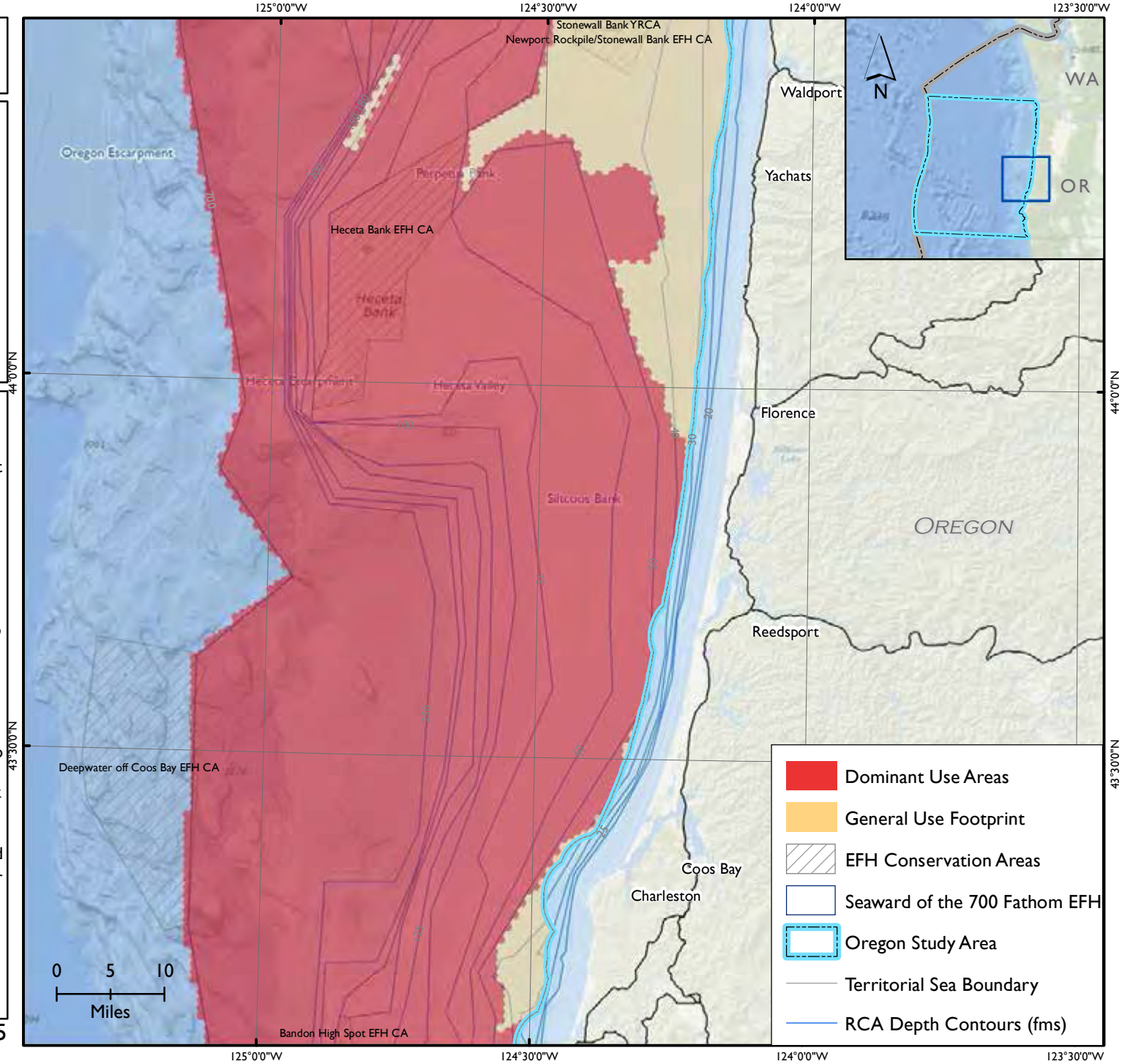

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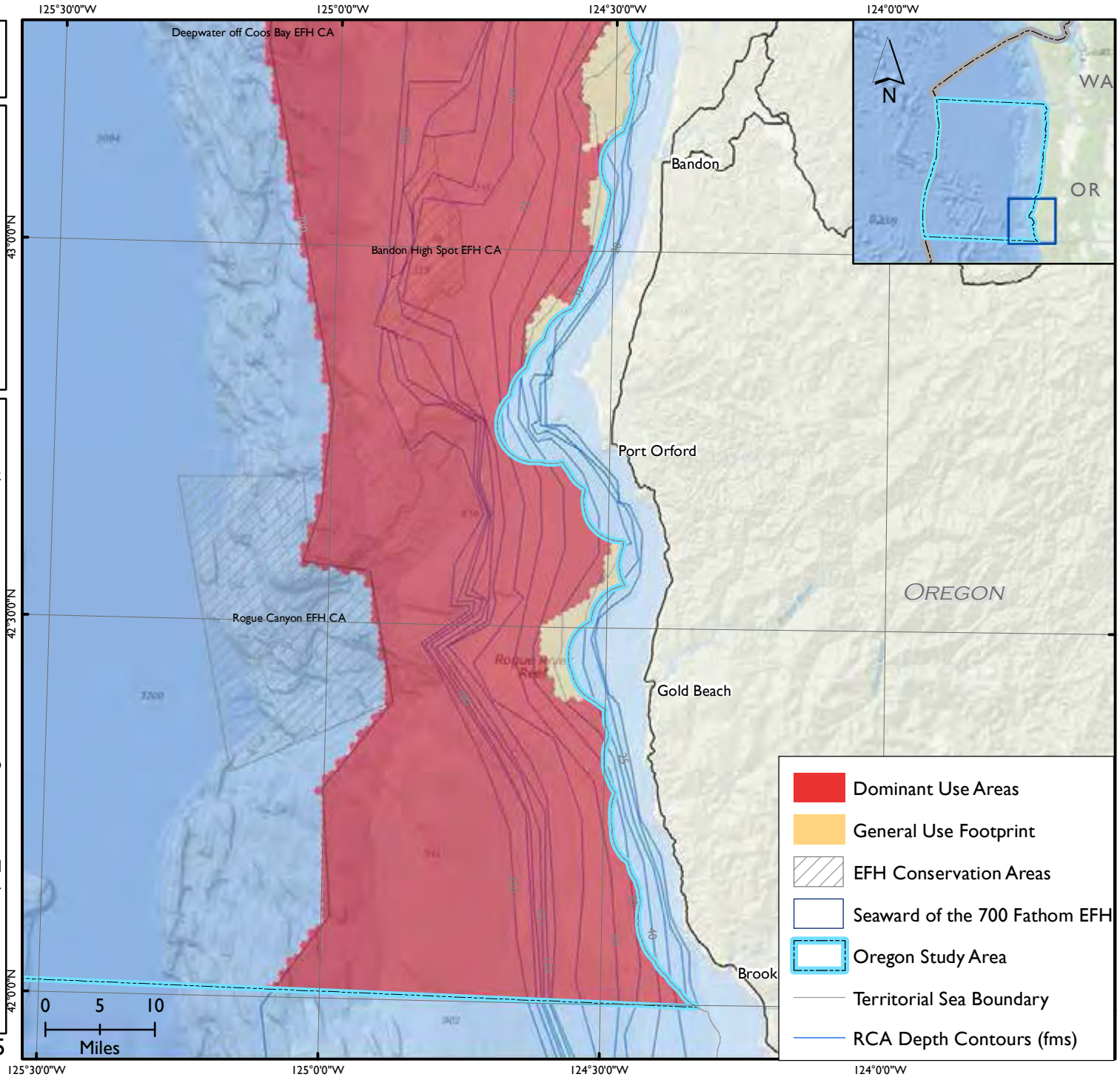

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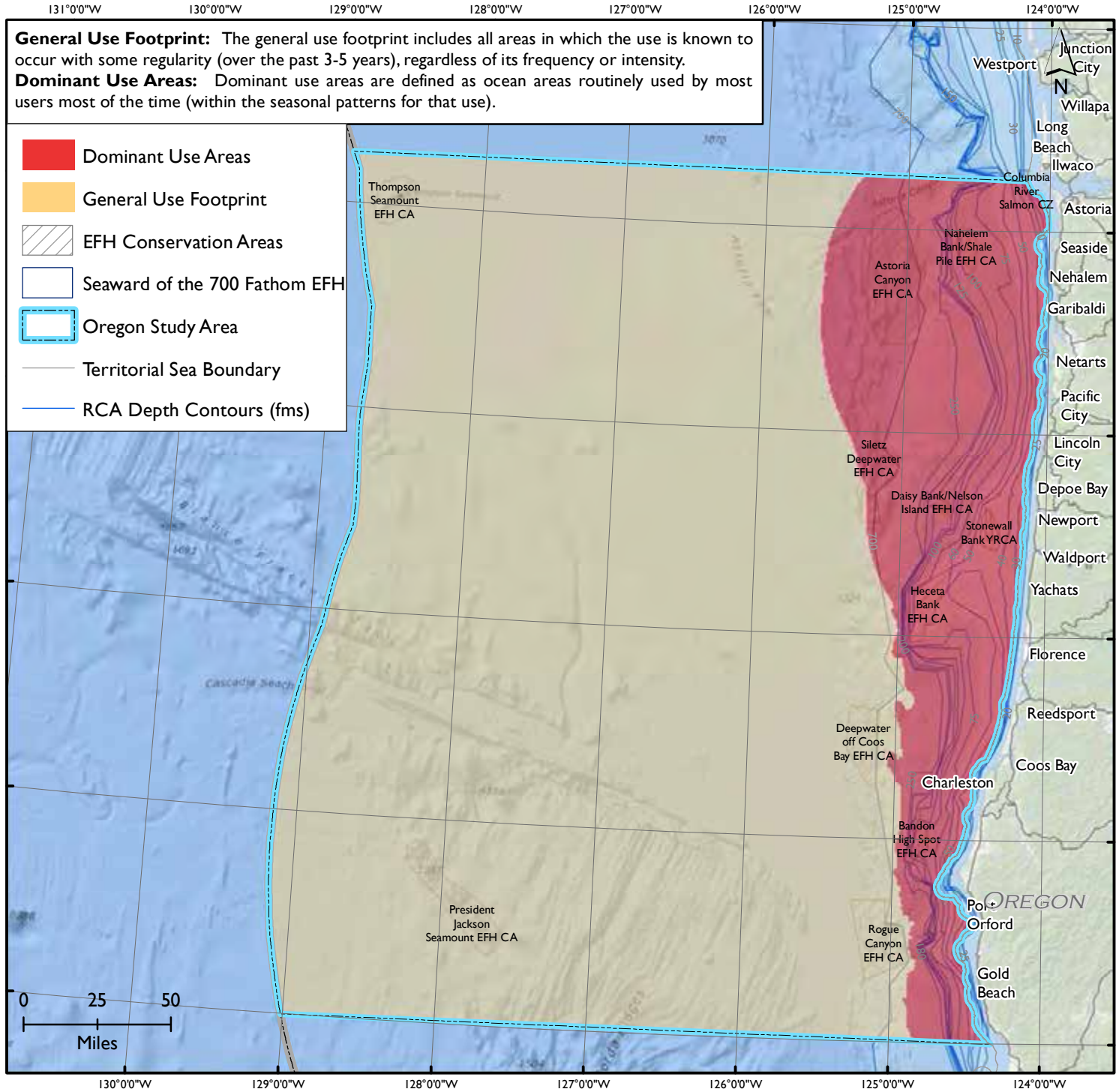
THE OREGON OCEAN USES ATLAS

Commercial Pelagic Fishing

Includes:
Gear Types: Use of mid-water trawling, purse seine, handlines, rod and reel, trolling, and buoys
Fisheries: Pelagic fishes and mobile invertebrates (Whiting, Sardine, Anchovy, Salmon, Tuna, and Squid)
Excludes:
All other forms of Fishing

Use Notes:
Much of the fishing in the study region is seasonal. Pelagic species are caught using a variety of gear such as mid-water trawl nets (Whiting), round haul, or seine, gear (Sardine, Anchovy) and hook and line trolling (Salmon, Tuna). Whiting are targeted by both local fishermen and boats coming from Alaska that fish 20 – 50 miles out during the summer. Trawling for Whiting takes place in narrow (< 1 mile) swaths. Divergence in fishing tack can be detrimental to catch. The Port of Garibaldi delivers captains and parts to the Whiting processor ships 20 miles offshore. Salmon and Tuna fleets are distributed statewide. The Columbia River is the biggest producing system for Chinook and Coho salmon; Chinook from California rivers are also harvested offshore Oregon. Salmon distribution is driven by sea surface temperature. The Tuna fishery is the widest ranging. The commercial Tuna fleet consists of up to 350 boats. Larger Tuna boats range beyond 200 NM offshore. The movements of migratory fish, like Tuna, depend on water temperature, current strength and baitfish distribution. Tuna tend to move to temperature breaks. Squid are also caught using mid-water seine nets. Rockfish such as Yellowtail and Widow can be found around rocky bottom habitat during the summer months but can be highly variable year to year based on seasonal ocean changes.



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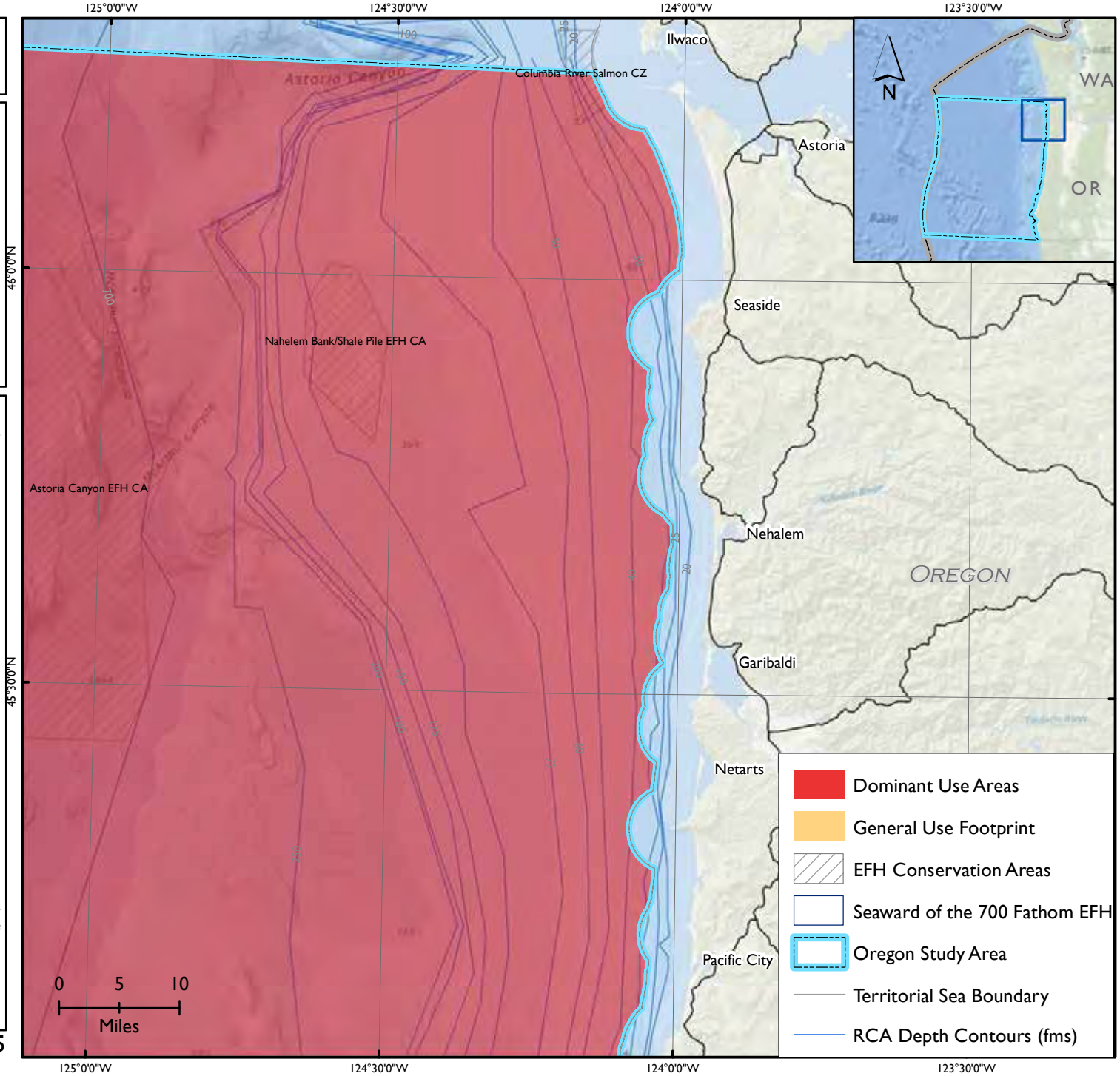

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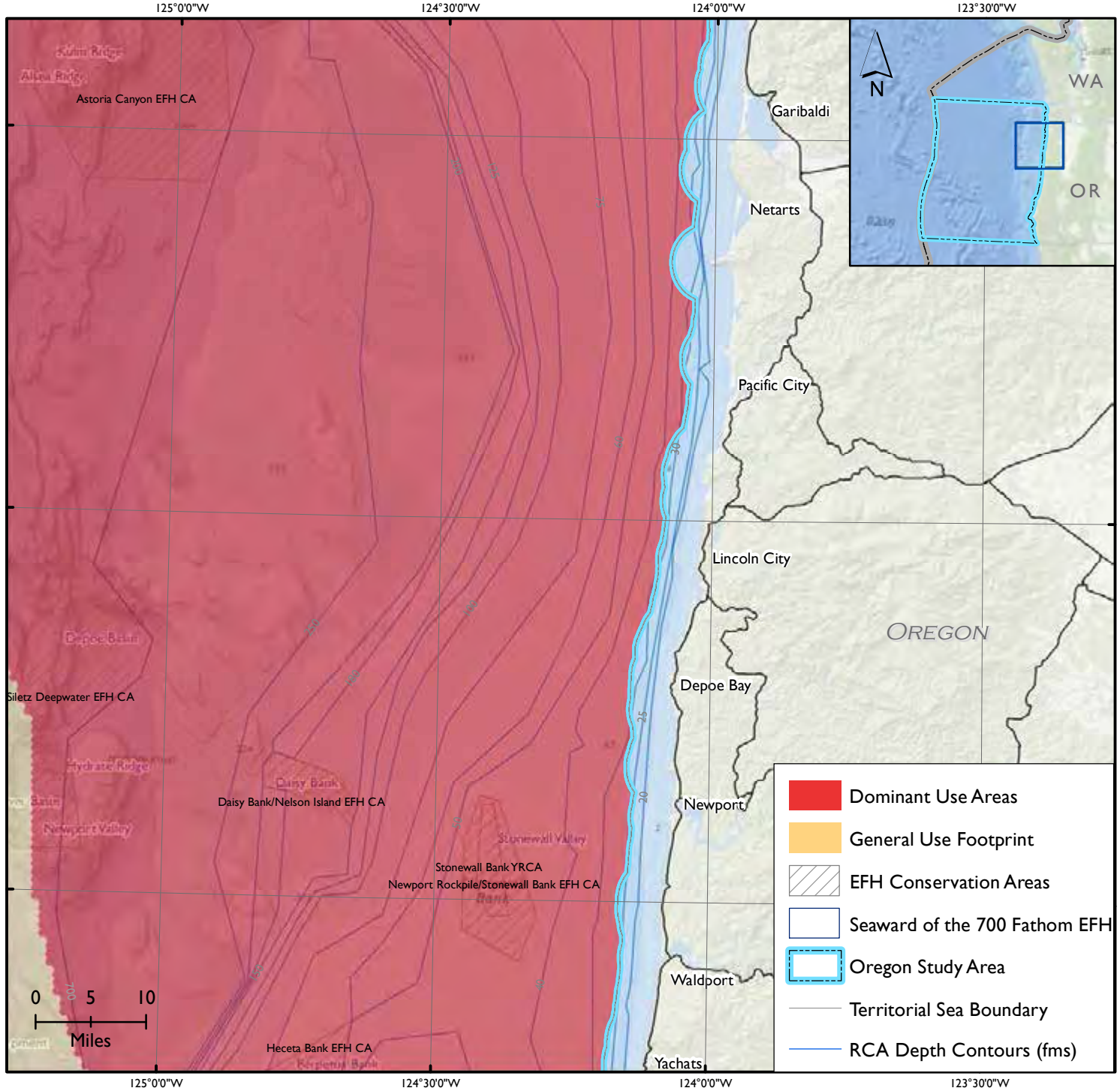

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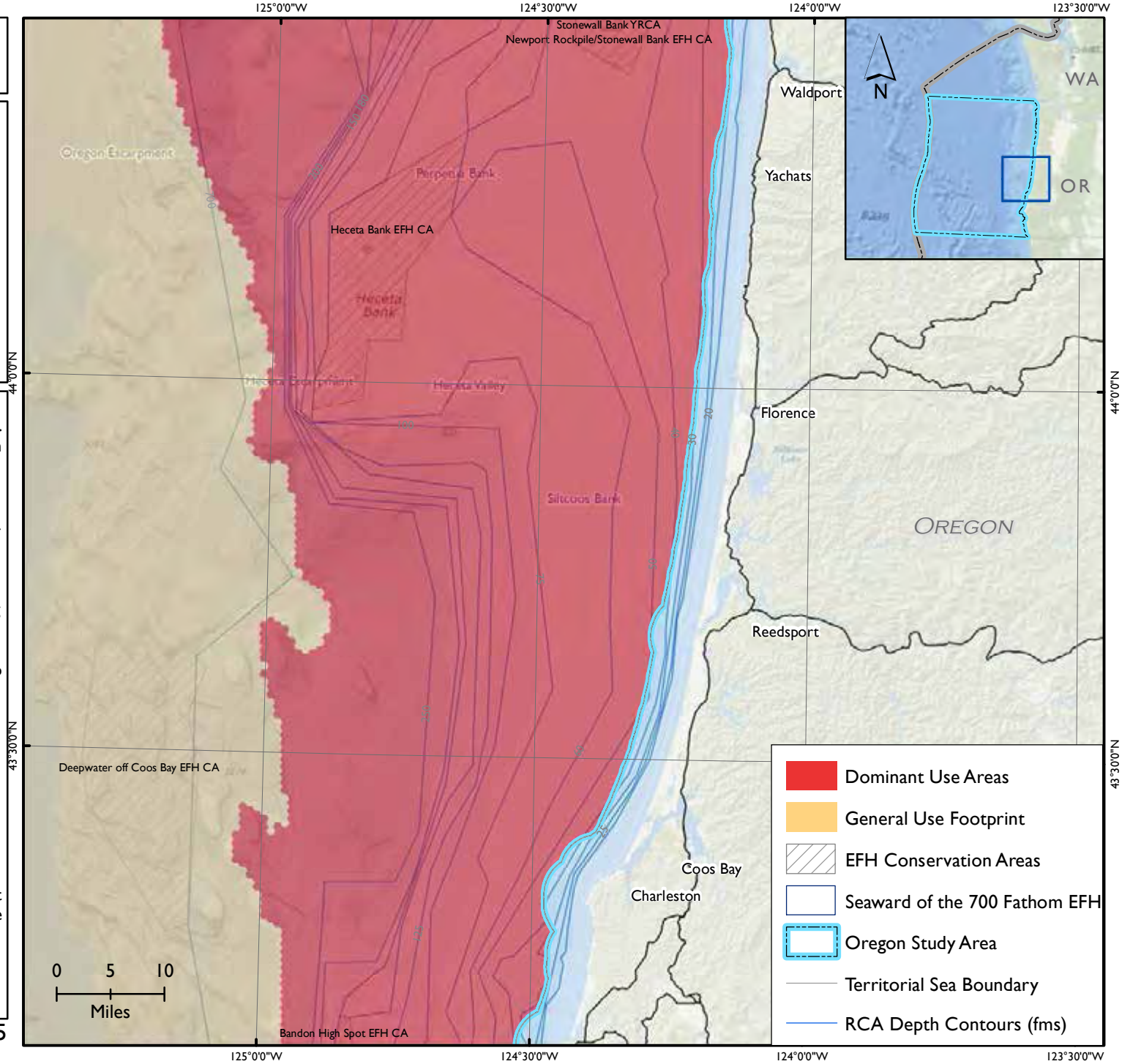

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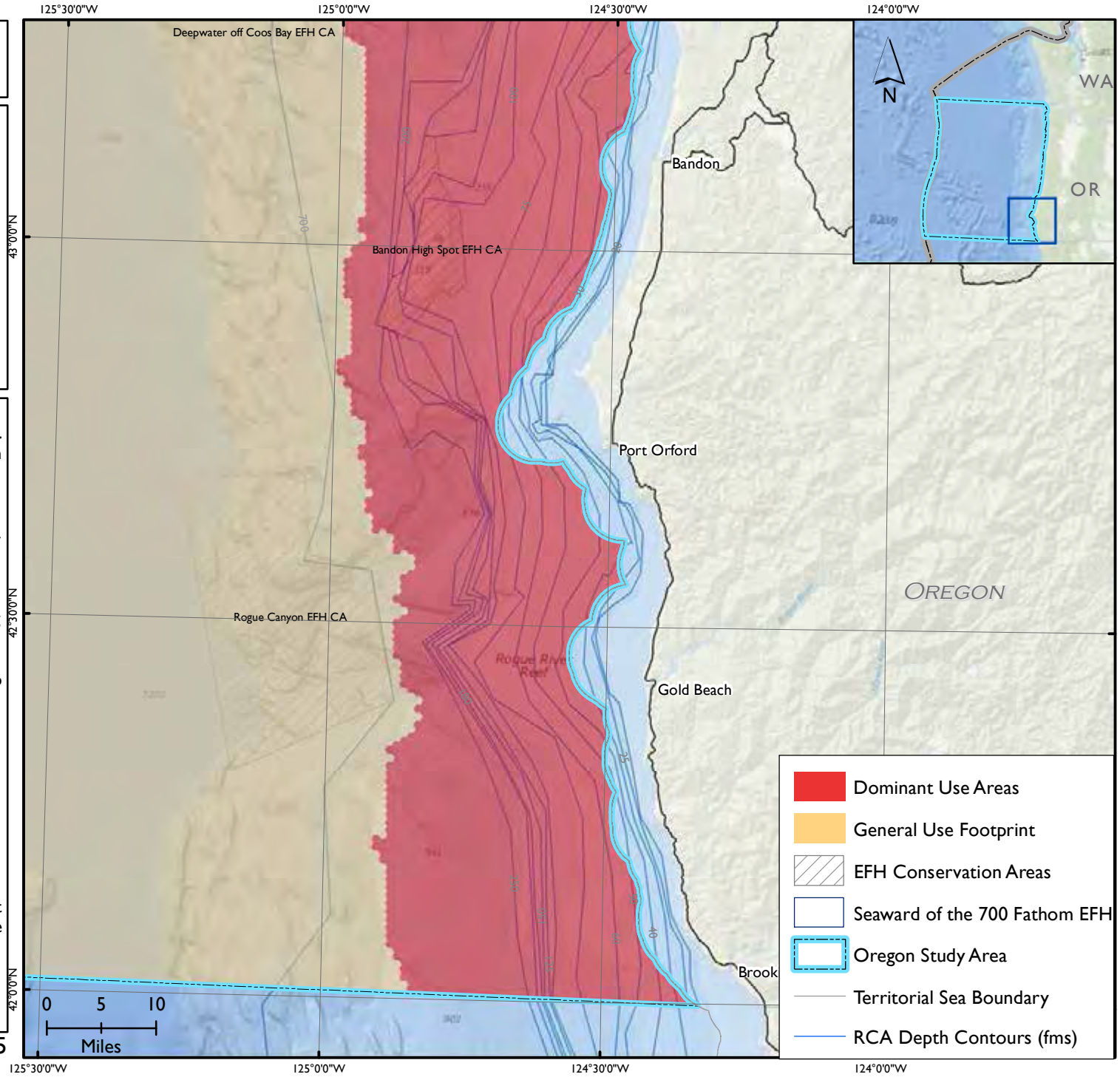

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THE OREGON OCEAN USES ATLAS

Recreational Fishing from Boats for Benthic Species

Includes:
Gear Types: Recreational fishing from head boats, charters, or private boats
Fisheries: Benthic species including mobile invertebrates (Rockfish, Halibut, and Crab)
Excludes:
Any other boat- or shore-based fishing

Use Notes:
Most recreational benthic fishermen catch Rockfish, Halibut or Crab during the spring and summer seasons. These boats use hook and line for Rockfish or Halibut and traps or pots for Crab. Charter boats targeting Rockfish and Crab will fish in state waters hosting up to 18 people on board. Crab boats will fish up to the breakers. The larger boats are concentrated around Depoe Bay (200 sport boats per day is not unusual), Newport (20 boats) and Garibaldi. Halibut is one of the main species recreationally fished outside 3 NM. When fishing for Halibut and Lingcod, fishermen typically stay within a day's sail of port (around 30 miles). There are some specific areas that Halibut fishers will target such as 'Halibut Hill' off of Garibaldi, 'Bandon High Spot', and 'Chicken Ranch' by Perpetua Bank. Groundfish are fished commercially and recreationally May 1 – September 30, inside 30 fathoms.

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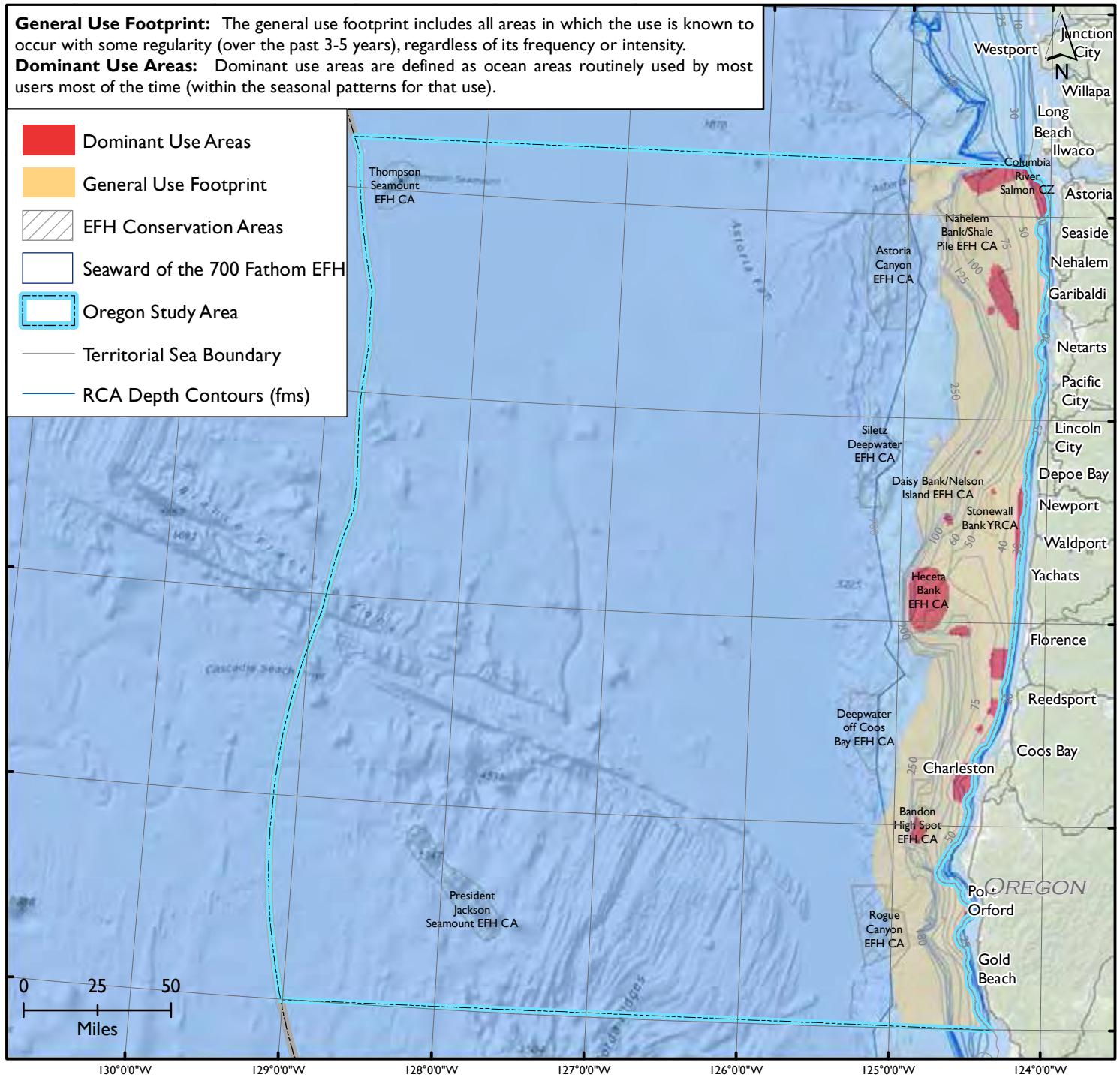

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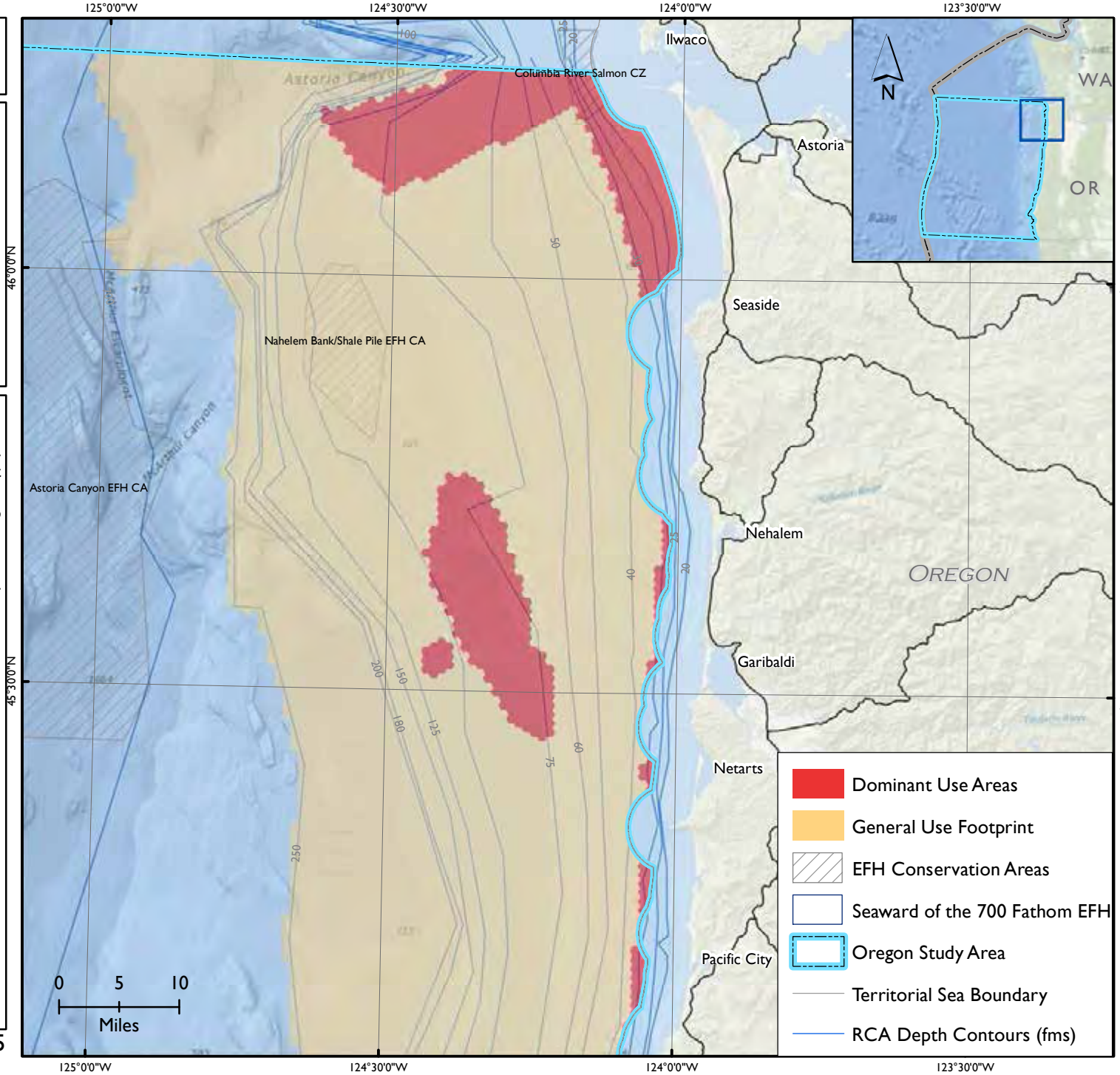

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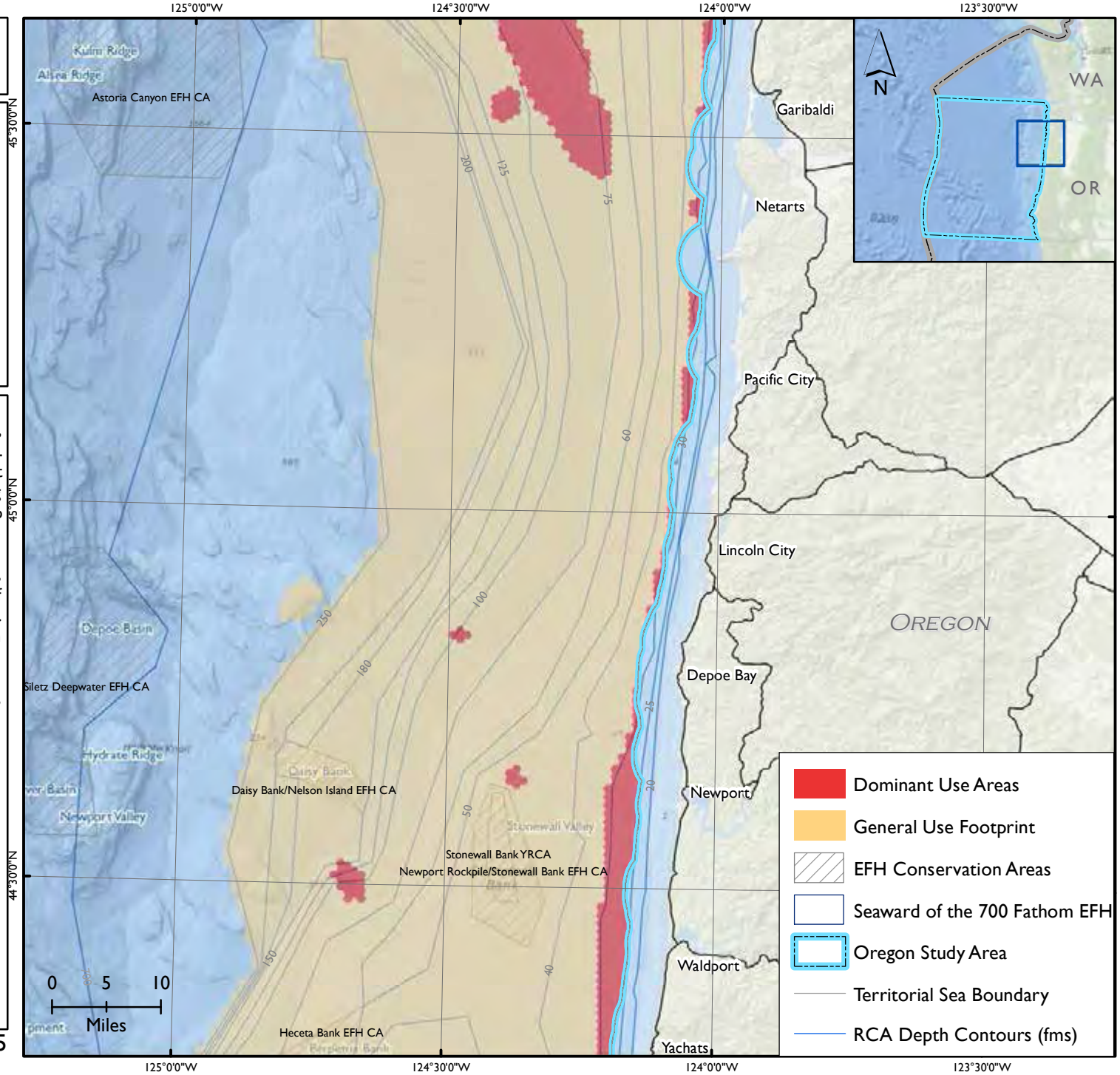

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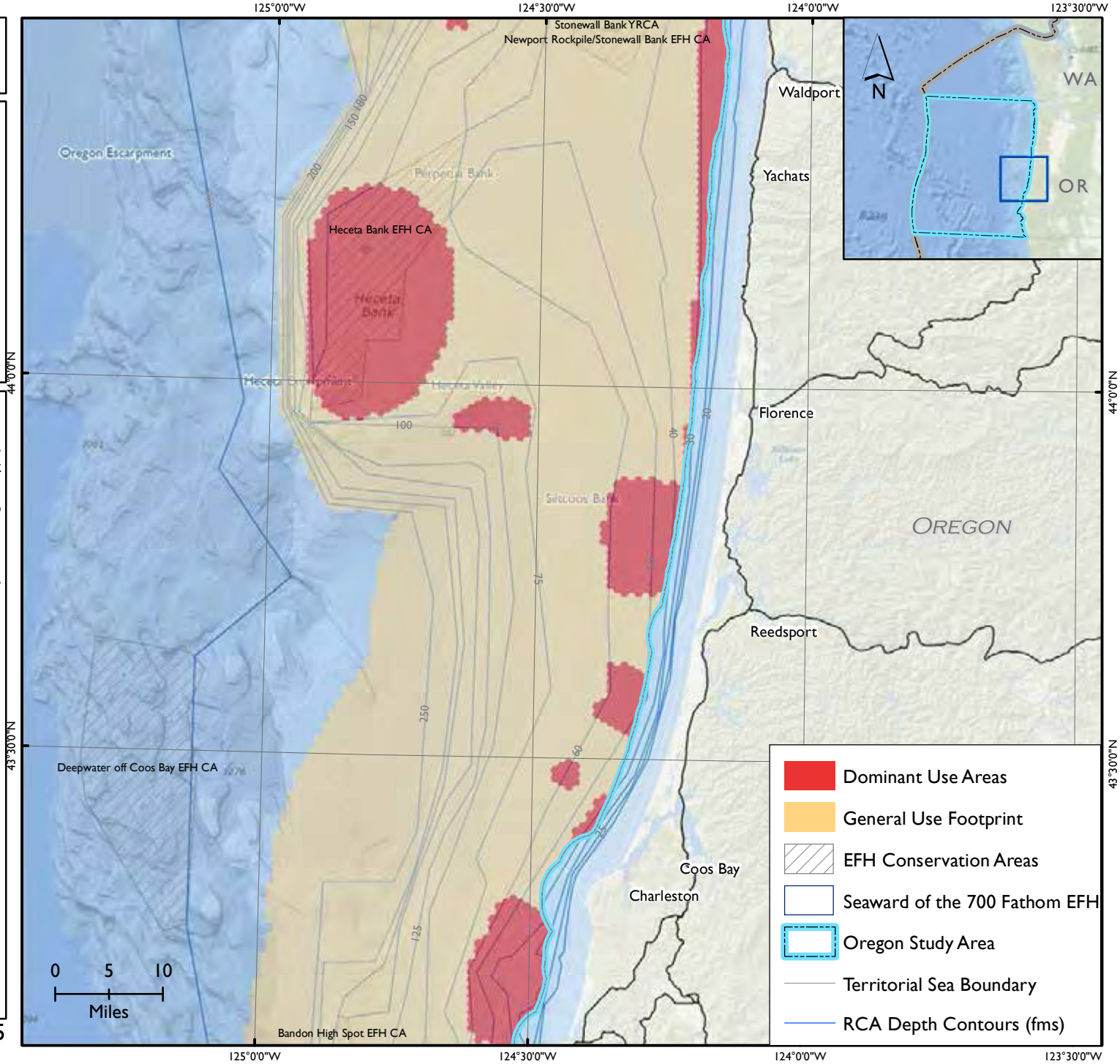

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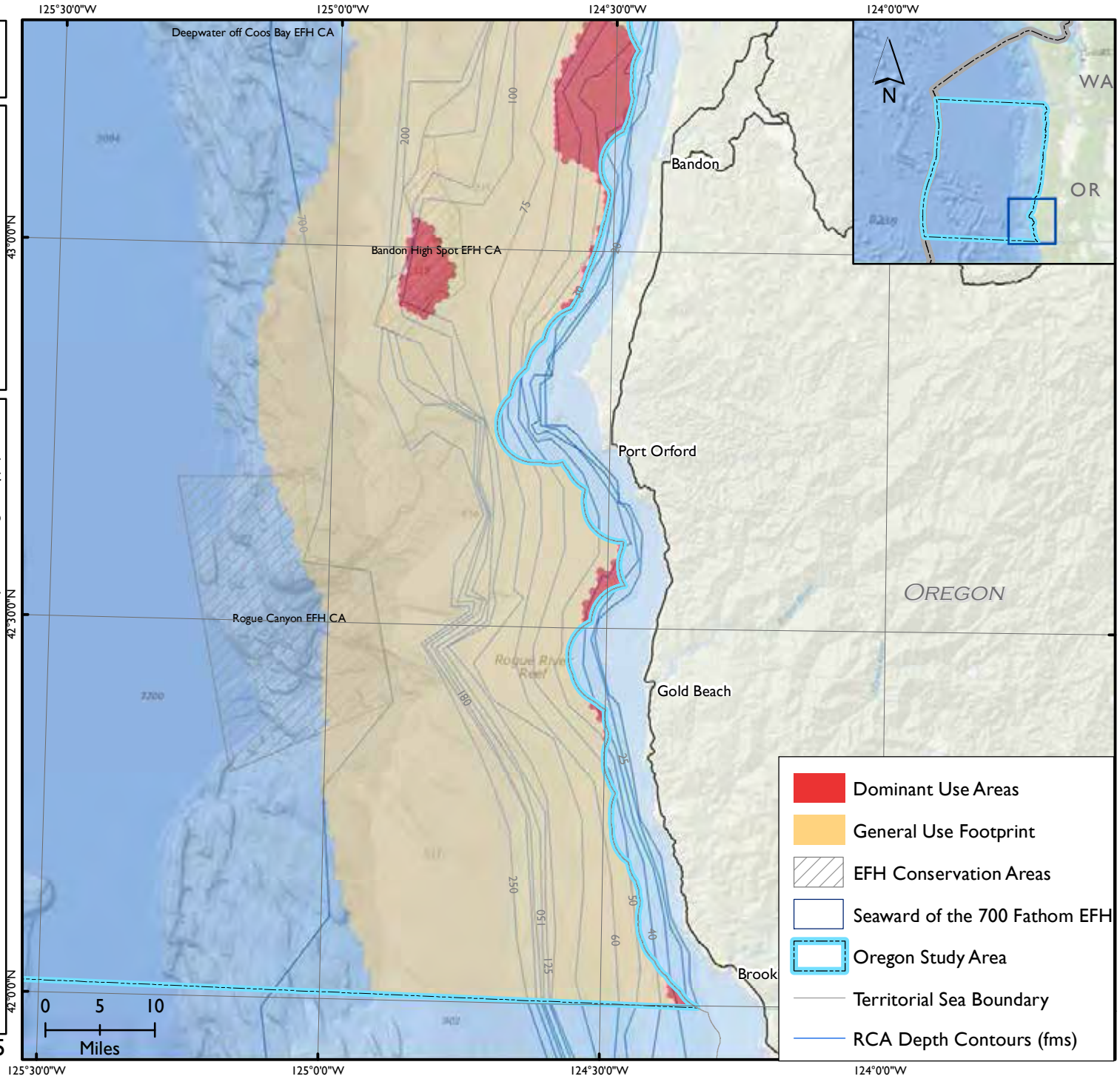

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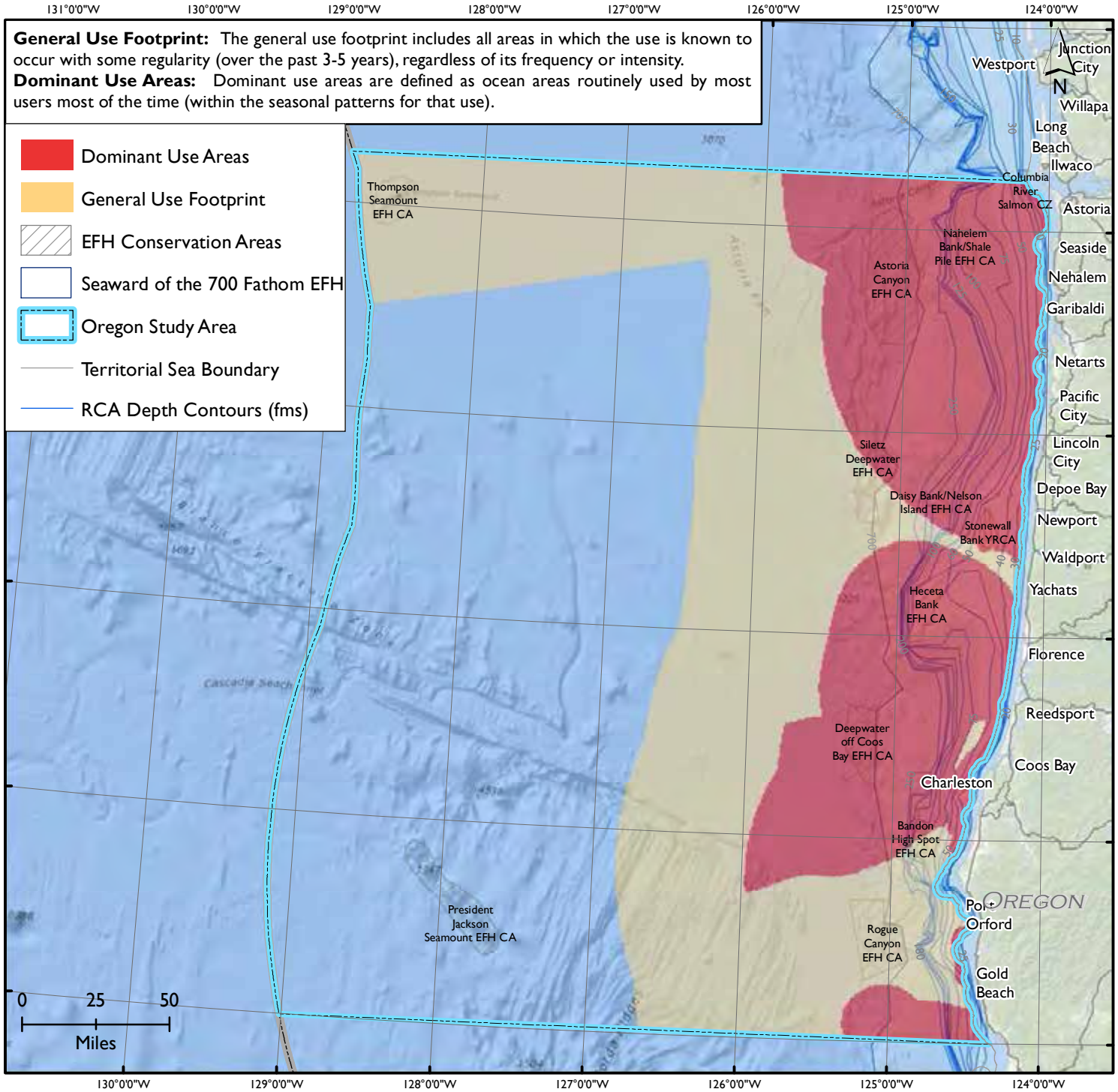
Use Notes:
Recreational pelagic fishing from boats generally occurs within 70 NM out and 15 – 20 NM north and south of major ports. Major ports are: Astoria, Nehalem, Garibaldi, Pacific City, Depoe Bay, Newport, Florence, Reedsport, Charleston, Bandon, Gold Beach, Brookings and Port Orford. Target species include Salmon, Tuna and occasionally Mahi Mahi, Wahoo and Marlin. Salmon season is April – September, with the best fishing in June – September from shore to 100 fathoms. Tuna can be caught year-round but mostly starts with the onset of warm weather out to 100 miles. Every year the ports in Ilwaco and Garibaldi host the 'Oregon Tuna Classic' tournament series in which participants donate their catch to the Oregon Food Bank. The main fishing areas for Salmon and Tuna can vary drastically from year to year and the fishing is largely concentrated by how far fishermen are willing to go from ports. Sport fishermen in small boats fish close to the mouth of Tillamook Bay and north up to Nehalem out to 30 – 40 fathoms; the weather in that area can change quickly, and the boats can run back to the bay with the ocean and not against it in foul weather. The dory fleet catches Salmon and Tuna coast-wide and is not limited to larger ports.



 Date: 3/11/2015

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Recreational Fishing from Boats for Pelagic Species

Includes:
Gear Types: Recreational fishing from head boats, charters, or private boats
Fisheries: Pelagic species
Excludes:
Any other boat- or shore-based fishing

Use Notes:
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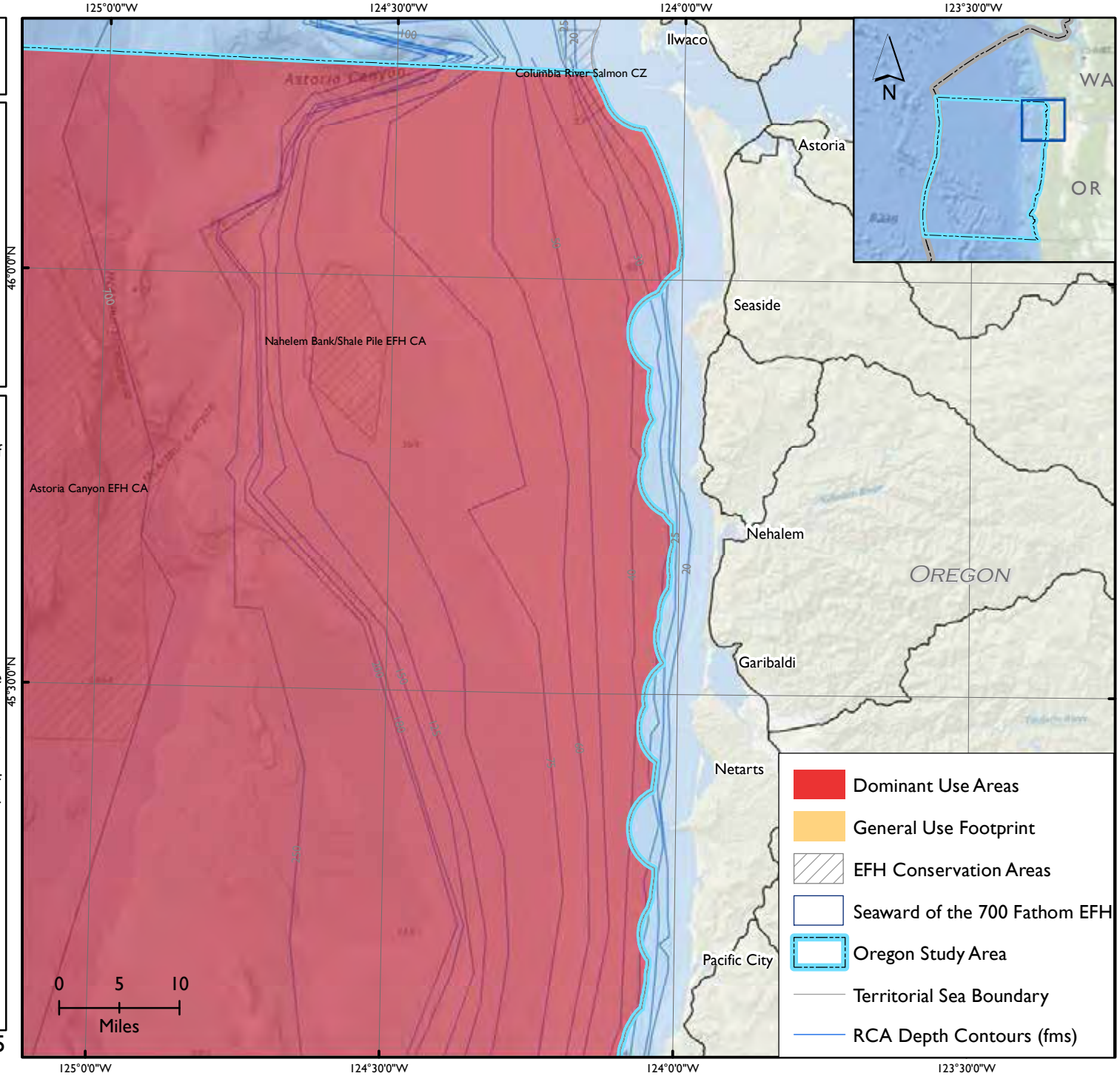

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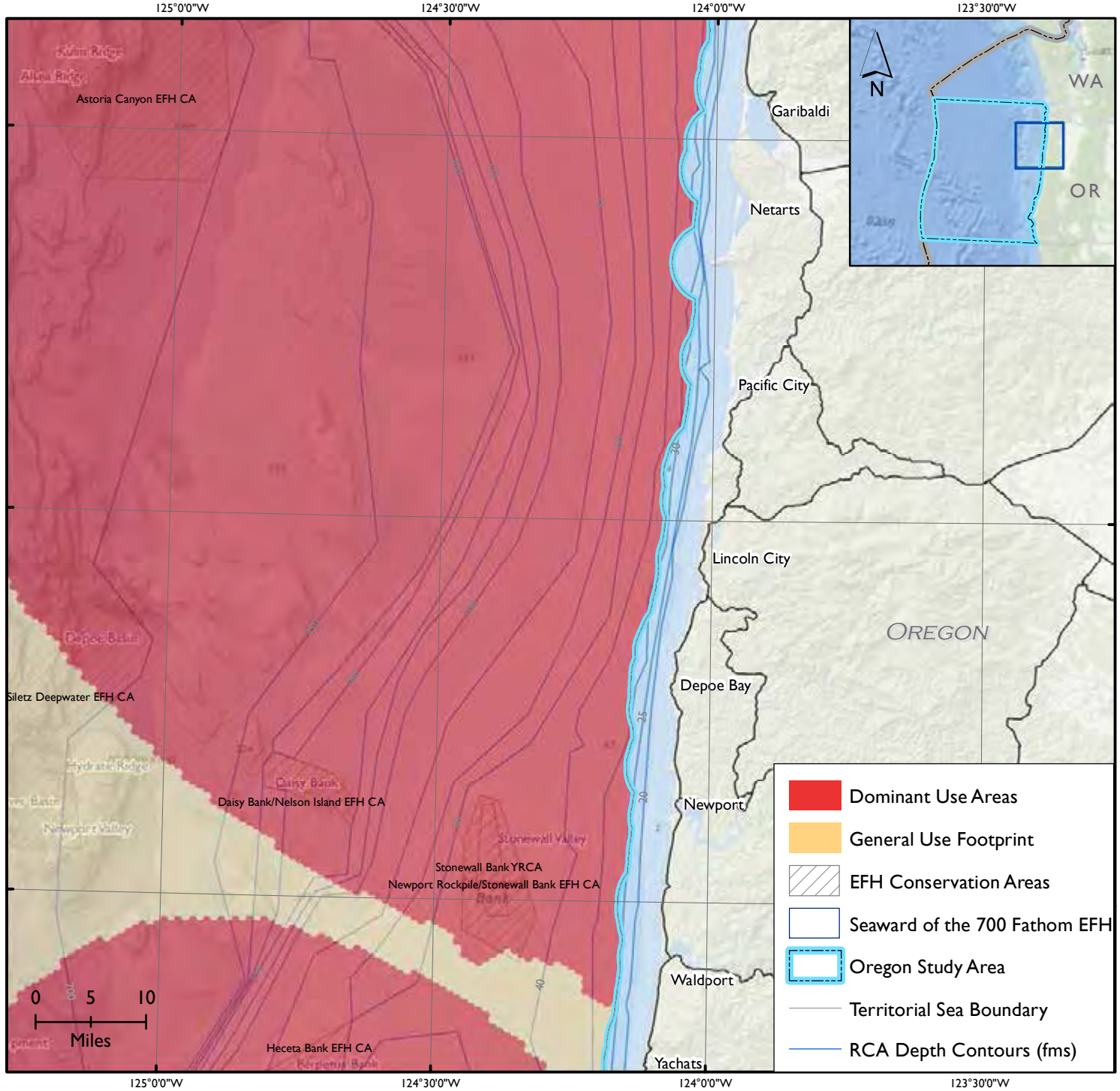

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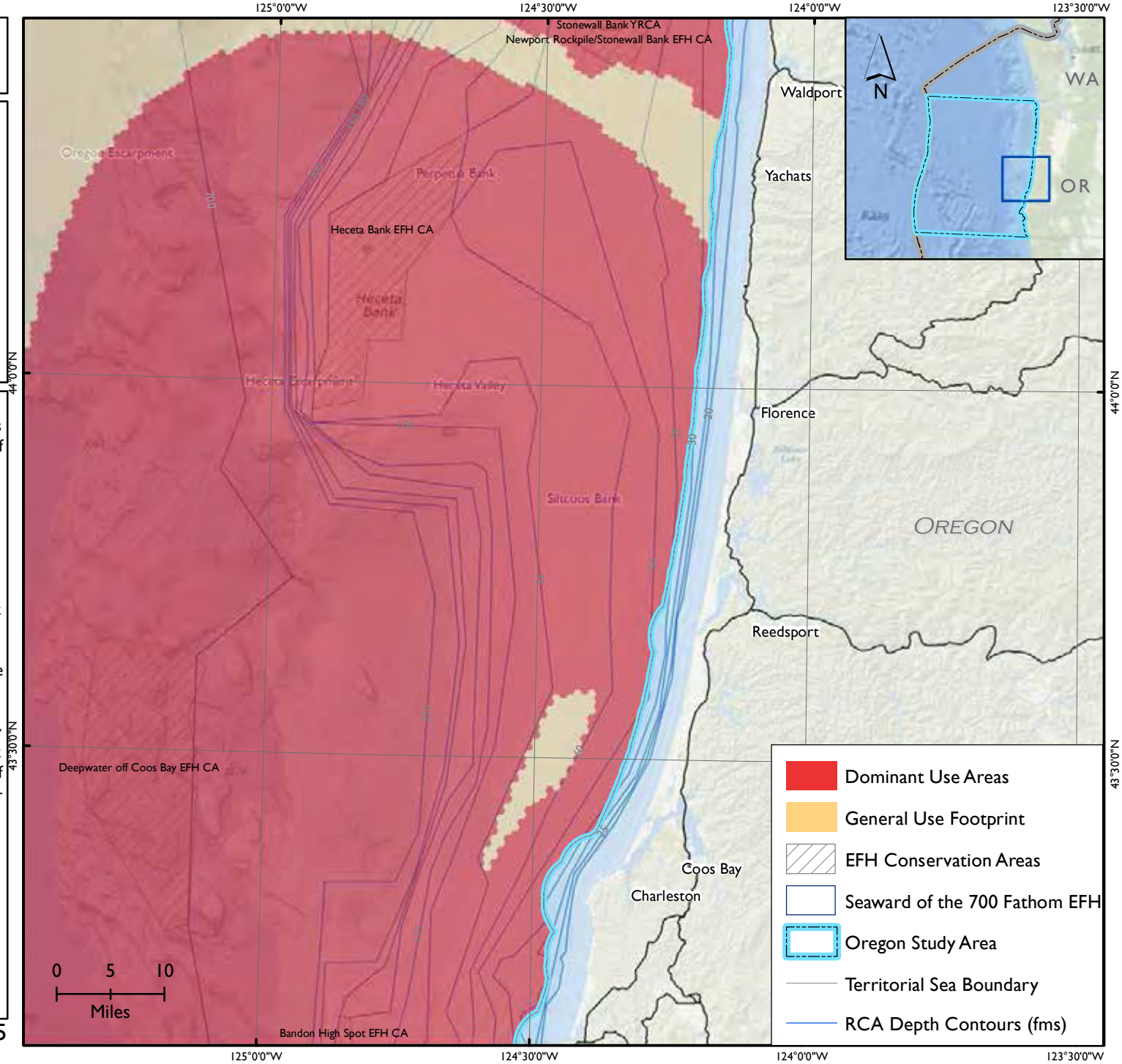

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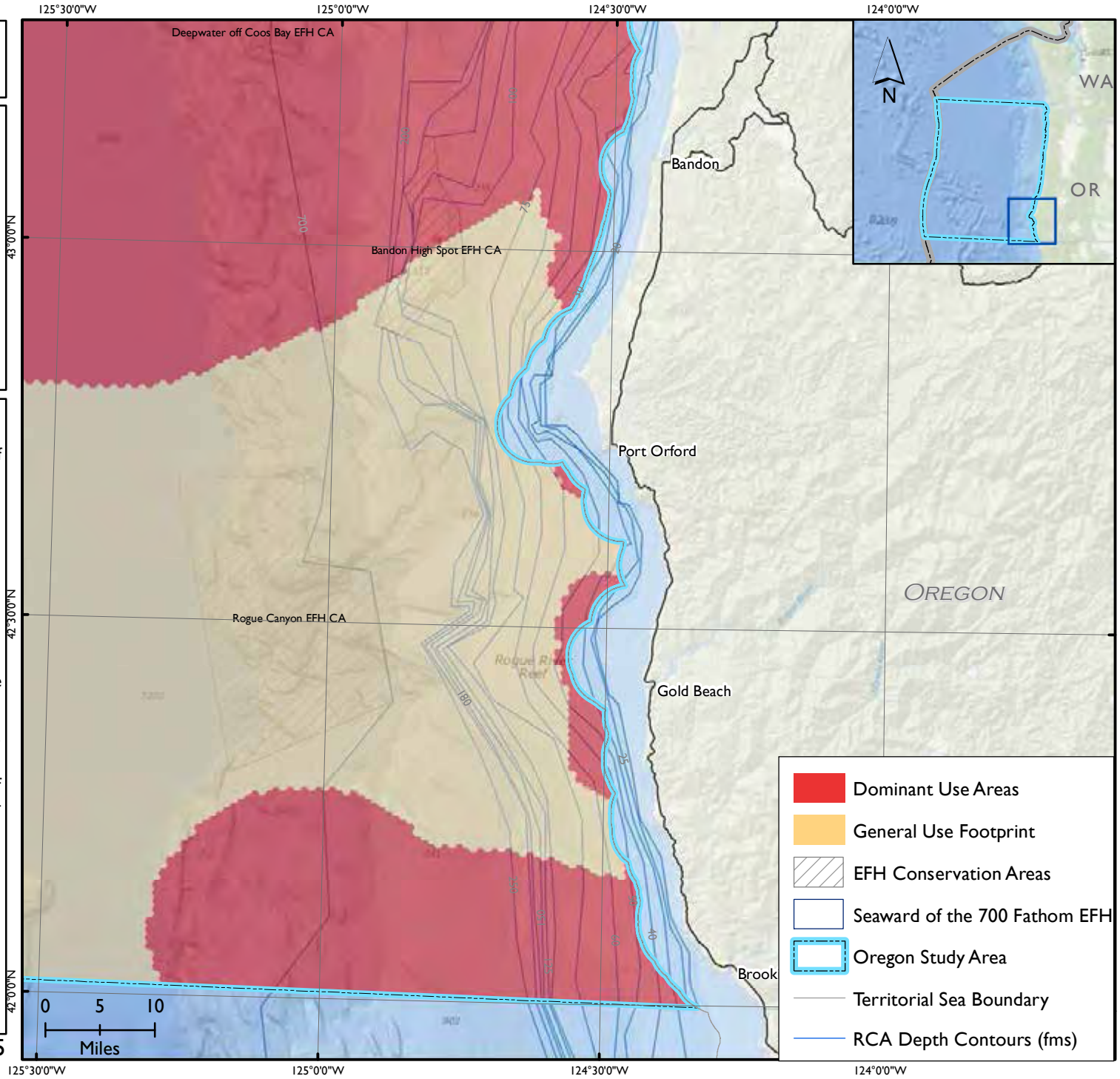

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THE OREGON OCEAN USES ATLAS

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Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils and other materials into ocean waters
Excludes:
Sewage Discharge, Mining and Mineral Extraction

Use Notes:
There is limited traditional ocean dumping such as dredge spoils disposal outside 3 NM. Environmental legislation prohibits dumping of most sinking materials inside 25 miles. Commercial shipping mid-ocean ballast water exchange has to occur outside of 50 miles and 200 meters in depth. There is a Whiting waste disposal area regularly used off of Newport.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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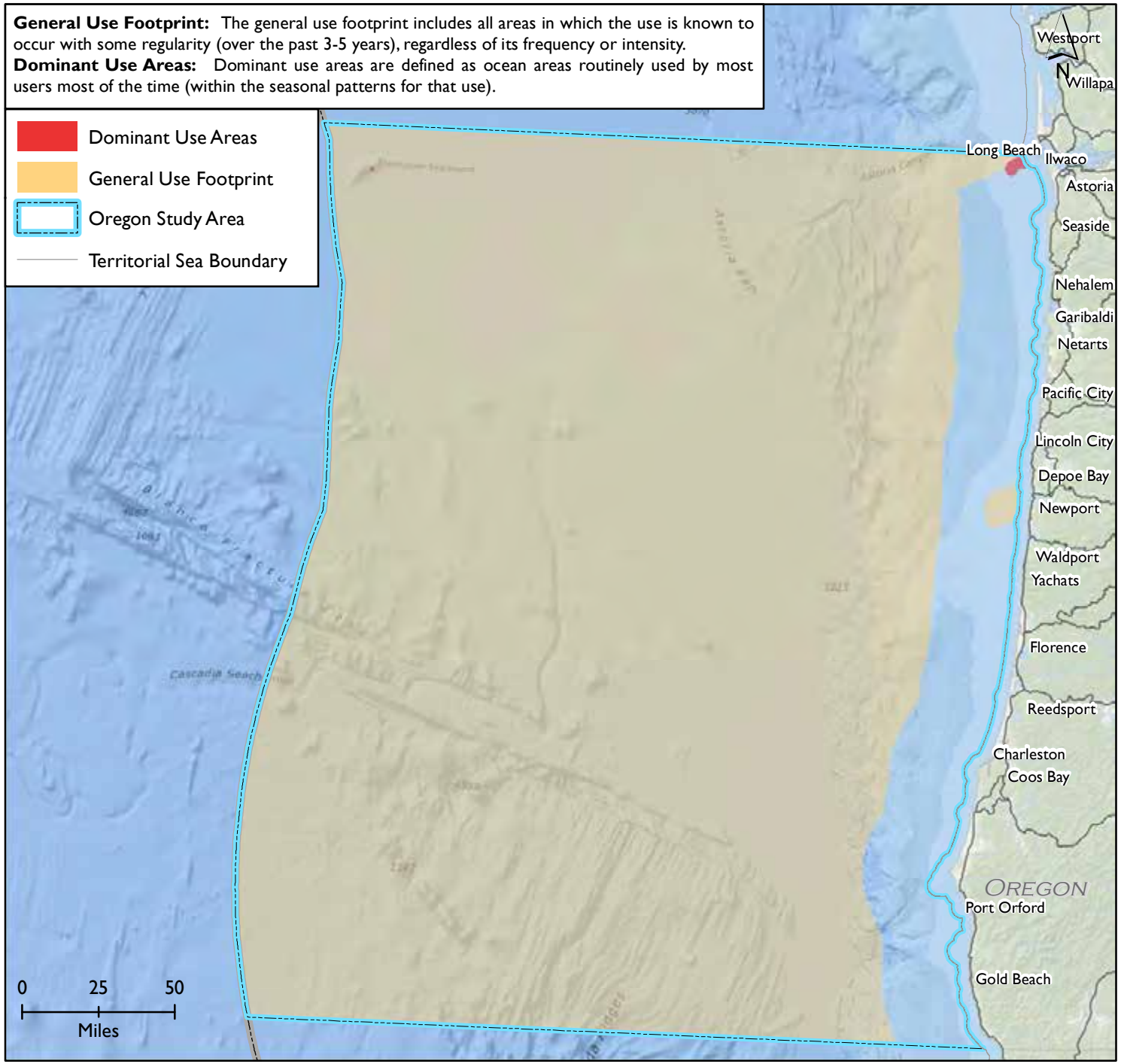

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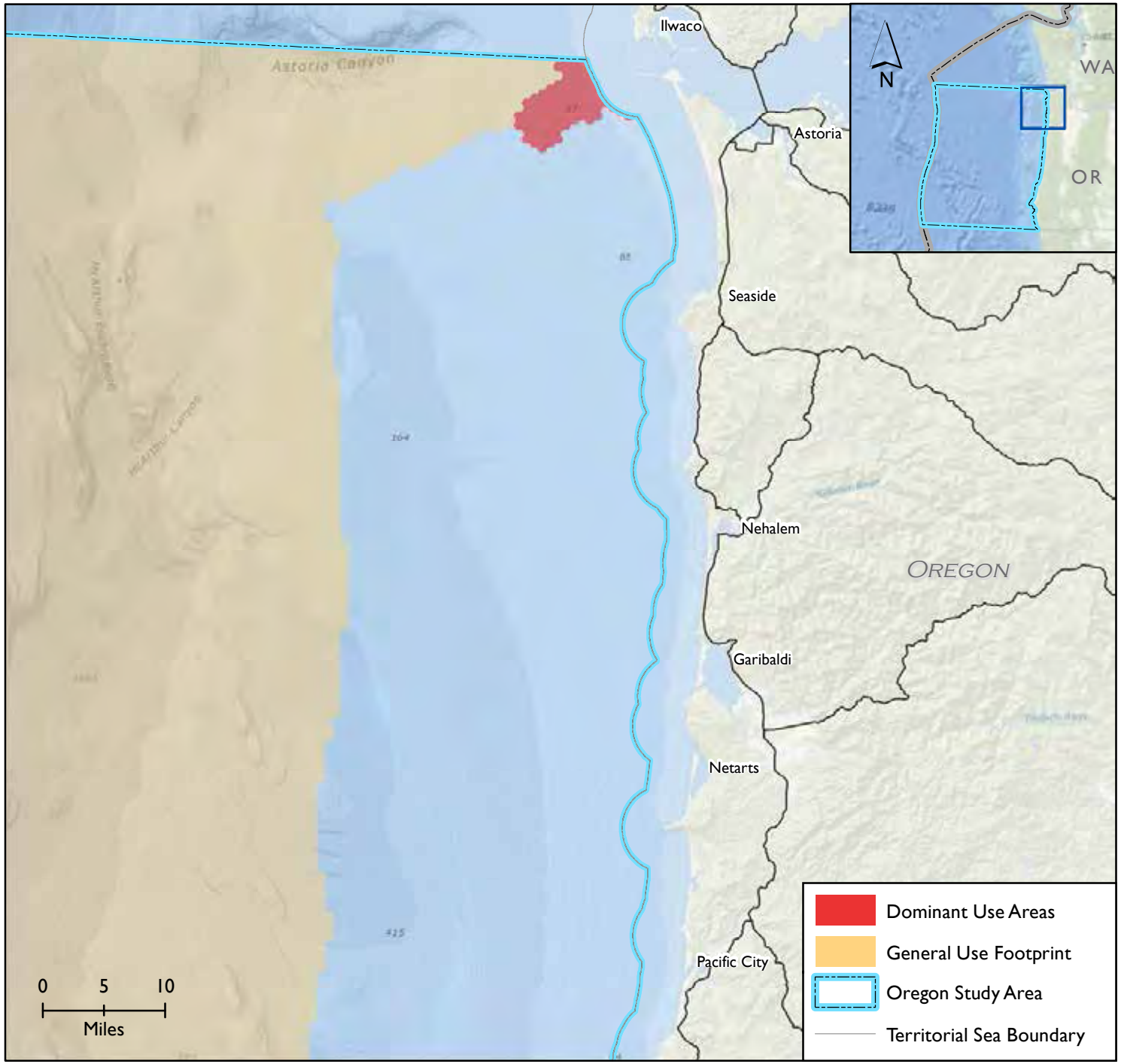

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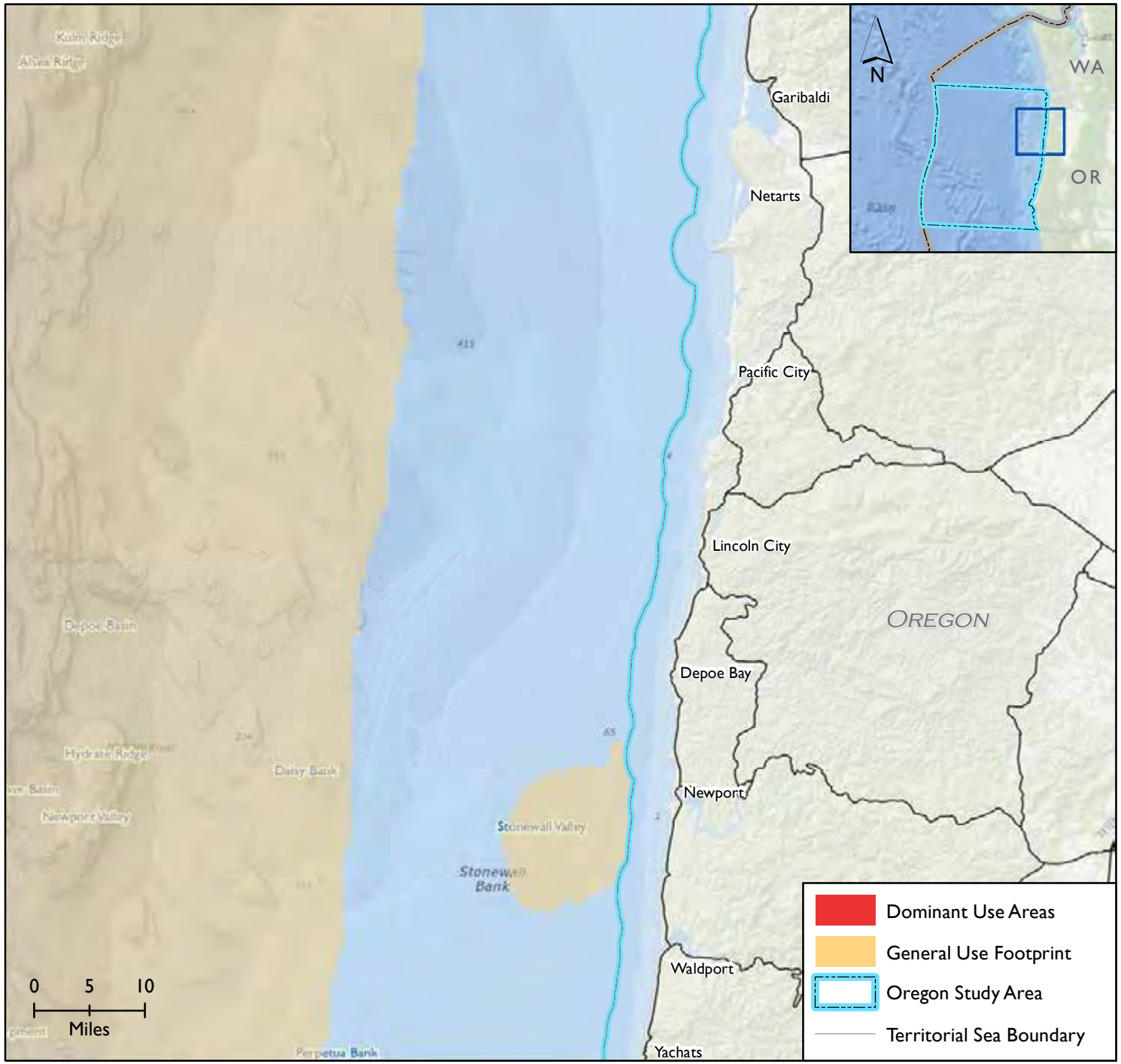

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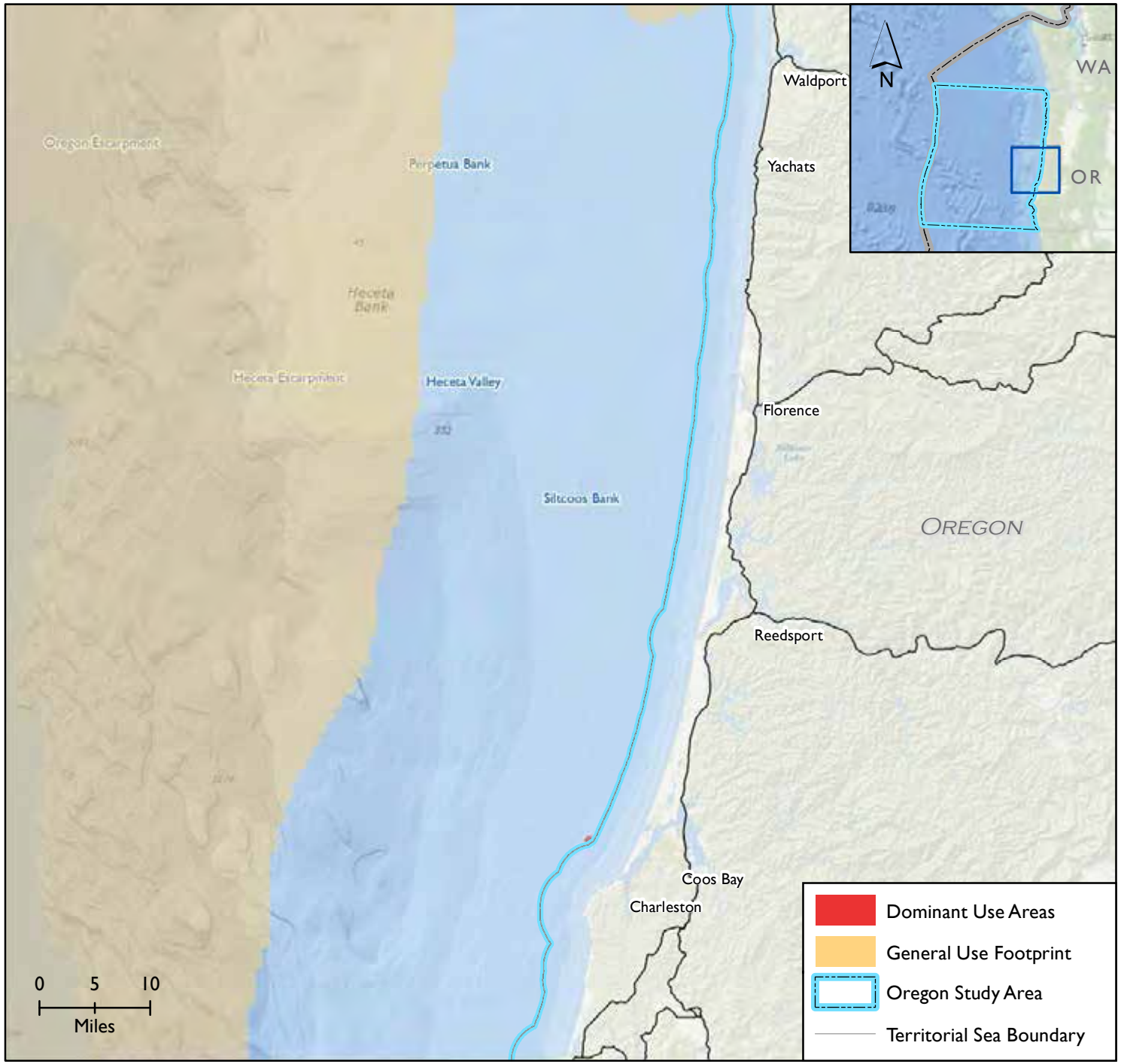

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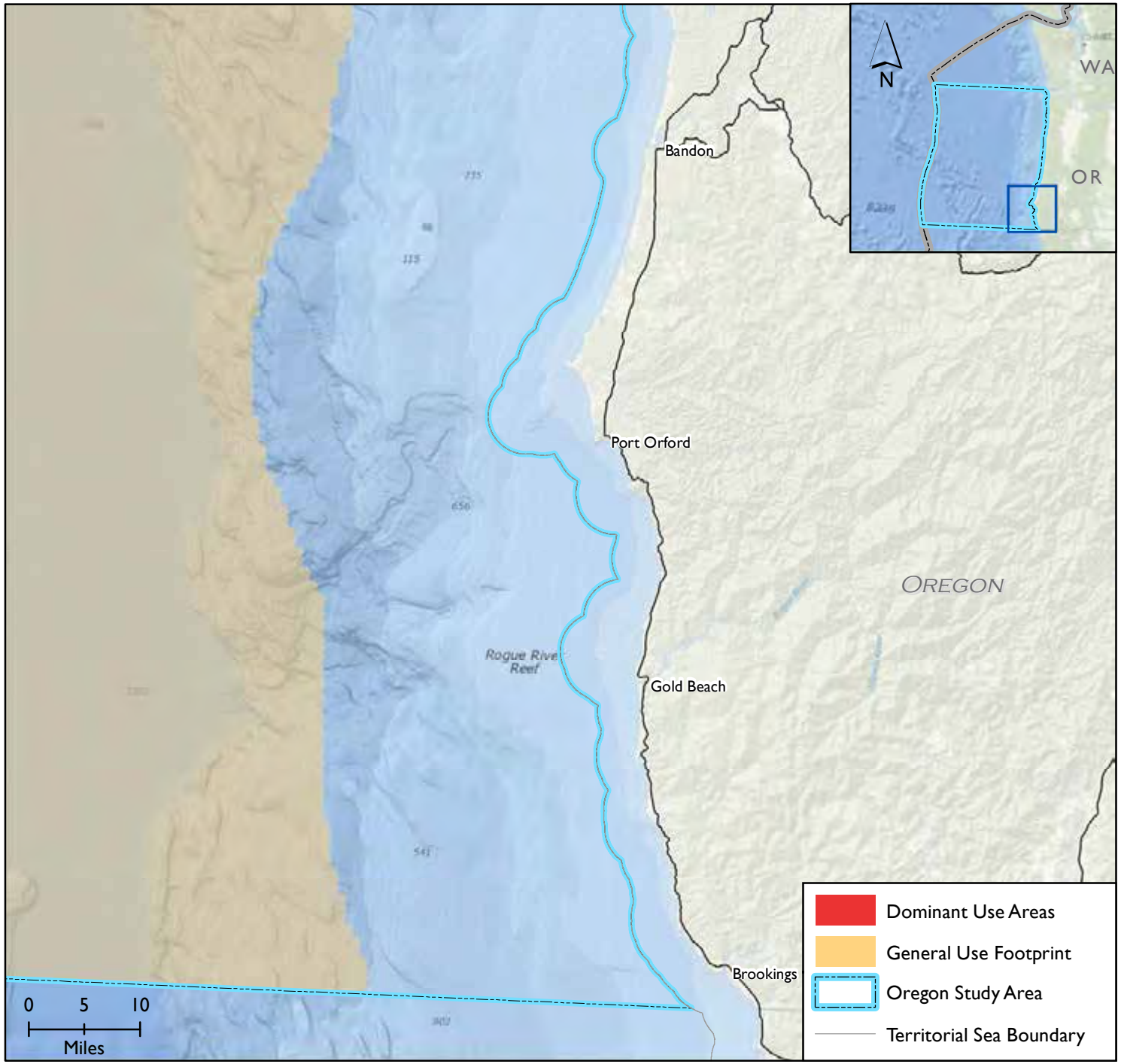

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THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, war games, and ordnance disposal

Excludes:
Wartime military operations

Use Notes:
Most Coast Guard and Navy activities in the study region are related to maneuvering activities on the continental slope near Washington. These activities include submarine traffic seaward of 100 fathoms, Coast Guard helicopter patterns and the Camp Rilea Danger Zone. The Coast Guard conducts much of its work inside 50 NM for rescue training and is most often called upon to pick up boats during the highly used summer season. Since the Coast Guard responds to distress calls from local fishing vessels and recreational boaters, its area of operations migrates with the fleet's seasonal movement.

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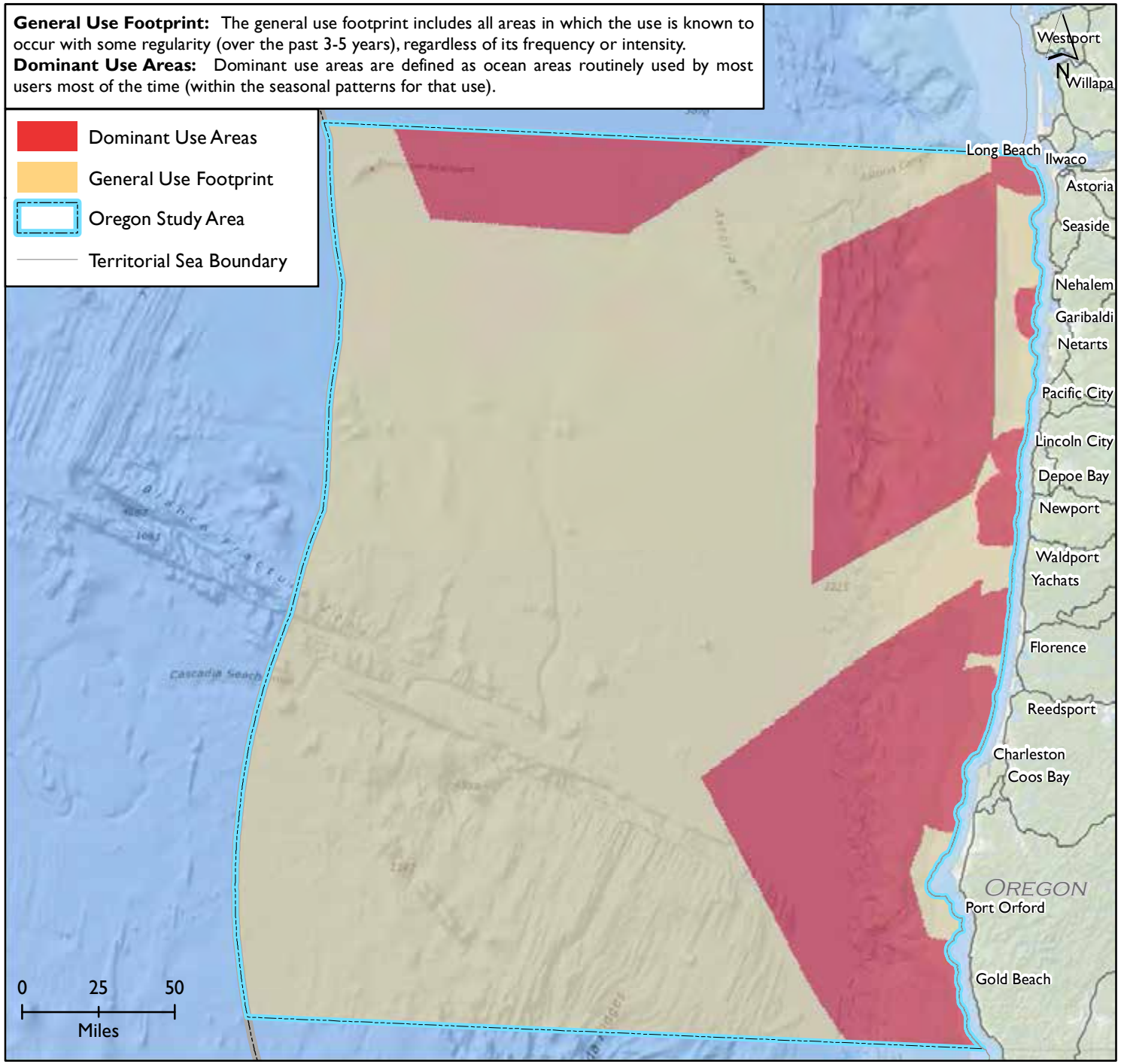

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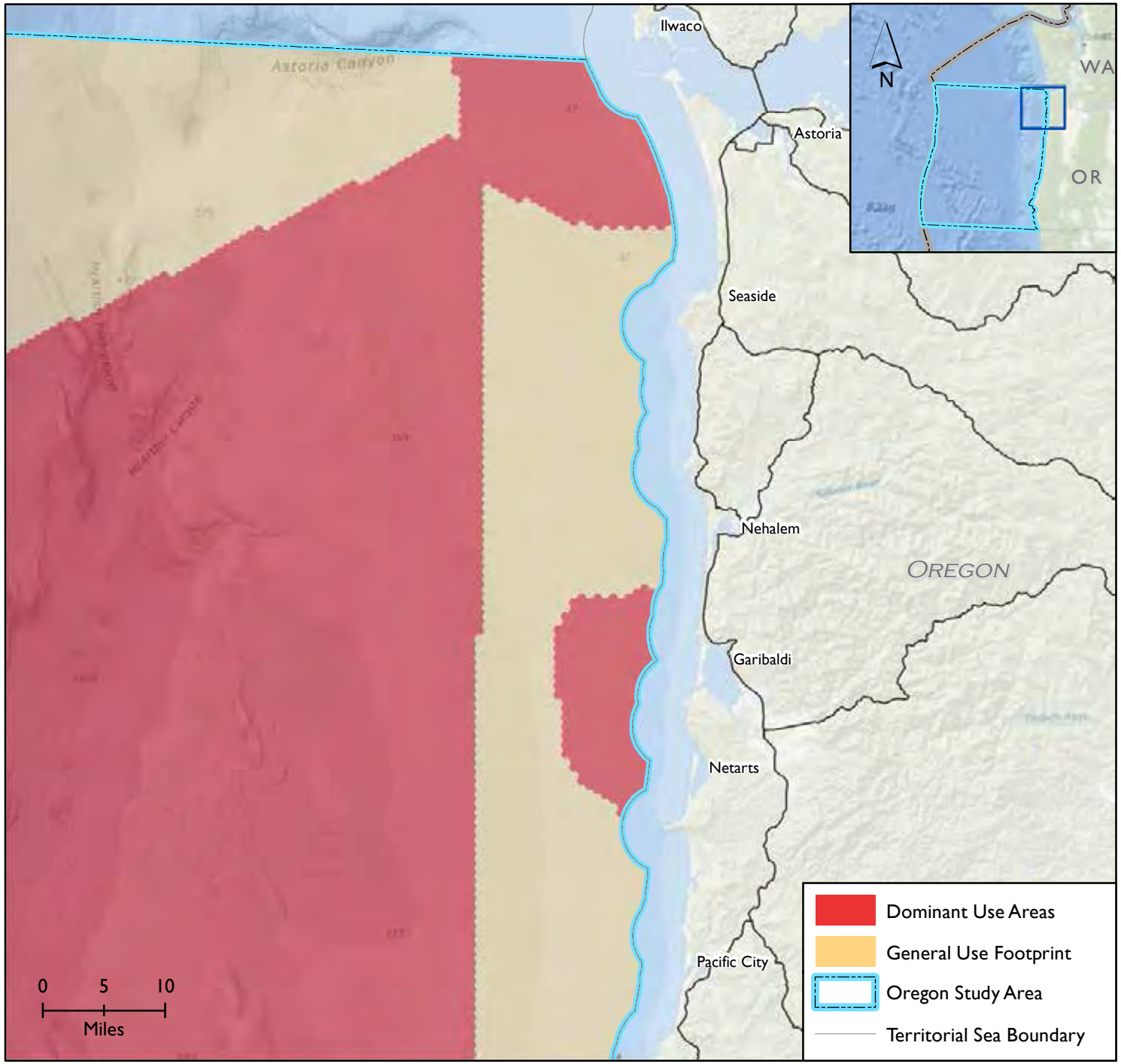

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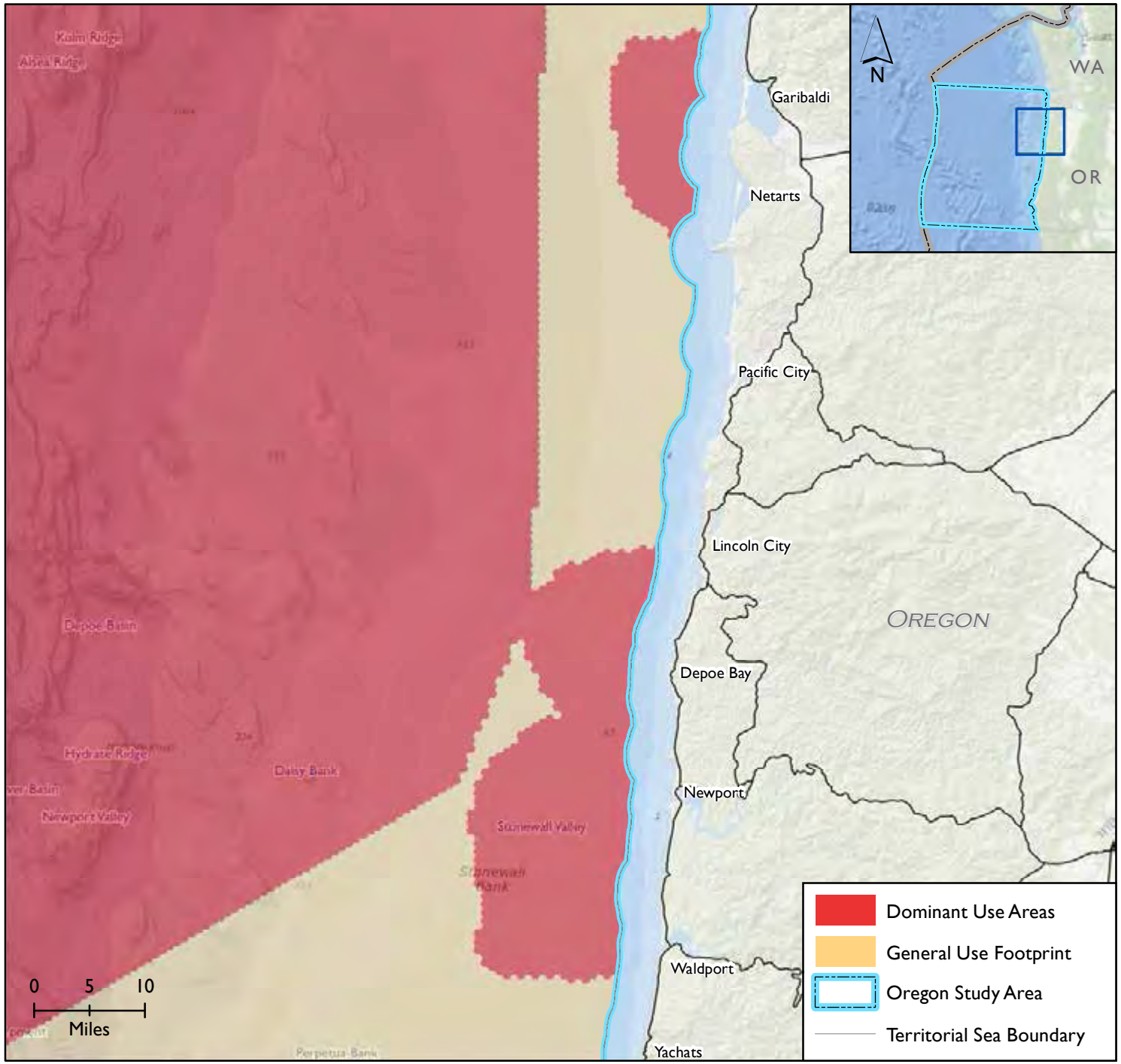

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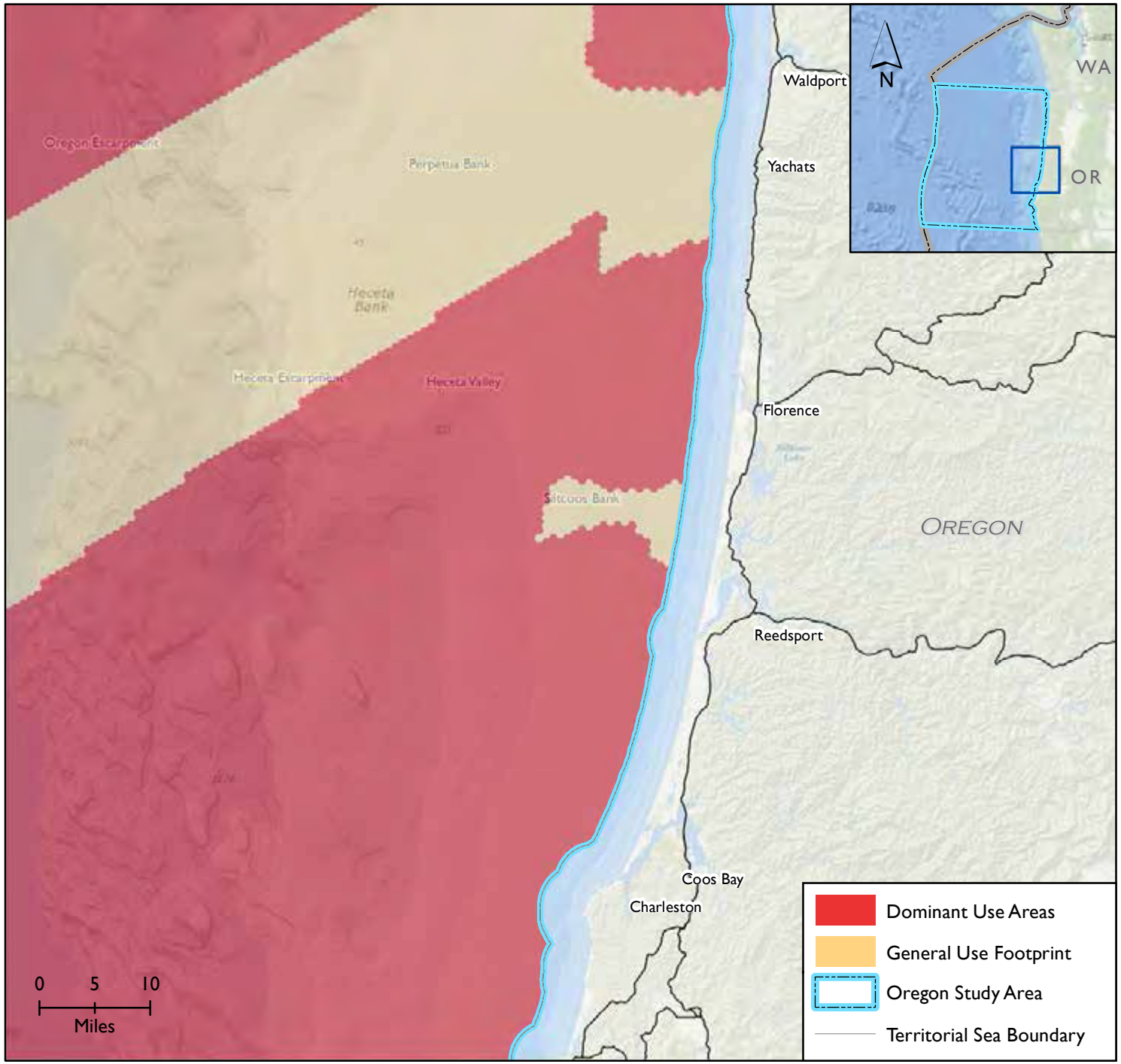

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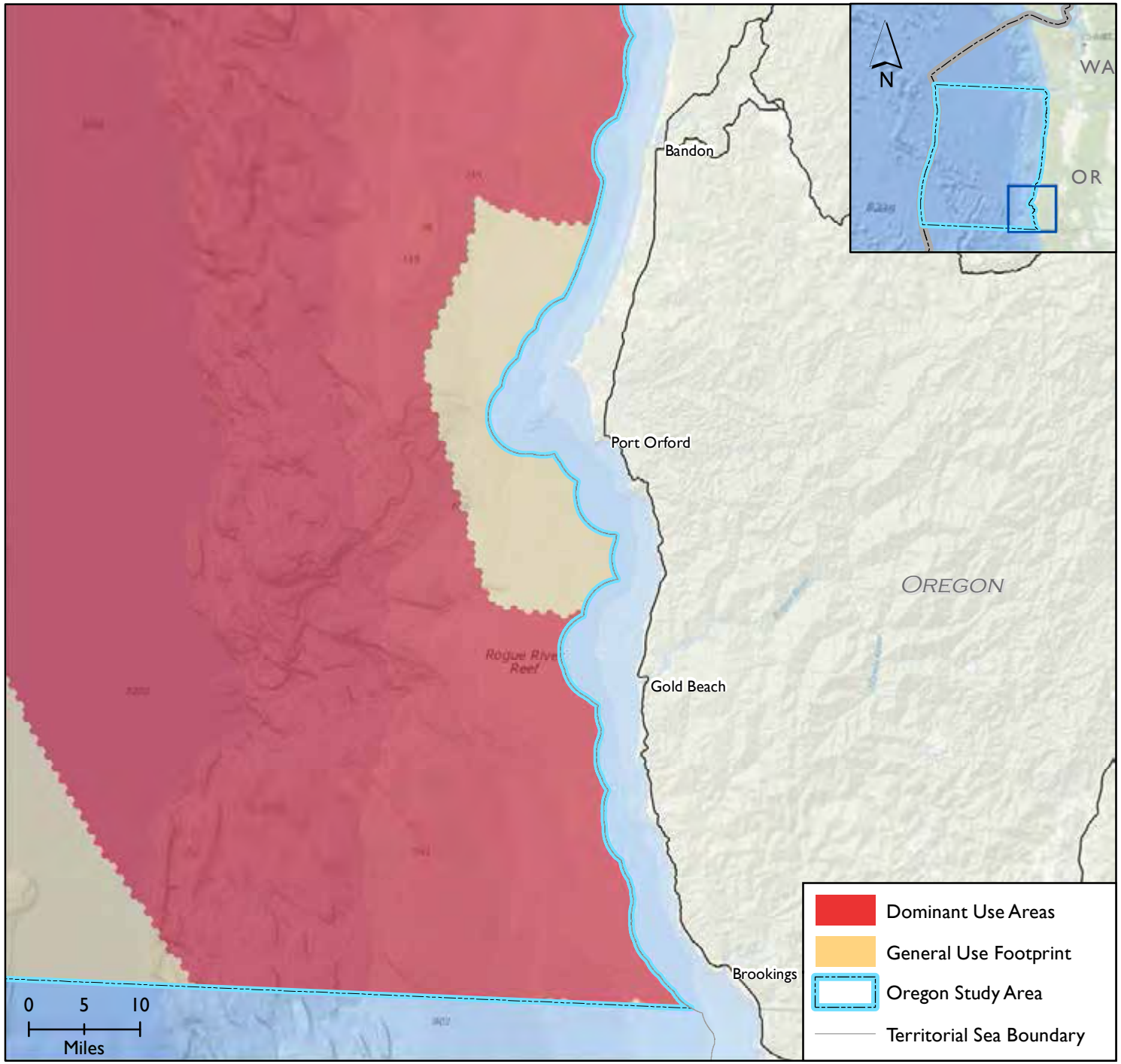

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THE OREGON OCEAN USES ATLAS

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Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Use Notes:
Oregon has one of the most well developed offshore renewable energy programs on the West Coast of the U.S. The WindFloat Pacific Demonstration Project is a proposed pilot-scale floating wind energy project offshore Coos Bay. The WindFloat commercial lease request was received by BOEM in May of 2013. Energy testing sites in the study region include the proposed Pacific Marine Energy Center (PMEC) South Energy Testing Site (SETS) offshore Newport. The PMEC SETS research lease request was received by BOEM in June of 2013. The Oregon Military Department commissioned a feasibility study and concept design study for ocean renewable energy offshore Camp Rilea. The unique Gorda Ridge system offshore southern Oregon is a potential source of geothermal energy, though no project proposals or lease requests for the Gorda Ridge system have been received to date. Regarding offshore renewable energy development, communities have concerns with visual impacts and effects on seabird populations, local fisheries, and local economies from unproven wave energy technologies and out-of-state jobs.

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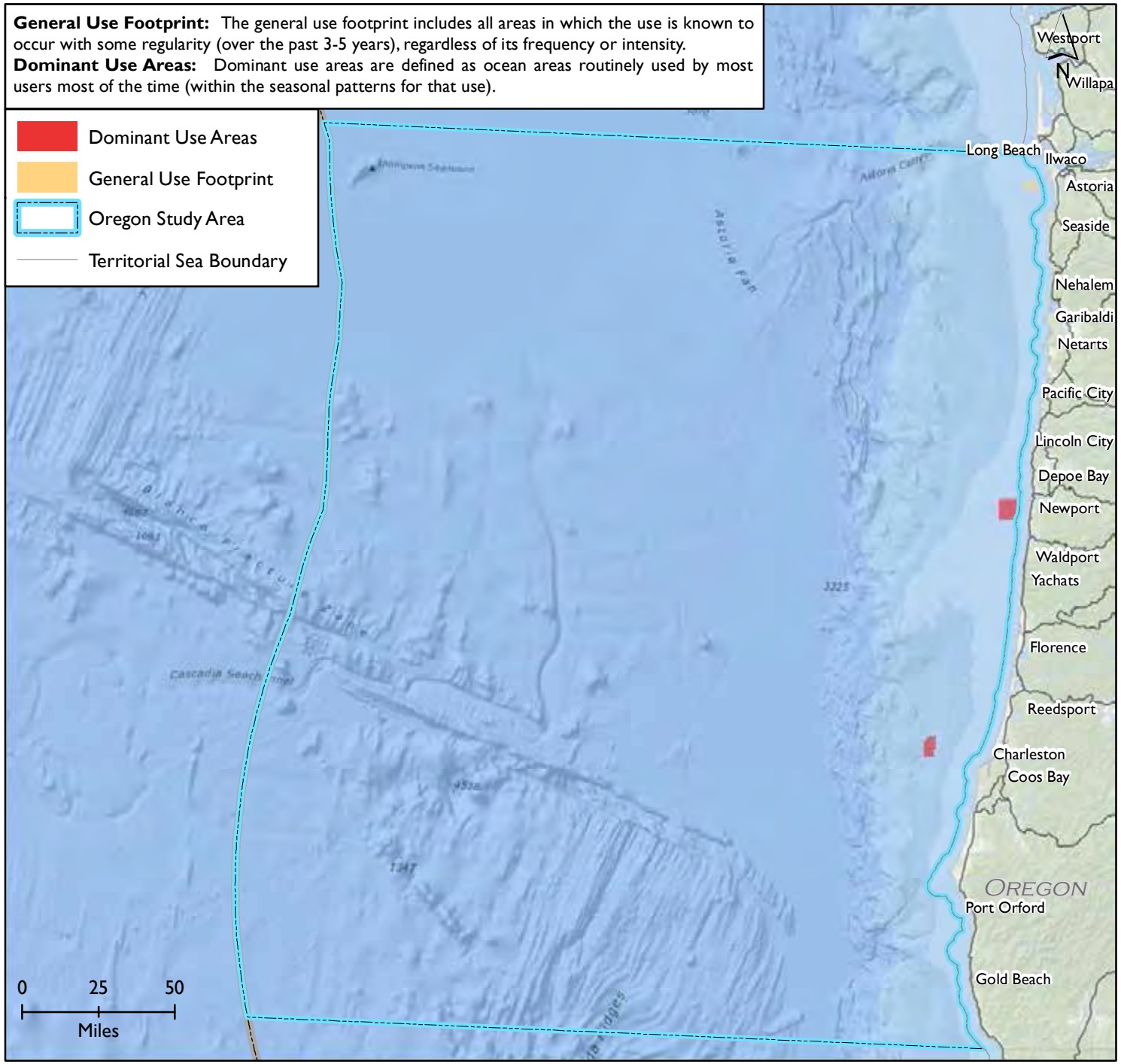

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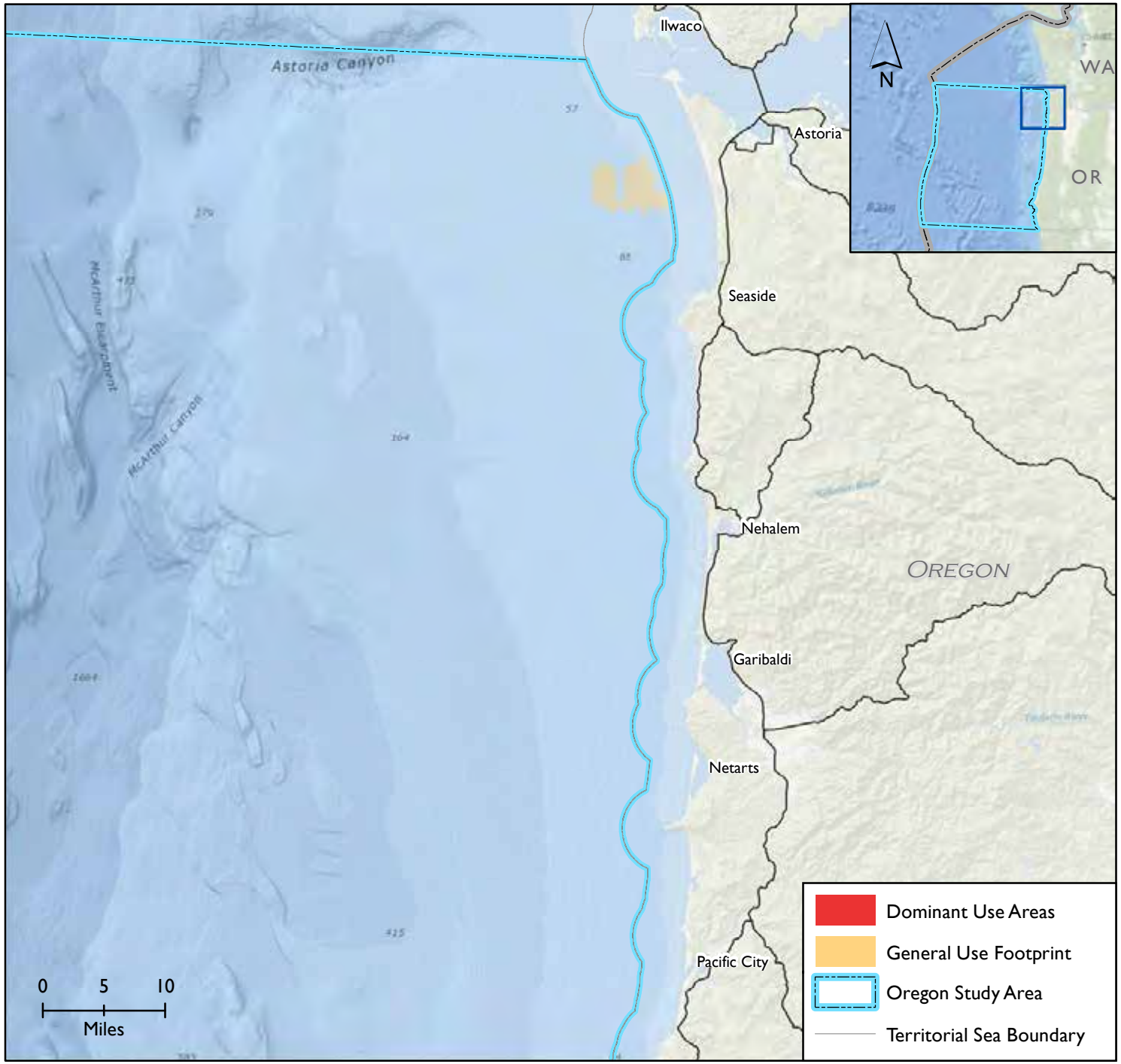

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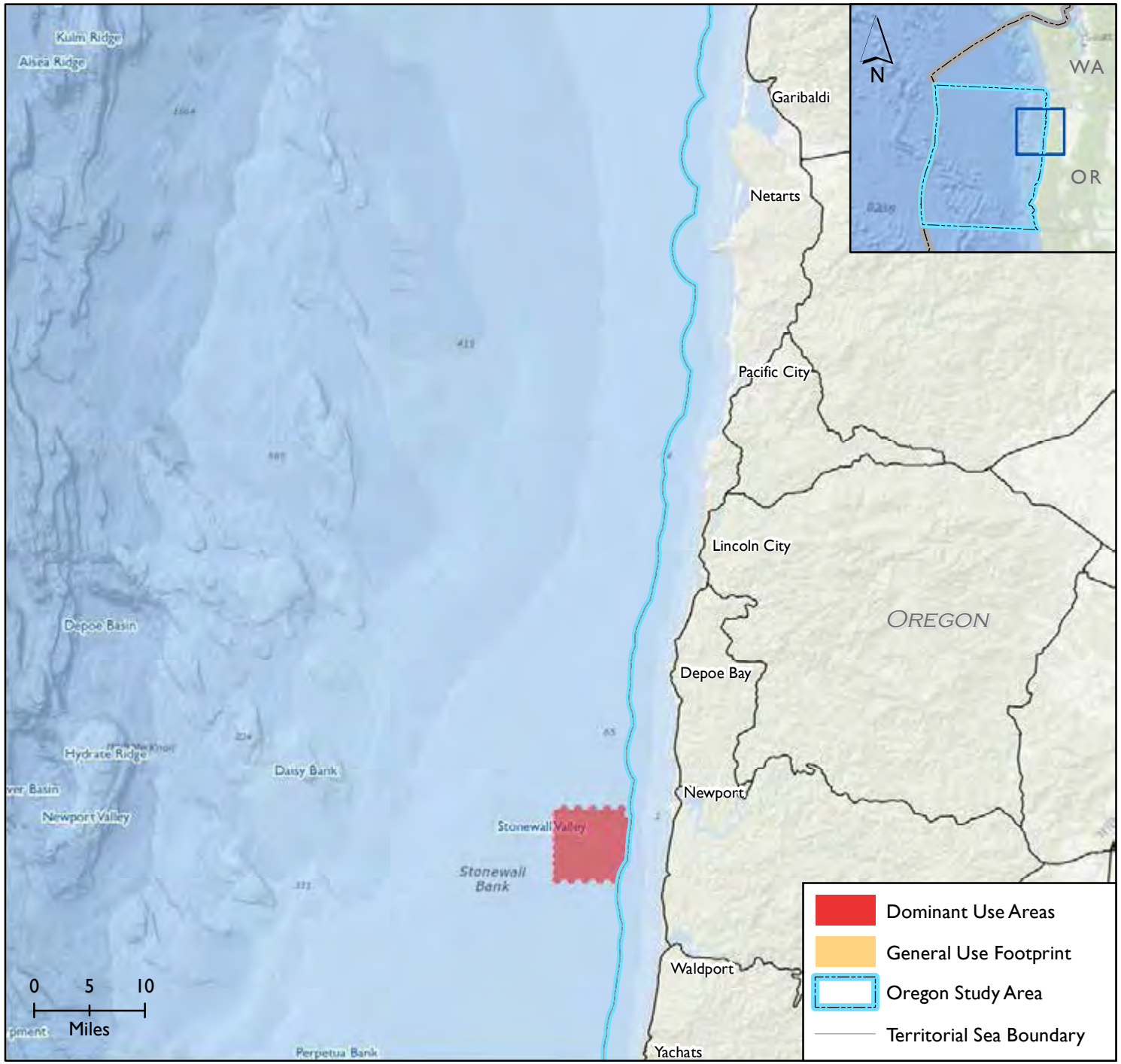

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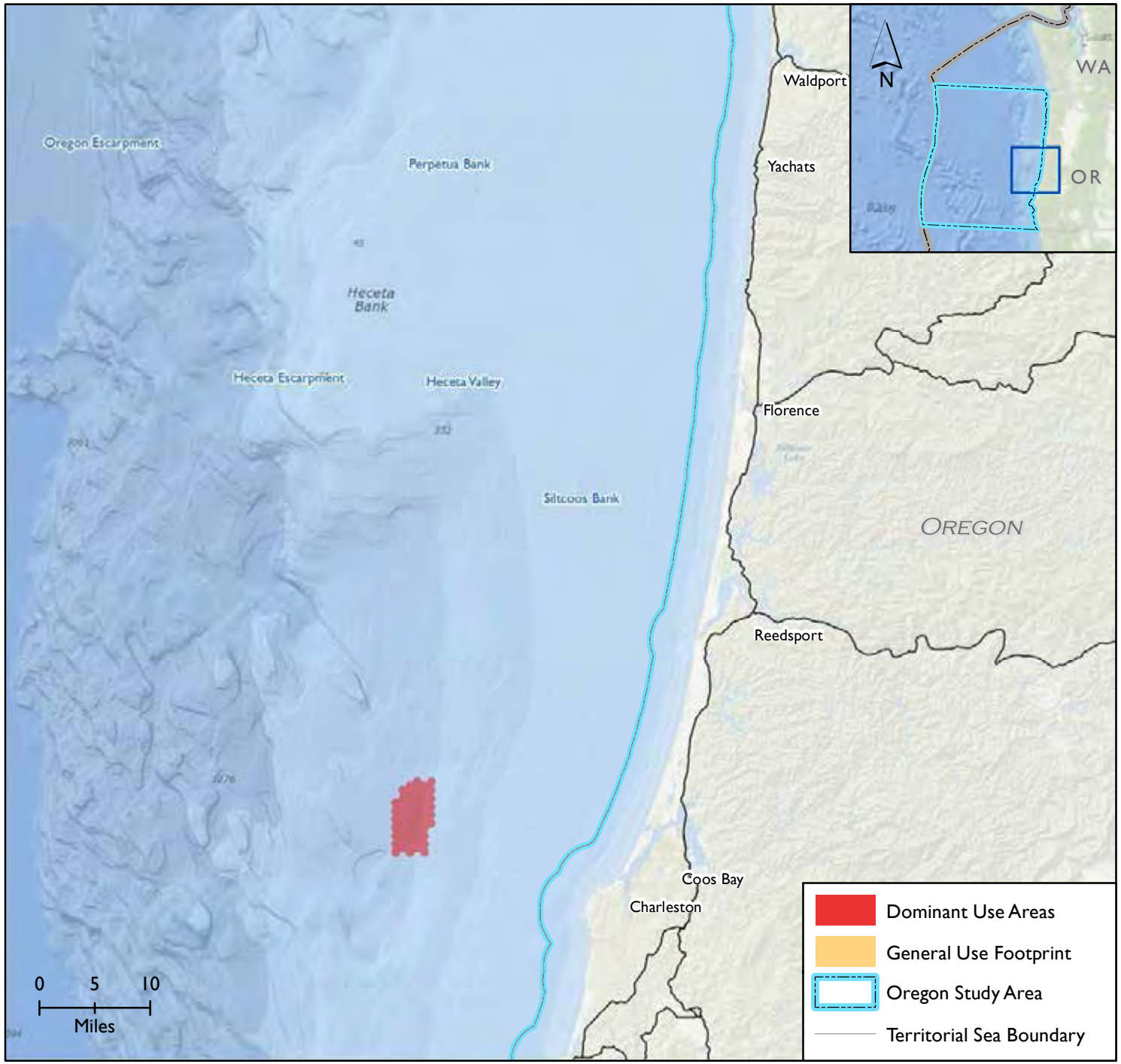

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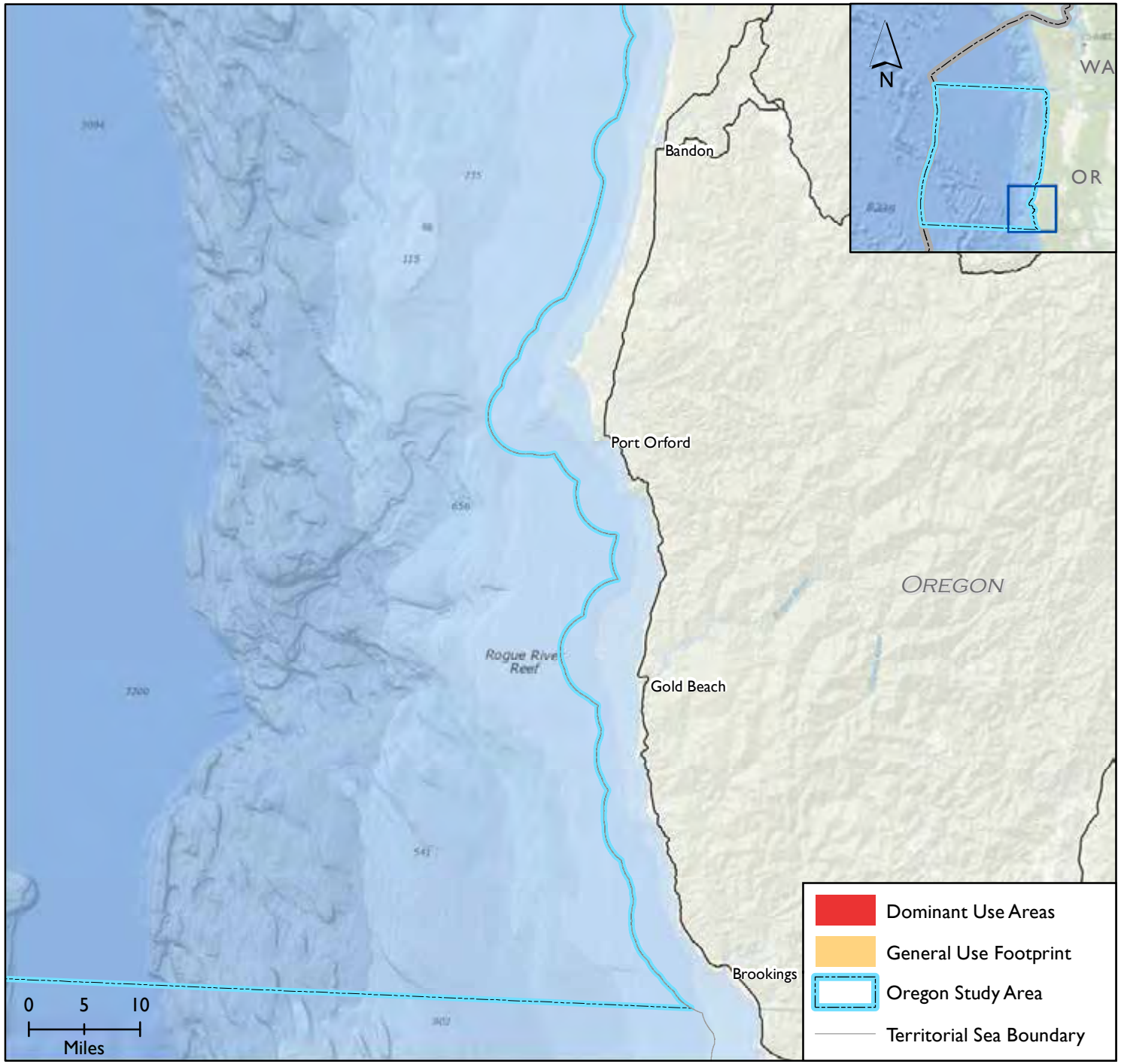

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Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Use Notes:
Heavy shipping use occurs throughout the study region. Ships in the region are either crossing the Pacific or transiting north and south 20 – 50 miles offshore. This traffic is concentrated closer to shore around the primary ports of Astoria, Newport and Coos Bay. Within most state waters, tow lanes exist (no major tow lanes in Garibaldi, Florence and Reedsport) for tugboats and barges but not deep draft shipping lanes. The tow lanes exist largely to prevent ships from picking up set crab gear. Most tow lane traffic is from ports such as Bandon, Florence and Coos Bay. An unlegislated agreement exists whereby the tow lanes are eligible to be crabbed during the crab season (winter months) but not at other times of the year. Changes in shipping goods such as timber logs and Liquified Natural Gas (LNG) development could alter shipping activities in the state dramatically.

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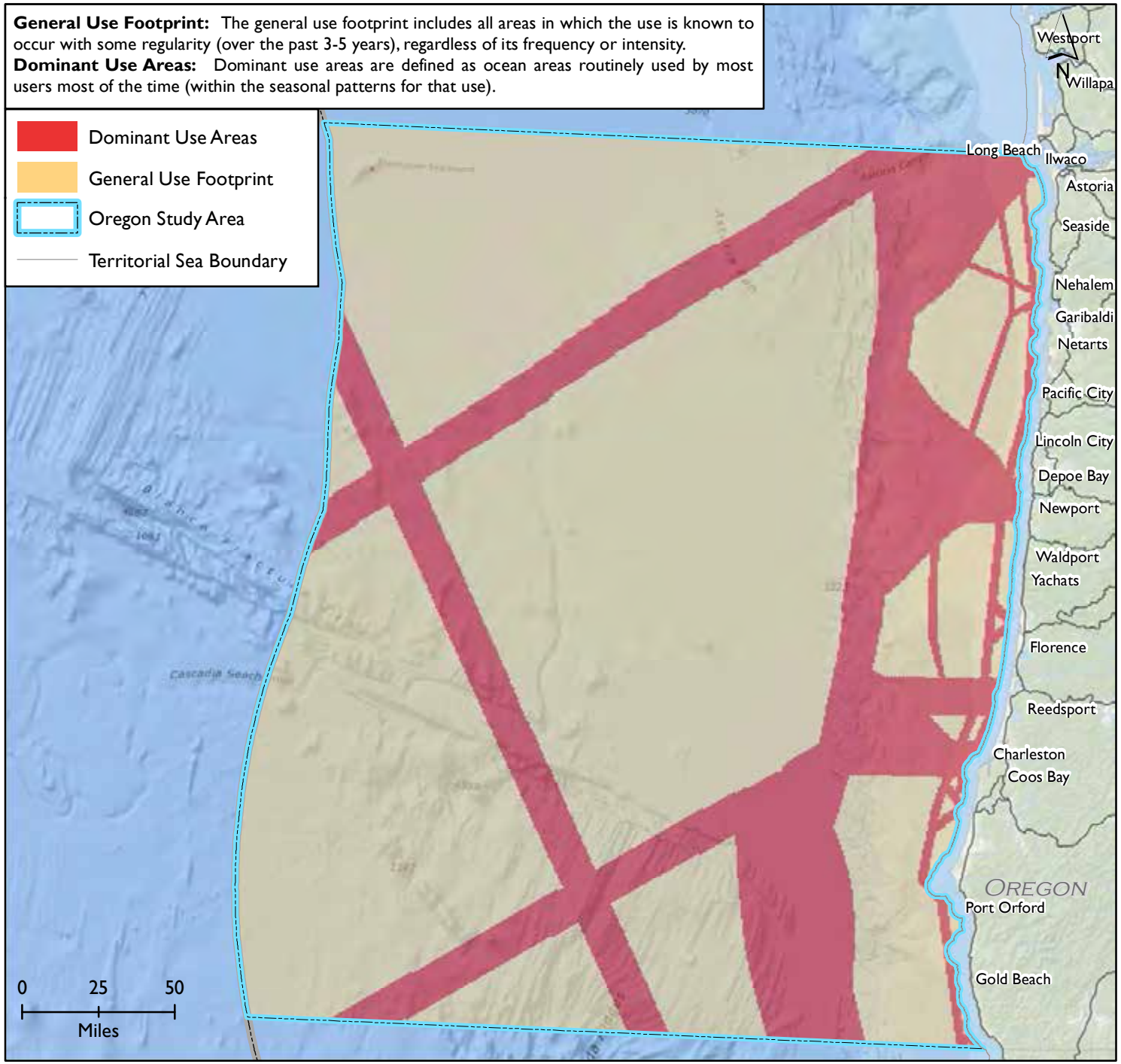

THE OREGON OCEAN USES ATLAS

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Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels
Excludes:
Cruise Ships, Military Vessels

Use Notes:
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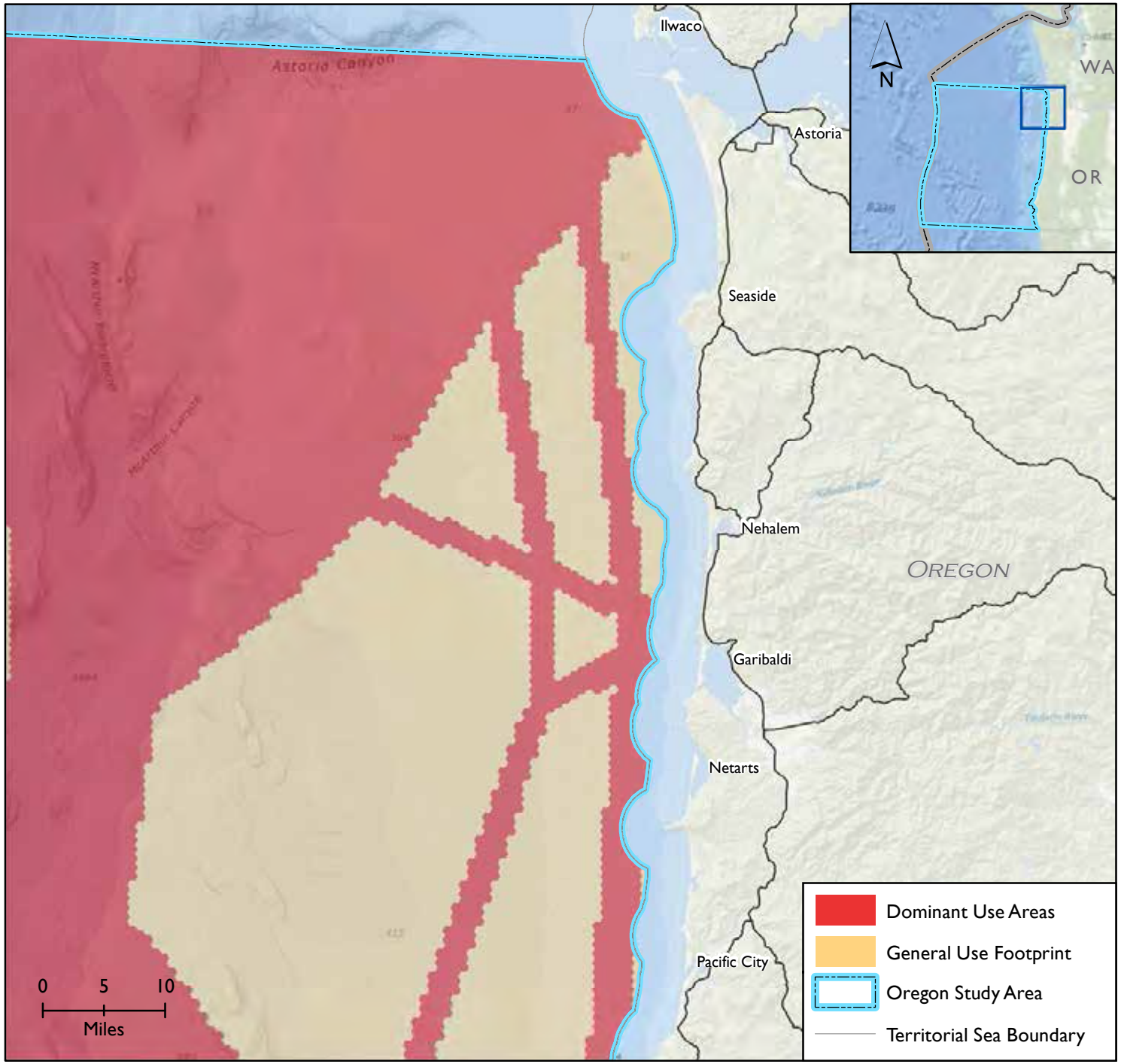

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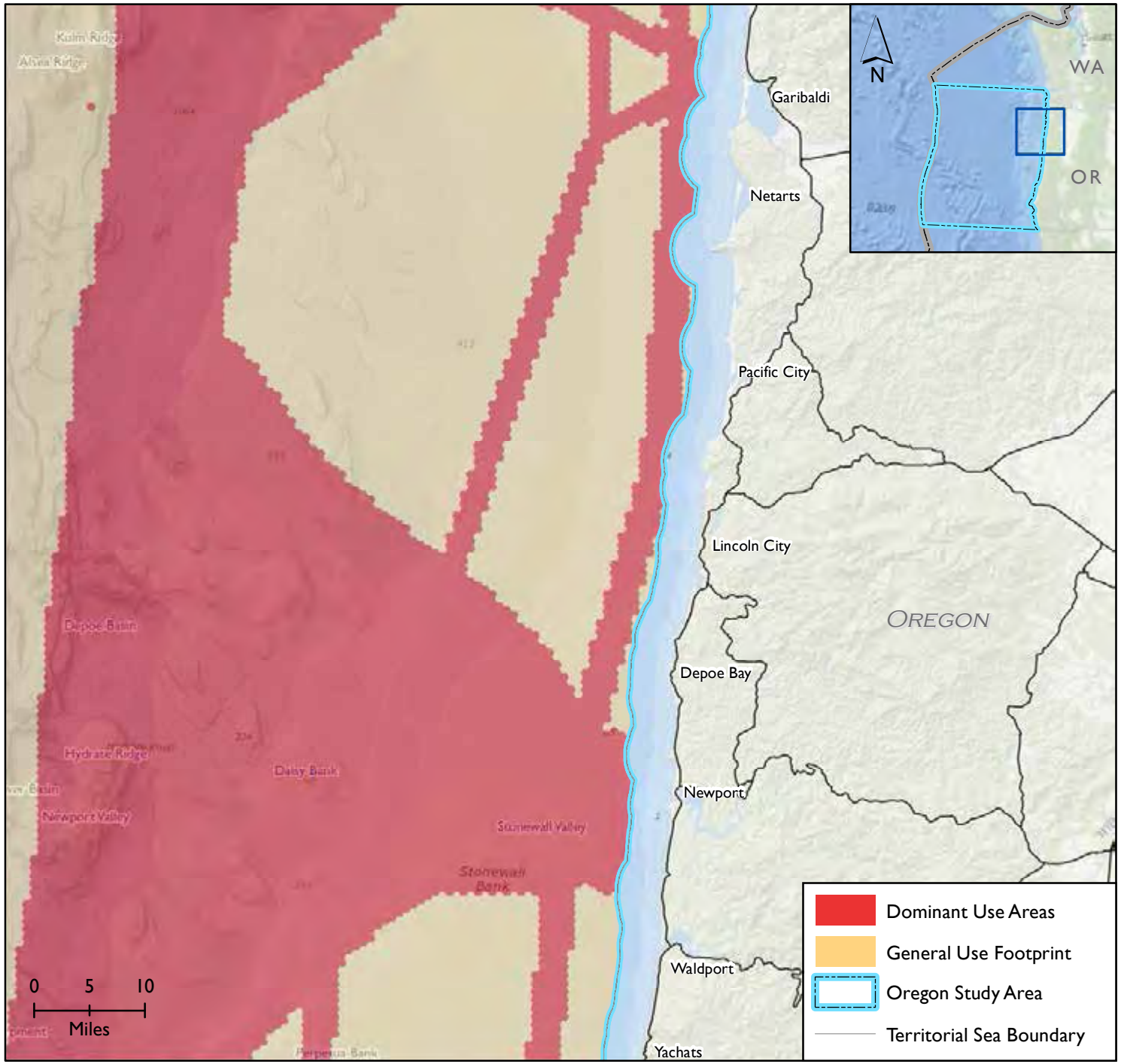

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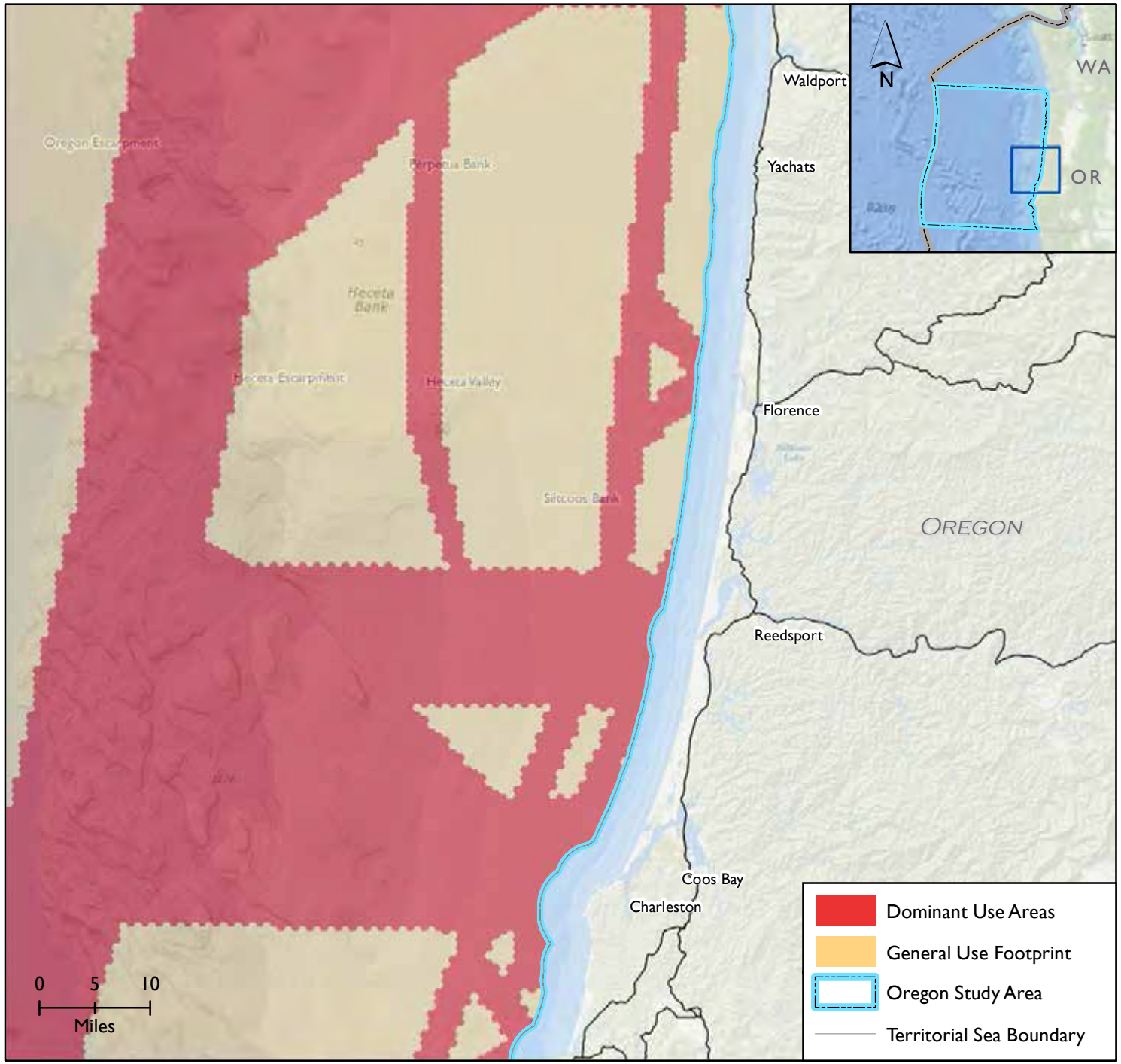

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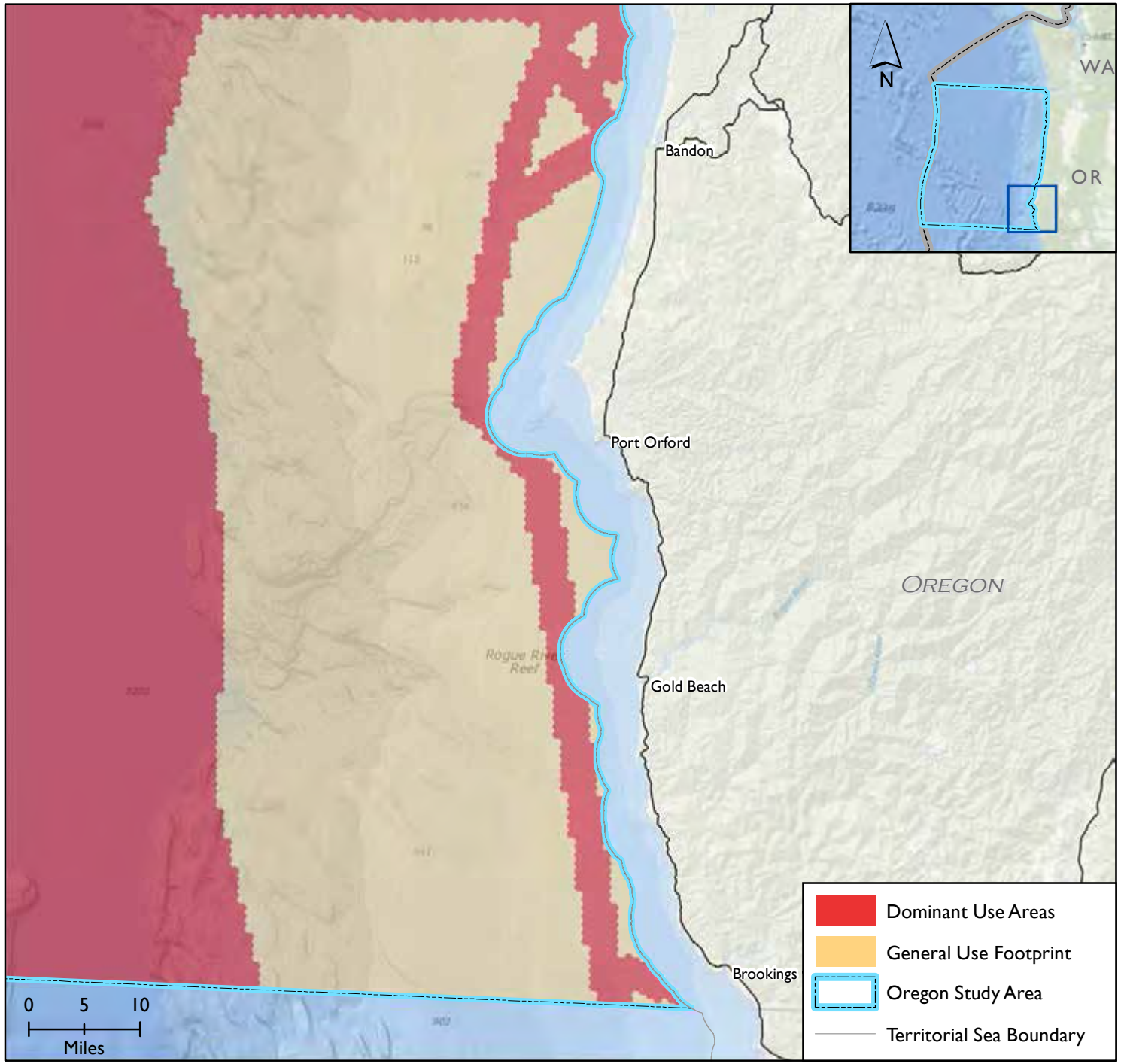

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Underwater Transmission Cables

Includes:
Cables installed on the seafloor to transmit data, communications, and electricity generated on land

Excludes:
Lost fishing gear, renewable electricity transmission cables

Use Notes:
Underwater transmission cables are present throughout the study region. Out to 700 fathoms, cables are buried to 1 meter to protect against trawling (burial does not protect against potential anchoring damage). Beyond this depth, the cables are simply laid on the seafloor. Existing cables are used predominantly for telecommunication and vary in length from north-south cables that span the west coast to transpacific cables. There are research cables around Coos Bay that include research arrays for the Ocean Observing Initiative (OOI).

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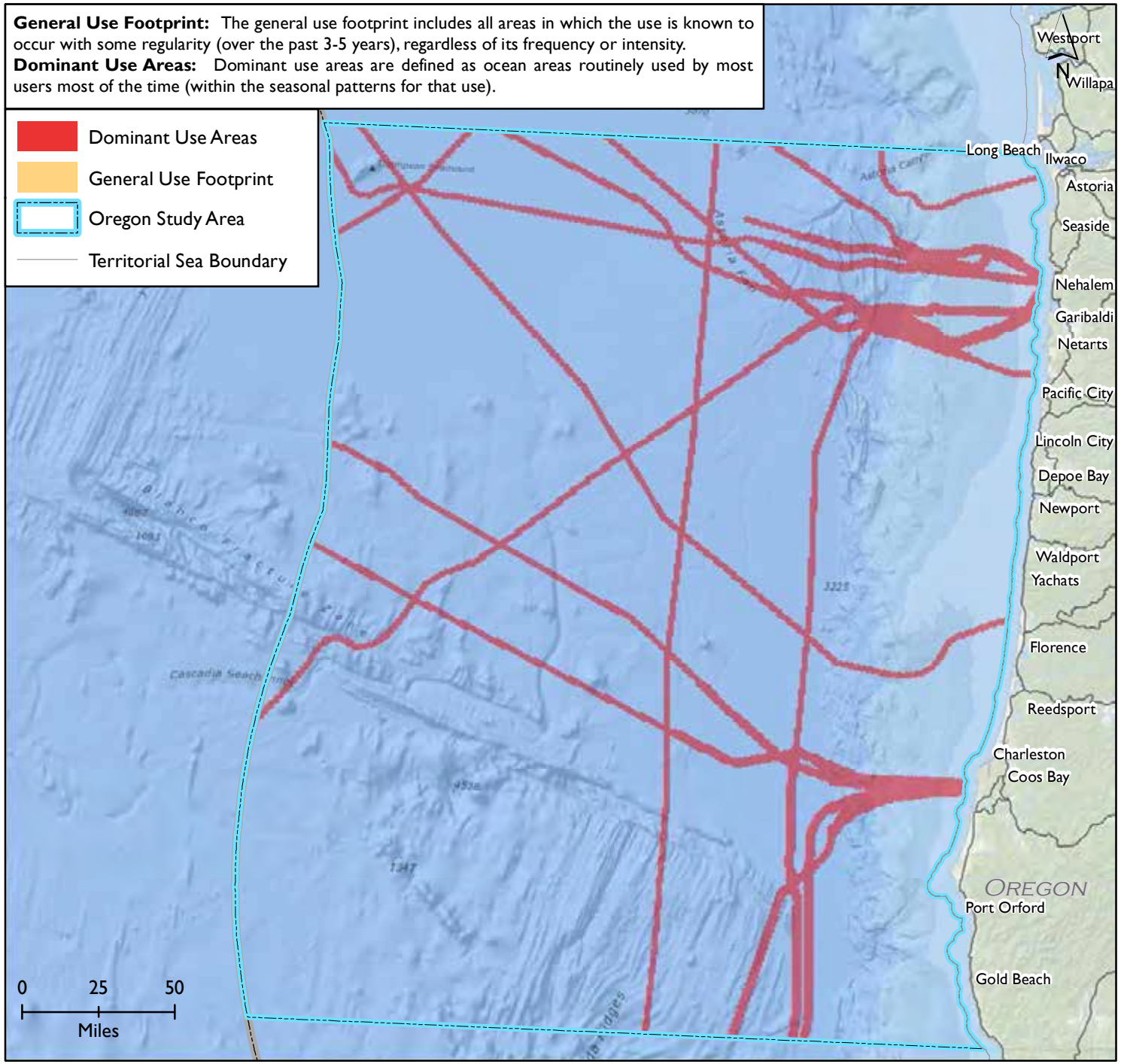

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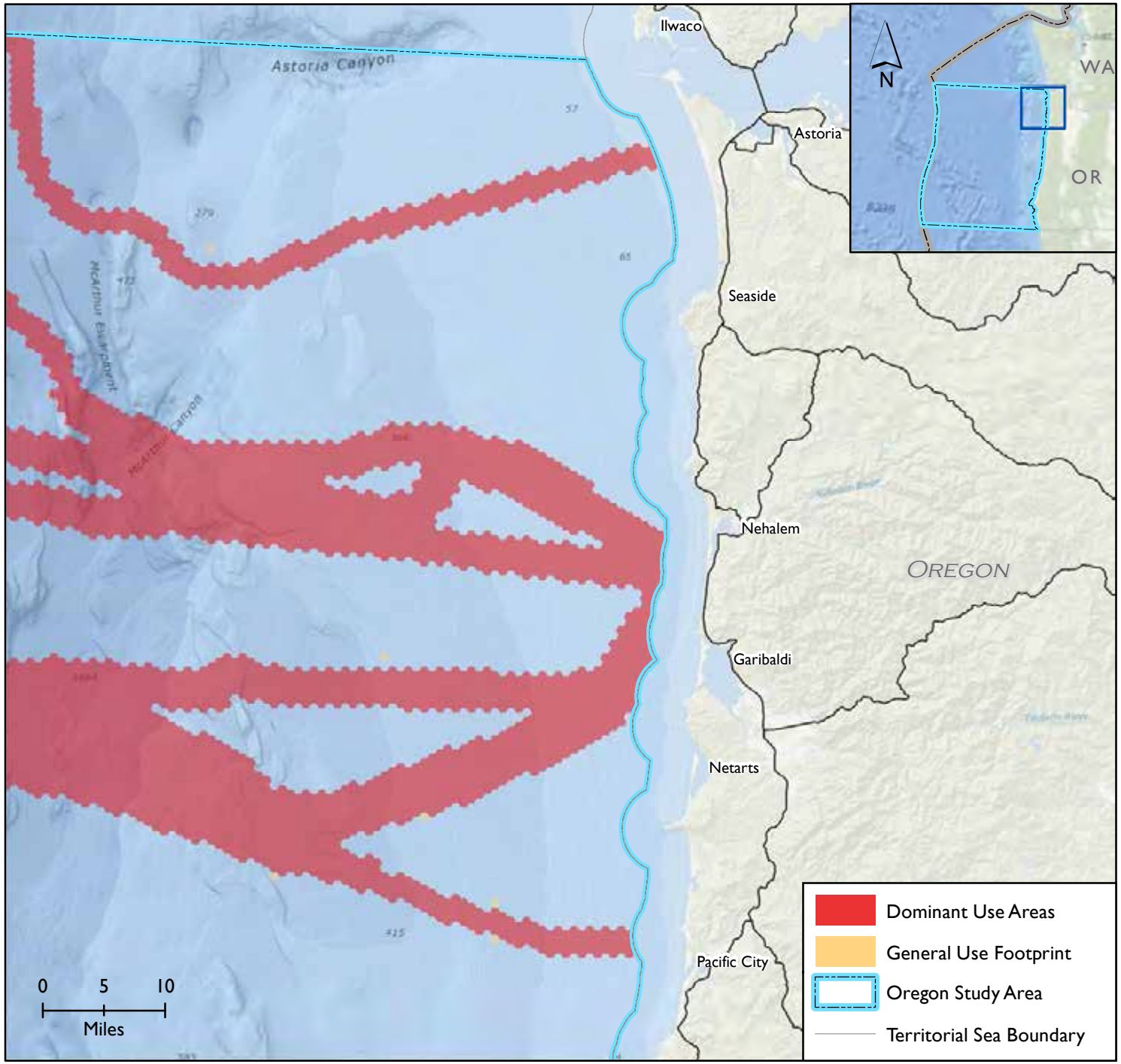

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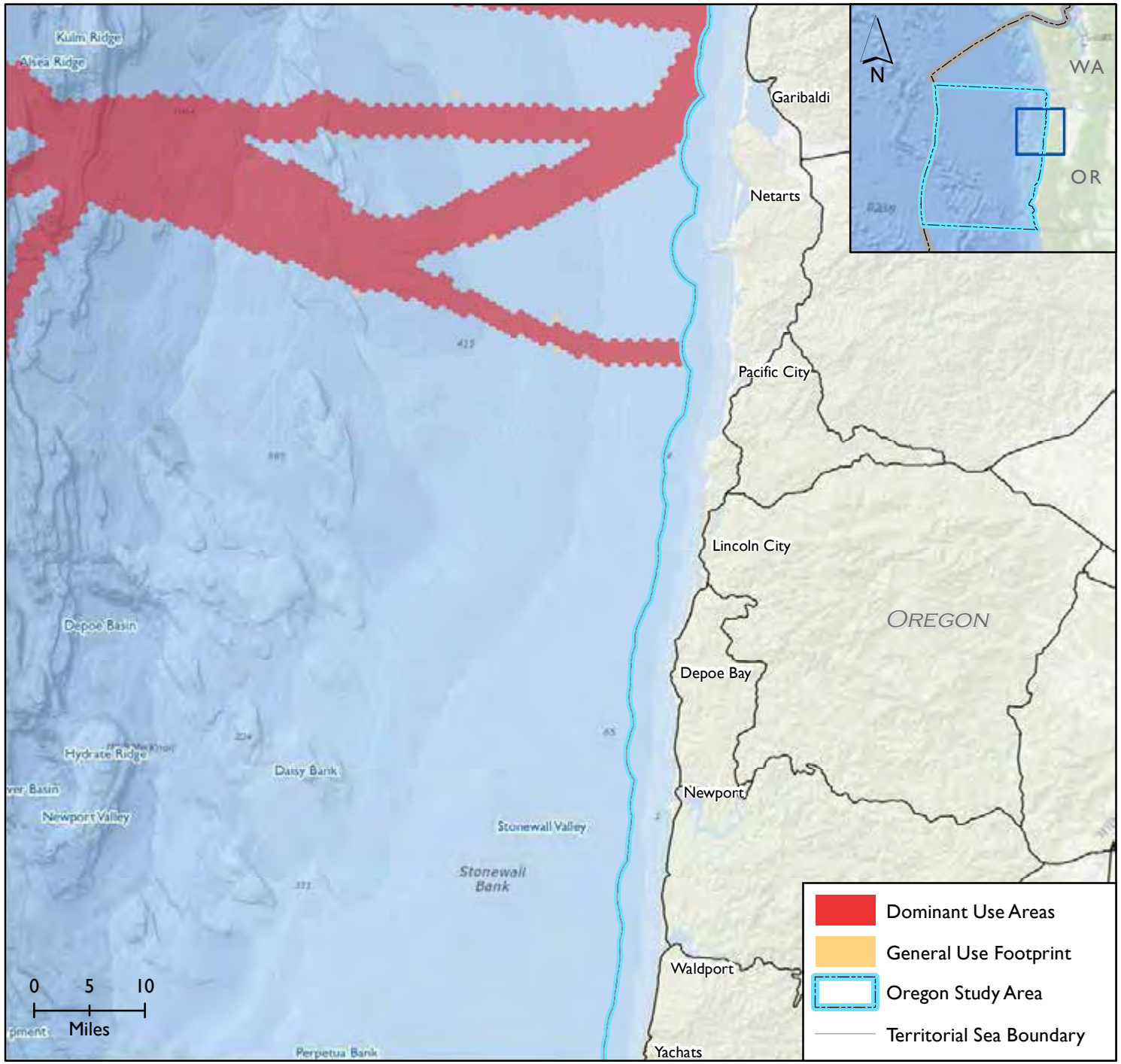

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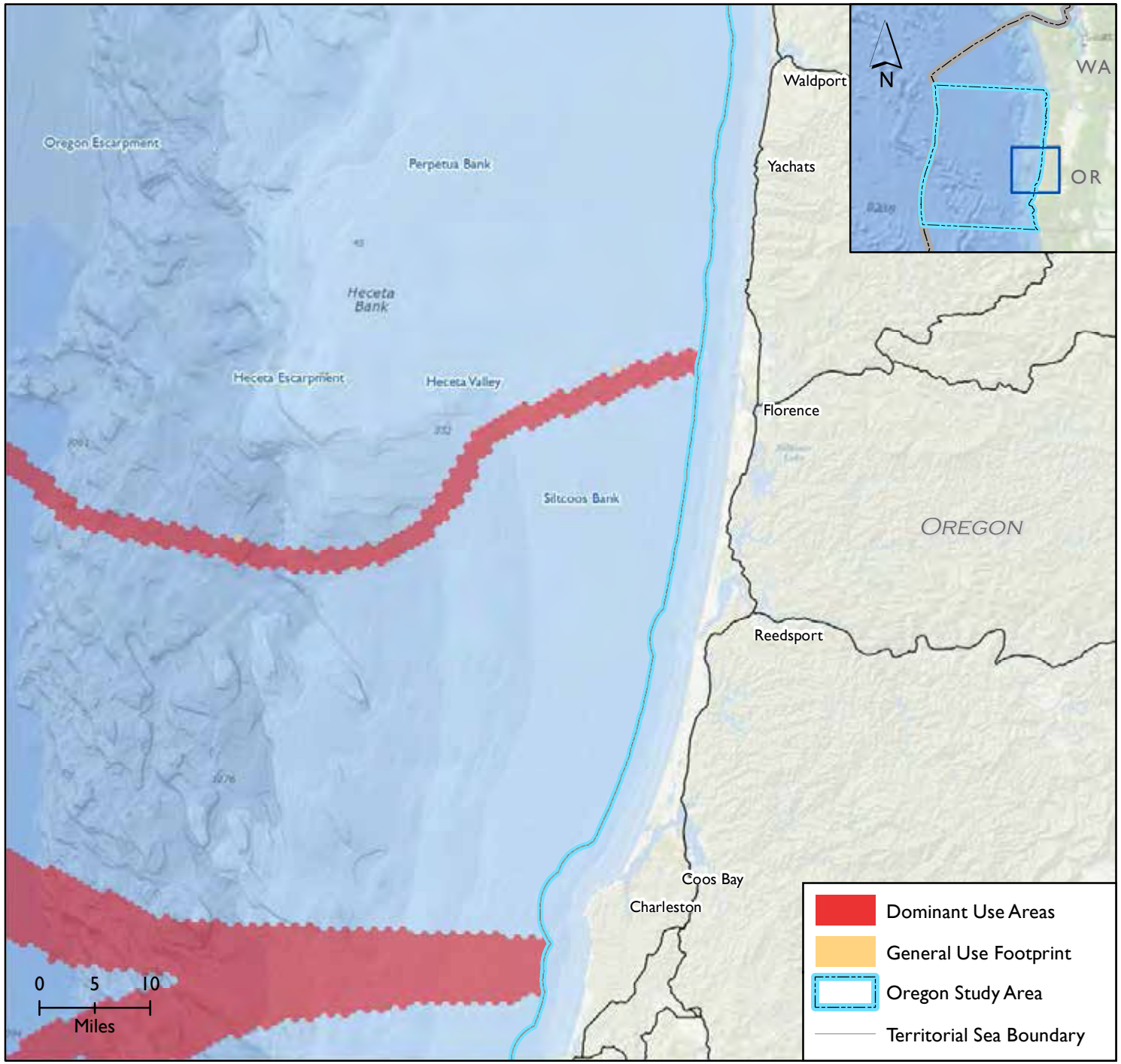

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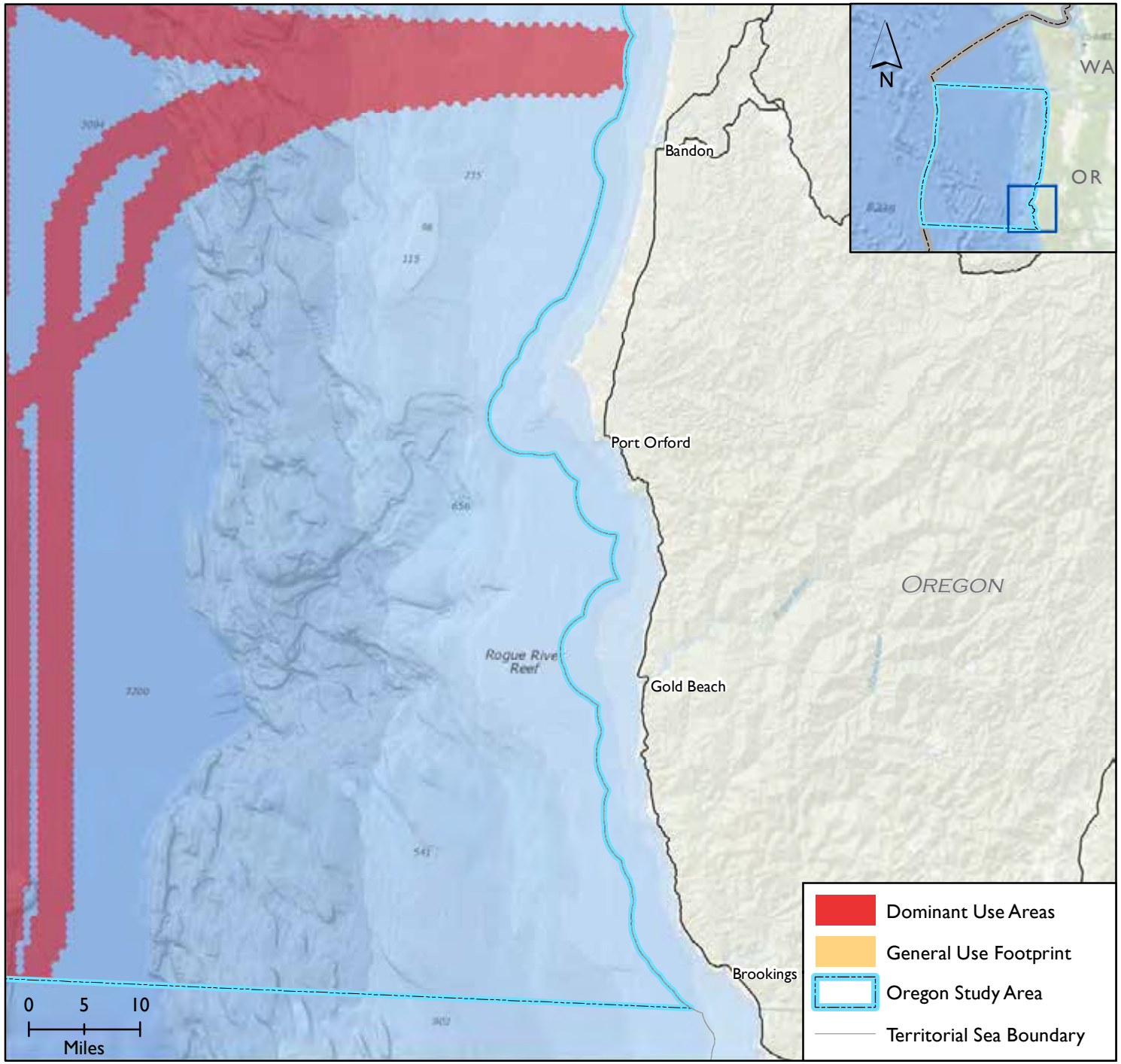

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THE OREGON OCEAN USES ATLAS

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Motorized Boating

Includes:
Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC)

Excludes:
Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing

Use Notes:
Motorized boating is not common in the study region. The highest use areas are around ports, where boats typically motor as far as 10 NM offshore. There is a limited transitory corridor 50 NM offshore that boaters use to move up and down the coast.

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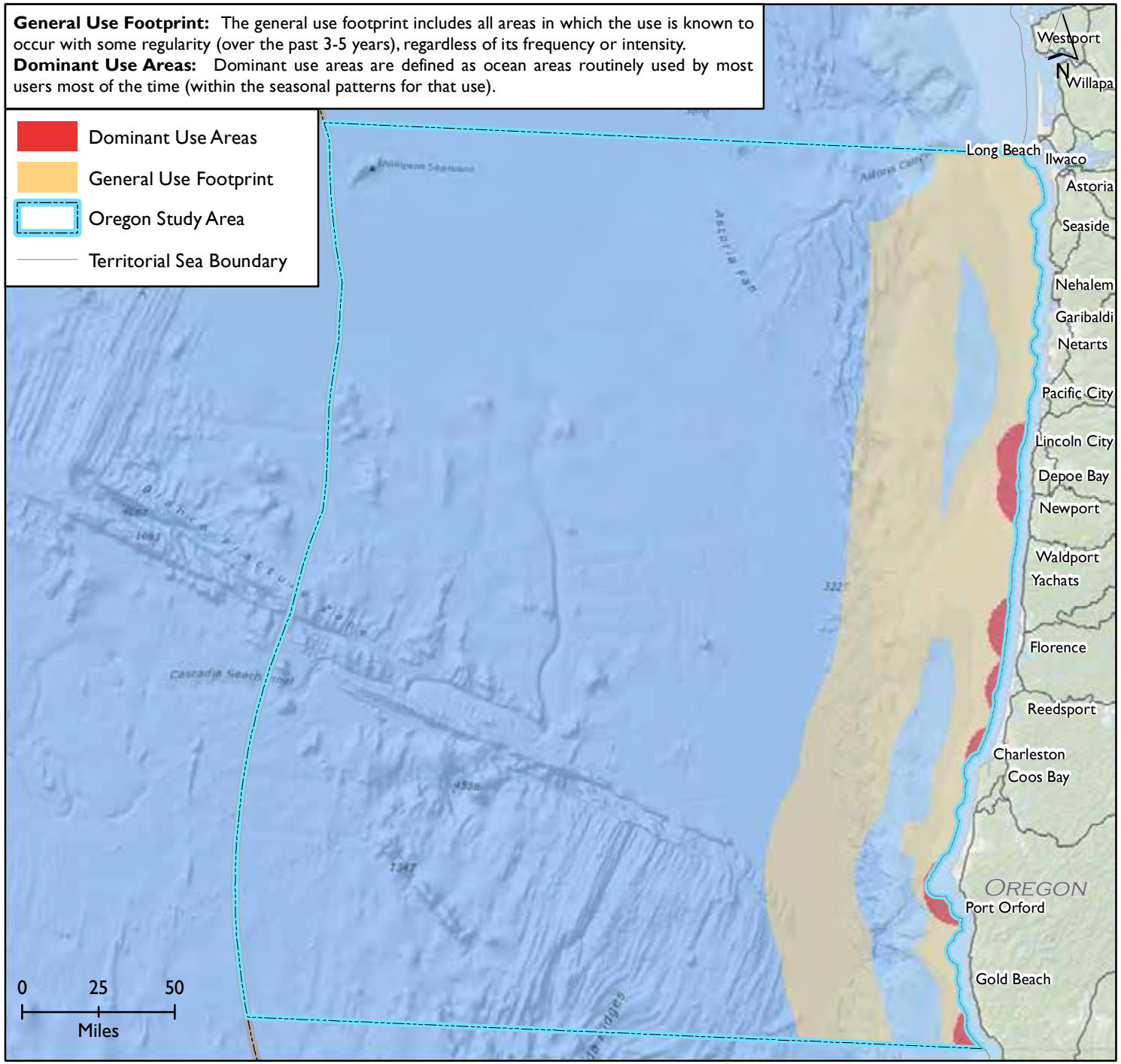

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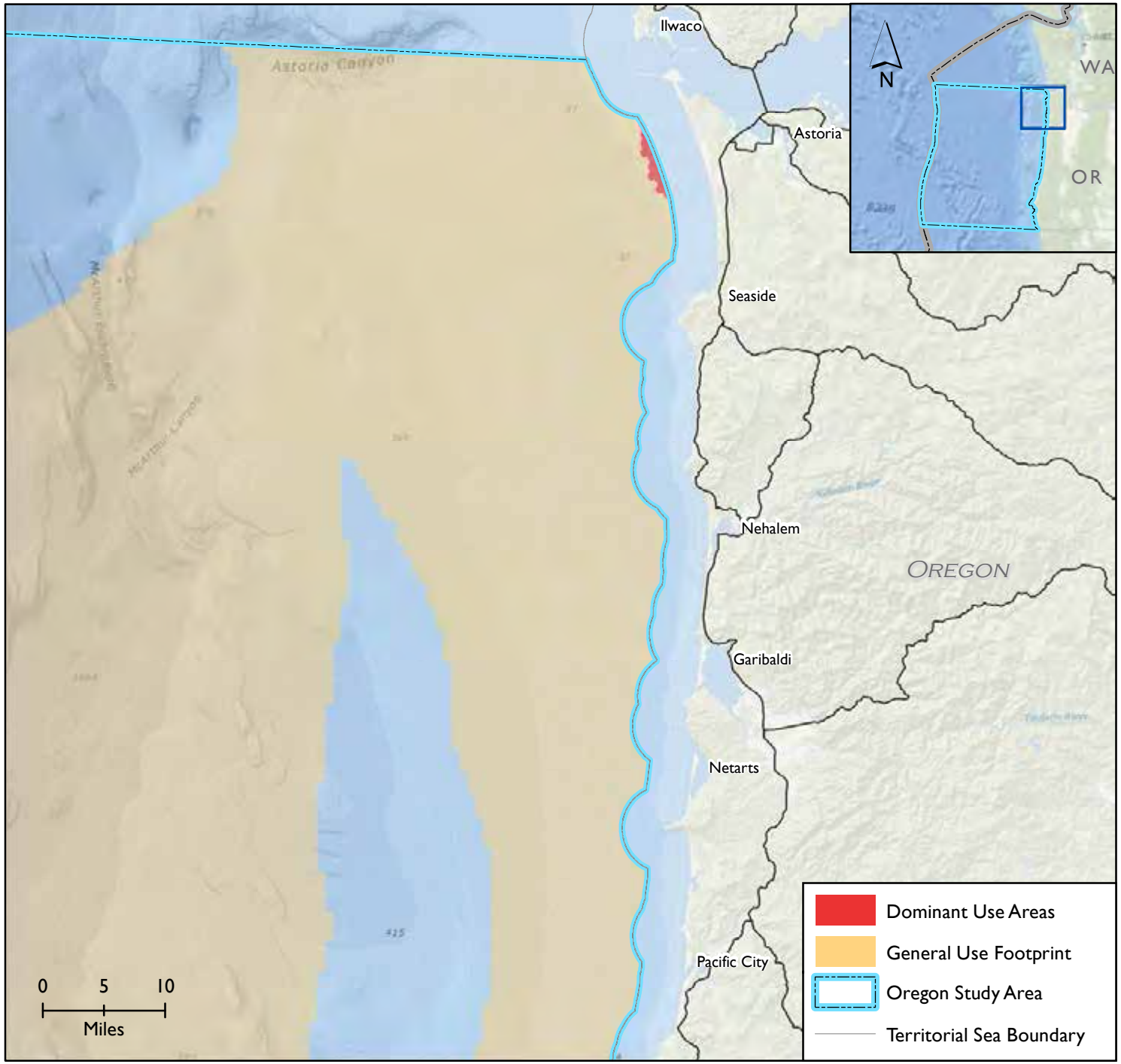

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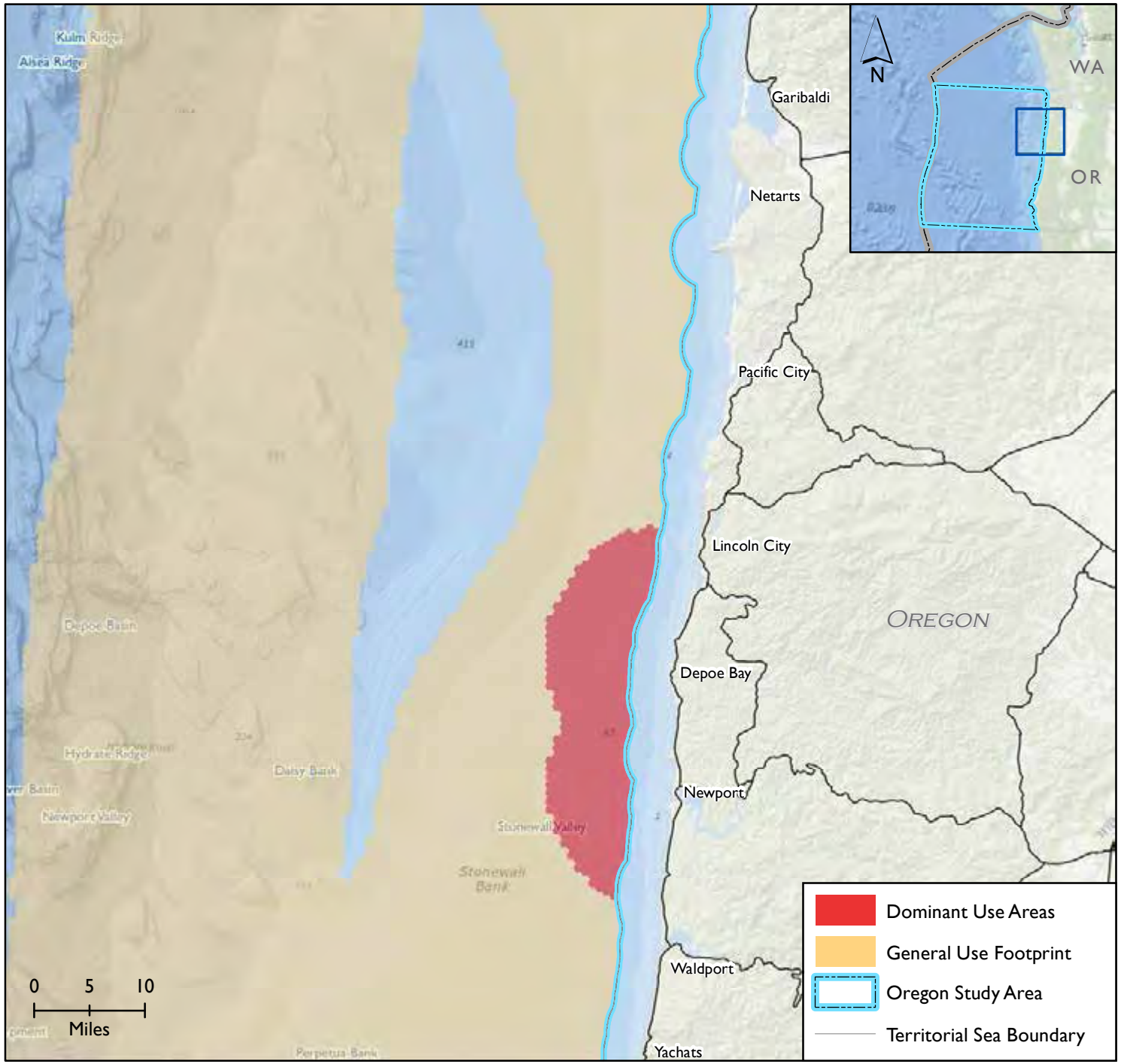

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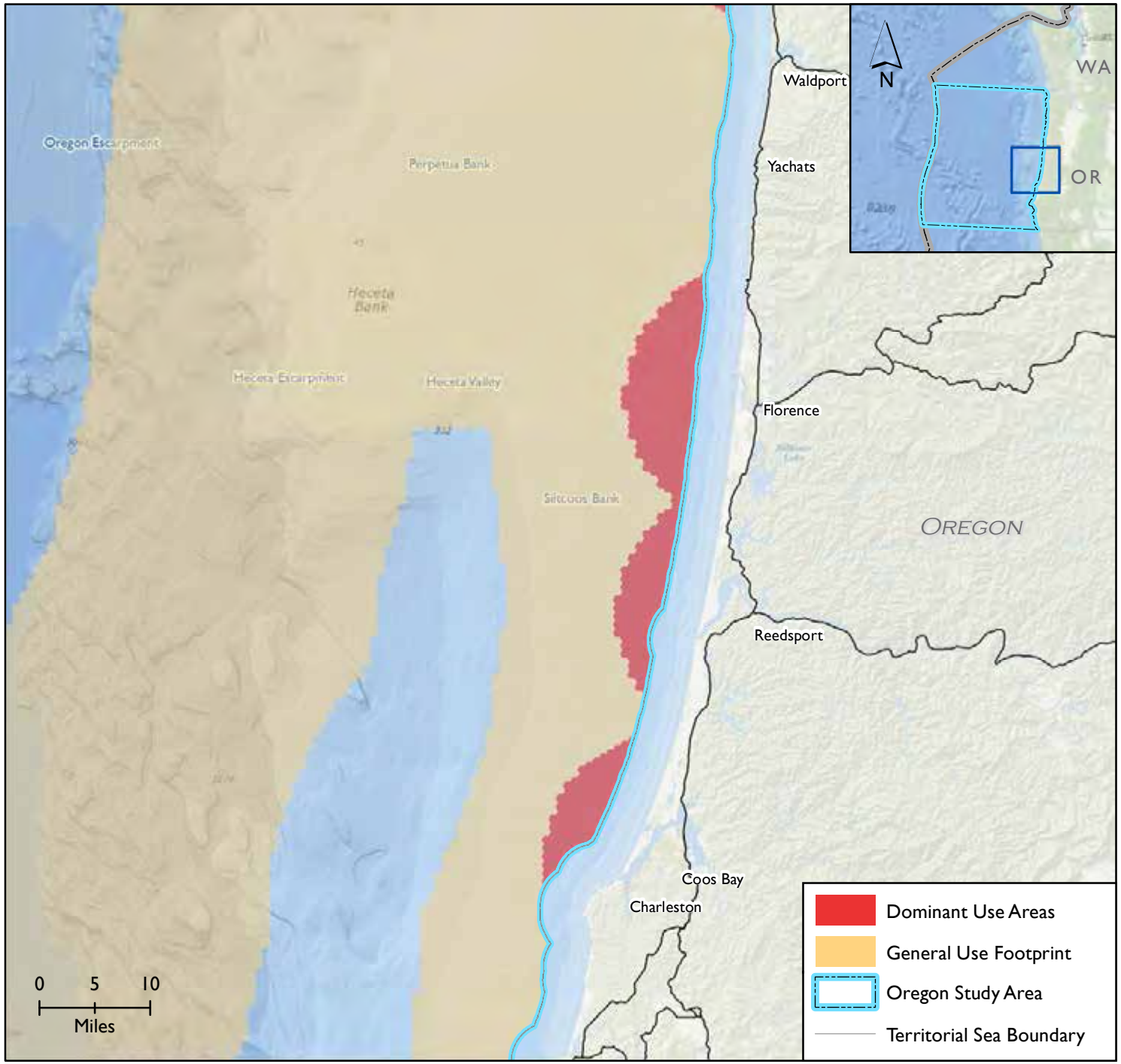

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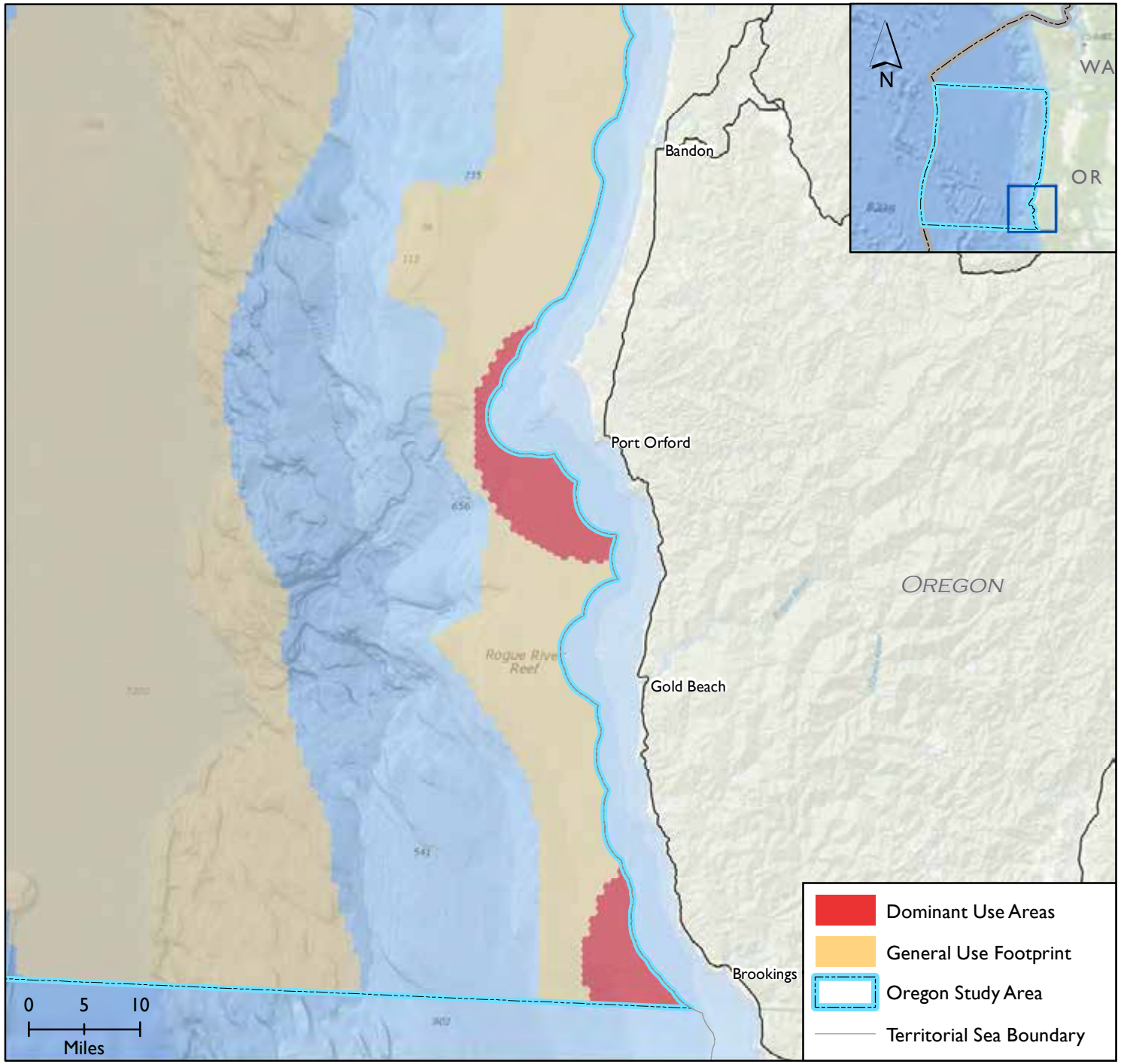

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THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships
Excludes:
Motorized Boating, Commercial Shipping

Use Notes:
Cruise ships are not common in the study region. Approximately 20 ships transit north to Alaska using existing shipping lanes. Cruise ships will stop in Astoria periodically, although their activity is limited to the summer months.

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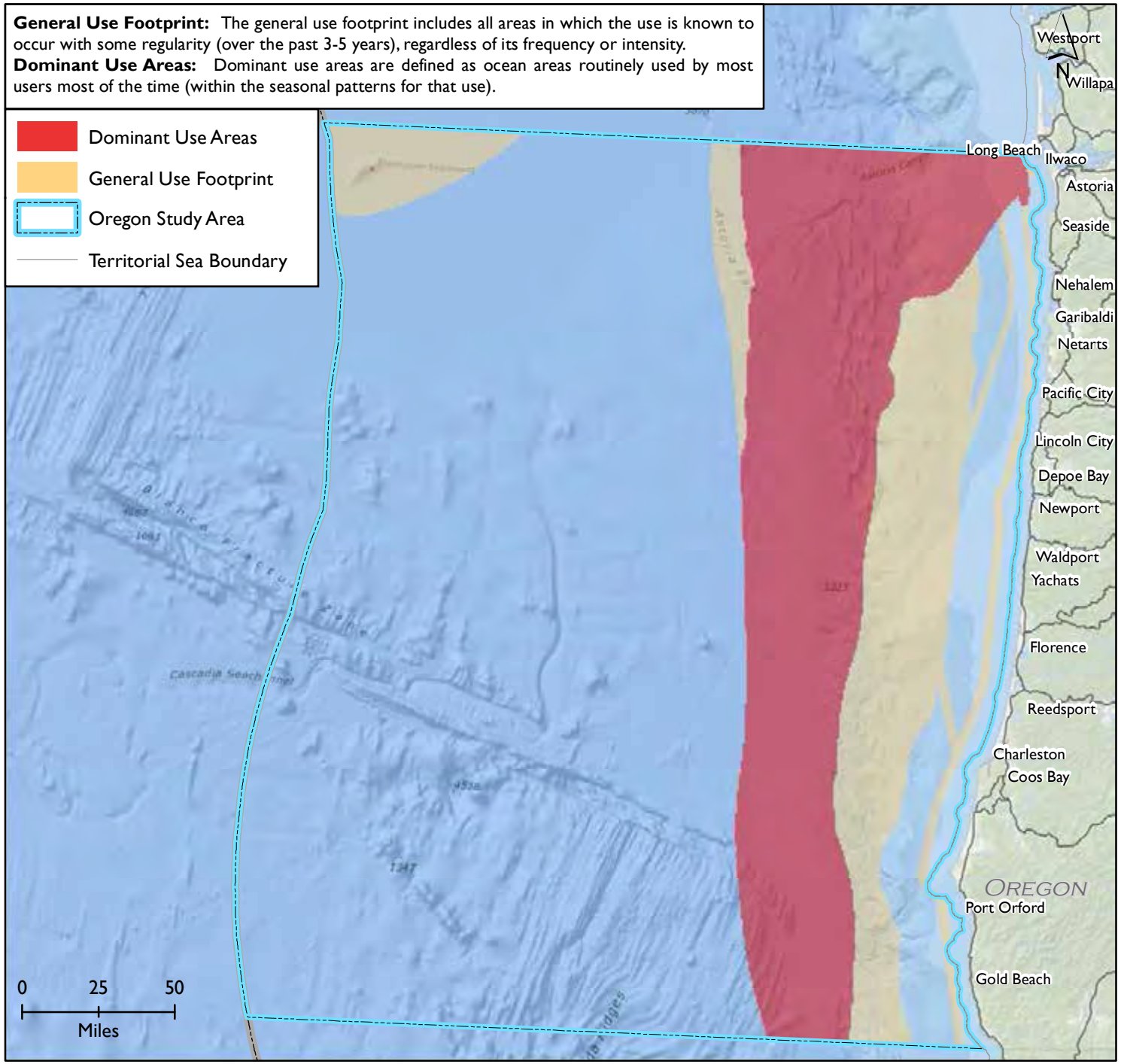

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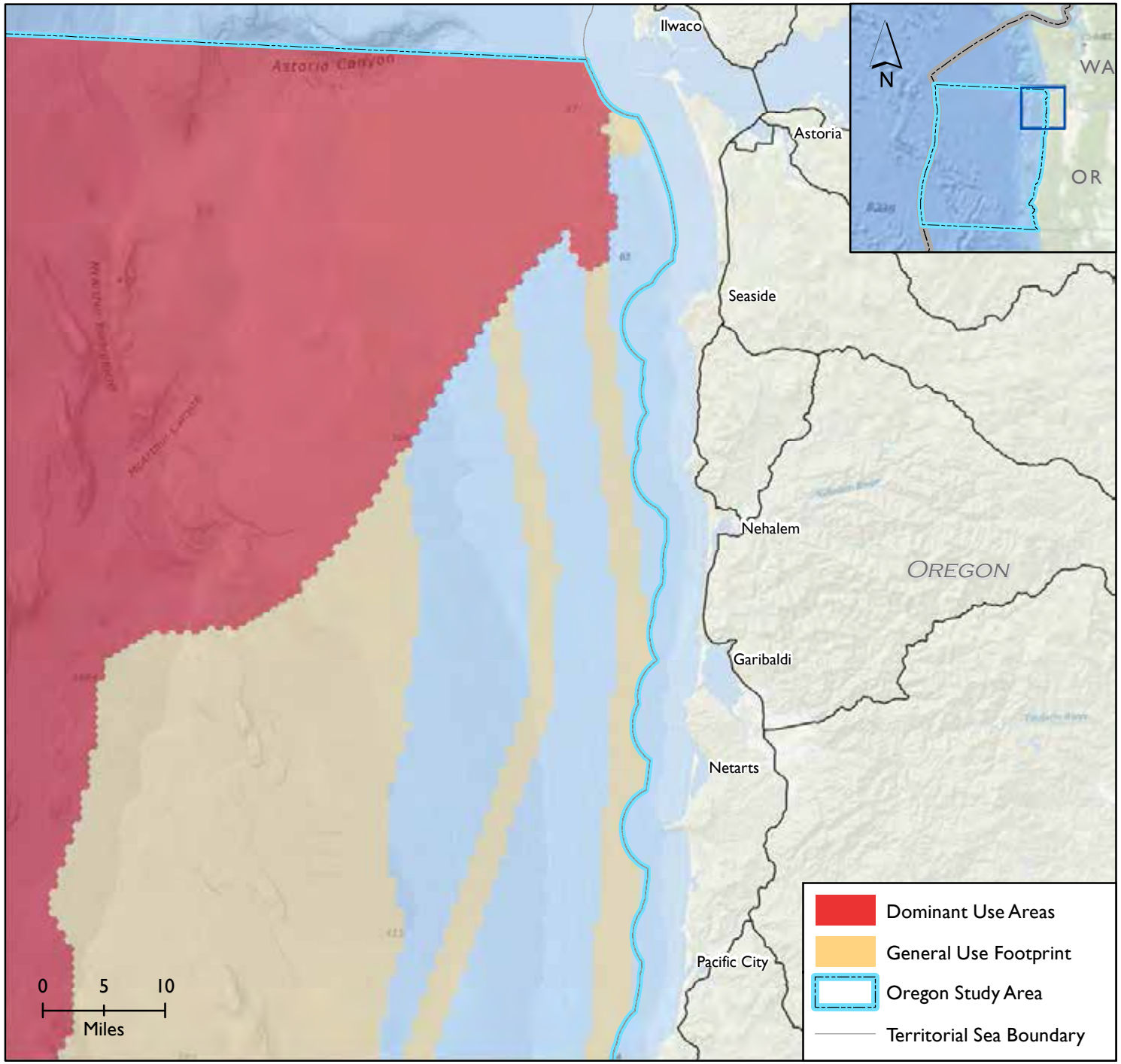

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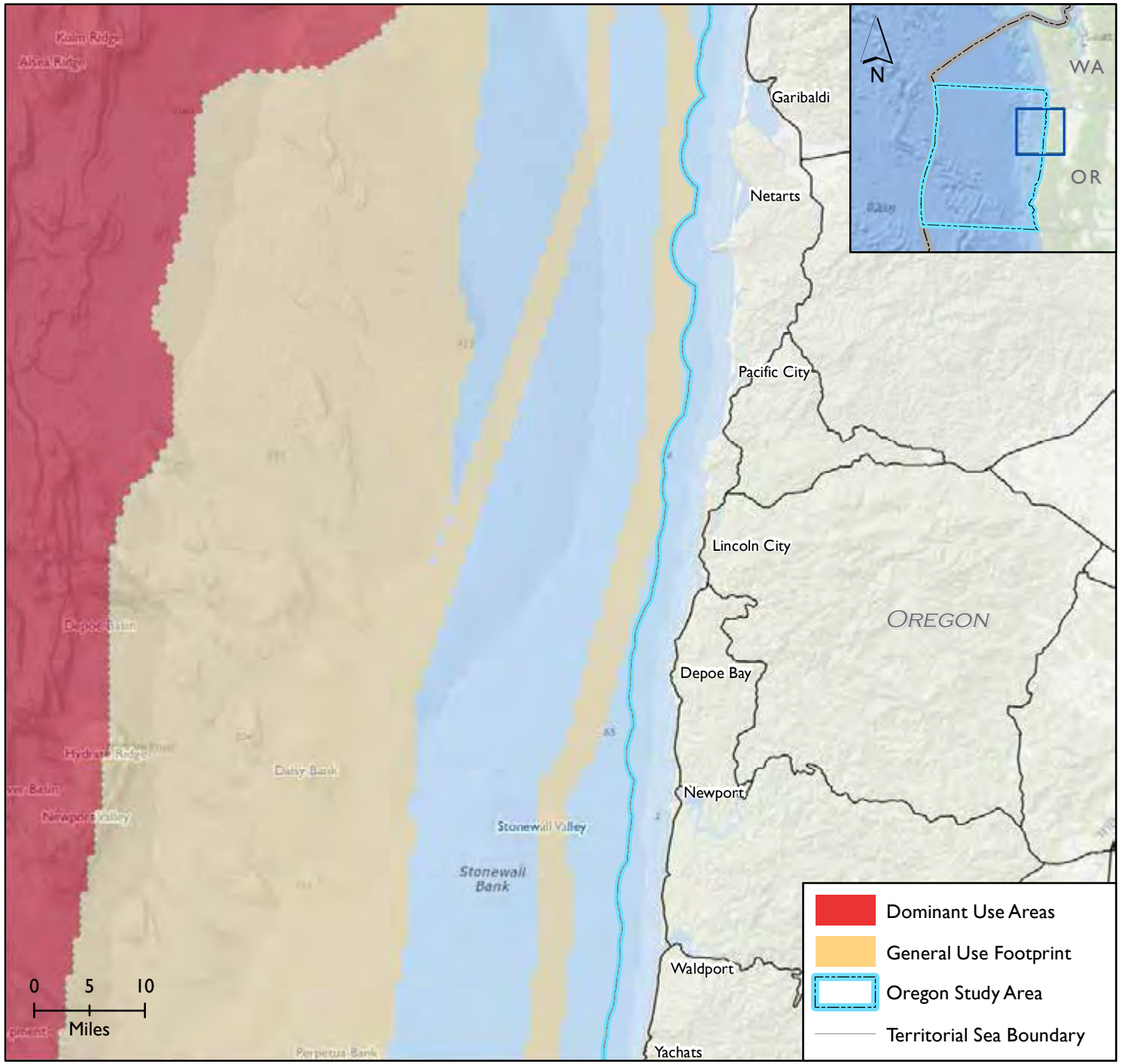

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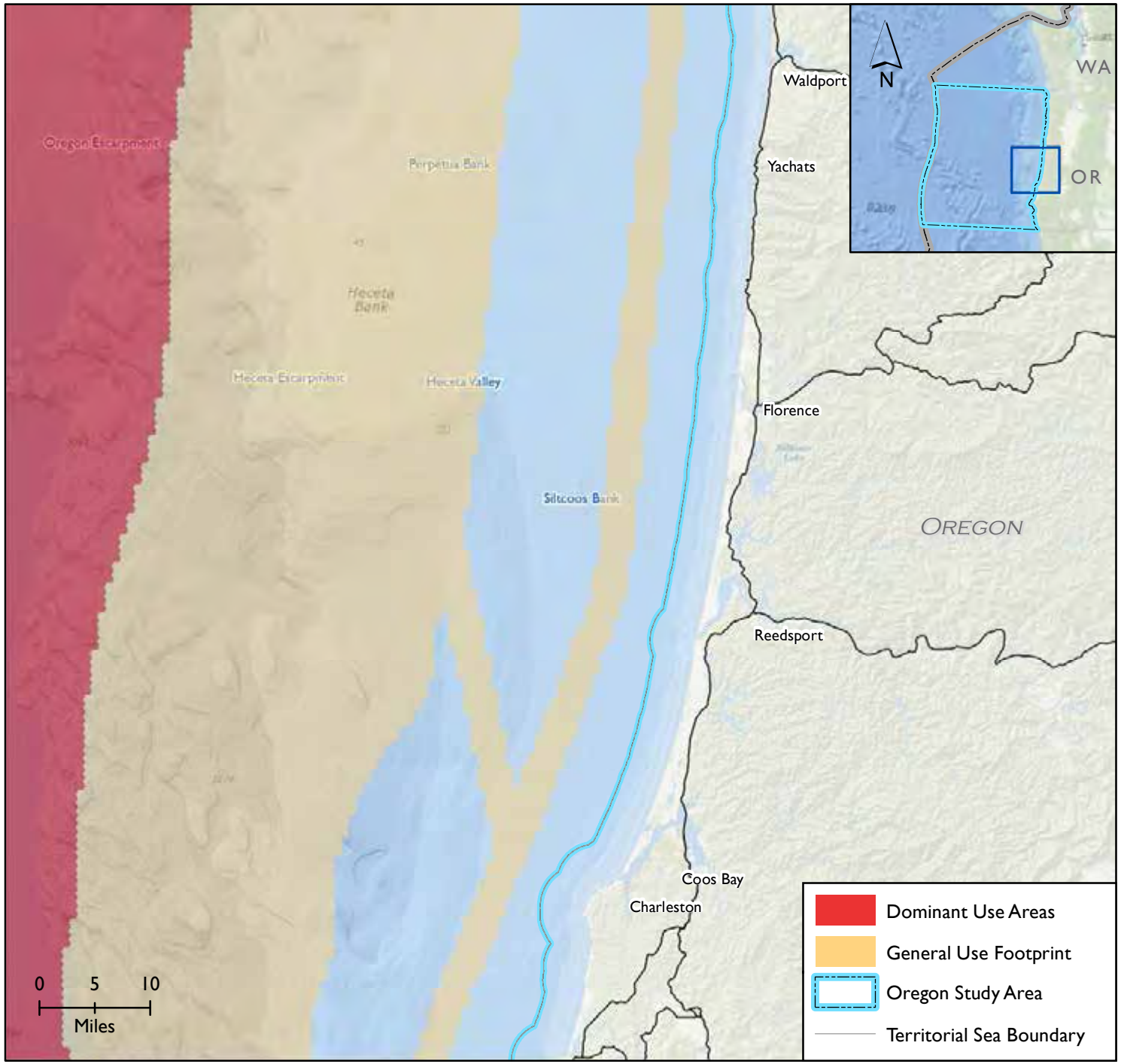

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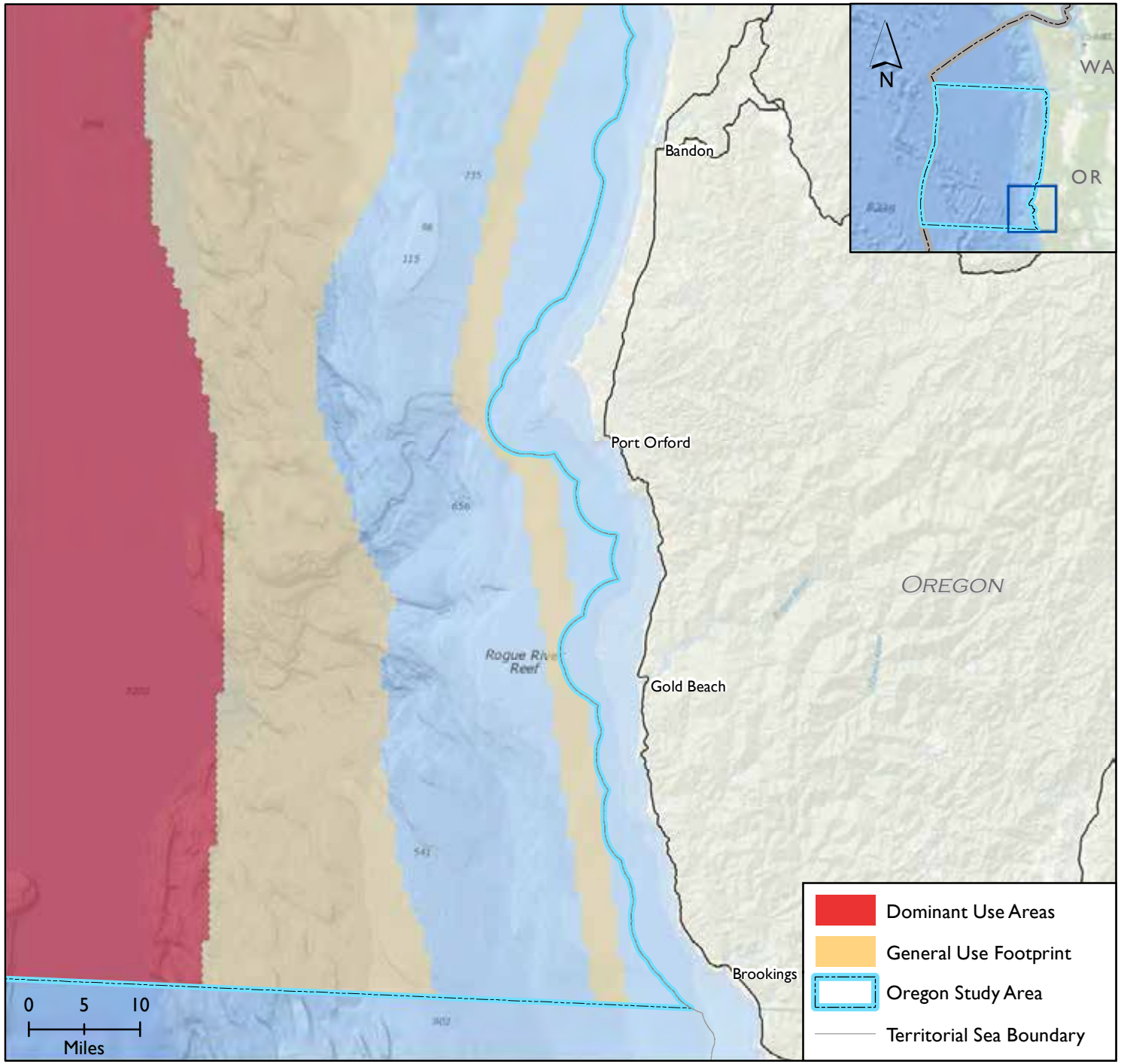

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The Pacific Regional Ocean Uses Atlas

Cultural Use

Includes:
Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance

Excludes:
All other uses and activities

Use Notes:
Much of the cultural value in the study region is perceived from coastal platforms such as tribal areas, lighthouses, forts, archaeological sites, memorials and cemeteries. Within the study region, the dominant use is the viewshed that can extend as far as 50 NM offshore the Oregon coast and beaches. Tribal cultural use is not explicitly depicted here.

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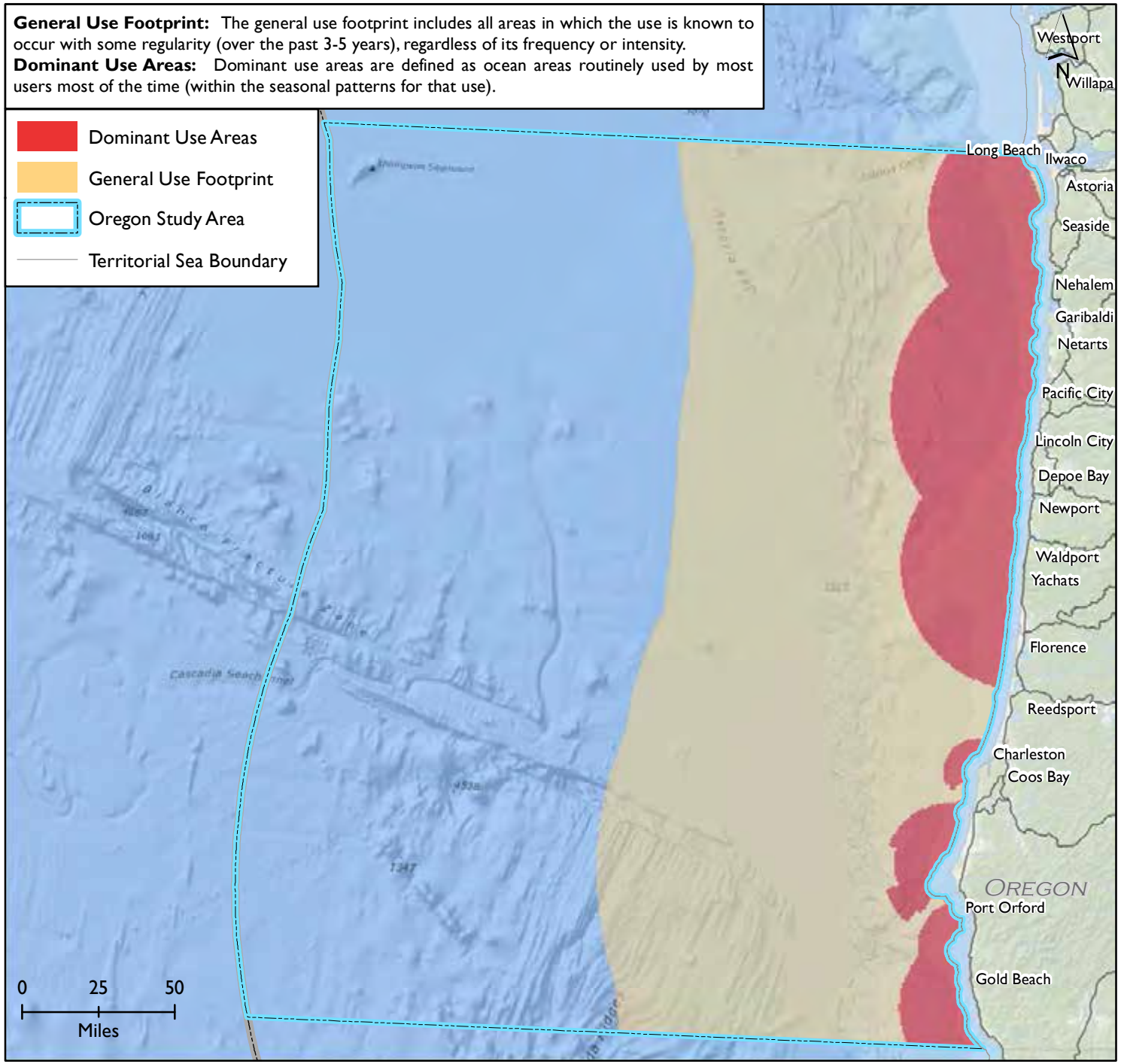

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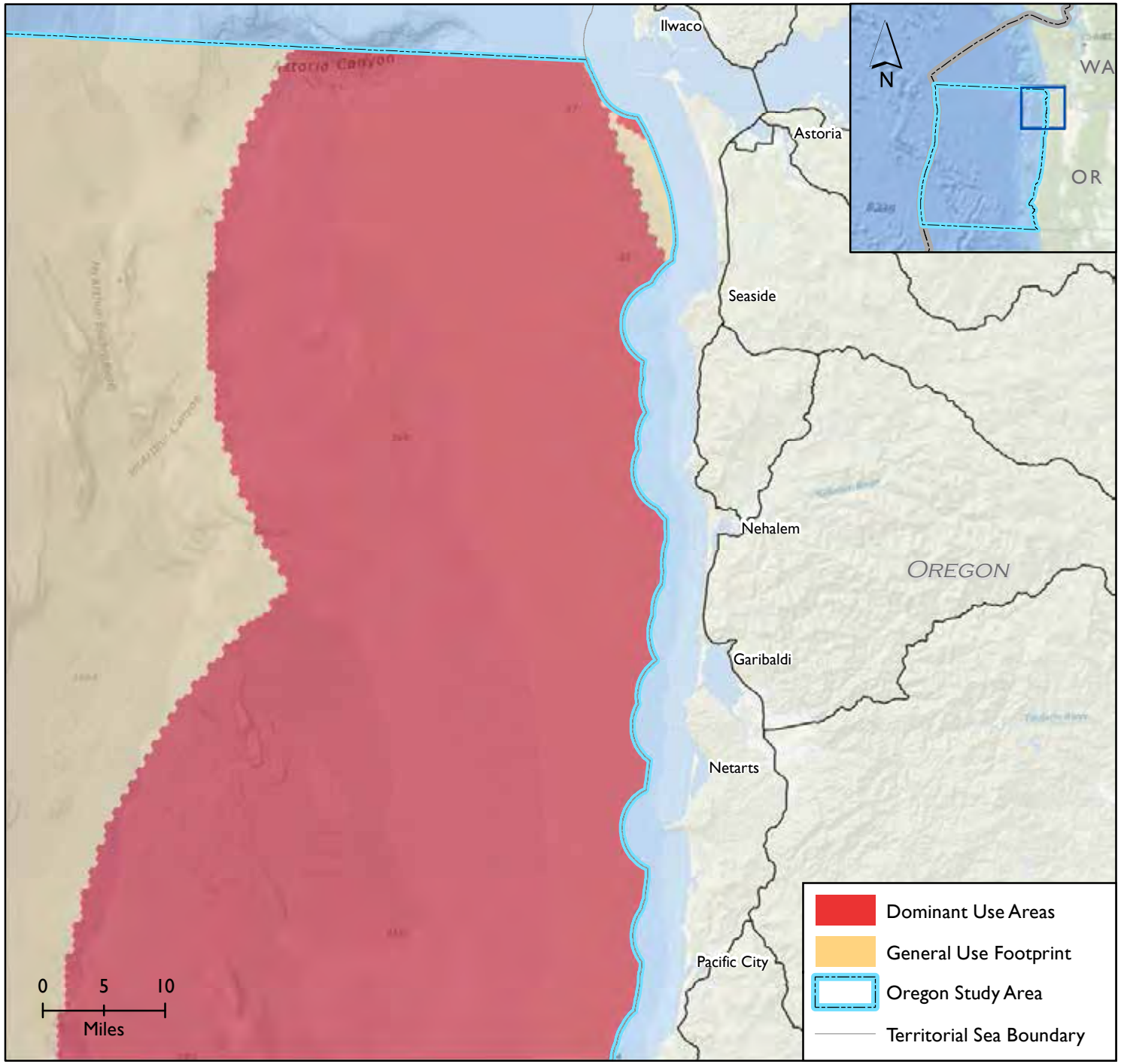

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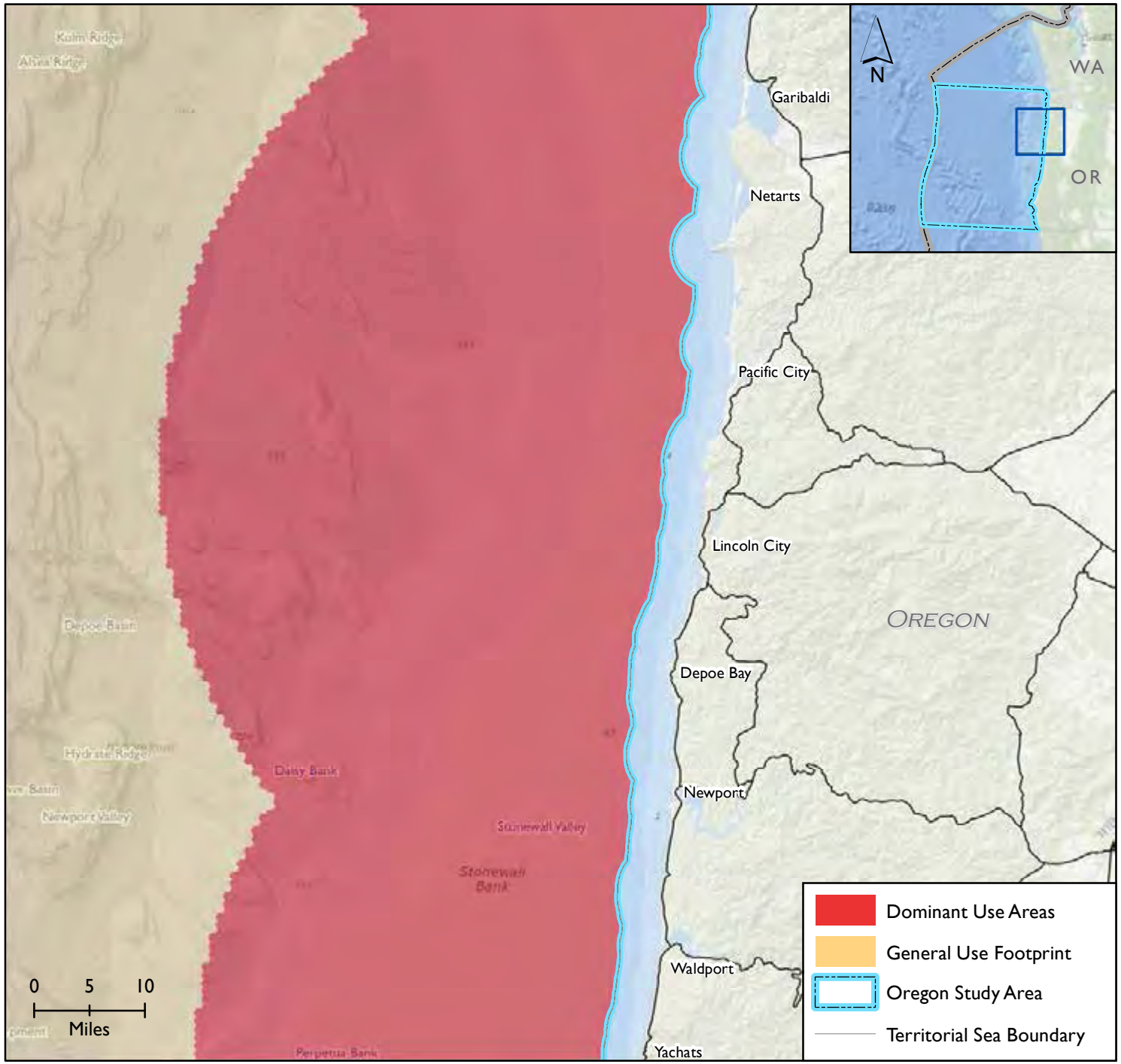

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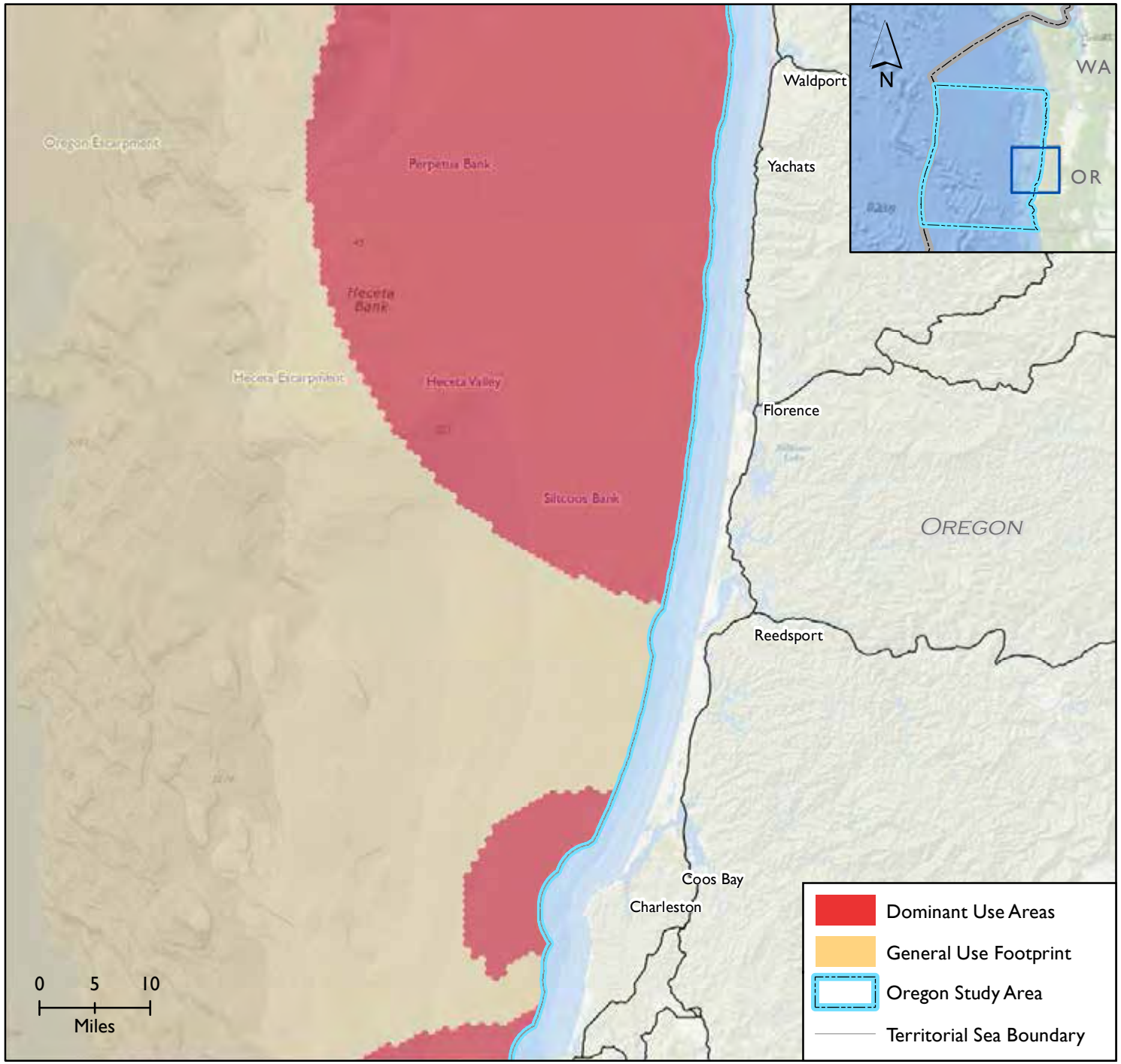

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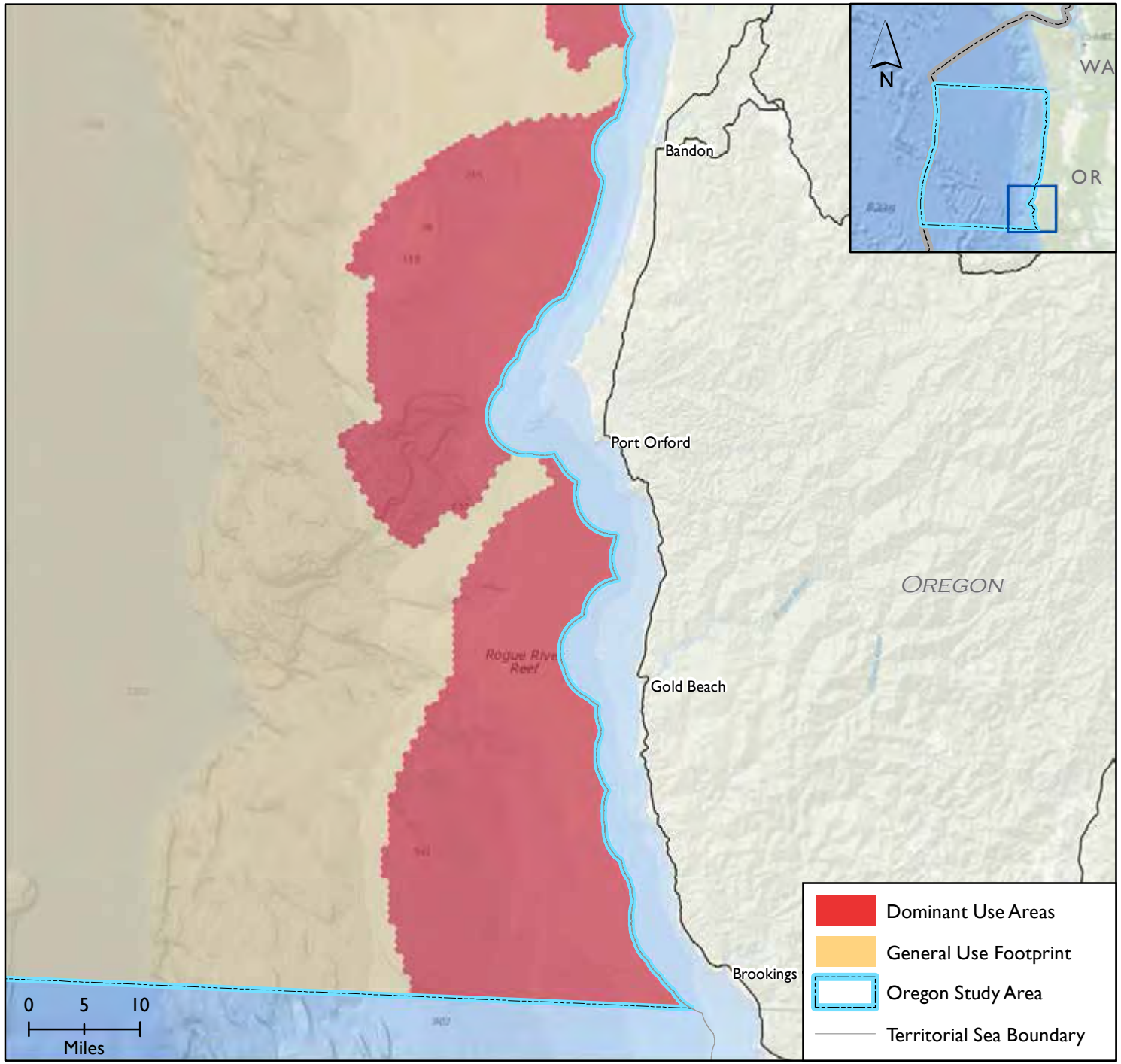

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Permanent Research Areas

Includes:
Sites, transects, and monitoring areas where routine research or monitoring is conducted
Excludes:
Motorized Boating, Commercial Shipping

Use Notes:
Permanent Research Areas are limited in the study region to areas with direct proximity to higher education facilities in Coos Bay and Newport. The use includes research moorings, oceanographic monitoring buoys and fishery survey tracts. Most data collected are by autonomous underwater vehicle (AUV) or remotely operated vehicle (ROV), and support oceanographic science such as ocean hypoxia. Areas of biological sampling include Heceta and Nehalem banks, although sampling is limited to areas with rocky substrate.

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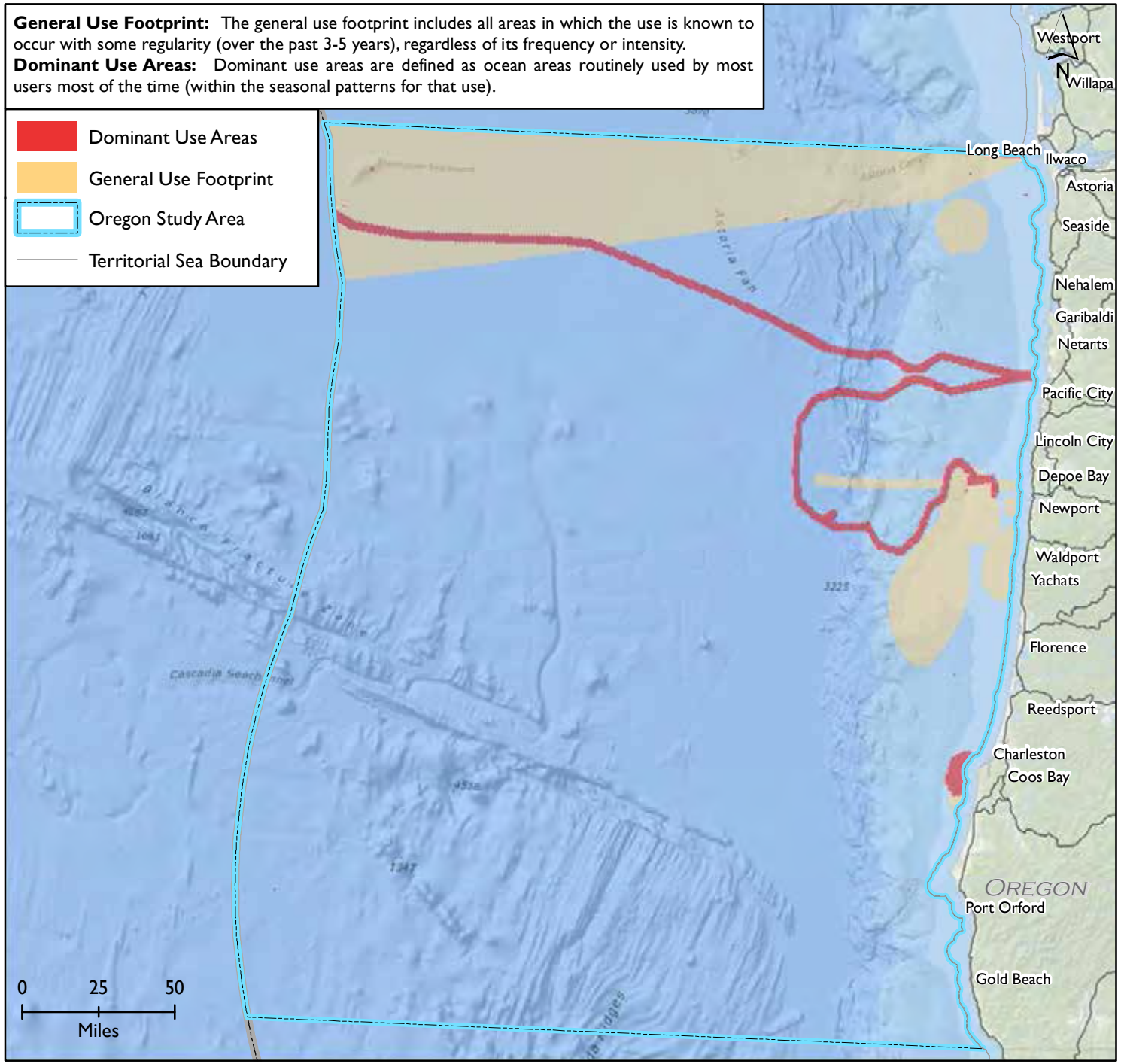

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Permanent Research Areas

Includes:
Sites, transects, and monitoring areas where routine research or monitoring is conducted
Excludes:
Motorized Boating, Commercial Shipping

Use Notes:
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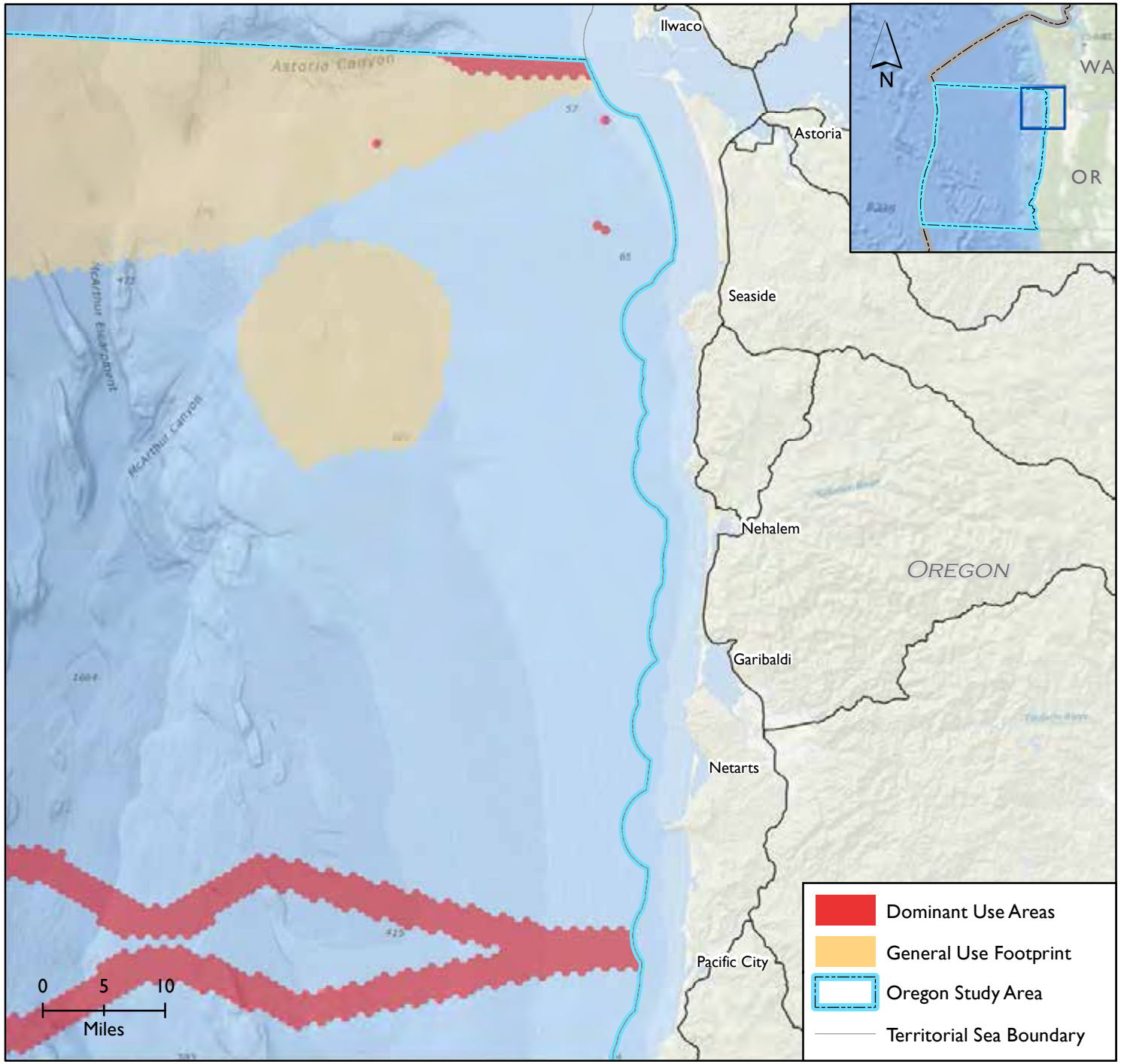

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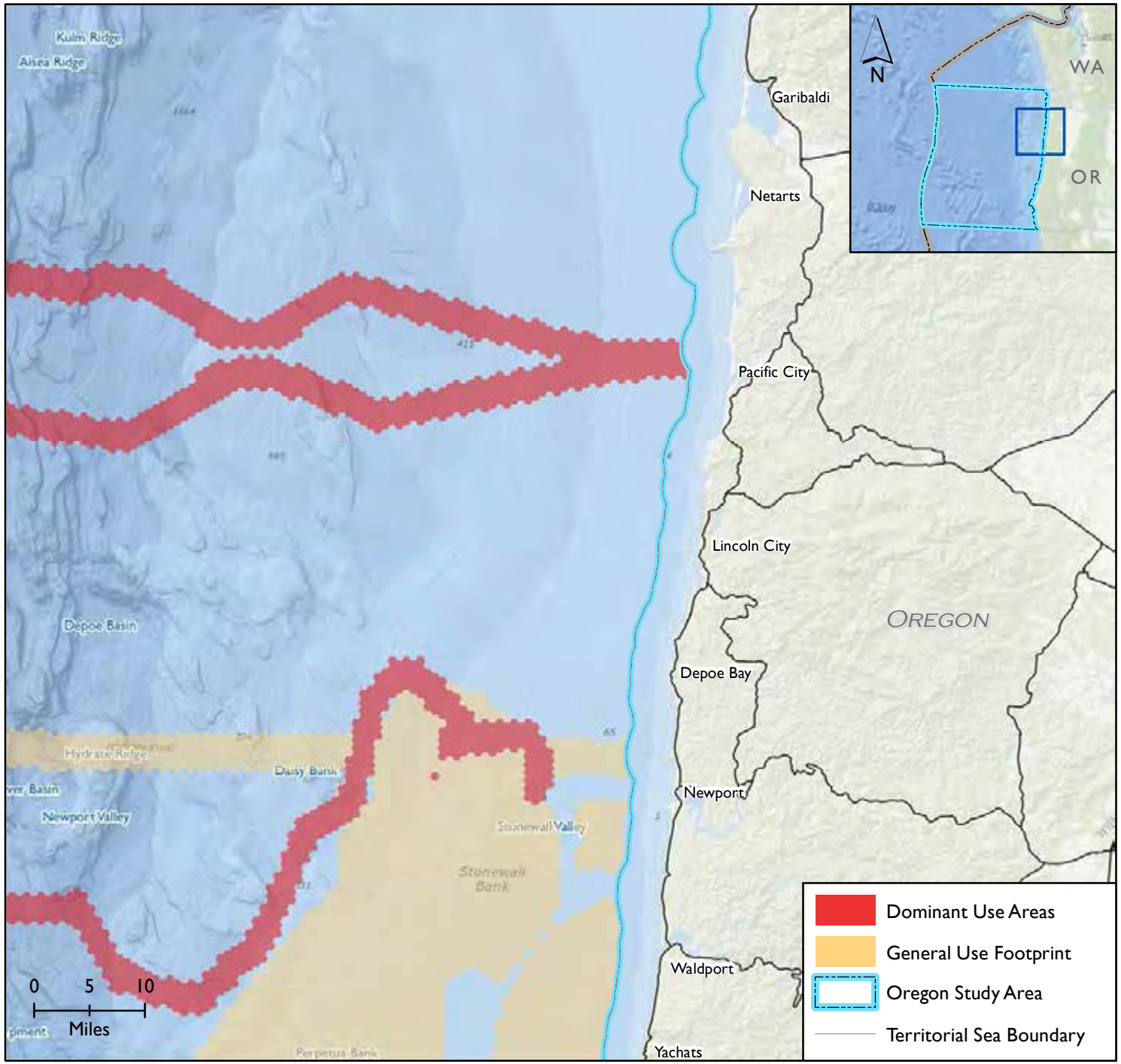

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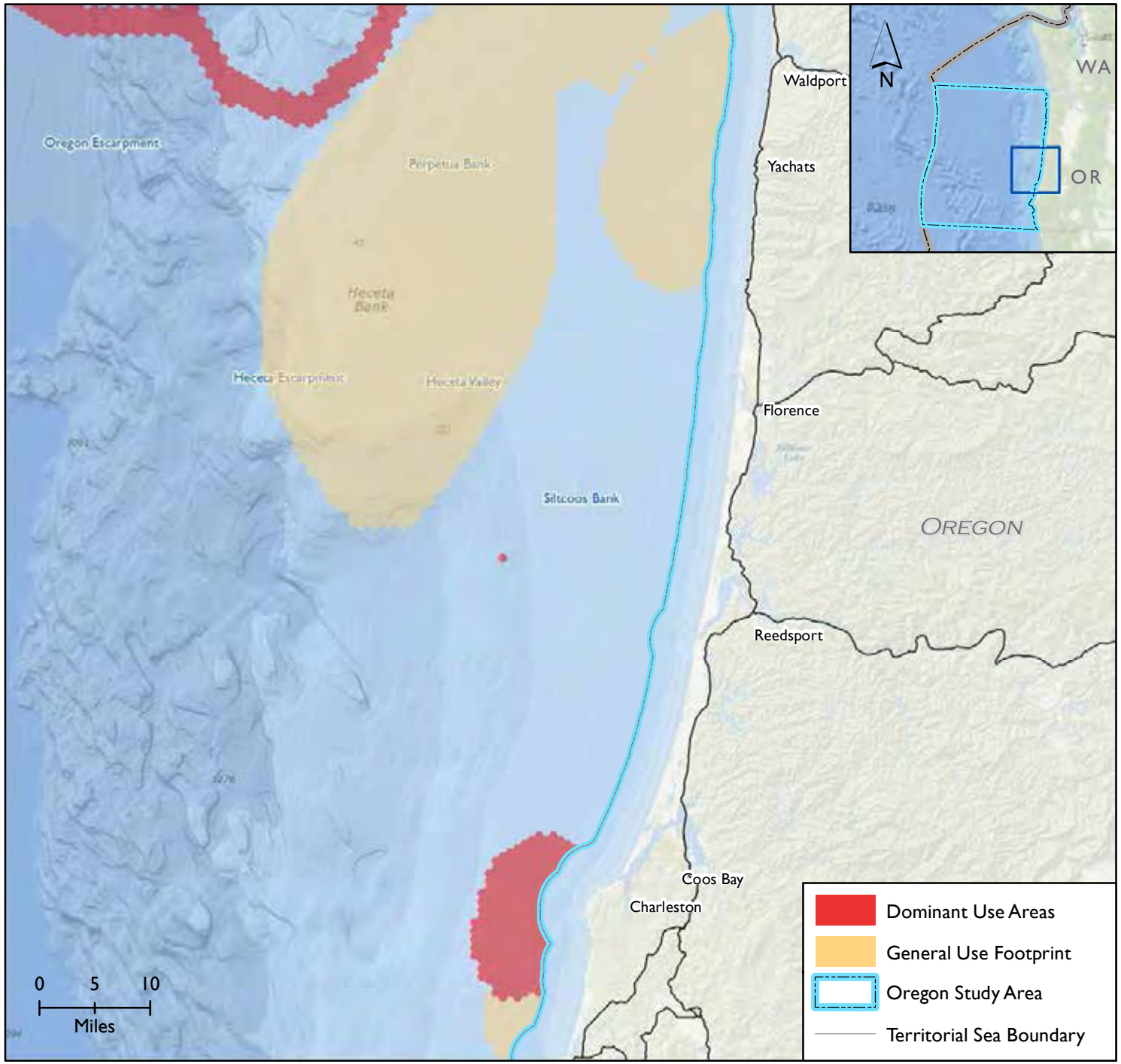

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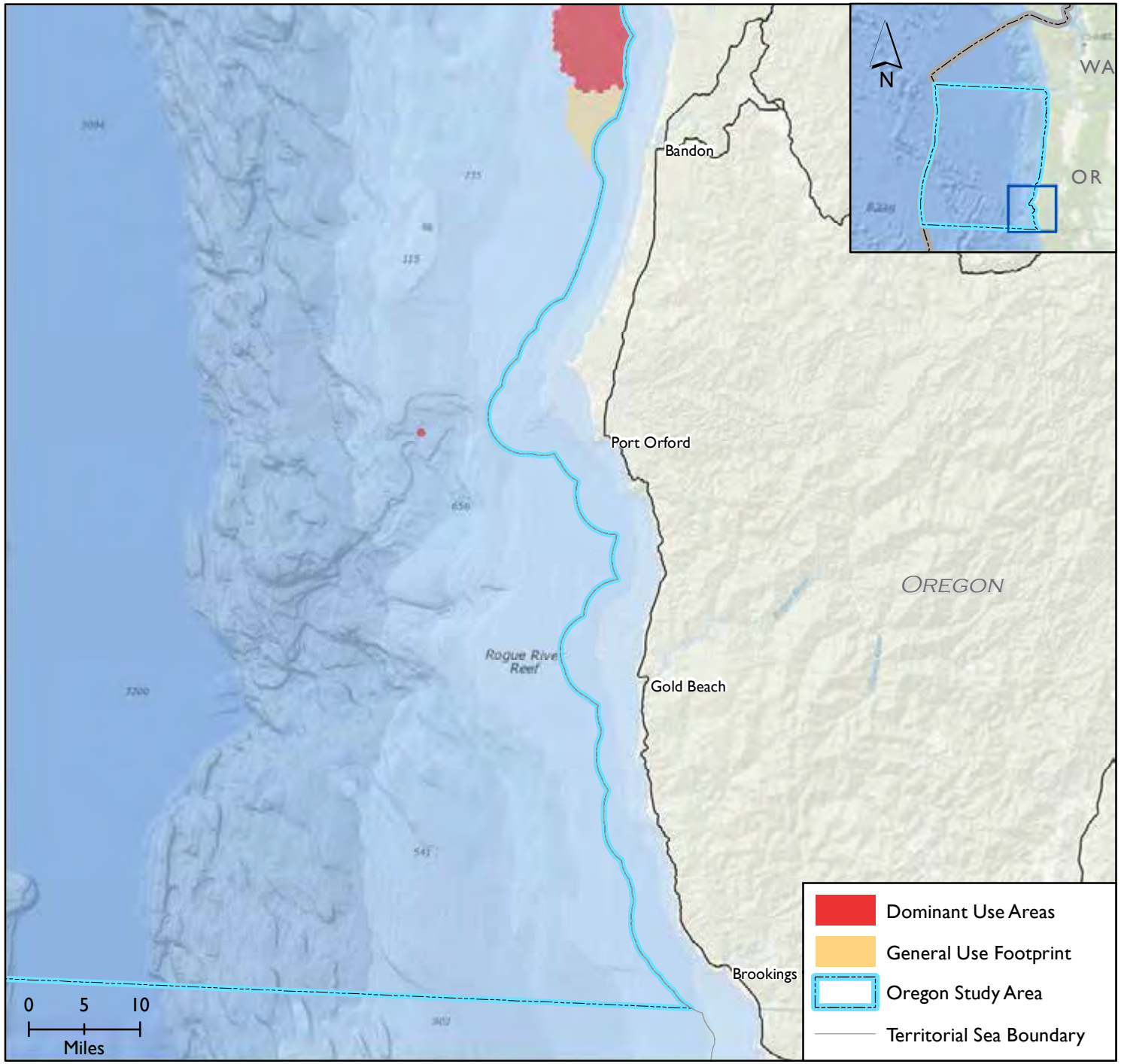

 Date: 3/11/2015

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Sailing

Includes:
Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes
Excludes:
Motorized Boating, Paddling

Use Notes:
Sailing in the study region is a seasonal use with limited activity in the winter due to extreme weather conditions. Much of the activity includes transiting through Oregon waters out to 50 NM offshore. Recreational sailors tend to congregate locally around major harbors such as Astoria, Newport and Coos Bay; there is an annual race (10 – 20 boats) from Astoria to Newport. Charter sailboats run seasonally from Garibaldi north to the San Juan Islands and south to Newport around 10 miles offshore.

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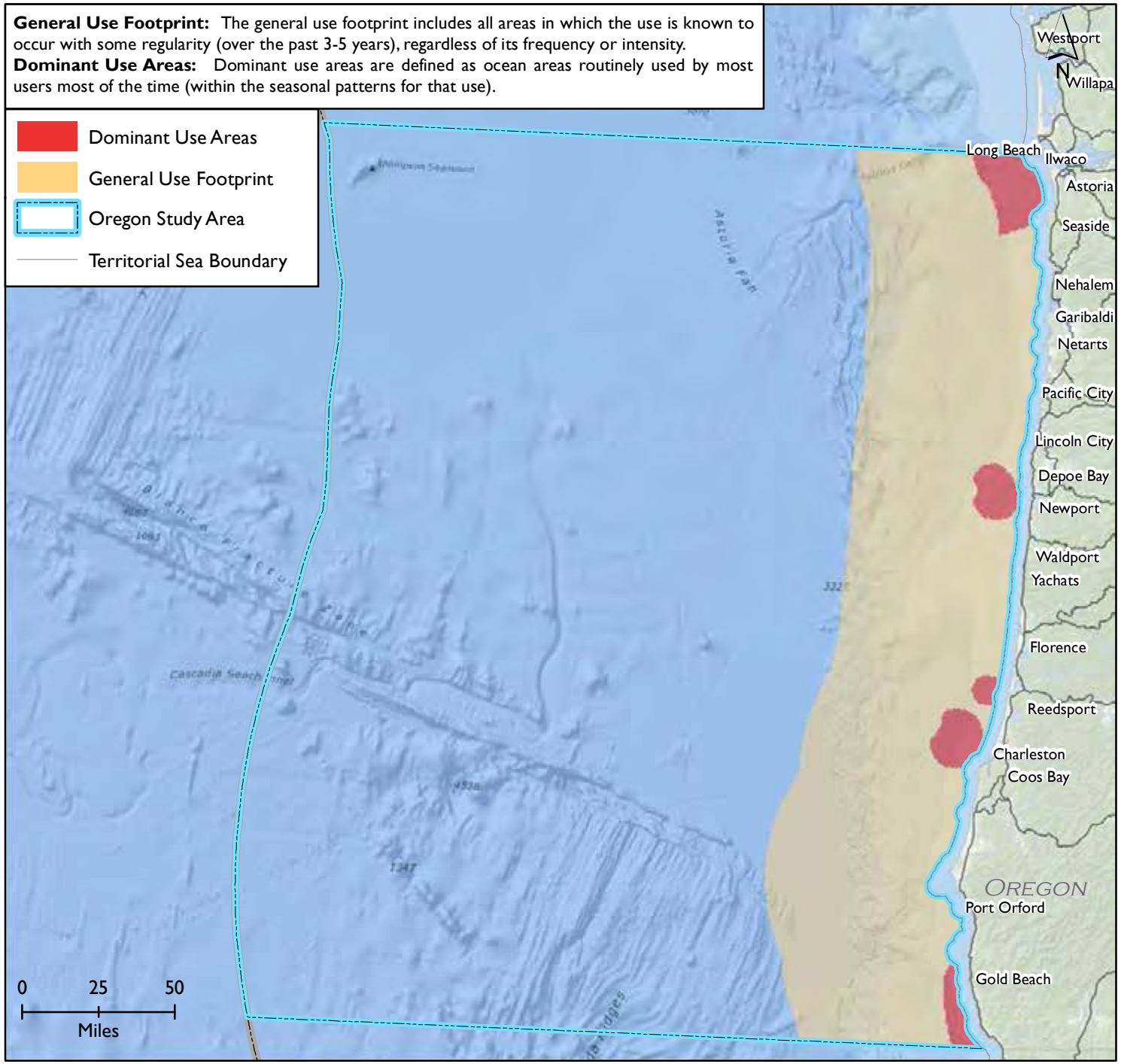

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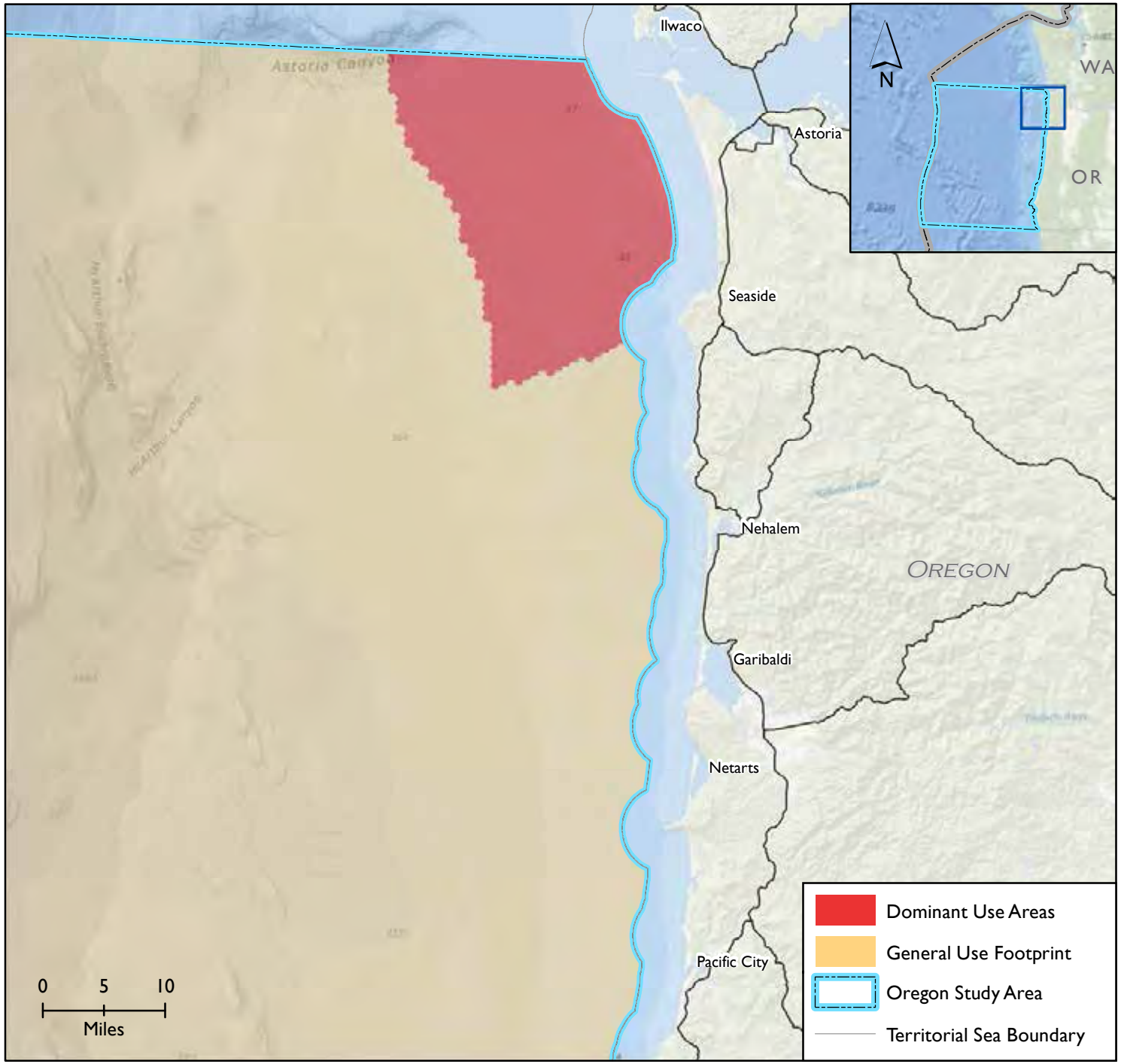

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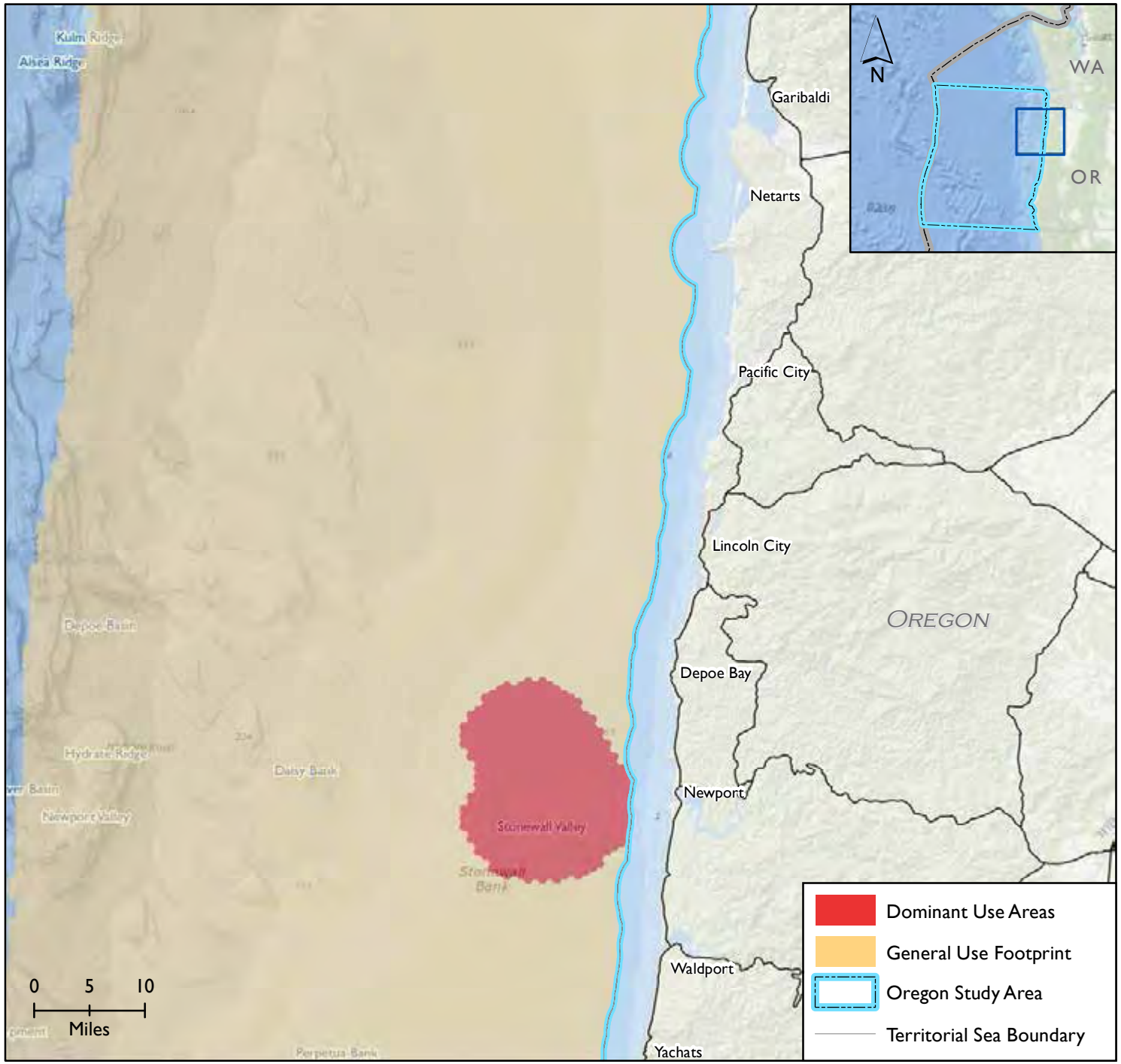

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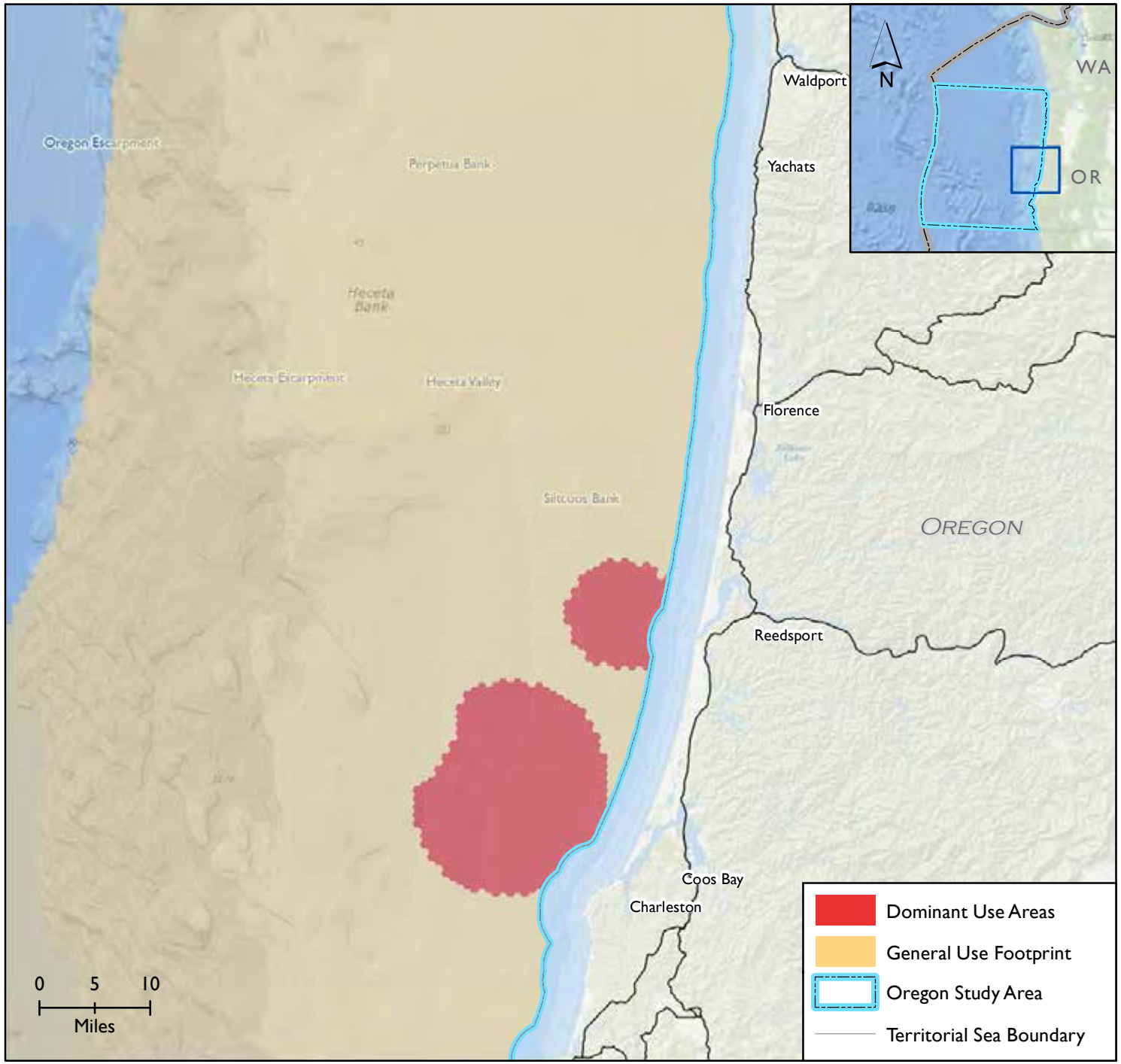

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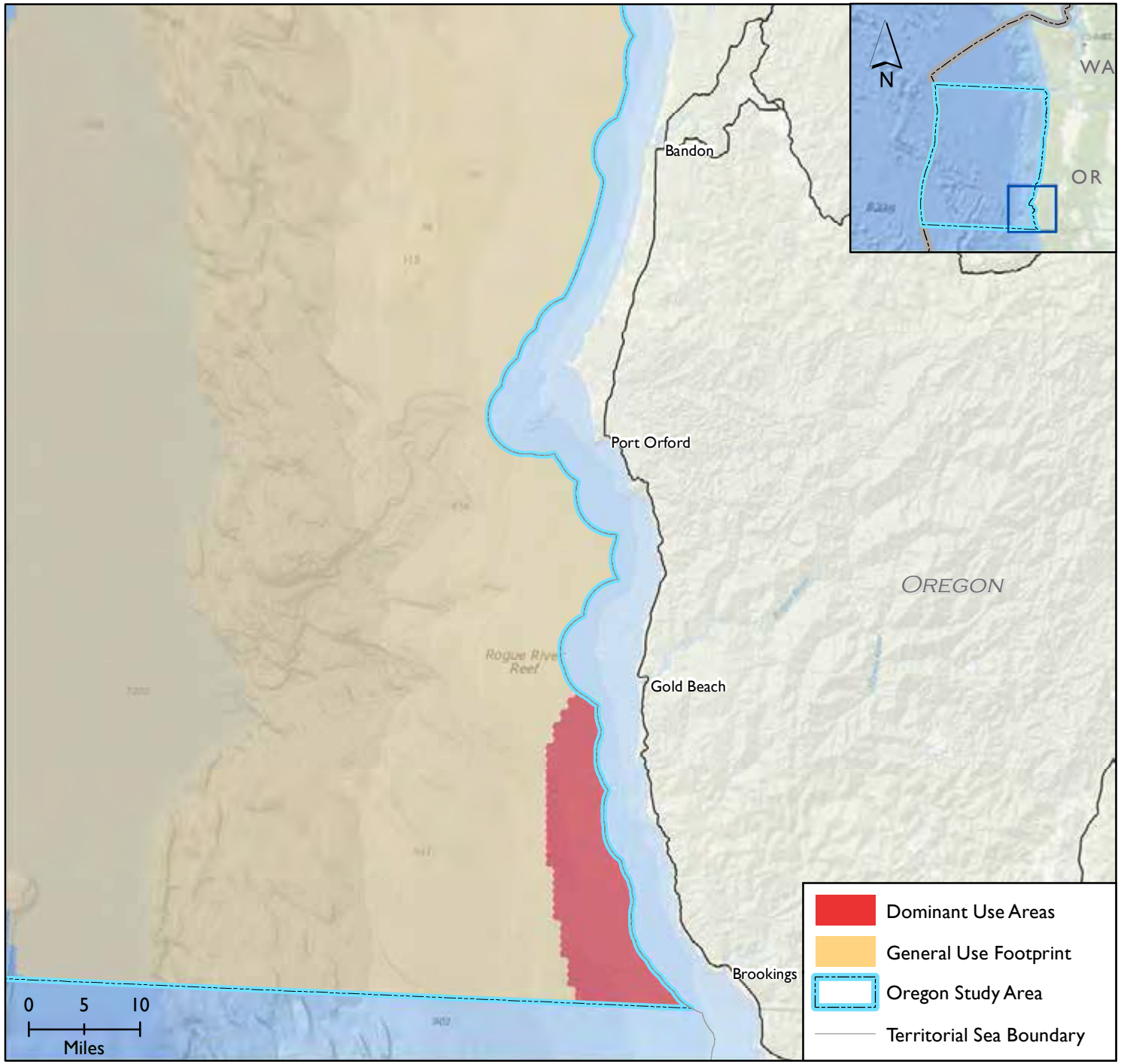

 Date: 3/11/2015

THE OREGON OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Wildlife Viewing at Sea

Includes:
Boat-based wildlife viewing at sea, usually on a commercial vessel

Excludes:
Incidental wildlife viewing from shore or while at sea pursuing other uses

Use Notes:
Wildlife viewing is dominated by whale watching and pelagic birding trips. These charter boats double as fishing boats depending on the season, so the use depends on where boat owners gain the maximum profit, whether from fishing or ecotours. Most charters are run out of Garibaldi and Newport heading to areas such as Cape Lookout and Three Arch Rocks. Other ports such as Yachats, Coos Bay, Astoria and Depoe Bay also have charter operators.

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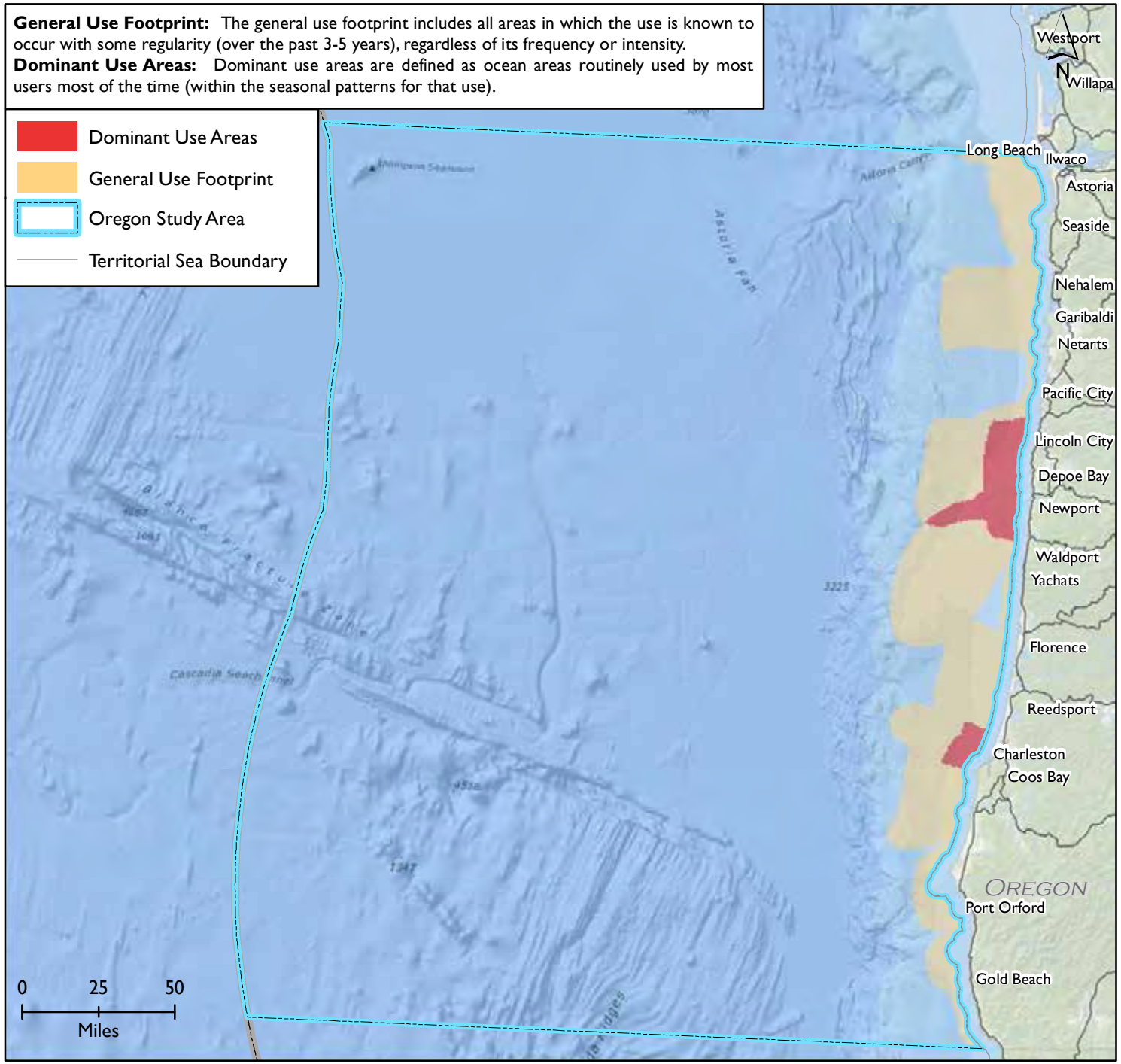

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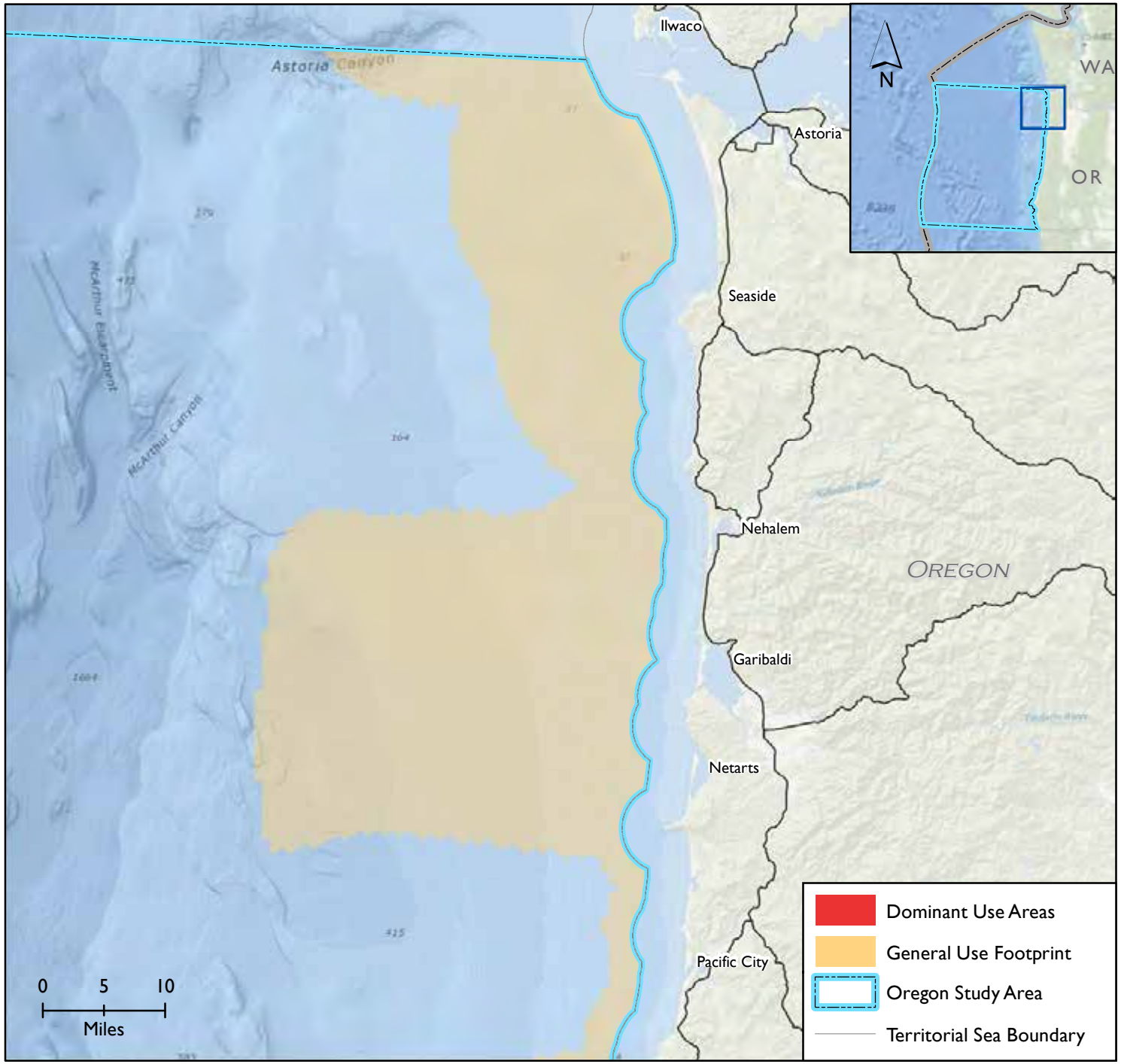

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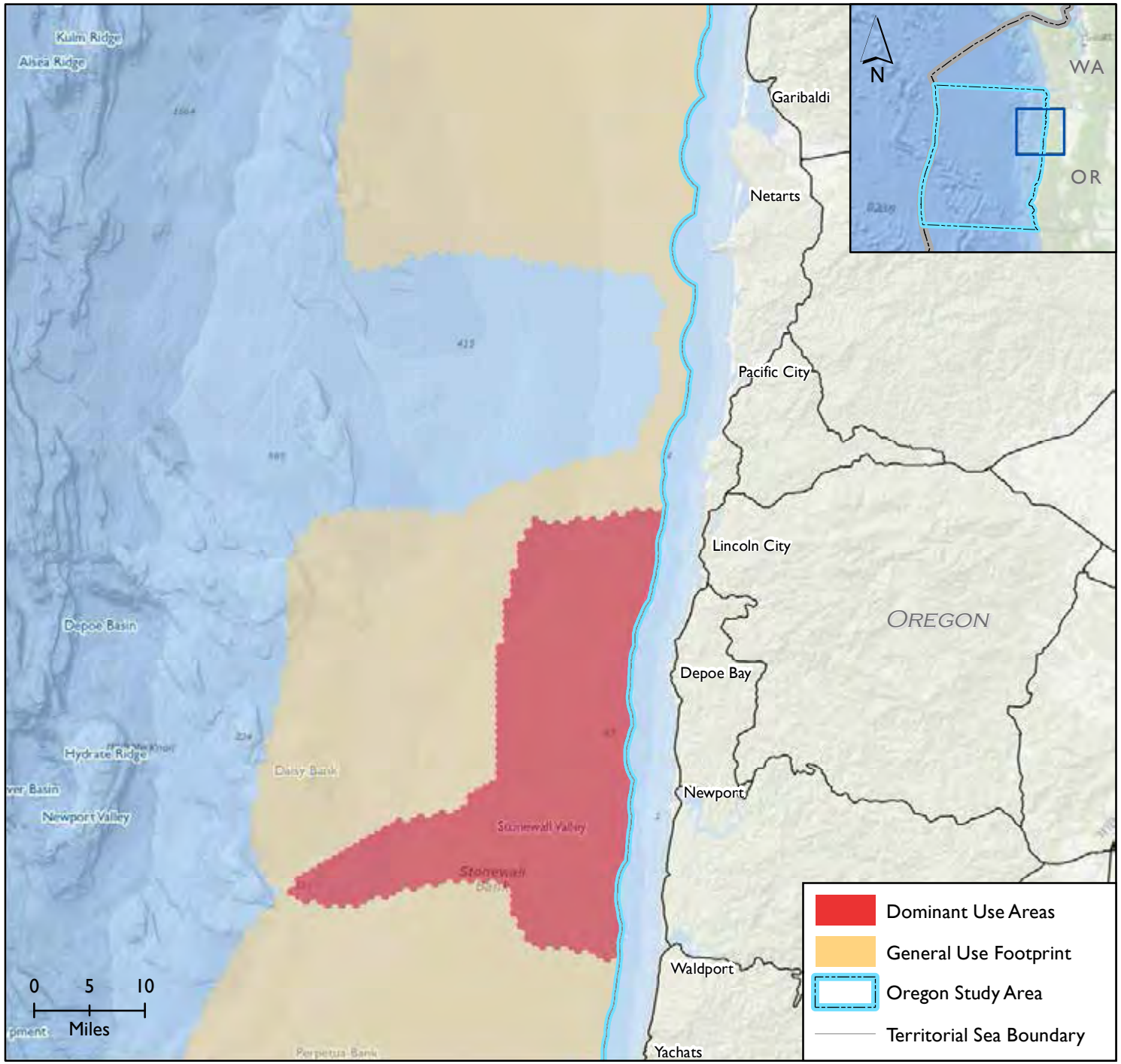

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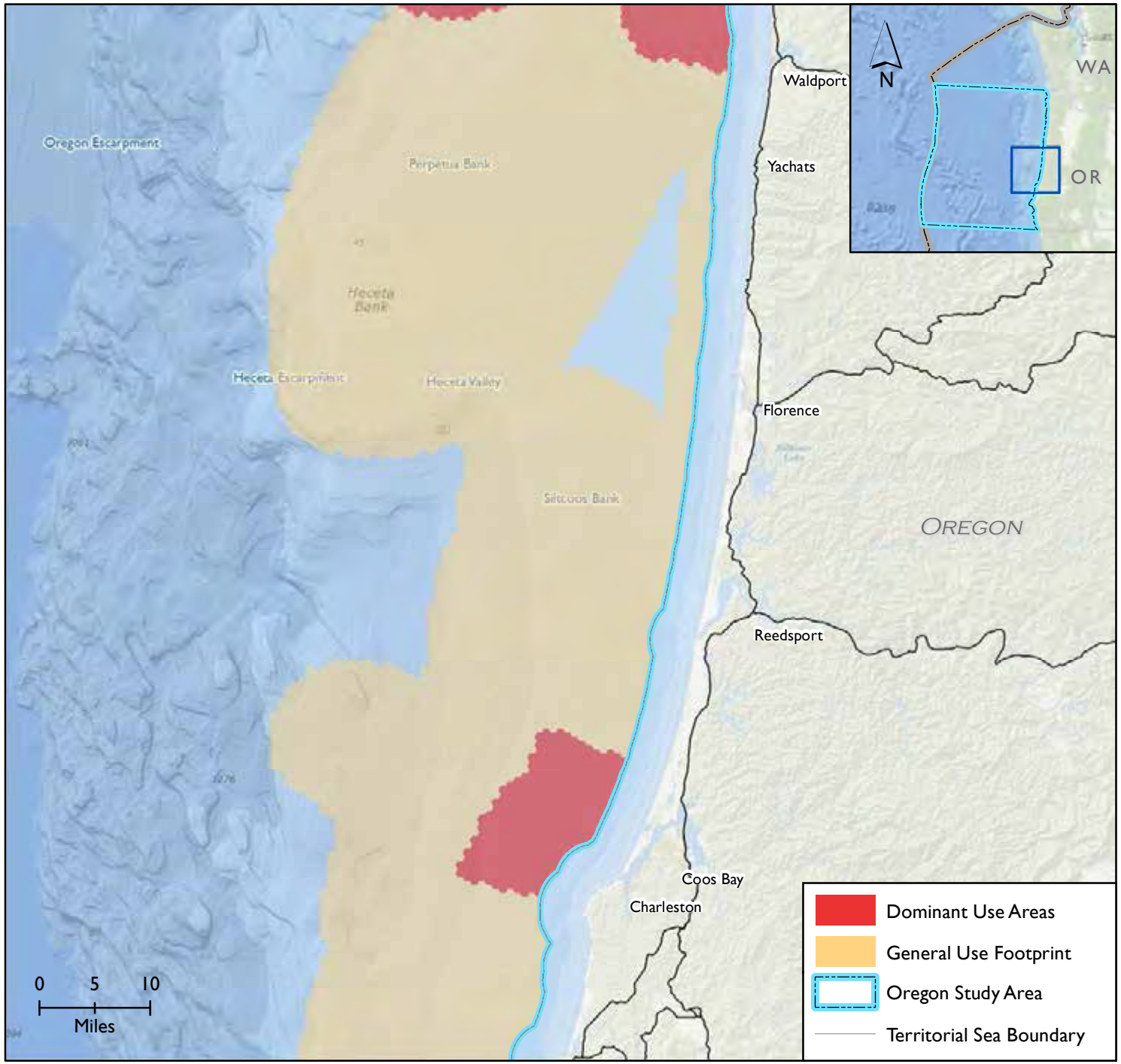

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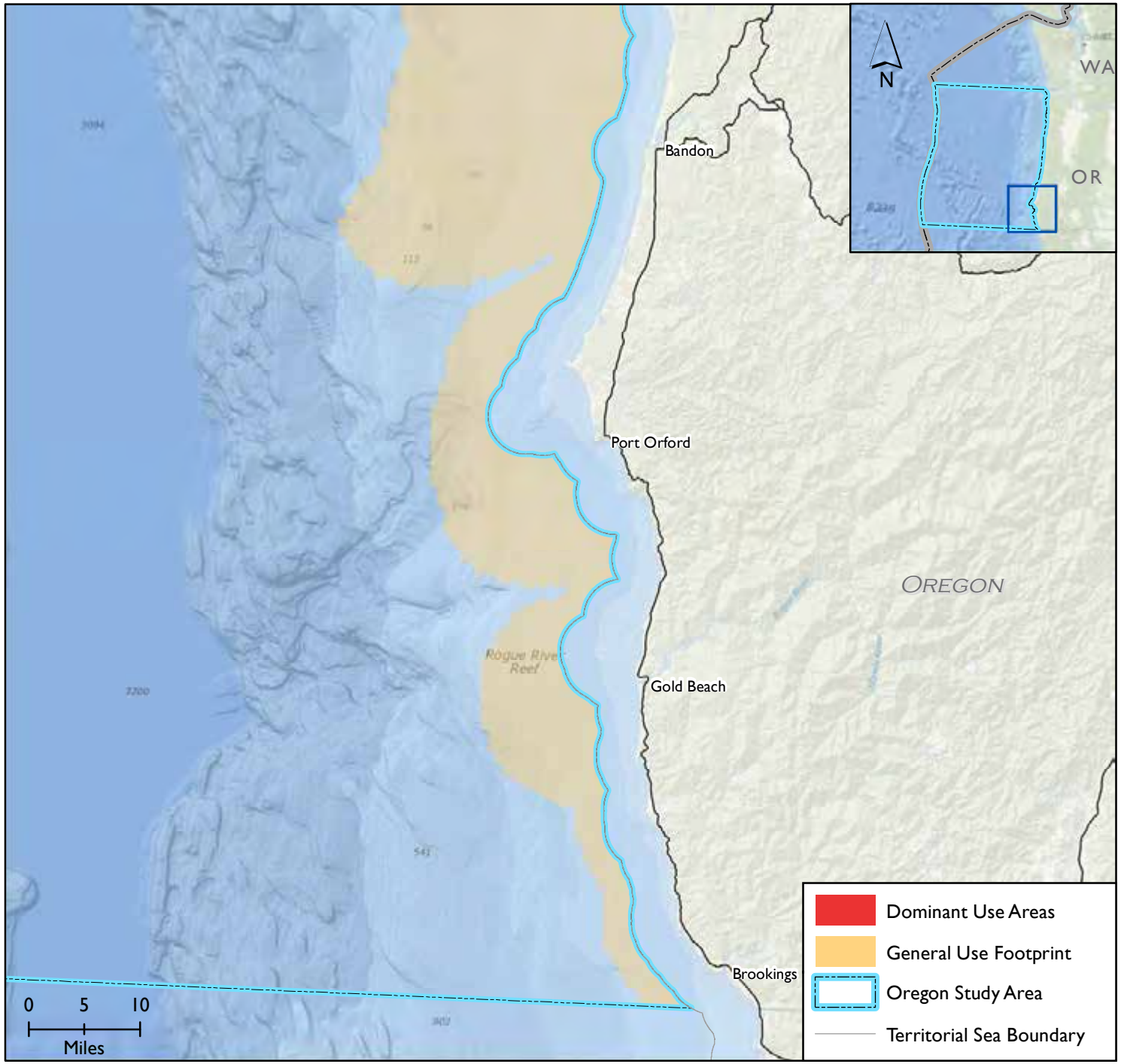


HAWAIʻI OCEAN USES ATLAS PROJECT
OCEAN USES MAP BOOK

Introduction

This map book contains cartographic products derived from the Hawaiʻi Ocean Uses Atlas participatory mapping workshops conducted in June and September of 2014:

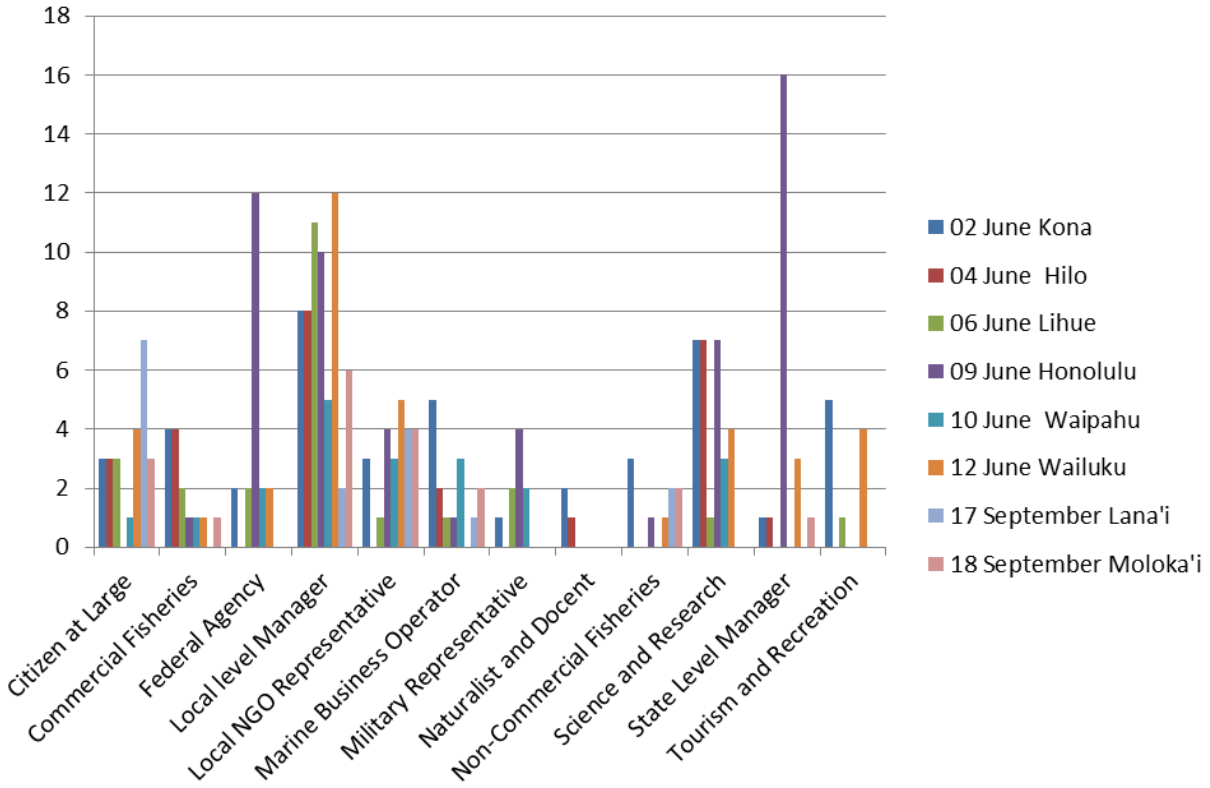
Date (2014)	Workshop Location
Monday, June 2nd	Hawaiʻi Island, Kona (West Hawaiʻi Civic Center)
Wednesday, June 4th	Hawaiʻi Island, Hilo (Hawaiʻi Community College)
Friday, June 6th	Kauaʻi, Lihue (Kauaʻi War Memorial)
Monday, June 9th	Oʻahu, Honolulu (Neal S. Blaisdell Center)
Tuesday, June 10th	Oʻahu, Waipahu (Waipahu High School)
Thursday, June 12th	Maui, Wailuku (J. Walter Cameron Center)
Wednesday, September 17th	Lanaʻi, Lanaʻi City, (Sacred Hearts Catholic Church)
Thursday, September 18th	Molokaʻi, Hoʻolehua, (Lanikeha Community Center)

These participatory mapping workshops were designed to collect spatial data from regional ocean uses experts and stakeholders for a wide range of activities that occur throughout the marine waters surrounding the eight main Hawaiian Islands. Through facilitated discussion and hands-on digital mapping, workshop participants documented areas where uses occur, variation in use patterns and historical and/or community perspectives about the nature of the use and how it has evolved over recent years.

The Hawaiʻi Ocean Uses Atlas project is a collaborative effort by NOAA, the Bureau of Ocean Energy Management (BOEM) and the State of Hawaiʻi Office of Planning. The Atlas is designed to collect information on ocean uses to help inform analyses of any proposed offshore renewable energy projects and coastal zone planning strategies and permitting decisions. The project was funded by the U.S. Department of the Interior, Bureau of Ocean Energy Management, through an Interagency Agreement with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service.

Workshop Attendance

The eight participatory mapping workshops were facilitated by staff from the NOAA Office for Coastal Management and NOAA's Marine Protected Areas Center, BOEM and the State Office of Planning. Throughout the State, 246 participants representing all use sectors attended the workshops. The participants spanned a wide range of expertise, as shown on the plot below.



Targeted Uses

Participants were invited to map a total of 27 uses shown in the following list. Maps for each of the mapped uses are provided at various scales in this map book and include definitions for each use category.

Non-Extractive Sector	Extractive Sector	Industrial/Military Sector
Beach Use	Commercial Dive Fishing/Harvest	Commercial Shipping
Boating	Commercial Fishing with Benthic Mobile & Fixed Gear	Cruise Ships
Paddling	Commercial Pelagic Fishing	Mining and Mineral Extraction
Permanent Research Areas	Commercial Intertidal Harvest	Mariculture & Fishponds
SCUBA & Snorkeling	Non-Commercial Dive Fishing	Military Operations
Surface Board Sports	Non-Commercial Kayak Fishing	Ocean Dumping
Swimming	Non-Commercial Fishing with Benthic Mobile & Fixed Gear	Renewable Energy
Wildlife Viewing at Sea	Non-Commercial Pelagic Fishing	Underwater Cables
	Non-Commercial Fishing from Shore	Underwater Pipelines
	Non-Commercial Intertidal Harvest	

Generalized Workshop Process

At the start of the workshop, participants were assigned to a work group and an associated mapping station. With guidance from facilitators, participants were asked to draw use areas based on their knowledge and observation of where this type of activity is known to occur. For some uses, existing data were presented and participants were asked to review and, if necessary, modify the existing data for completeness and accuracy. Each use was explicitly defined (see use descriptions on maps) and participants were asked to map the general use footprint and dominant use areas, as described below. Participants were also asked to record relevant supplemental information (e.g., seasonality, social and cultural significance, historical patterns), which was compiled and added to the final use maps.

Participants were asked to provide information on ocean uses, if possible, to improve the quality and availability of data to help inform potential development analyses. The following provides detail for type of information collected for each use category:

- **General Use Footprint:** The general use footprint includes all areas in which the use is *known to occur with some regularity* (over the past 3-5 years), regardless of its frequency or intensity. The general use footprint does not include areas where the use may occur once or twice or where it might *conceivably* occur now or in the future.

- **Dominant Use Areas:** Dominant use areas are defined as *ocean areas routinely used by most users most of the time* (within the seasonal patterns for that use). Dominant use areas must be drawn within the general use footprint. Participants were asked to work together to draw dominant use areas as they occur throughout the study region.

- **Supplemental Use Data:** Participants were asked to provide supplemental information on the *ocean use information form*. For some uses, participants noted specific locations on the map where variation of the use occurs (e.g. fishing for special events, night vs. day fishing). This information was compiled and added to the use maps in the Notes Section.

Specific traditional and customary Hawaiian uses of the ocean were not mapped explicitly. The mapping workshops were deemed an inappropriate forum for sharing such sensitive information.

BOEM has funded a separate study to assess historic properties and cultural resources in the main Hawaiian Islands, the Maritime Heritage Resources in Hawaiʻi project. For more information on this project, please contact:

- David Ball (david.ball@boem.gov)
- Hans Van Tilburg (hans.vantilburg@noaa.gov)
- James Delgado (james.delgado@noaa.gov

Maps

Data compiled during the workshop were processed to create maps documenting the use patterns as drawn by the workshop participants. The following maps show patterns for each use mapped in the workshops and include the general use footprint and dominant use areas, as well as a compilation of the supplemental data provided by participants throughout the mapping process. In creating the use maps, note the following protocol used to create the general use footprint and dominant use areas.

The ***general use footprint*** includes **ALL** areas that were mapped as general use by **ANY** of the groups that mapped that particular use over the eight days of workshops.

The ***dominant use areas*** shown on the maps include **ONLY** those areas that were mapped as dominant by a **MAJORITY** of the groups that mapped that particular use over the three days of workshops.

Based on participants' use knowledge and/or willingness to share use information, some uses (or categories of use) were not mapped in every workshop. As a result, gaps in use patterns shown on the maps may indicate that either the use does not occur in a particular area OR information on the use was not collected during the workshops. For clarification, please consult the Island Use Notes to confirm which uses were not mapped.

The maps have been reviewed by workshop participants prior to publication. Revisions and modifications were made to some of the draft maps based on the collective participant feedback. For access to the spatial data (including detailed metadata on processing, review and revisions) please visit NOAA's Digital Coast (coast.noaa.gov/dataregistry/).

Contacts

If you have questions about this project, please contact:

Mimi D'Iorio
Project Lead
Mimi.Diorio@noaa.gov

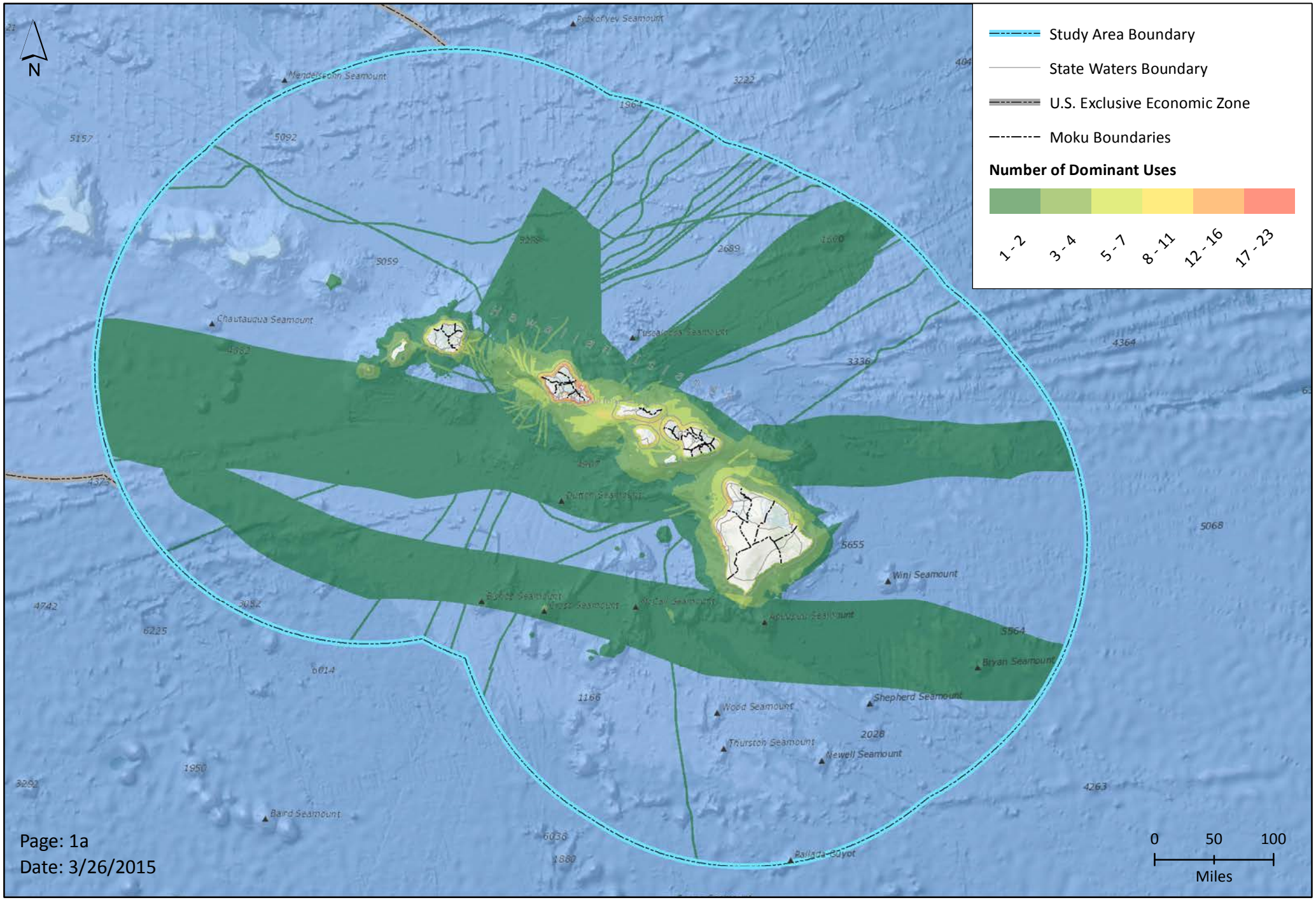
Sara Guiltinan
Project Officer
Sara.Guiltinan@boem.gov

Leo Asuncion
Hawai'i Office of Planning
Leo.Asuncion@dbedt.hawaii.gov

March 2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas



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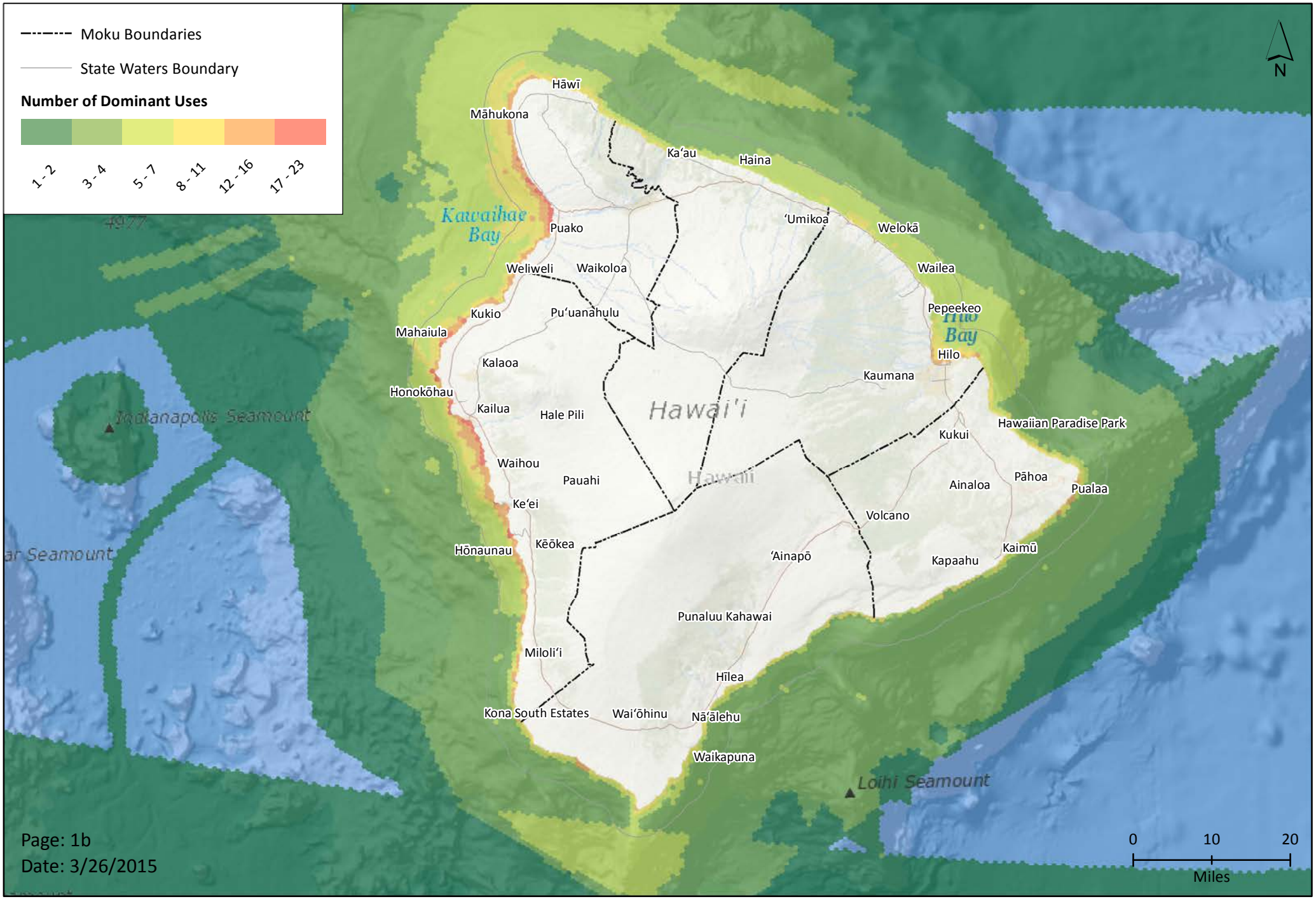
Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas



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Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

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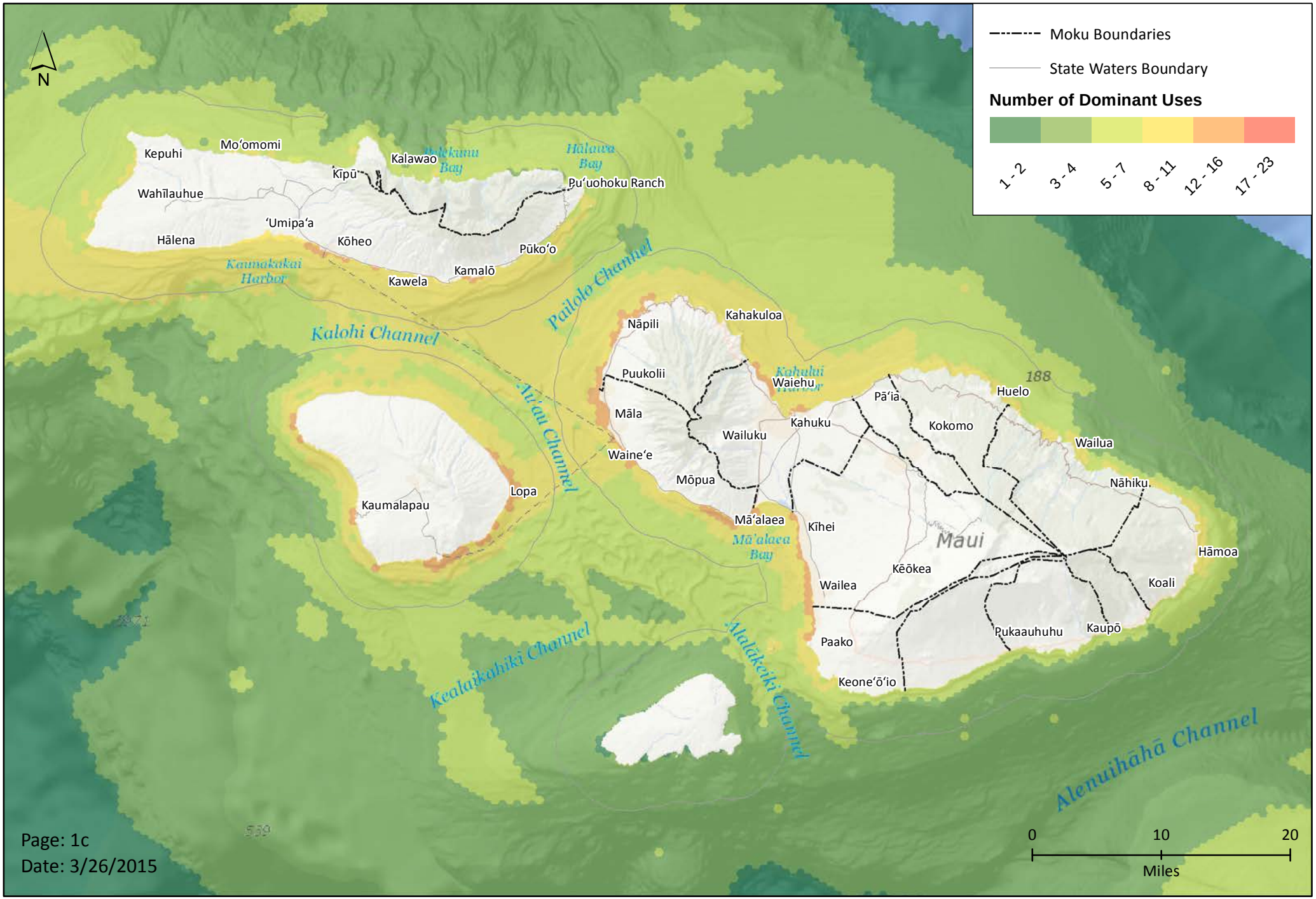

THE HAWAII OCEAN USES ATLAS: OAHU

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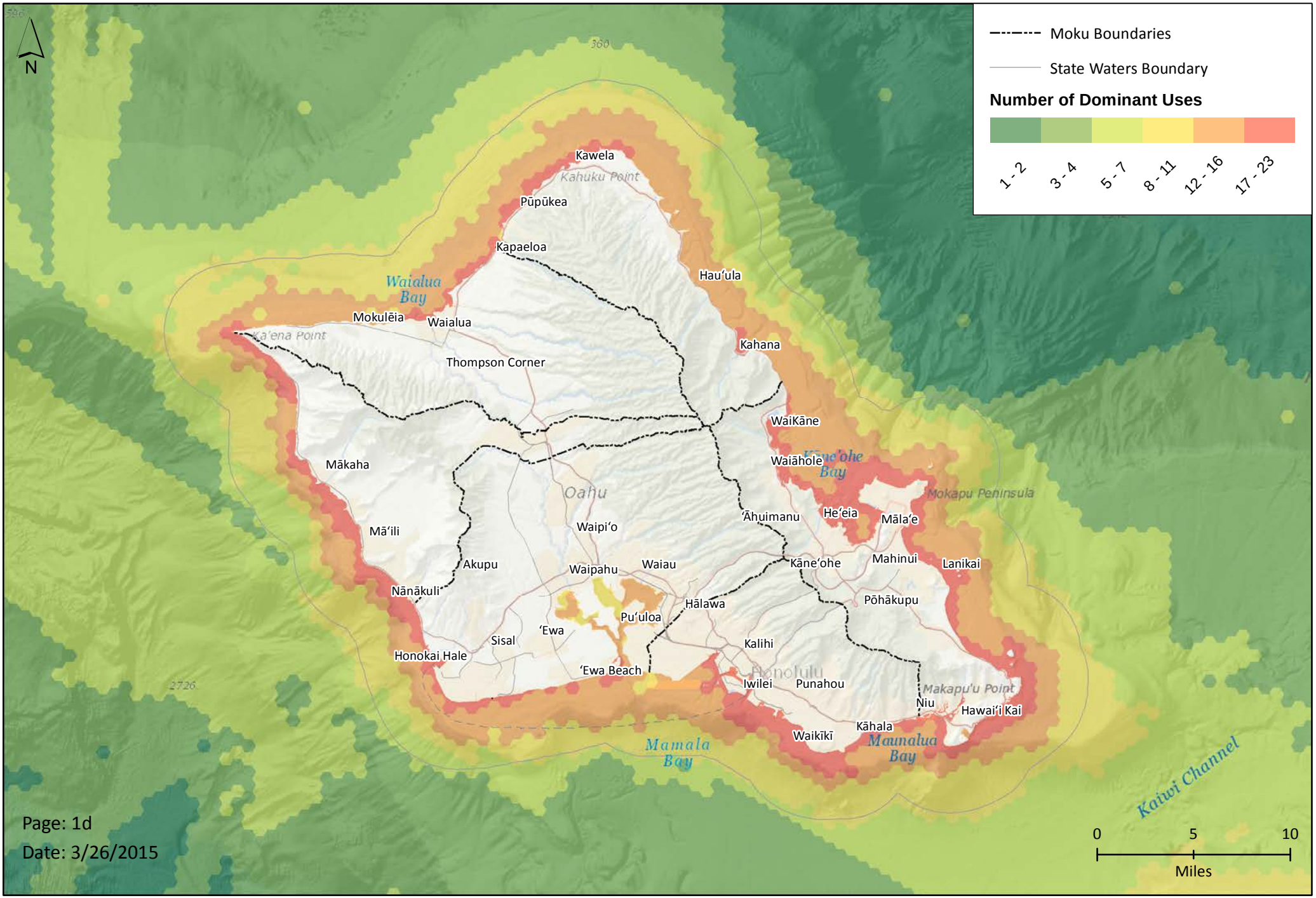

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Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

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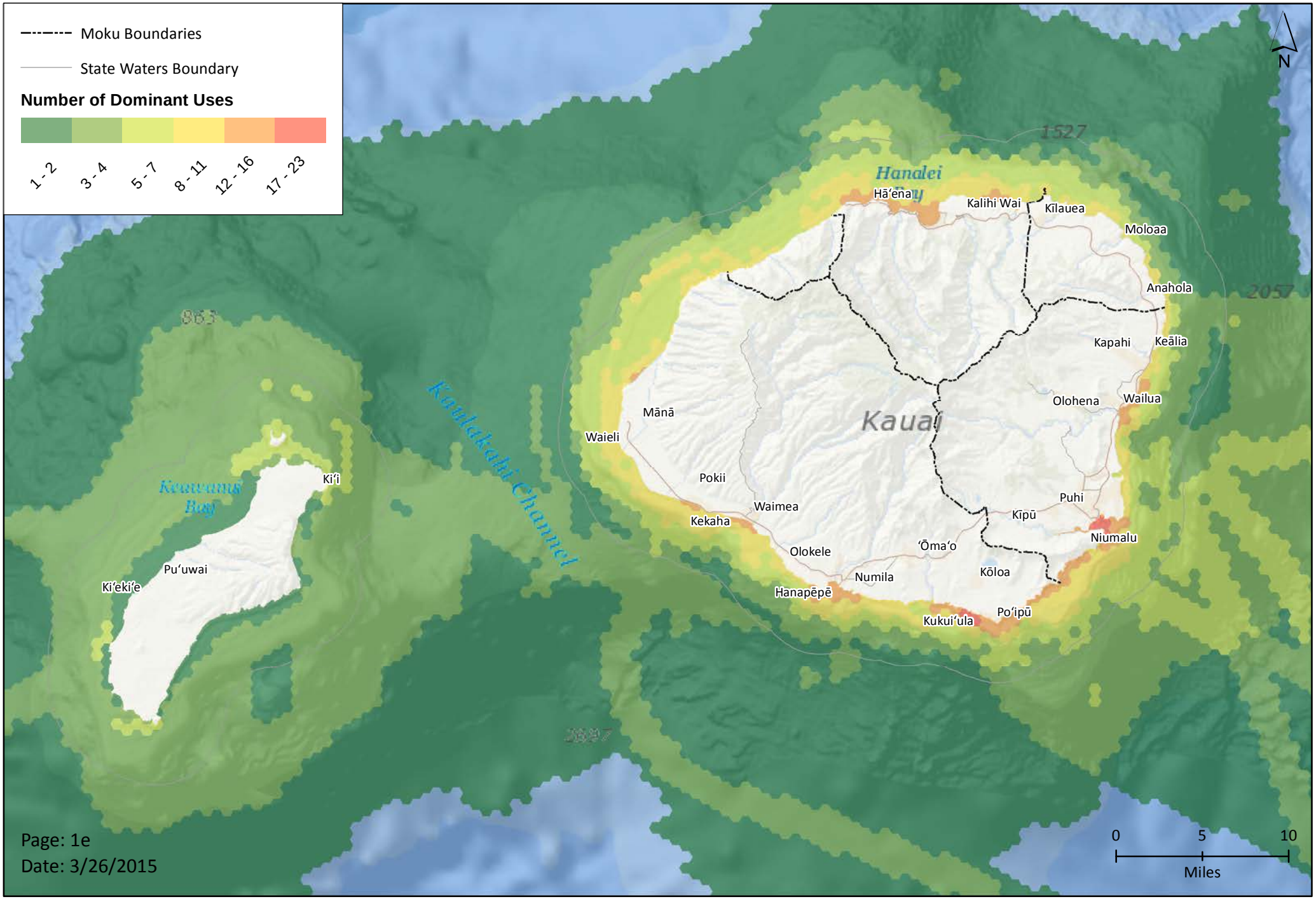

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Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Commercial Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for commercial purposes. Includes in-water use of spear for fish and he'e(octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Non-Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest, use of lobster nets

Statewide Use Notes:
Dive fishers are primarily subsistence and non-commercial fishers. The few commercial divers target live fish for the aquarium trade, a contentious activity in the islands that predominantly occurs off the Kona coast. Dominant use areas for dive fishing are around coastal access points in proximity to population zones and surrounding the state-maintained Fish Aggregation Devices (FADs). Free diving is increasing in popularity both as a recreational activity and for spearfishing. Dive fishing is dependent upon environmental conditions; SCUBA divers reach depths of ~130 feet, while free divers can reach a maximum depth of ~100 feet. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

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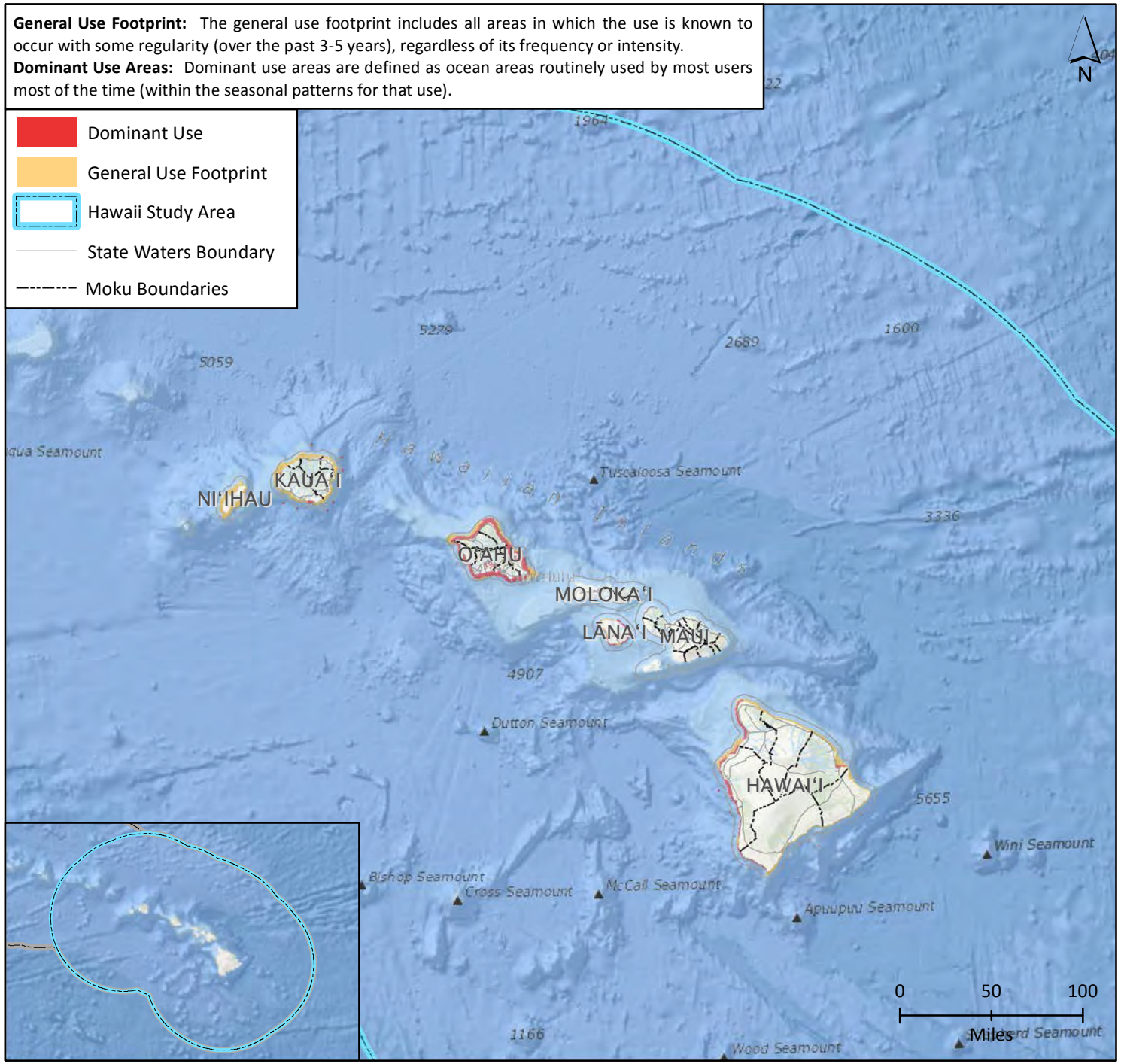

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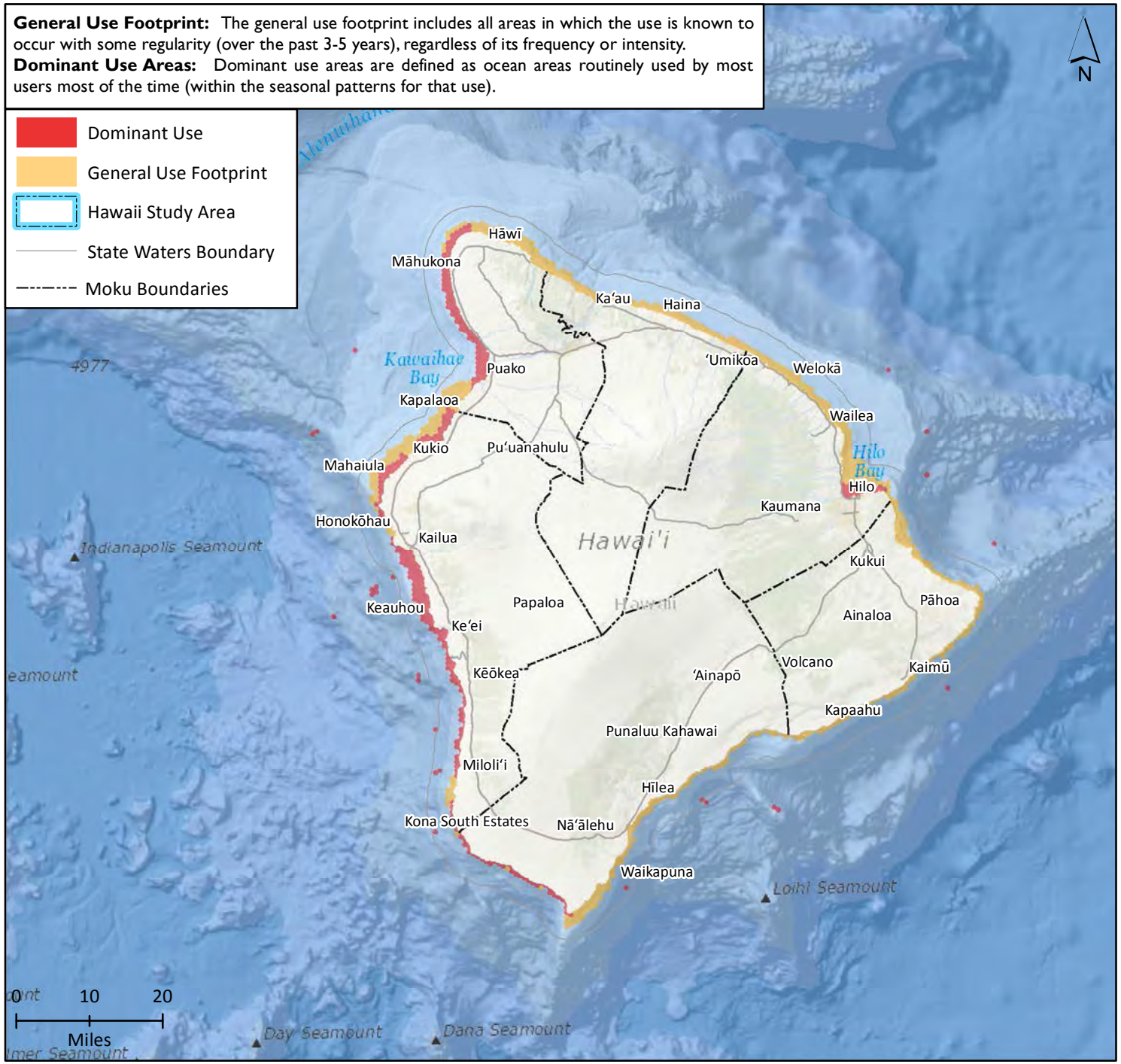
Commercial Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for commercial purposes. Includes in-water use of spear for fish and he'e(octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Non-Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest, use of lobster nets

Island Use Notes:
Commercial dive fishing occurs throughout all marine waters around Hawaii Island, typically down to 150 feet. On the leeward side, the use is more common due to preferred marine conditions and increased access to the shoreline. Spearfishing using SCUBA gear is prohibited within 3 miles from shore on the leeward side, but free diving is allowed with restrictions on lobster collection. Divers can collect fish for the aquarium trade using SCUBA but this activity is prohibited within Fish Replenishment Areas (FRAs). Aquarium collection is a contentious use and often occurs covertly at sites farther from shore with limited access. Blue water diving occurs less frequently around the Fish Aggregation Devices (FADs) within 100 feet of the buoy. On the windward side, Kings Landing to Hilo Bay is a dominant use area. Private FADs have been placed offshore in a few select locations, but these are not as highly used as the state-maintained FADs.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

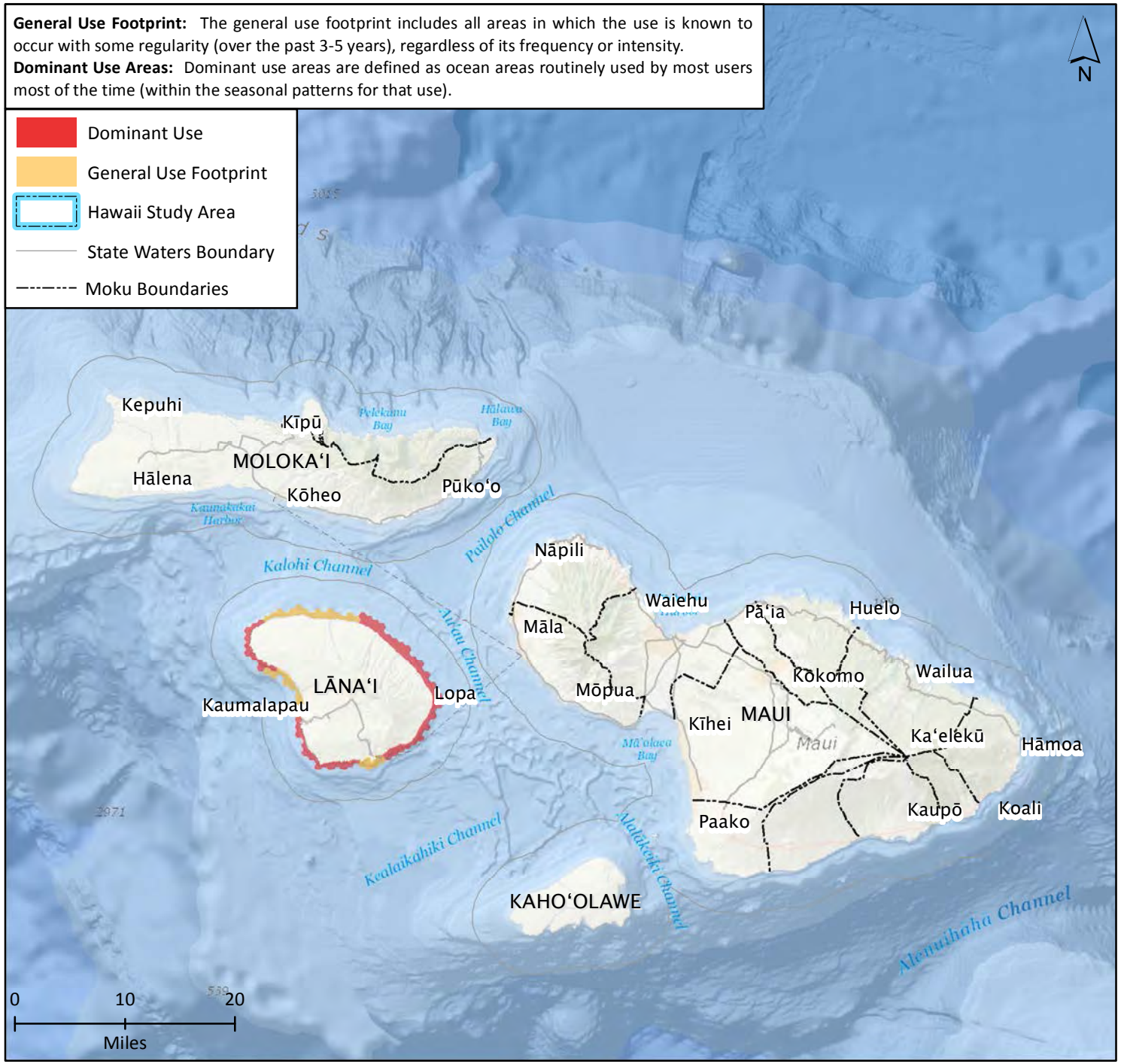
Commercial Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for commercial purposes. Includes in-water use of spear for fish and he'e(octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Non-Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest, use of lobster nets

Island Use Notes:
Maui:
Information on commercial dive fishing and harvest was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.
Lanai:
Workshop participants did not provide additional contextual information for this use.
Molokai:
Information on commercial dive fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

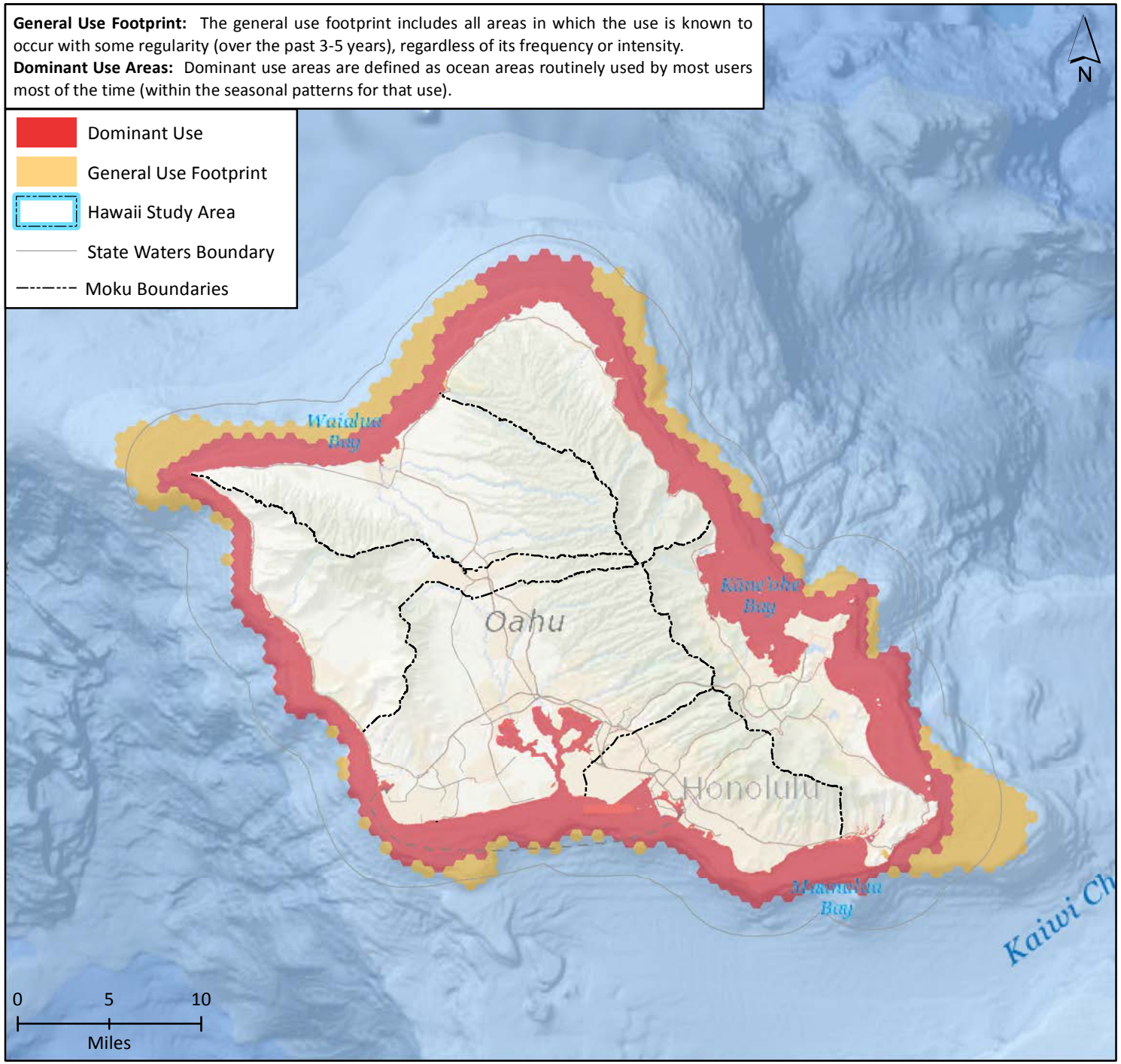
Commercial Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for commercial purposes. Includes in-water use of spear for fish and he'e(octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Non-Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest, use of lobster nets

Island Use Notes:
Commercial dive fishing occurs all around the island, generally free diving from shore to 90 feet depth and SCUBA to 150 feet depth. The dominant areas are along the shallow reef flat (in areas like Kahana Bay) and areas along the reef break. SCUBA is more prevalent, but free diving is increasing in popularity. A controversial component of this activity focuses on the capture of live fish for the aquarium trade.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

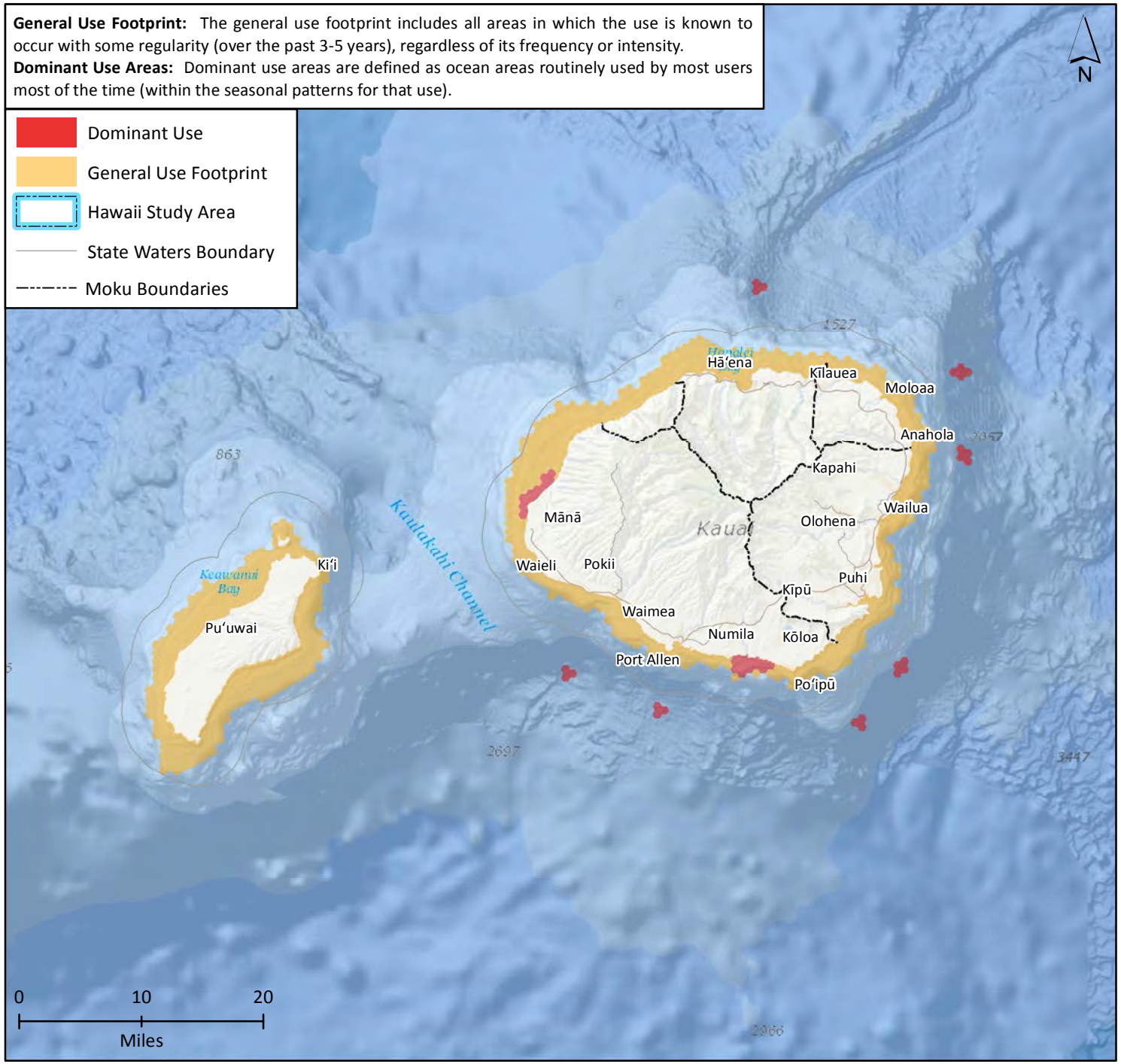
Commercial Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for commercial purposes. Includes in-water use of spear for fish and he'e(octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Non-Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest, use of lobster nets

Island Use Notes:
Commercial dive fishing is a weather dependent activity that occurs around Kauai and Niihau (mainly off the west coast of Niihau). Divers typically catch reef fish and sell to families and local markets. On Kauai, commercial divers will collect corals down to 180 feet deep; there is one dive boat licensed for this activity. Free diving is growing in popularity, and occurs to depths of 100 feet around Kauai. Blue water diving occurs less frequently offshore within 0.25 miles of Fish Aggregation Devices.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

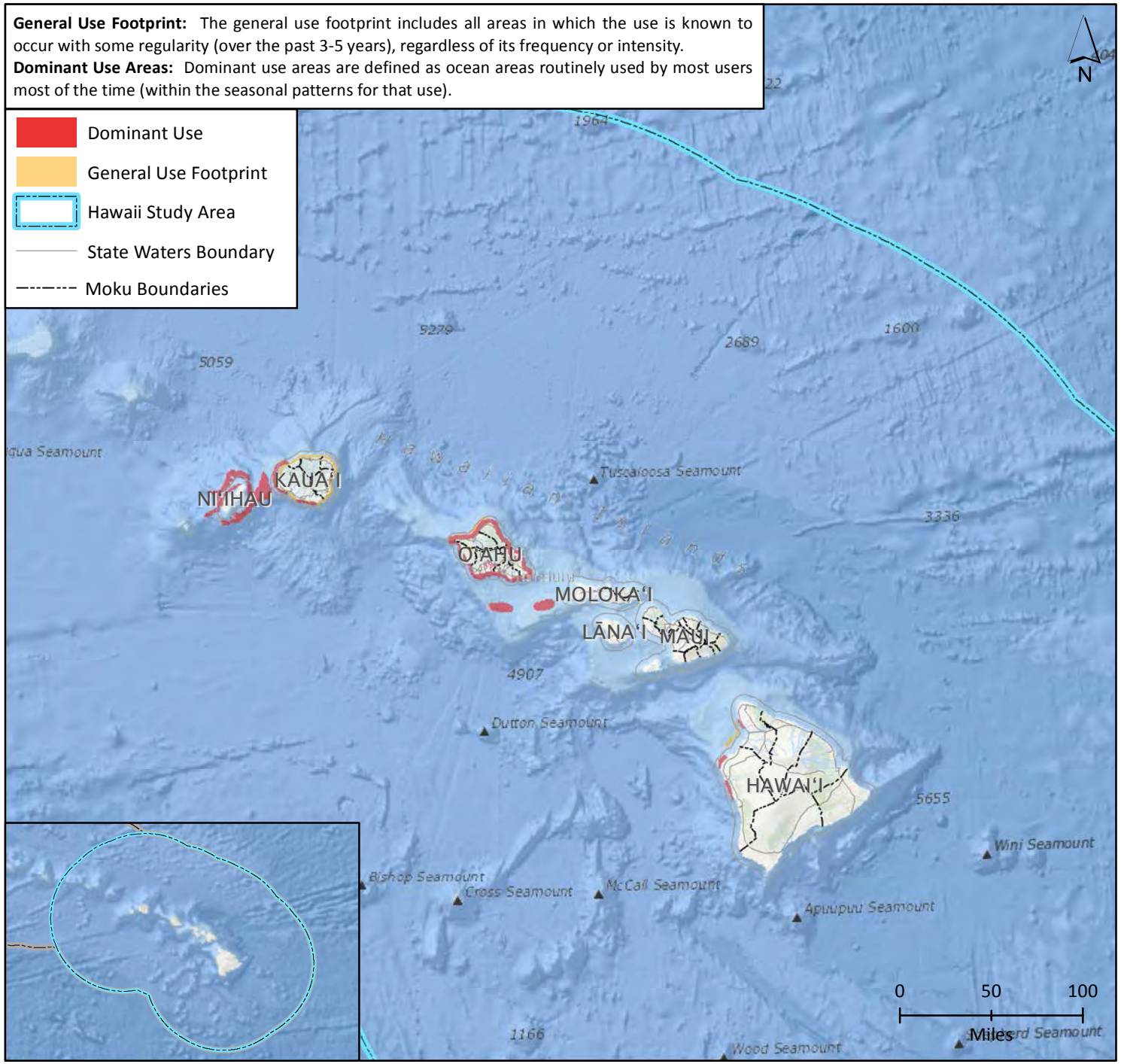
Commercial Fishing with Benthic Fixed Gear

Includes:
Use of traps, pots, long lines, bottom or anchored gillnets and other bottom-tending gear types used to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Statewide Use Notes:
As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottomfish-a mix of high-value snapper and groupers. Crap can be found in areas with sandy bottoms; fish are found in areas with higher rugosity. Fishers are typically non-commercial but will occasionally sell the best of their catch. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

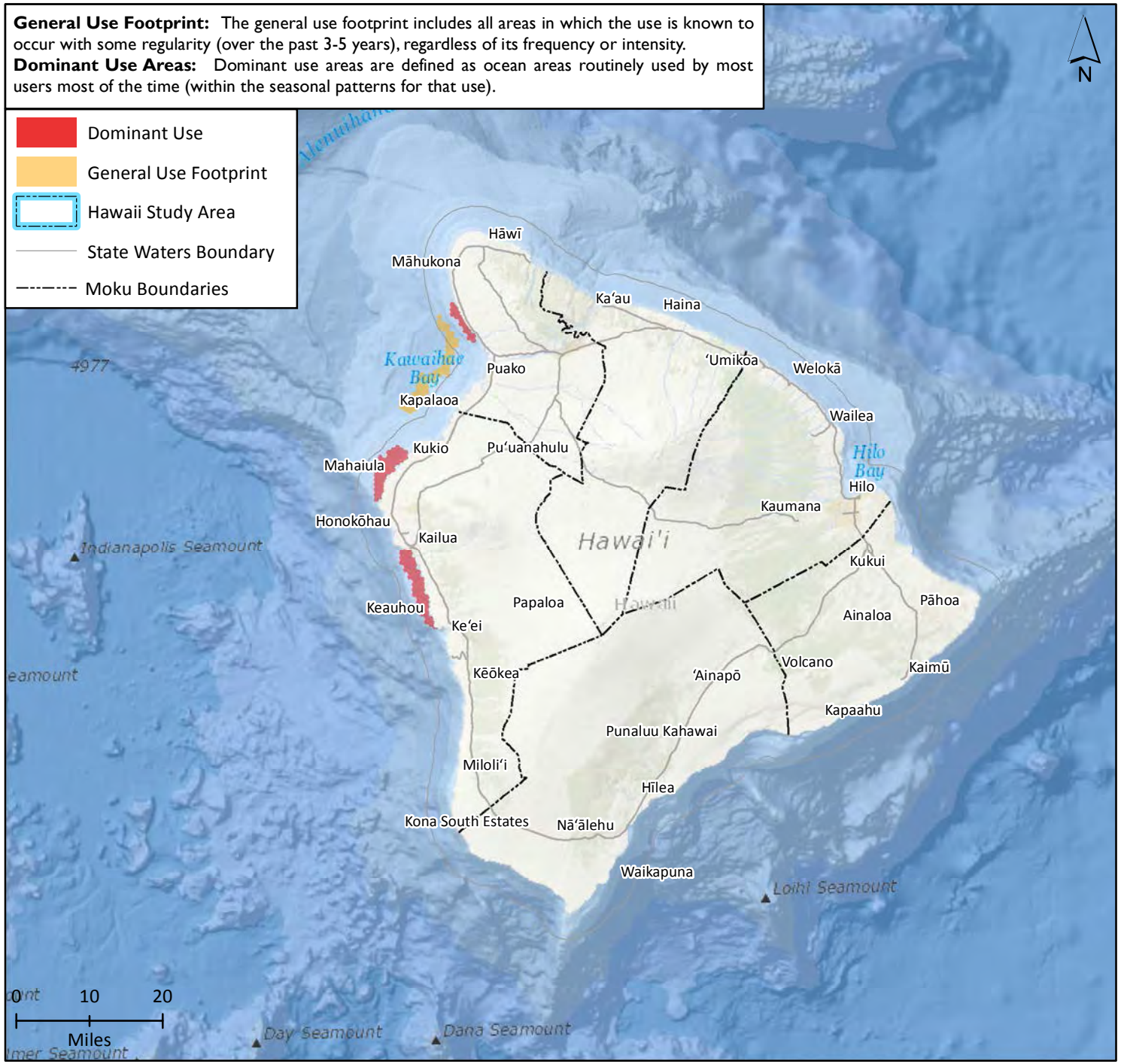
Commercial Fishing with Benthic Fixed Gear

Includes:
Use of traps, pots, long lines, bottom or anchored gillnets and other bottom-tending gear types used to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Island Use Notes:
Commercial fishing with benthic mobile & fixed gear is mainly referred to as bottom fishing. The use is strongly tied to seafloor depth, seafloor morphology and distance from shore. The Cross, Loihi, and Daly seamounts, as well as other shallow seamounts (< 200 fathoms) and ledges off Maui and between Maui and Hawaii are well-known bottom fishing grounds. Users that target Kona crabs typically seek sandy bottom areas at depths of 20 - 50 fathoms with fixed nets commonly used at night for catching lobster. The predominant bottom fish species caught are snapper, grouper and jacks. Bottom fishing is prohibited in Mahaiula, and in the South Point bottom fish restricted areas (BRFA), but mainly occurs all around the island at 40 - 250 fathoms.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Fixed Gear

Includes:
Use of traps, pots, long lines, bottom or anchored gillnets and other bottom-tending gear types used to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

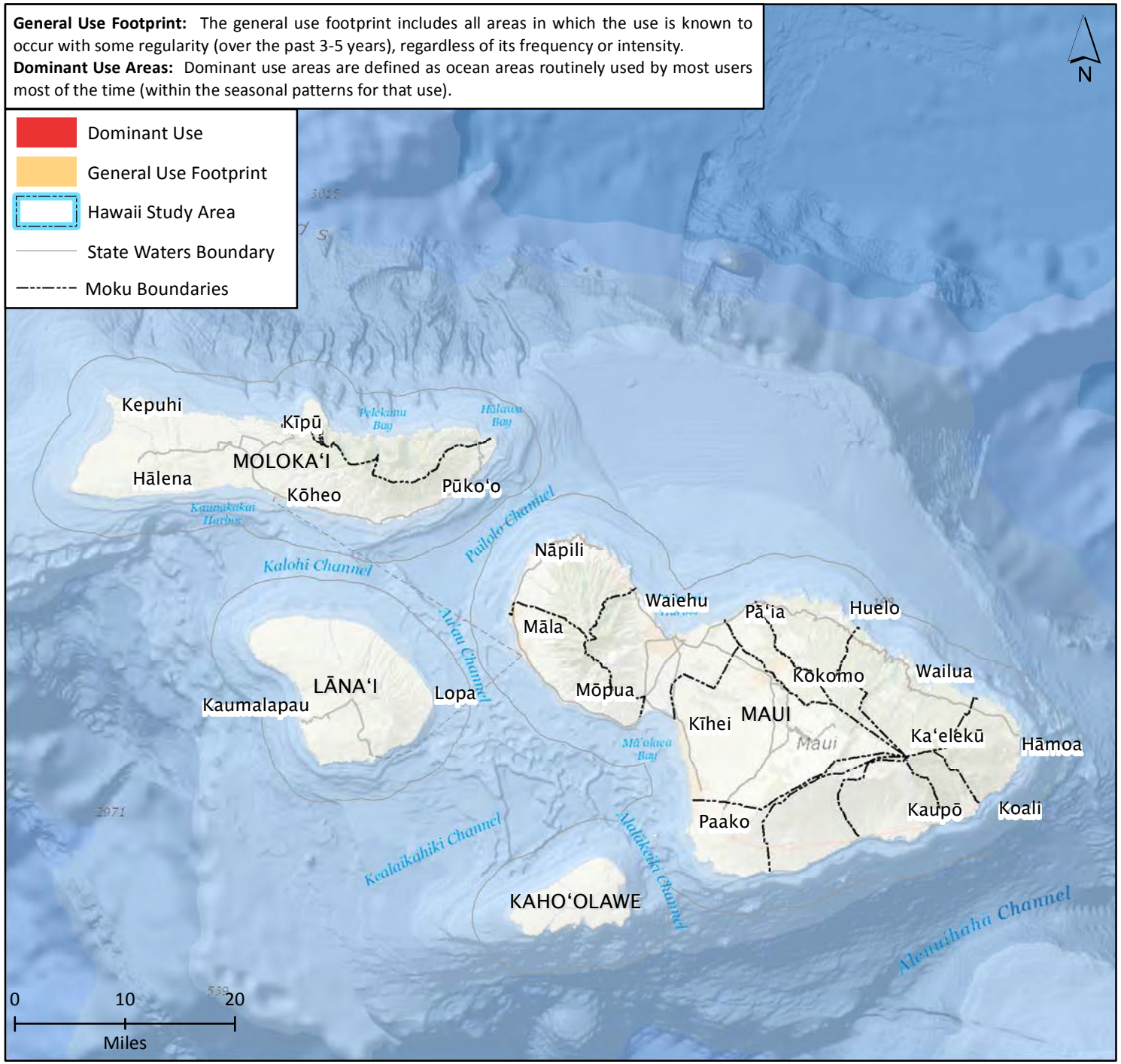
Island Use Notes:

Maui:
Commercial benthic fishers primarily target Kona crab due to regulatory restrictions on the use of other gear types, (e.g., gill nets and lay nets). This activity is dominant throughout Maui Nui and along Penguin Bank (predominantly Oahu fishermen), but fuel costs often limit the distance that fishers will go from their home port. This use was discussed but use areas were not mapped during the workshop.

Lanai:
Information on commercial fishing with benthic mobile and fixed gear was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.

Molokai:
Commercial fishing occurs from the shoreline out to beyond 200 nautical miles. Dominant use areas are around Maui Nui with bottom fishing typically from Kaunakakai to Kamalo harbor.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

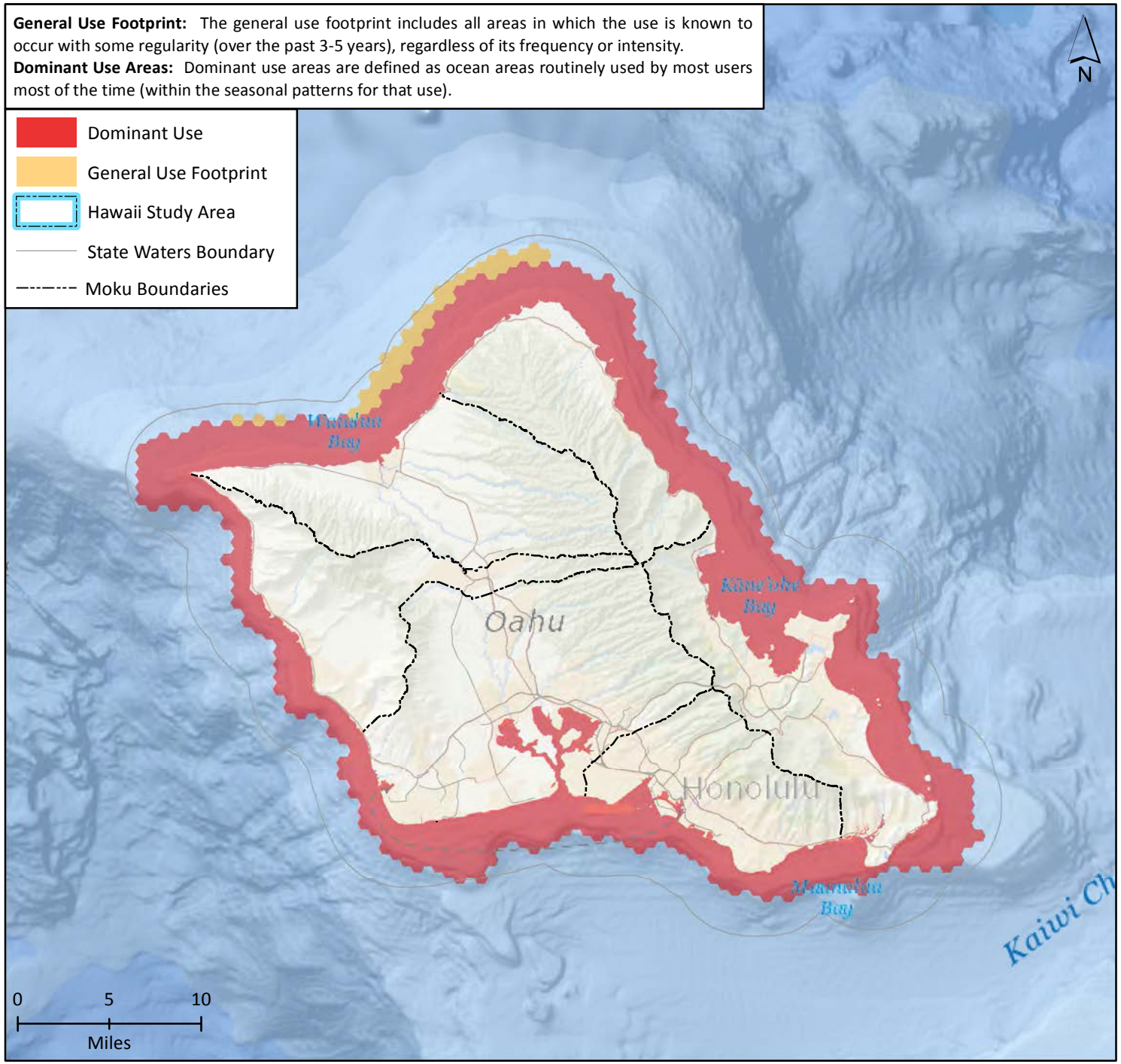
Commercial Fishing with Benthic Fixed Gear

Includes:
Use of traps, pots, long lines, bottom or anchored gillnets and other bottom-tending gear types used to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Island Use Notes:
Commercial bottom fishing occurs all throughout the islands, depending on the season and the target species anywhere from the shoreline out to 350 fathoms. Bottom fishing for deep-water shrimp is most common between 200 – 350 fathoms and for Kona crab between 20-40 fathoms. Dominant use areas exist around Penguin Bank. Regulations and ocean conditions limit the locations and seasons for commercial bottom fishing.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

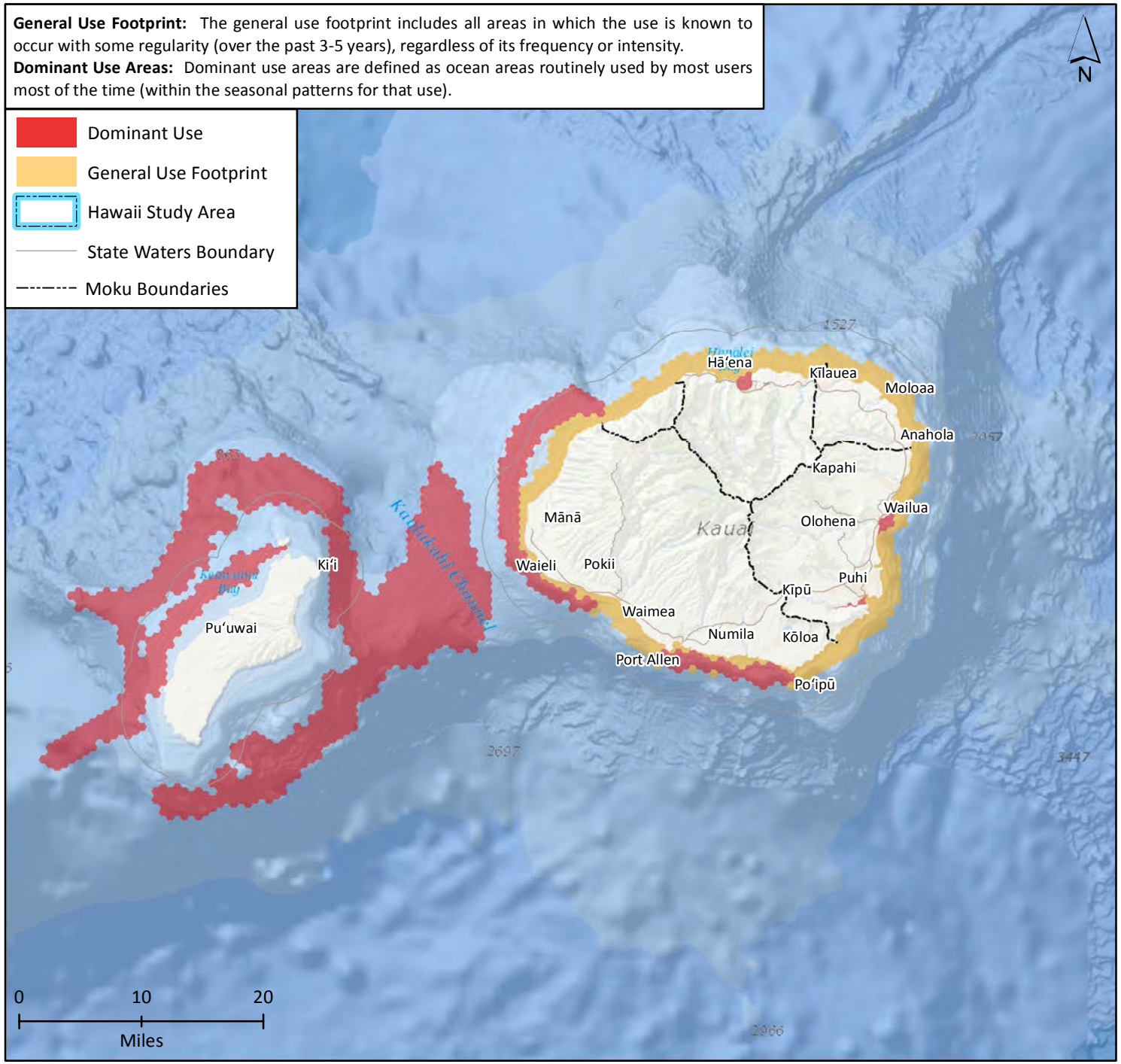
Commercial Fishing with Benthic Fixed Gear

Includes:
Use of traps, pots, long lines, bottom or anchored gillnets and other bottom-tending gear types used to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Island Use Notes:
Commercial fishing with benthic gear occurs all around Kauai, mainly within the 20 – 500 fathom depth range. The typical species caught are the deep seven species. Using fixed gear, the most targeted species are the Kona crab and Samoan crab which are found mainly around Hanalei Bay and the mouth of the Wailua river. Kona crab fishing targets sandy bottom areas, between 20 – 60 fathoms. Fishers will also trap Oopu, an anadromous fish that breeds in the local rivers. These fish spawn from August to September and need heavy rains to trigger their cycles. In recent years, more non-resident/off-island boats have been seen fishing in Kauai waters. Alaskan fishermen come to fish for shrimp off Kauai using traps between 300 – 500 fathoms.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Mobile Gear

Includes:
Use of hand lines, benthic longlines, drag nets, drift nets and other mobile gear to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Statewide Use Notes:
As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity . Fishers are typically non-commercial but will occasionally sell the best of their catch. Across the state there is no benthic trawling or trolling except to target Monchong near Hawaii island on the Cross seamount.
Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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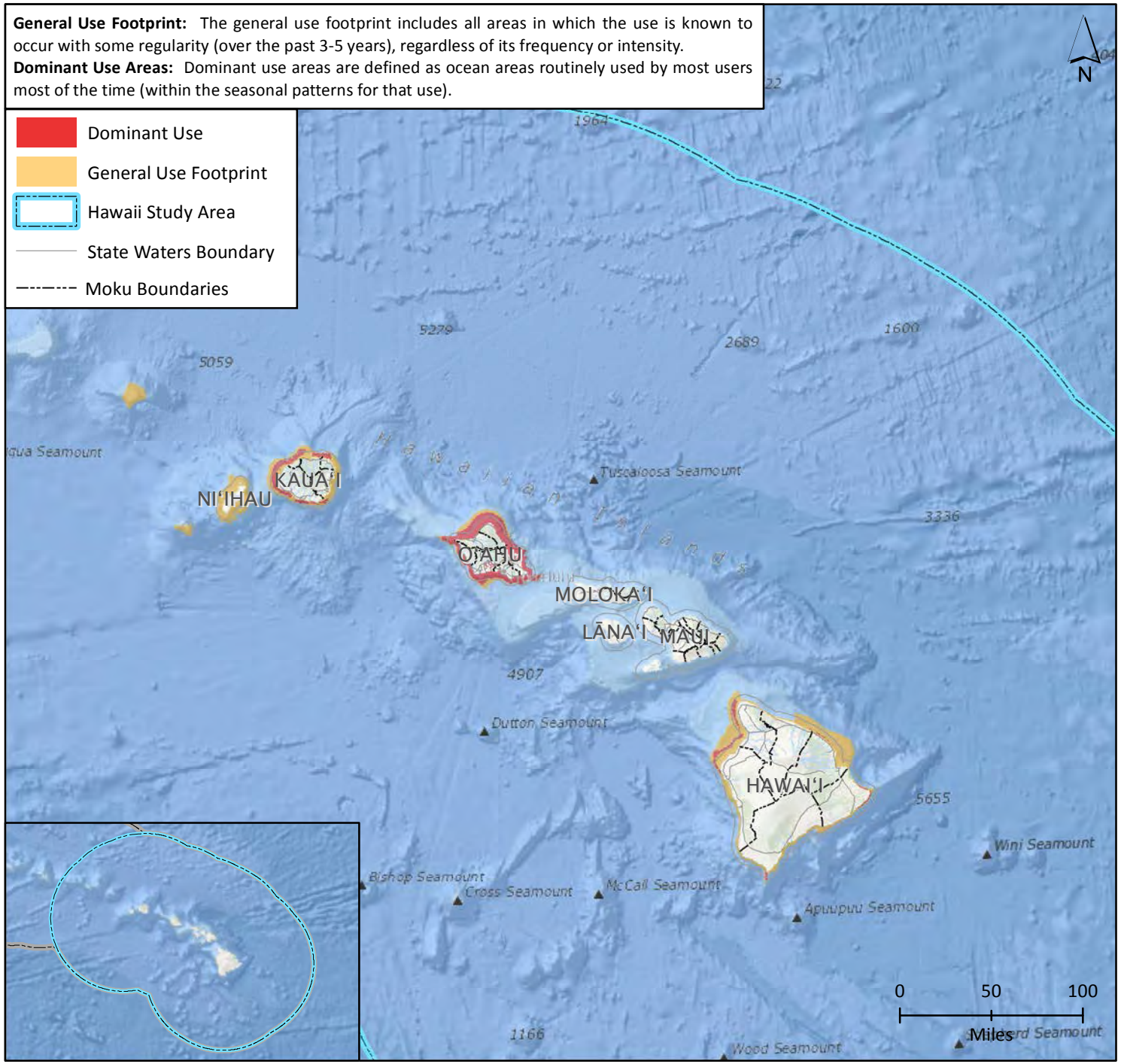


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

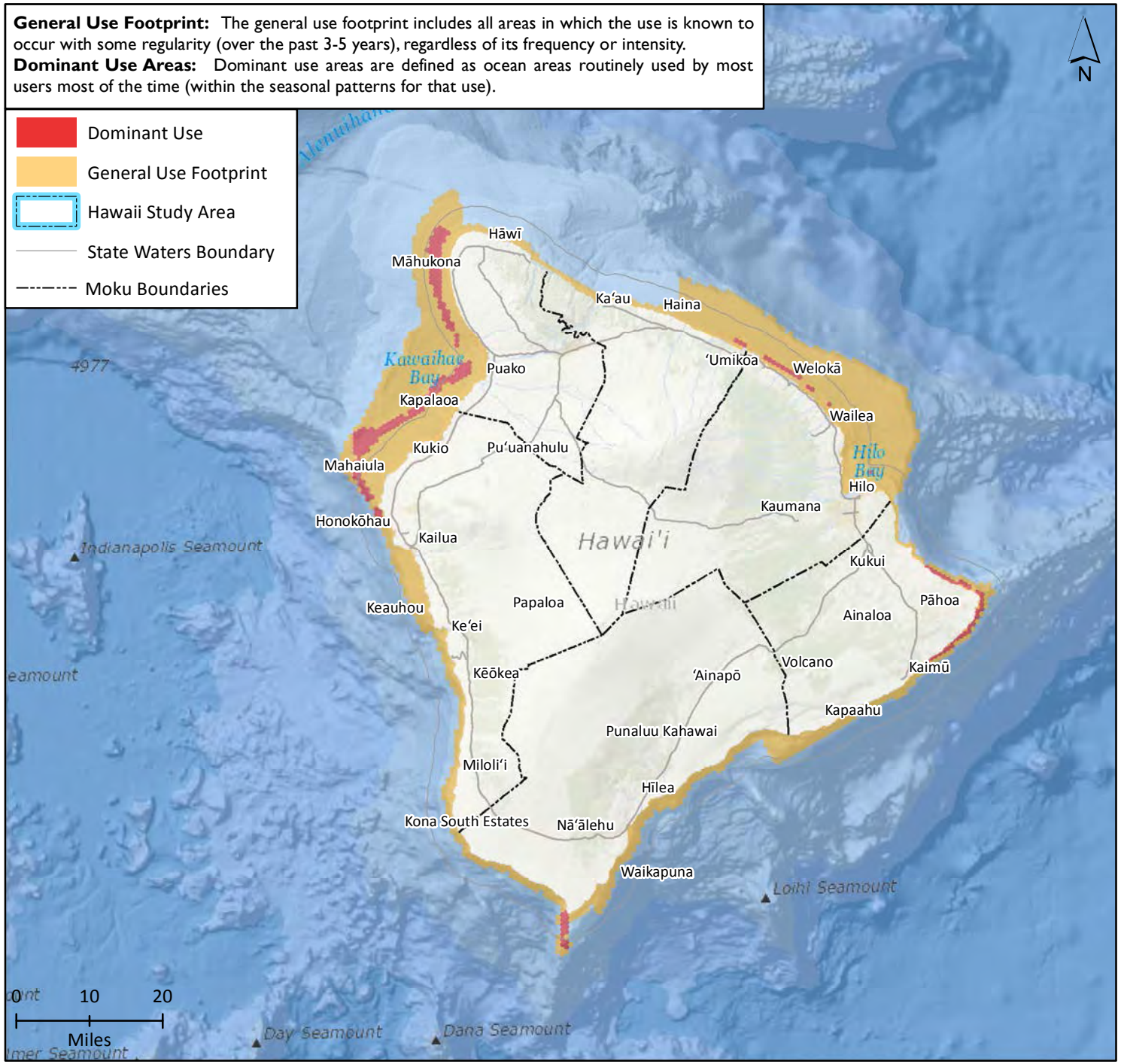
Commercial Fishing with Benthic Mobile Gear

Includes:
Use of hand lines, benthic longlines, drag nets, drift nets and other mobile gear to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Island Use Notes:
Commercial fishing with benthic mobile & fixed gear is mainly referred to as bottom fishing. The use is strongly tied to seafloor depth, seafloor morphology and distance from shore. The Cross, Loihi, and Daly seamounts, as well as other shallow seamounts (< 200 fathoms) and ledges off Maui and between Maui and Hawaii are well-known bottom fishing grounds. Users that target Kona crabs typically seek sandy bottom areas at depths of 20 - 50 fathoms with fixed nets commonly used at night for catching lobster. The predominant bottom fish species caught are snapper, grouper and jacks. Bottom fishing is prohibited in Mahaiula, and in the South Point bottom fish restricted areas (BRFA), but mainly occurs all around the island at 40 - 250 fathoms. Across the state there is no benthic trawling or trolling except to target Monchong near Hawaii island on the Cross seamount.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Mobile Gear

Includes:
Use of hand lines, benthic longlines, drag nets, drift nets and other mobile gear to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

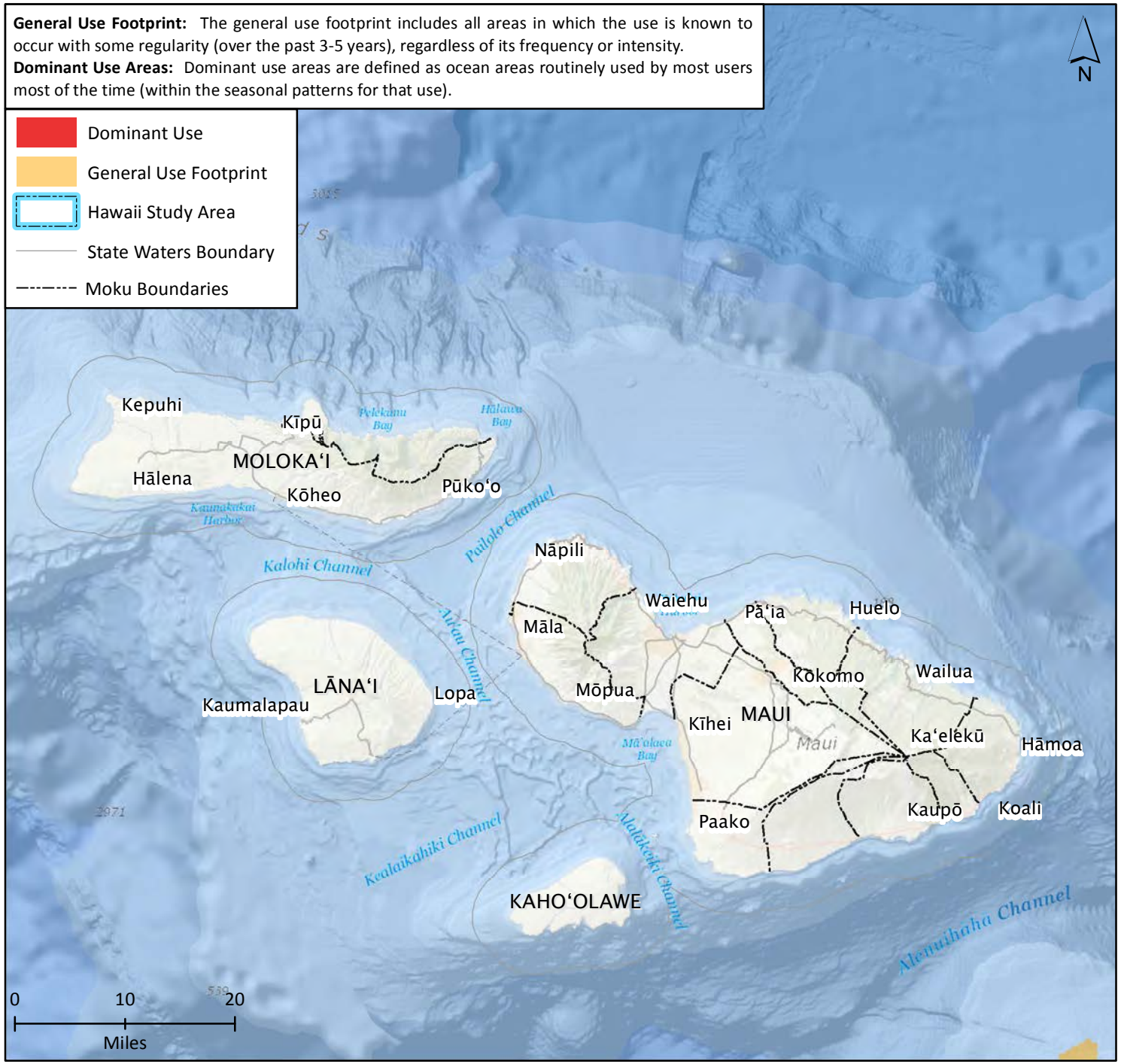
Island Use Notes:

Maui:
Commercial benthic fishers primarily target Kona crab due to regulatory restrictions on the use of other gear types, (e.g., gill nets and lay nets). This activity is dominant throughout Maui Nui and along Penguin Bank (predominantly Oahu fishermen), but fuel costs often limit the distance that fishers will go from their home port. This use was discussed but use areas were not mapped during the workshop.

Lanai:
Information on commercial fishing with benthic mobile and fixed gear was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.

Molokai:
Commercial fishing occurs from the shoreline out to beyond 200 nautical miles. Dominant use areas are around Maui Nui with bottom fishing typically from Kaunakakai to Kamalo harbor. This use was discussed but use areas were not mapped during the workshop.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Mobile Gear

Includes:
Use of hand lines, benthic longlines, drag nets, drift nets and other mobile gear to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Island Use Notes:
Commercial bottom fishing occurs all throughout the islands, depending on the season and the target species anywhere from the shoreline out to 350 fathoms. Bottom fishing for deep-water shrimp is most common between 200 – 350 fathoms and for Kona crab between 20-40 fathoms. Dominant use areas exist around Penguin Bank. Regulations and ocean conditions limit the locations and seasons for commercial bottom fishing.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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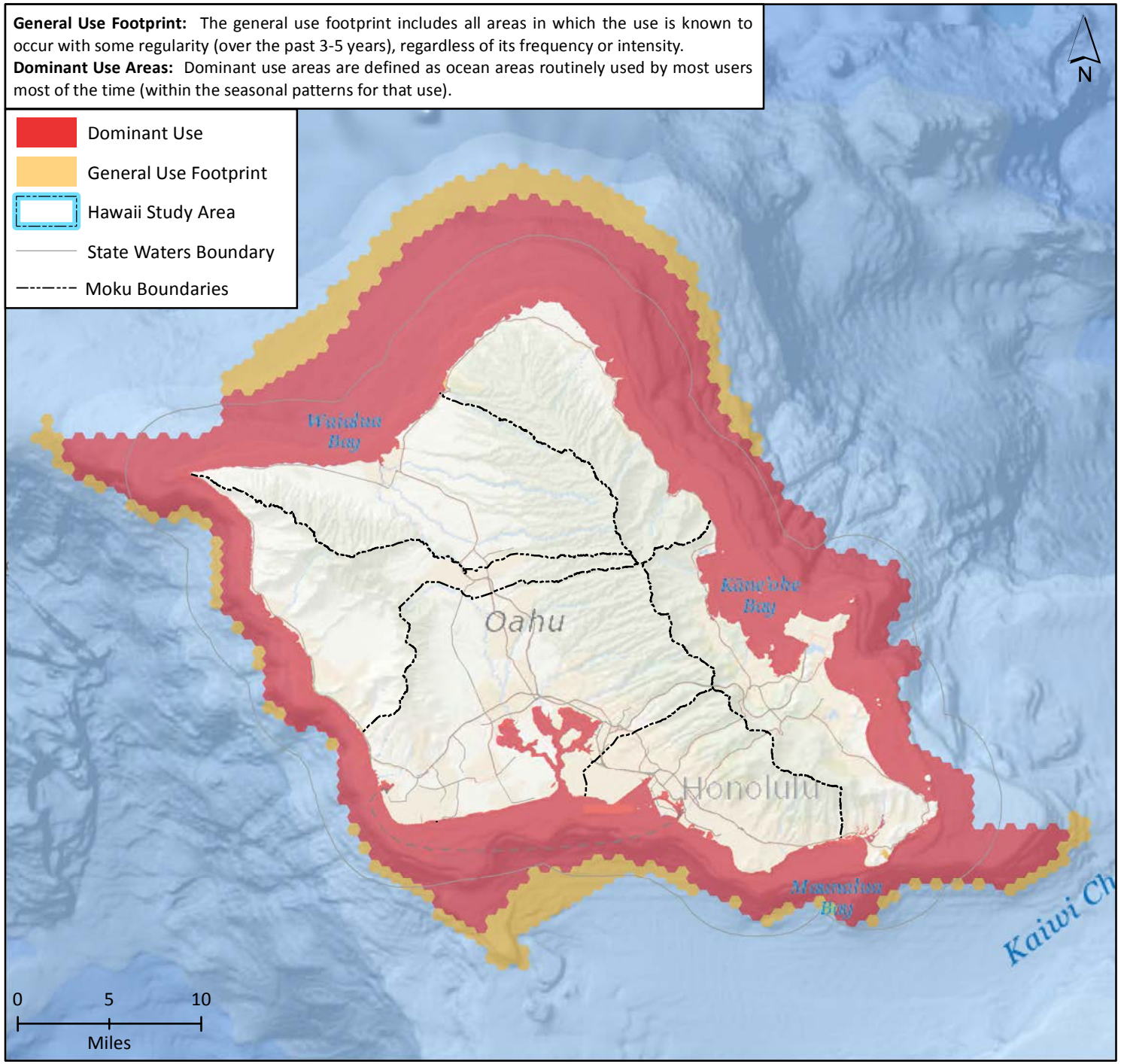

Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Commercial Fishing with Benthic Mobile Gear

Includes:
Use of hand lines, benthic longlines, drag nets, drift nets and other mobile gear to catch benthic fishes and invertebrates for commercial purposes

Excludes:
All other forms of fishing

Island Use Notes:
Commercial fishing with benthic gear occurs all around Kauai, mainly within the 20 – 500 fathom depth range. The typical species caught are the deep seven species. Using fixed gear, the most targeted species are the Kona crab and Samoan crab which are found mainly around Hanalei Bay and the mouth of the Wailua river. Kona crab fishing targets sandy bottom areas, between 20 – 60 fathoms. Fishers will also trap Oopu, an anadromous fish that breeds in the local rivers. These fish spawn from August to September and need heavy rains to trigger their cycles. In recent years, more non-resident/off-island boats have been seen fishing in Kauai waters. Alaskan fishermen come to fish for shrimp off Kauai using traps between 300 – 500 fathoms.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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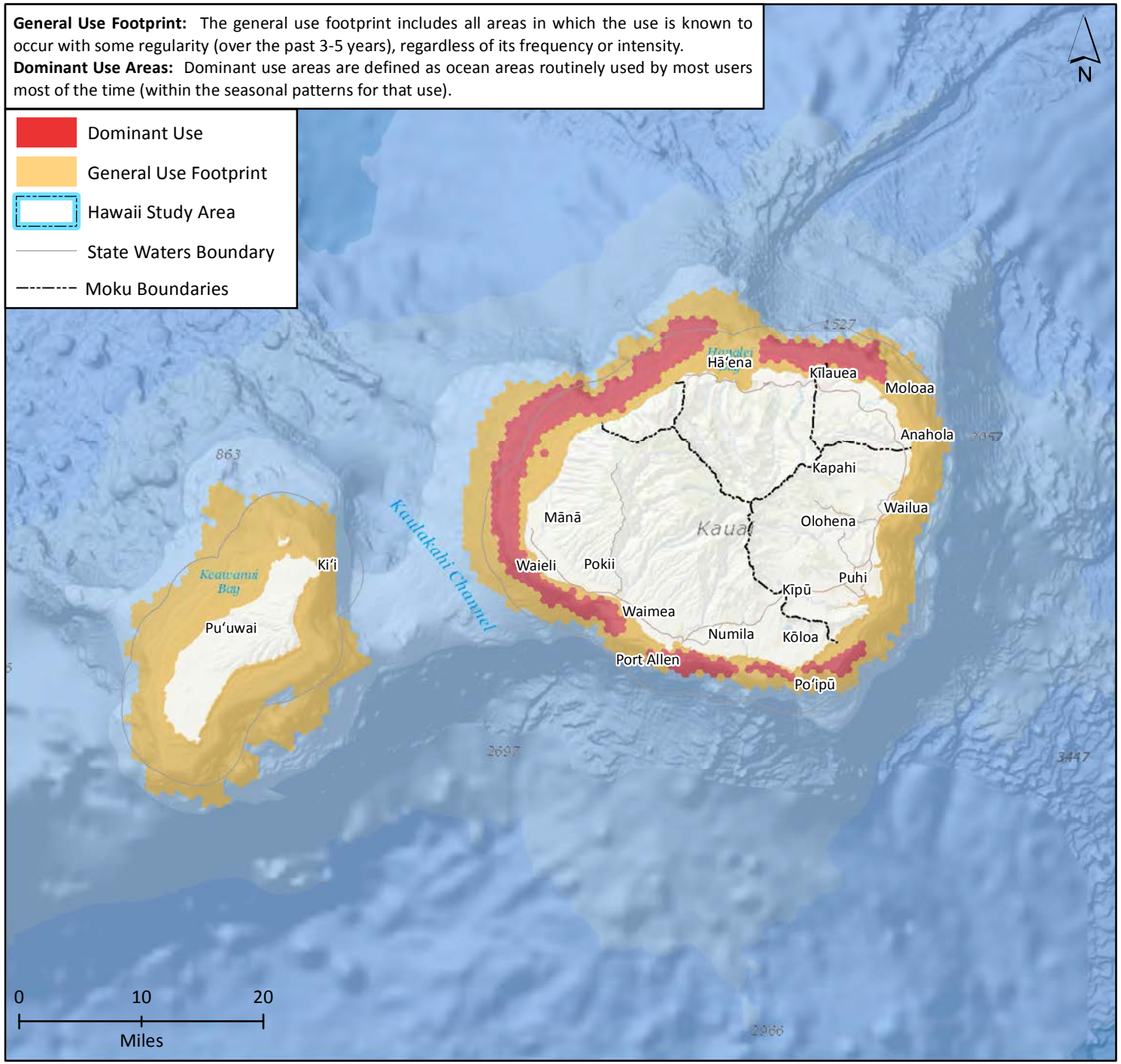


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

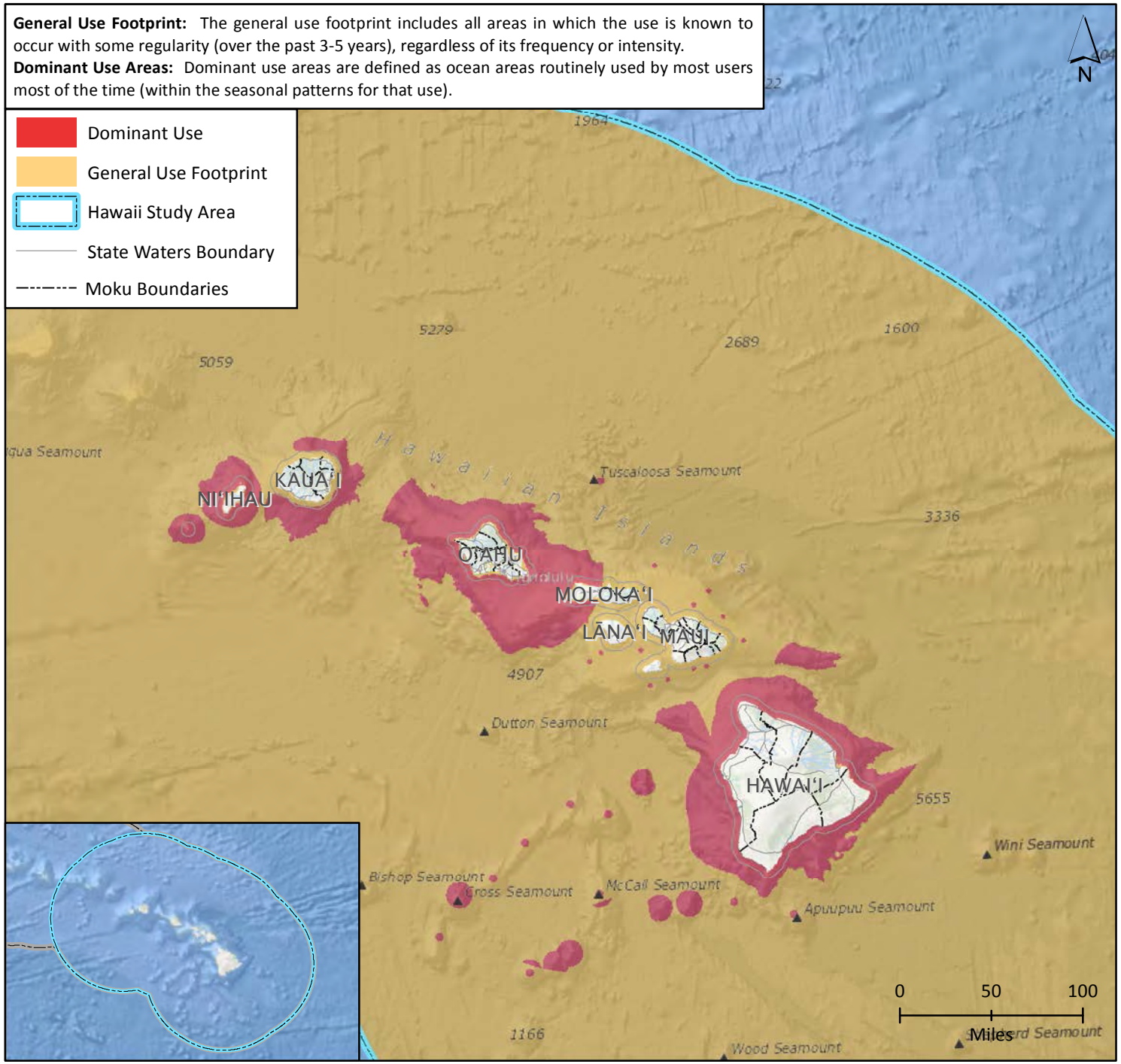
Commercial Pelagic/Midwater Fishing

Includes:
Use of pelagic longlines, hand lines, mid-water gillnets, rod and reel, trolling, buoys and other mobile gear to catch pelagic fishes and mobile invertebrates for commercial purposes. Includes fishing at Fish Aggregation Devices (FADs)

Excludes:
All other forms of fishing

Statewide Use Notes:
Pelagic fishers use the all marine waters around the islands and venture beyond 200 nautical miles from shore. Dominant use areas are near submerged ledges and drop offs and surrounding seamounts and the state-maintained Fish Aggregation Devices (FADs). Prime fishing spots vary from island to island. Typical gear used are rod and reel (trolling) or kaka (hand) line from a boat. Kaka line fishing often occurs in smaller boats closer to shore. There are 110 long liners in the state and 11 short liners (<1 nautical mile length line). Most long liners are based from Honolulu including selling their catch and resupplying there. Some short line boats are based on Hawaii island, but sell primarily in Honolulu and to a lesser amount in Kona/Hilo. Long liners using gear longer than 1 nautical mile are restricted by the MHI longline fishing prohibited area. Longlining is the primary method of fishing, if measured by pounds of landed fish. The primary use, when measured by effort, is trolling for pelagics (marlin, mahi mahi, ono, and ahi). Commercial long liners follow seasonal and year-round regulatory closures. The primary target species are large pelagic fish including hebi(swordfish), ahi (tuna), akule (scad), and mahi (dolphin fish). Pelagic species' distributions vary seasonally. Noncommercial fishers use the same areas as the commercial pelagic fishers, the primary difference is non-commercial fishers will stay closer to shore to limit fuel costs (<15-20 miles). Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

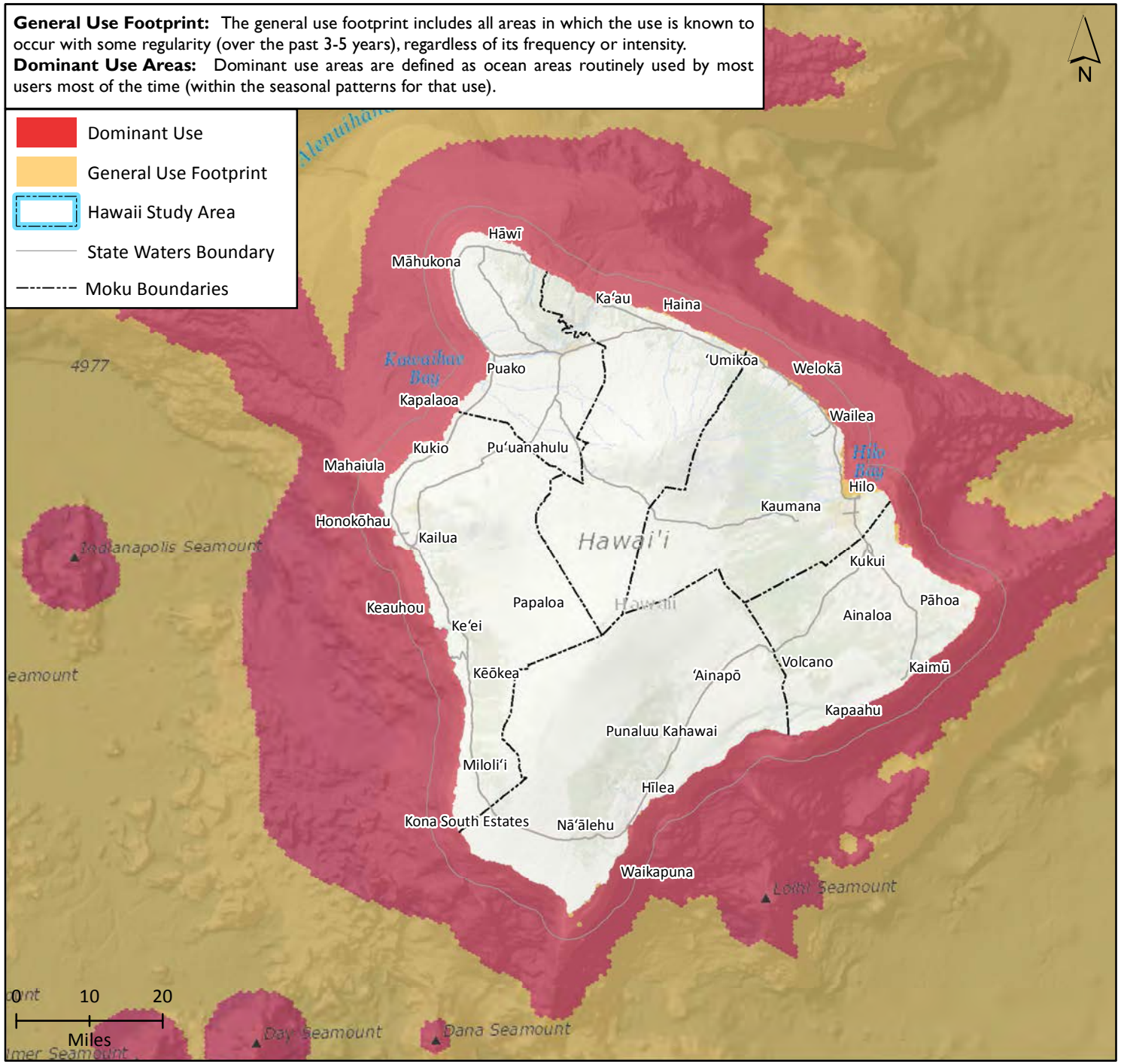
Commercial Pelagic/Midwater Fishing

Includes:
Use of pelagic longlines, hand lines, mid-water gillnets, rod and reel, trolling, buoys and other mobile gear to catch pelagic fishes and mobile invertebrates for commercial purposes. Includes fishing at Fish Aggregation Devices (FADs)

Excludes:
All other forms of fishing

Island Use Notes:
Commercial pelagic fishing occurs throughout the main eight Hawaiian Islands out to 200 nm and beyond. On the leeward side of Hawaii Island, dominant use is mainly within 10 miles from shore due to optimal marine conditions, fuel costs and good fishing. The waters surrounding Kailua-Kona hold regular fishing competitions, with dominant contest areas from Keauhou to Milolii. There are also many koas near Kawaihae. Fishers who use these koas have terrestrial landmarks that help to locate the koas at sea. The traditional 'drop stone' technique is commonly used, whereby a fish is tied to a stone and dropped into the water as bait to attract larger fish. Long lining is the primary method of fishing for pelagics, as trawling and purse seining are illegal in Hawaii's waters. There are specific quotas set for long lining, but these are not often met. Long line and short line fishermen tend to fish by exclusion zones rather than depth. The main pelagic species targeted are marlin, ono (usually within 40 – 60 fathoms), ahi using opelu as bait. The seamounts are popular for ahi fishing and are believed to be larval retention zones. Ahi migration patterns vary seasonally, routing north of the island in the fall and winter and south through the spring and summer. Smaller tuna are caught on the cross seamount using short lines (<1 nautical mile length) and around NOAA weather buoys. Private FADs have been placed offshore in a few select locations, but these are not as highly used as the state-maintained FADs.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

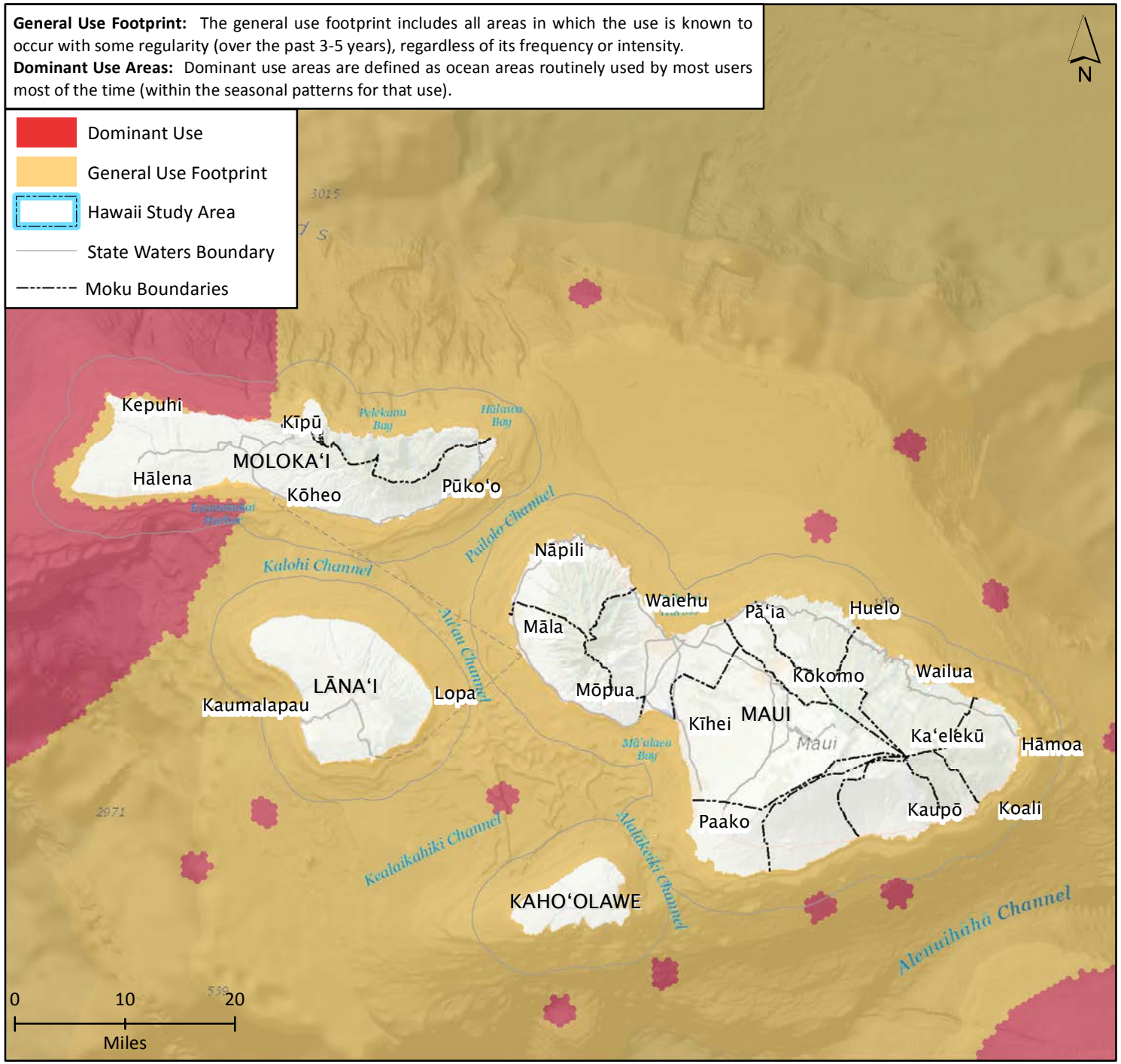
Commercial Pelagic/Midwater Fishing

Includes:
Use of pelagic longlines, hand lines, mid-water gillnets, rod and reel, trolling, buoys and other mobile gear to catch pelagic fishes and mobile invertebrates for commercial purposes. Includes fishing at Fish Aggregation Devices (FADs)

Excludes:
All other forms of fishing

Island Use Notes:
Maui:
Maui fishermen request no development beyond the 20 fathom line.
Lanai:
Information on commercial pelagic fishing was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.
Molokai:
Information on commercial pelagic/midwater fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

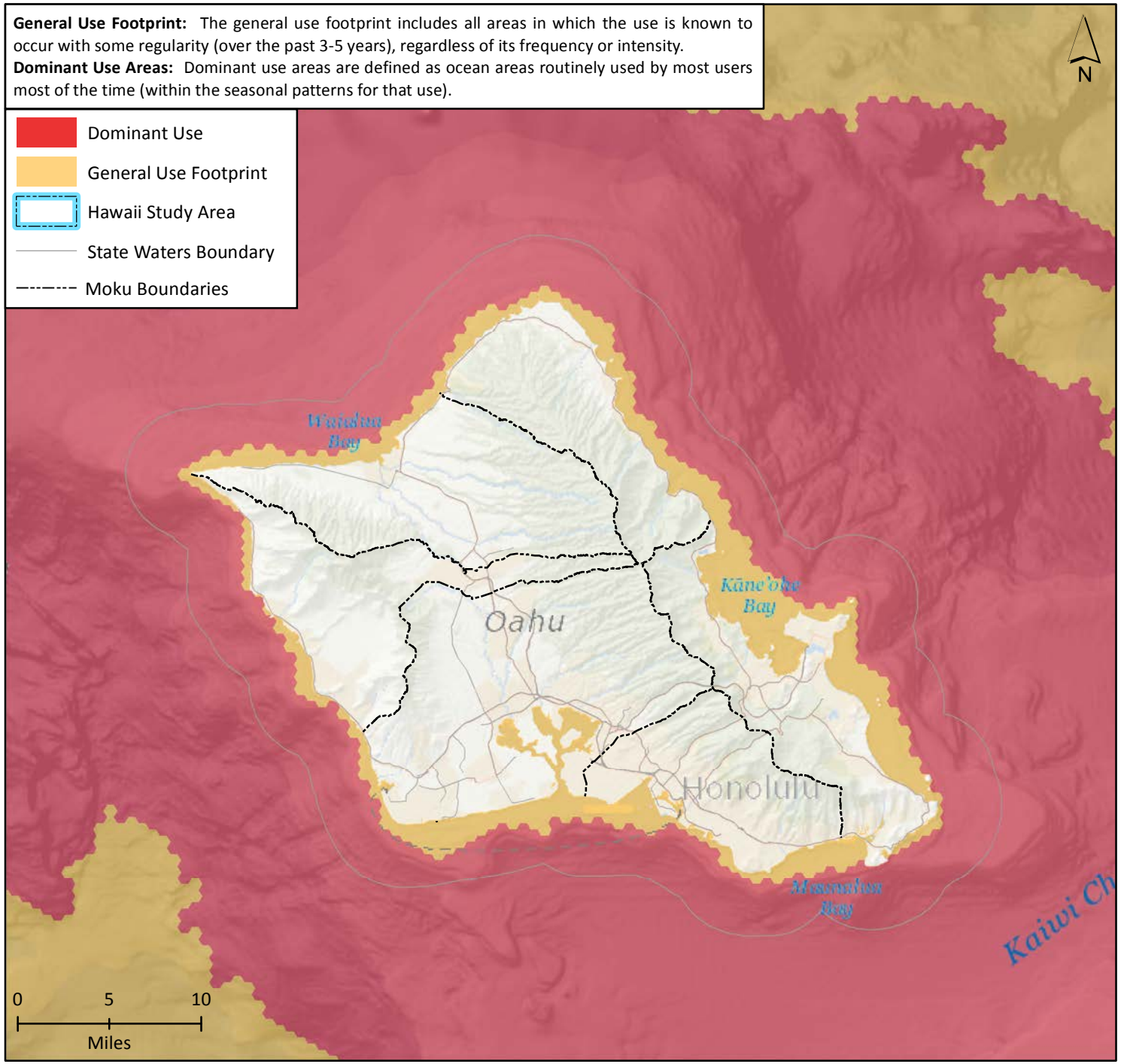
Commercial Pelagic/Midwater Fishing

Includes:
Use of pelagic longlines, hand lines, mid-water gillnets, rod and reel, trolling, buoys and other mobile gear to catch pelagic fishes and mobile invertebrates for commercial purposes. Includes fishing at Fish Aggregation Devices (FADs)

Excludes:
All other forms of fishing

Island Use Notes:
Commercial pelagic fishing occurs throughout Hawaii's waters, from the shoreline to outside the 200 nautical mile extent of the US Exclusive Economic Zone, with the exception of the 50 nautical mile exclusion zone around the islands for pelagic long lining. Throughout the year, the targeted species change, but the activity occurs year round, most commonly with deep-sea hand lines or kaka lines. Trolling is not common, but does occur between 20-1500 fathoms. Dominant use areas are influenced by distance from port (driven by fuel costs and distance that can be covered in a day trip) and mostly include area from the shore out to 35 miles offshore. Non-commercial and subsistence fishers fish the same area. The depth zones typically fished vary depending on target species (e.g. akule, opelo and ono between 50-200 fathoms).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

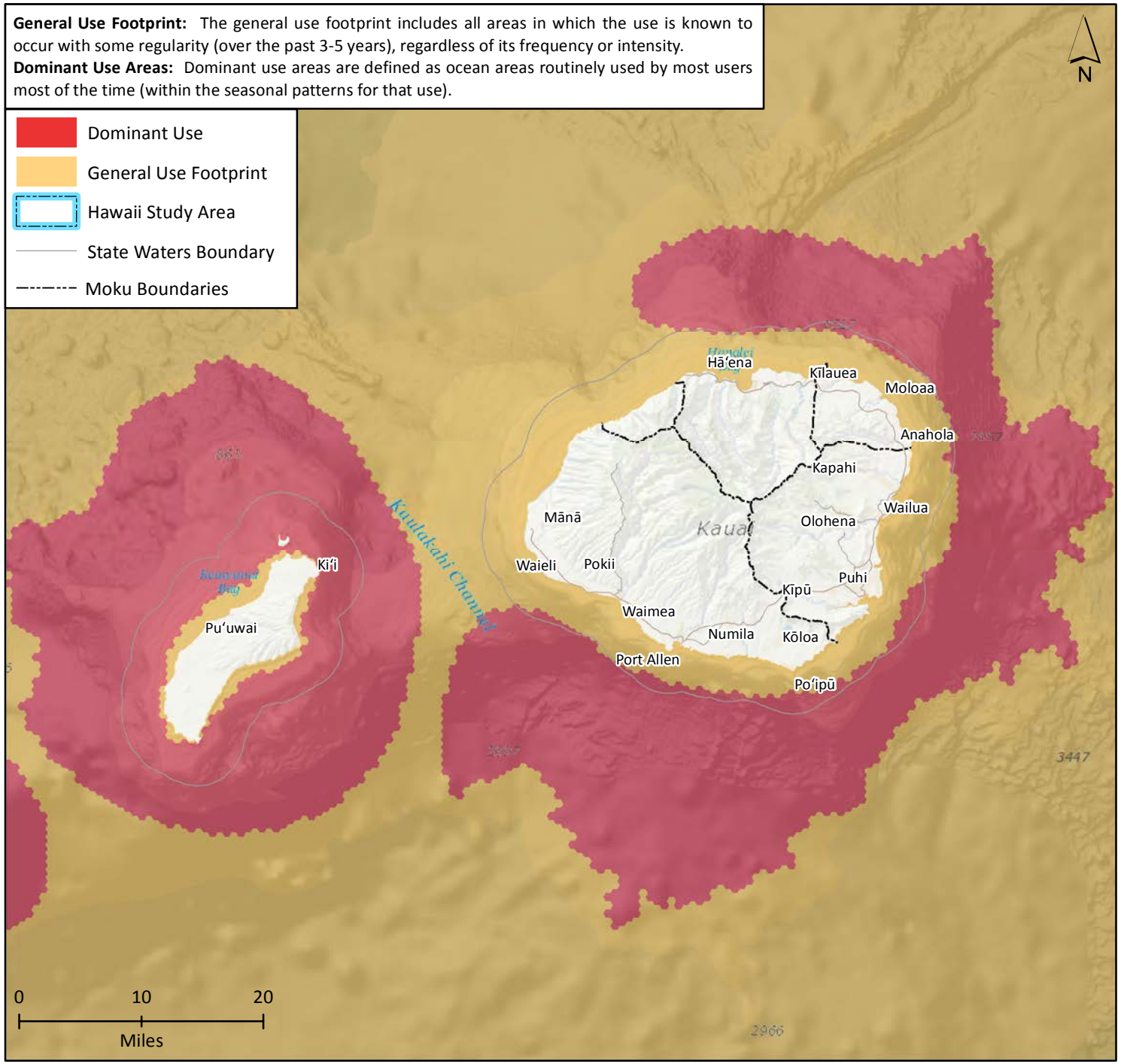
Commercial Pelagic/Midwater Fishing

Includes:
Use of pelagic longlines, hand lines, mid-water gillnets, rod and reel, trolling, buoys and other mobile gear to catch pelagic fishes and mobile invertebrates for commercial purposes. Includes fishing at Fish Aggregation Devices (FADs)

Excludes:
All other forms of fishing

Island Use Notes:
Commercial pelagic fishermen are predominantly targeting akule, ono, mahi and ahi, all around the main eight Hawaiian islands at depths ranging from 20 – 1500 fathoms. The dominant use areas are found around the Fish Aggregation Devices and within a two mile buffer around Niihau. Generally, the fishers follow the fish and their migrations and spawning seasons.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



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THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

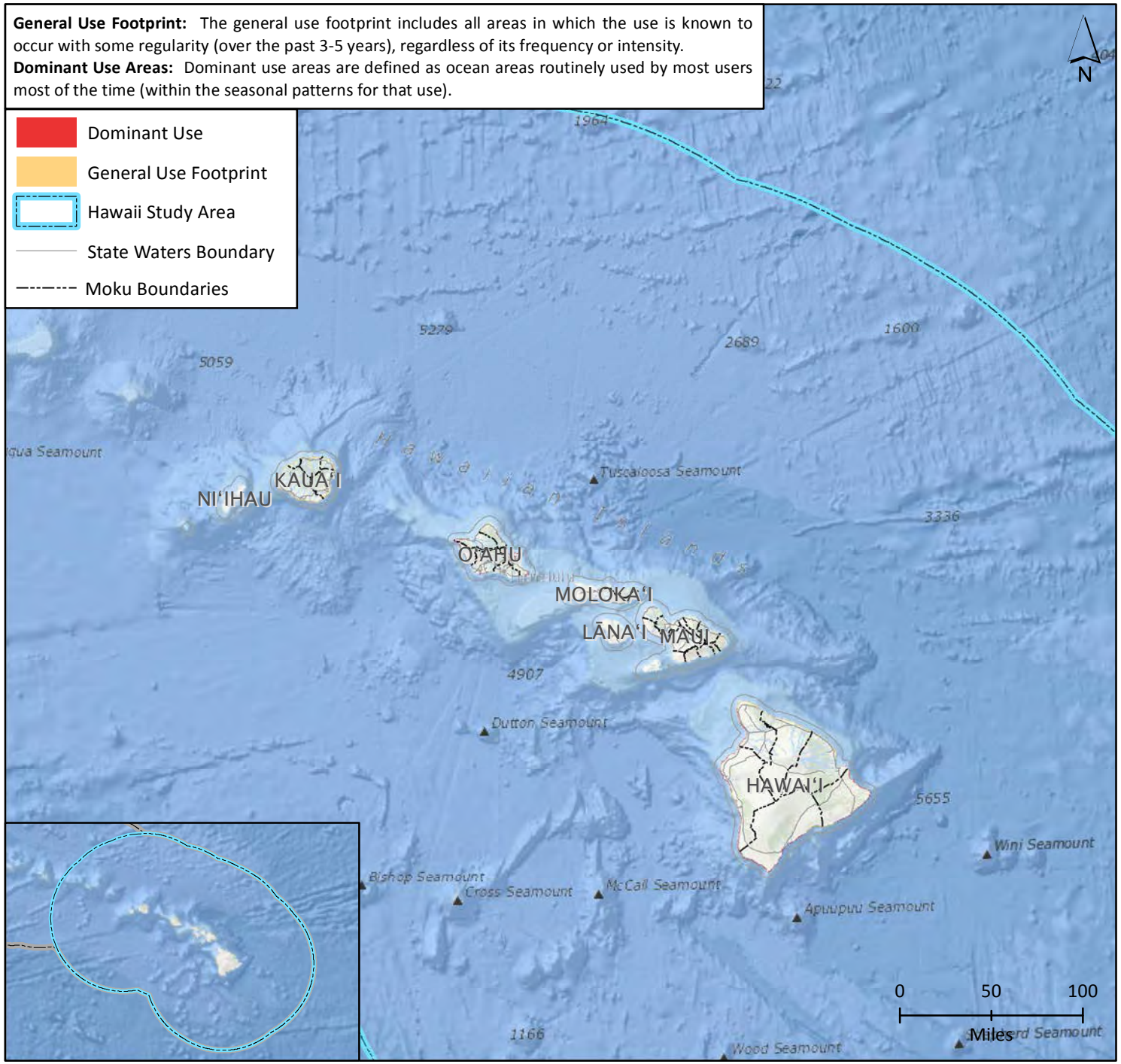
Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for commercial purposes. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab and sea cucumbers

Excludes:
Mariculture, Tide Pooling, SCUBA/Snorkeling, net fishing

Statewide Use Notes:
Intertidal gathering occurs everywhere there is coastal access in the Hawaiian Islands as a non-commercial or subsistence activity. Dominant use areas are public access zones close to population centers that have unique conditions for the target species, such as access to brackish water, rocky headlands or sandy beach. Areas that prohibit access or harvest may still be used, but to a lesser extent. The collection zones are between high and low tide, although users will wade depending on depth . Gathering zones are seasonal based on species availability and ocean conditions for safe access. Gathering seasons can often be indicated by terrestrial environmental cues (e.g., blossoms on specific tree species) that vary from island to island. Primary target species are limu (seaweed), opihi (limpets) and heʻe/ tako (octopus). These species taste different depending on whether they are collected from exposed or calm areas. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

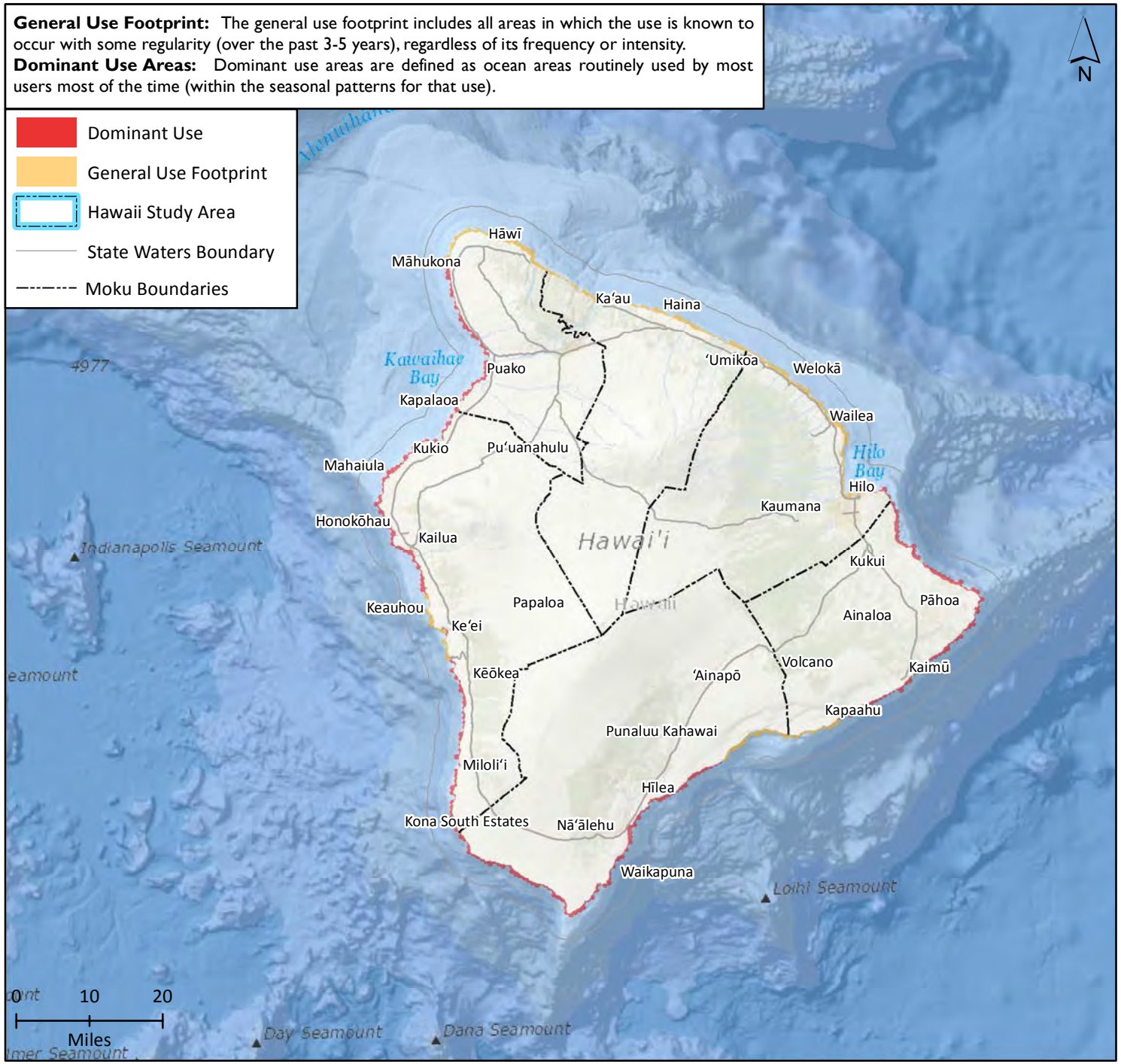
Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for commercial purposes. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab and sea cucumbers

Excludes:
Mariculture, Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
Commercial intertidal harvest occurs on all shorelines that offer safe access both from the land and sea. Harvest primarily targets opihi, limu and small shrimp that are used as bait. Intertidal aquarium harvesting also occurs along the Kona coast and near Honaunau. The dominant use areas are based on ease of access. Commercial intertidal harvest is less important to the community than non-commercial intertidal harvest in terms of subsistence and food supply. Main collection zones are ~15 – 20 feet from shore and between lowest low to highest high tide (~10 – 15 feet deep).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

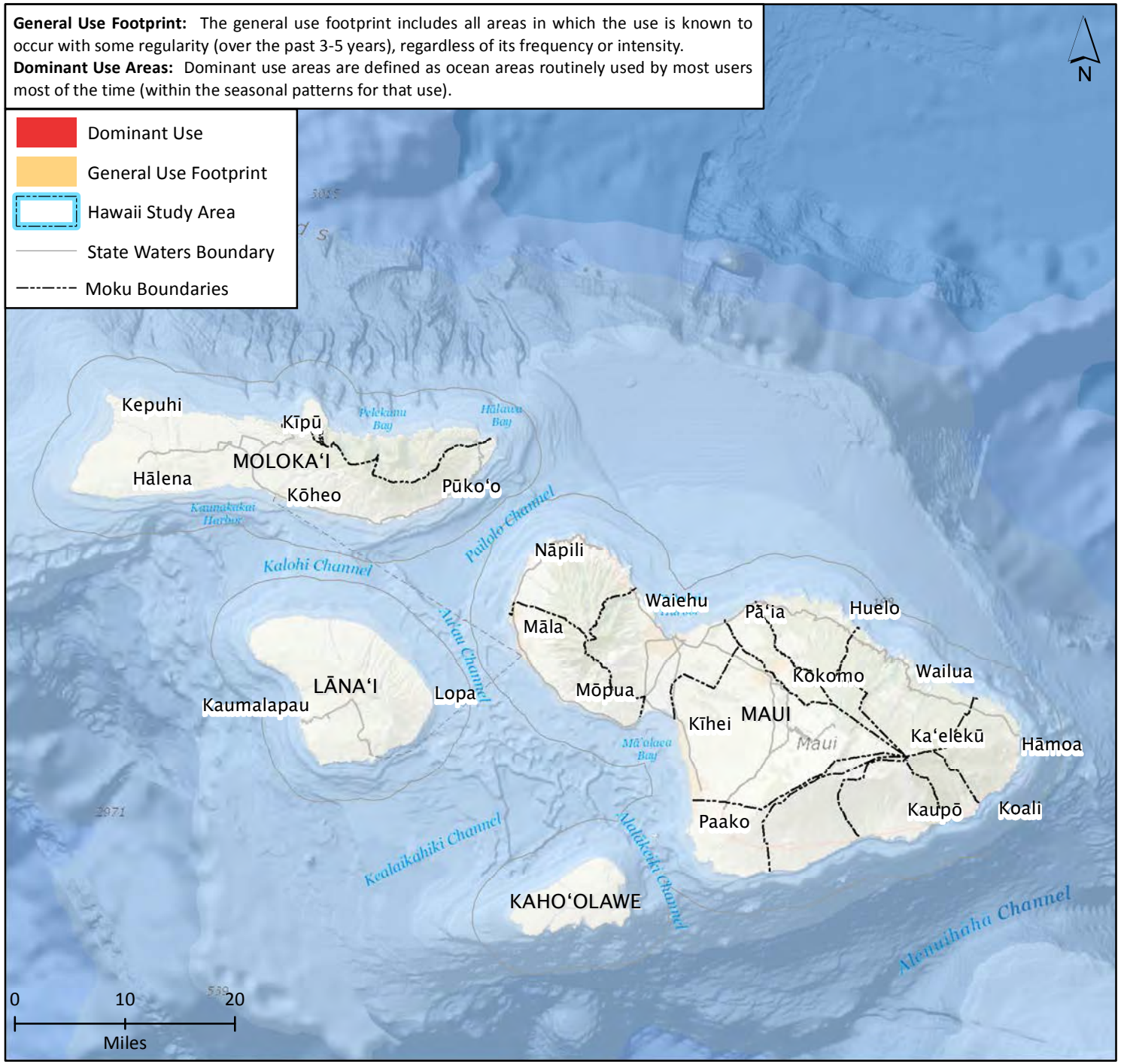
Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for commercial purposes. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab and sea cucumbers

Excludes:
Mariculture, Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
Maui:
Information on commercial intertidal harvest was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.
Lanai:
Information on commercial intertidal harvest was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.
Molokai:
Information on commercial intertidal harvest was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

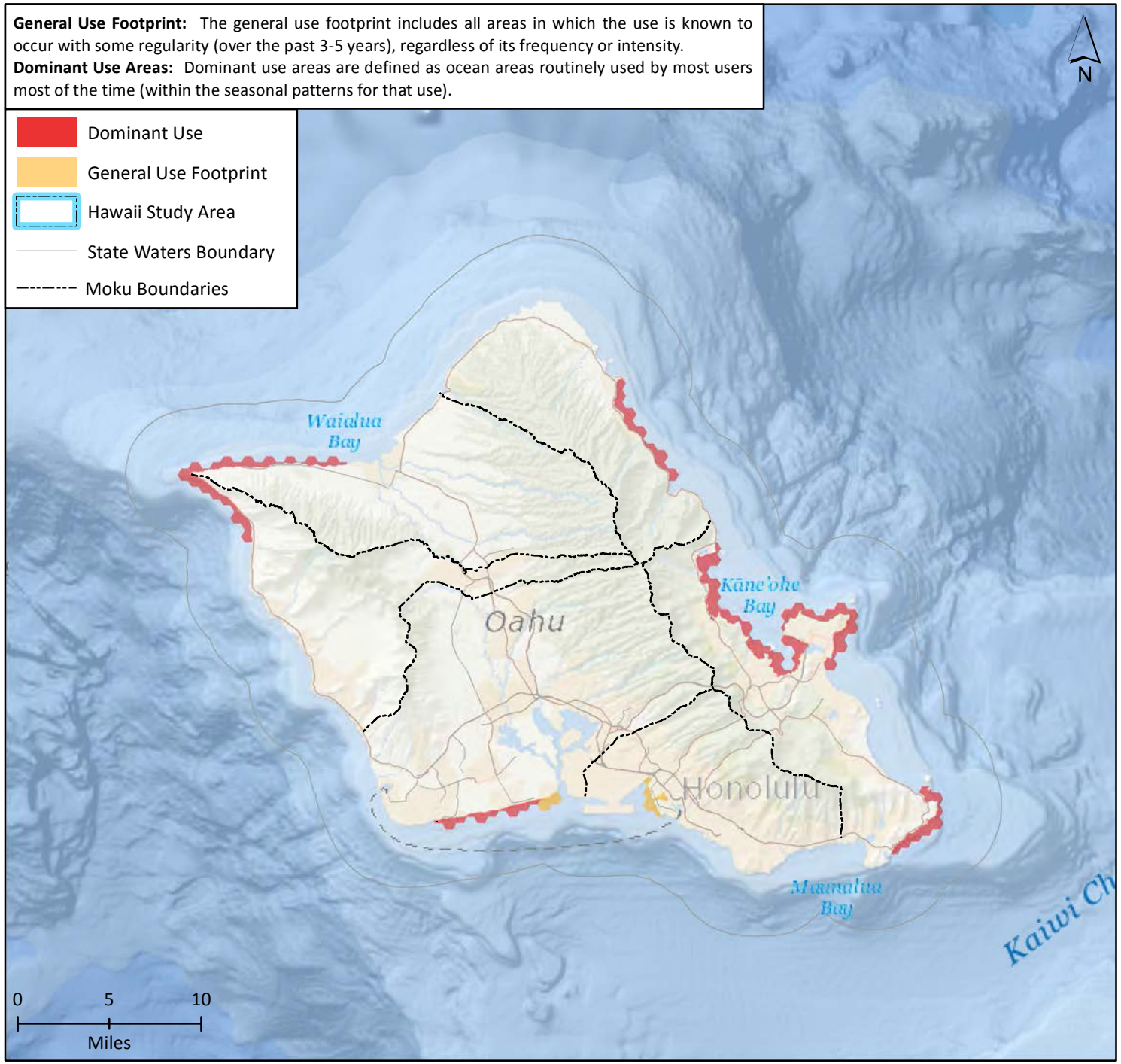
Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for commercial purposes. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab and sea cucumbers

Excludes:
Mariculture, Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
There is little strictly commercial intertidal harvest on Oahu. Dominant use areas are Kaena Point, Ewa and Mamala Bay. Primary species targeted are limu (seaweed) harvesting and opihi (limpets). Opihi sales are largely non-disclosed sales to local vendors.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

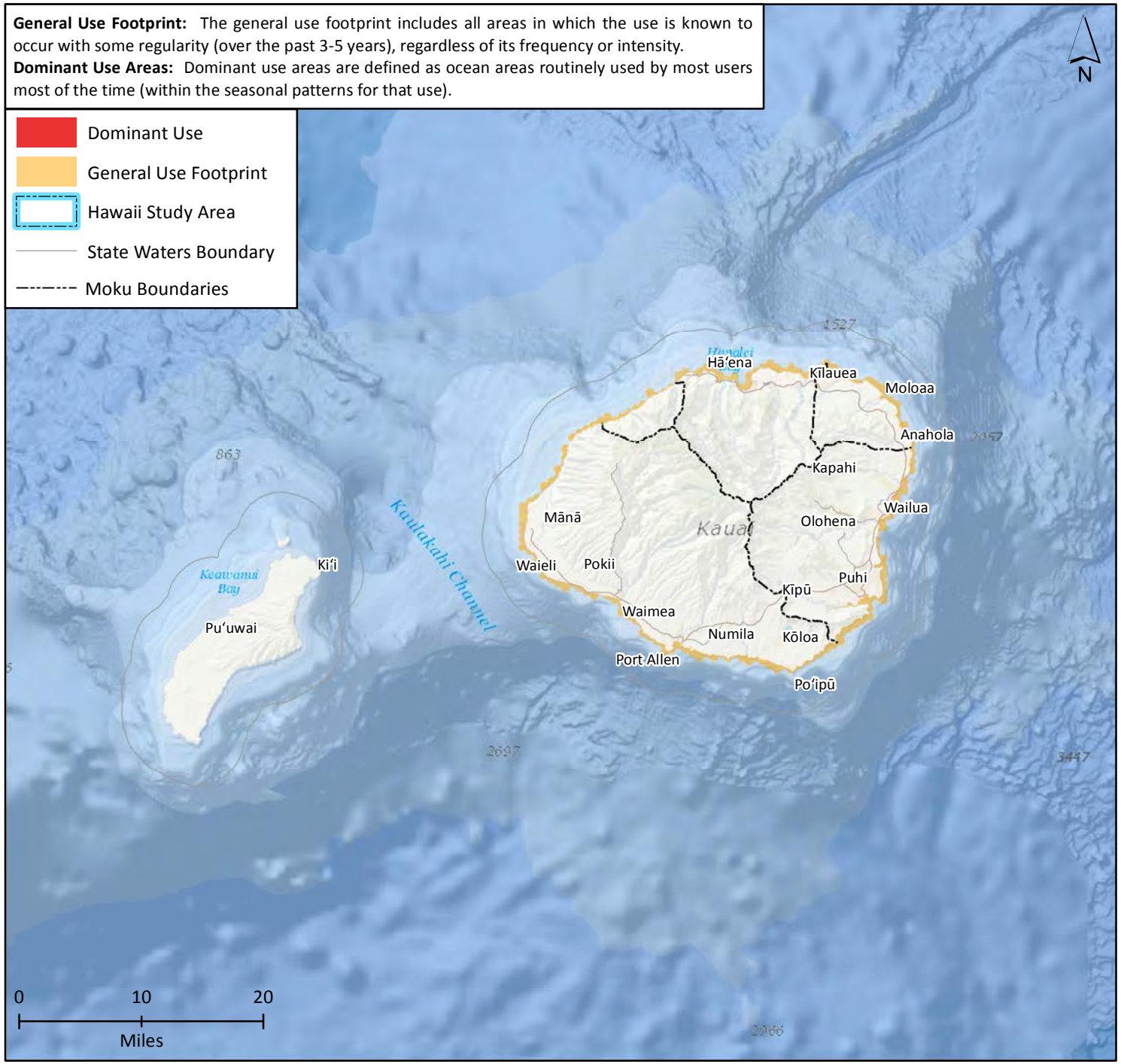
Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for commercial purposes. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab and sea cucumbers

Excludes:
Mariculture, Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
Commercial intertidal harvest occurs all throughout the islands, and often illegally. Opihi and limu are the main species gathered, and harvest is based on the seasonality and availability of these species, which in some areas has been heavily over-harvested. Traditionally, salt is gathered and sold at Hanapepe. (Limited knowledge at the workshop)

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



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THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Non-Commerical Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices. Includes in-water use of spear for fish and he'e (octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest

Statewide Use Notes:
Dive fishers are primarily subsistence and non-commercial fishers. The few commercial divers target live fish for the aquarium trade, a contentious activity in the islands that predominantly occurs off the Kona coast. Dominant use areas for dive fishing are around coastal access points in proximity to population zones and surrounding the state-maintained Fish Aggregation Devices (FADs). Free diving is increasing in popularity both as a recreational activity and for spearfishing. Dive fishing is dependent upon environmental conditions; SCUBA divers reach depths of ~130 feet, while free divers can reach a maximum depth of ~100 feet. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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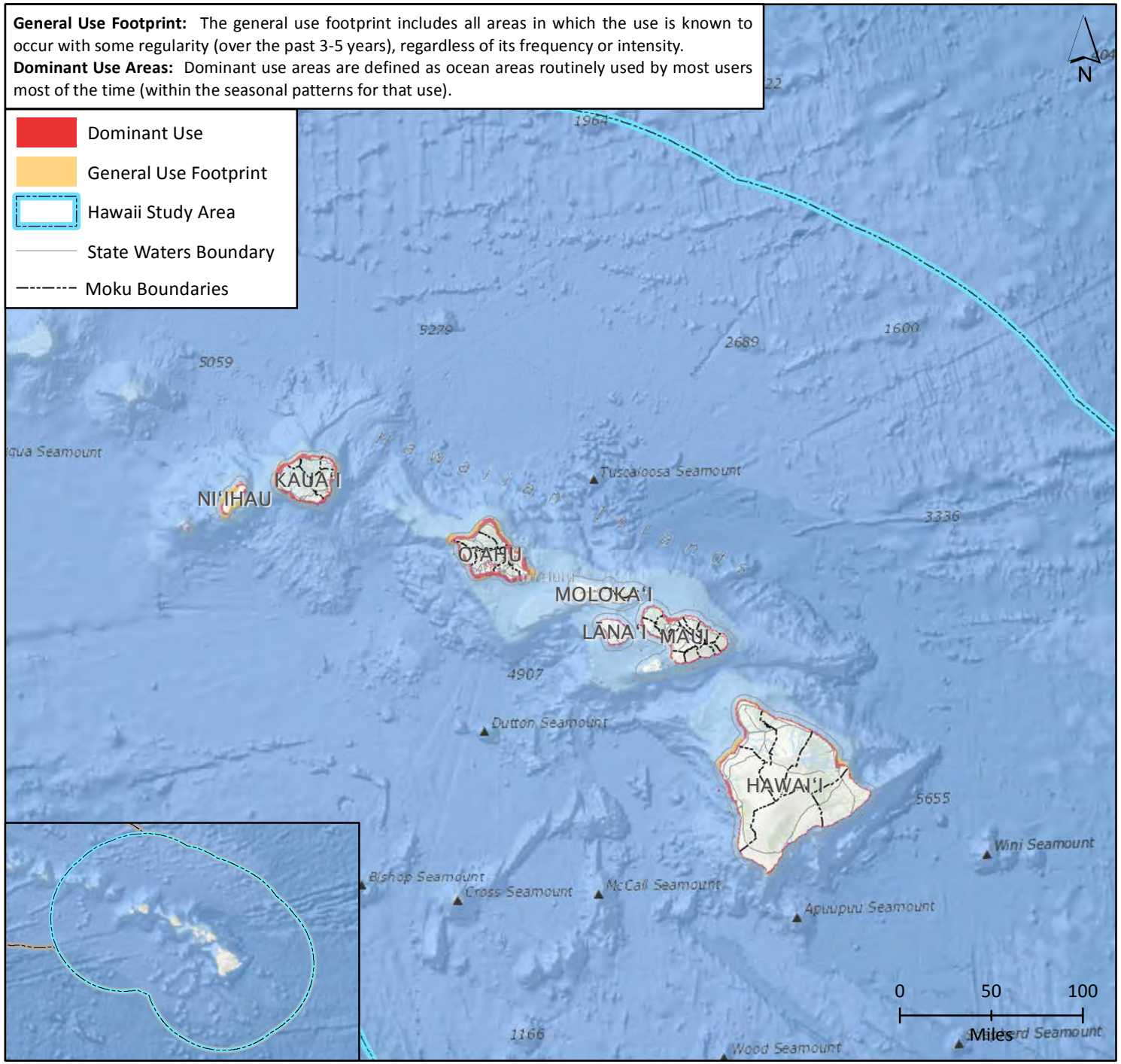


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

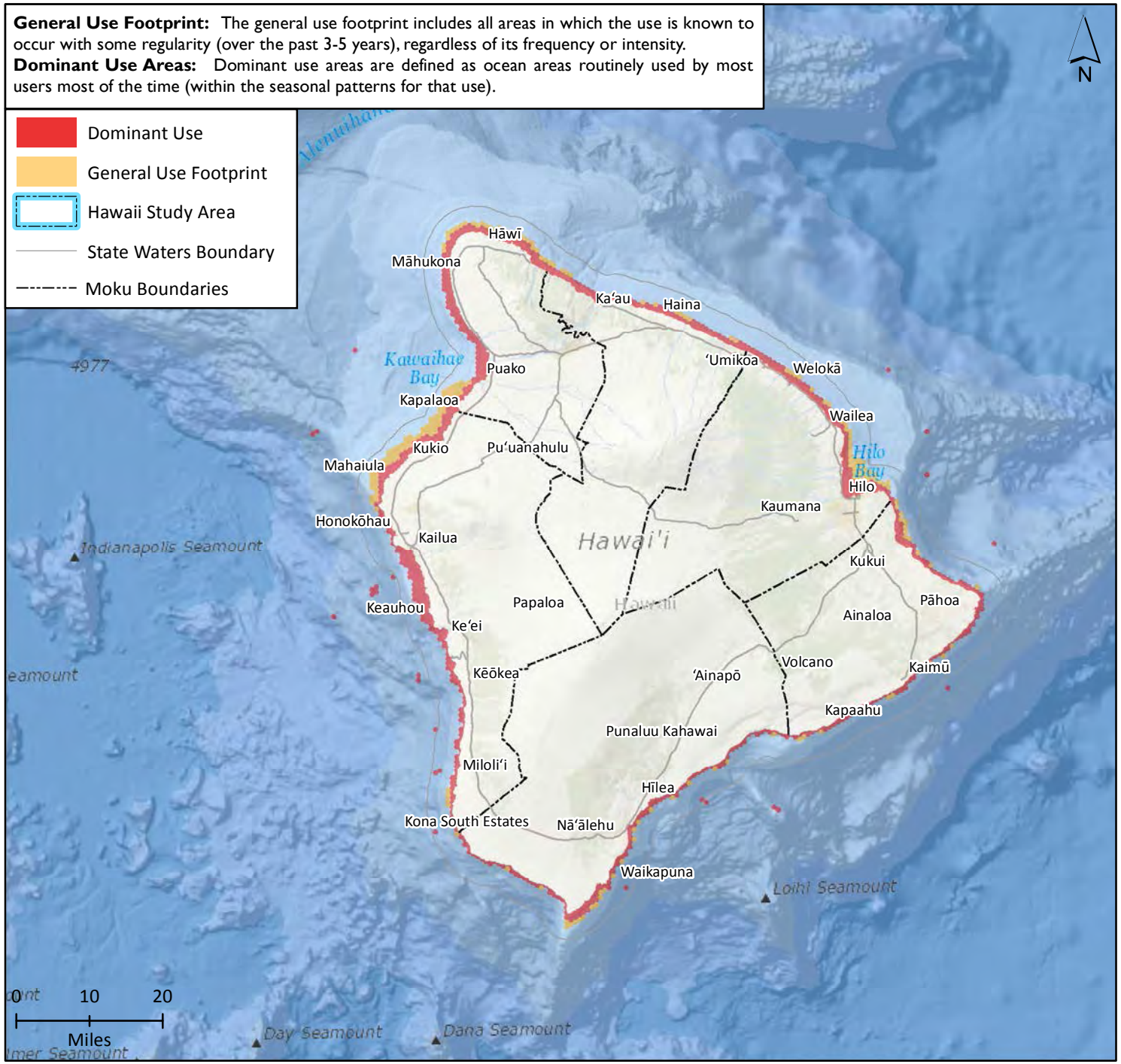
Non-Commerical Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices. Includes in-water use of spear for fish and he'e (octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest

Island Use Notes:
Dive fishing is more heavily practiced on the leeward side due to more optimal ocean conditions and focuses on primarily on reef fish and some pelagic species such as mahi (dorado) and tuna (ahi). Non-commercial and commercial dive fishing occur mainly in the same areas, but the non-commercial activity is much greater overall in all areas. There has been discussion about a 10 year spearfishing ban around Kaupulehu, but there has been community opposition to such a ban to date.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Non-Commerical Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices. Includes in-water use of spear for fish and he'e (octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest

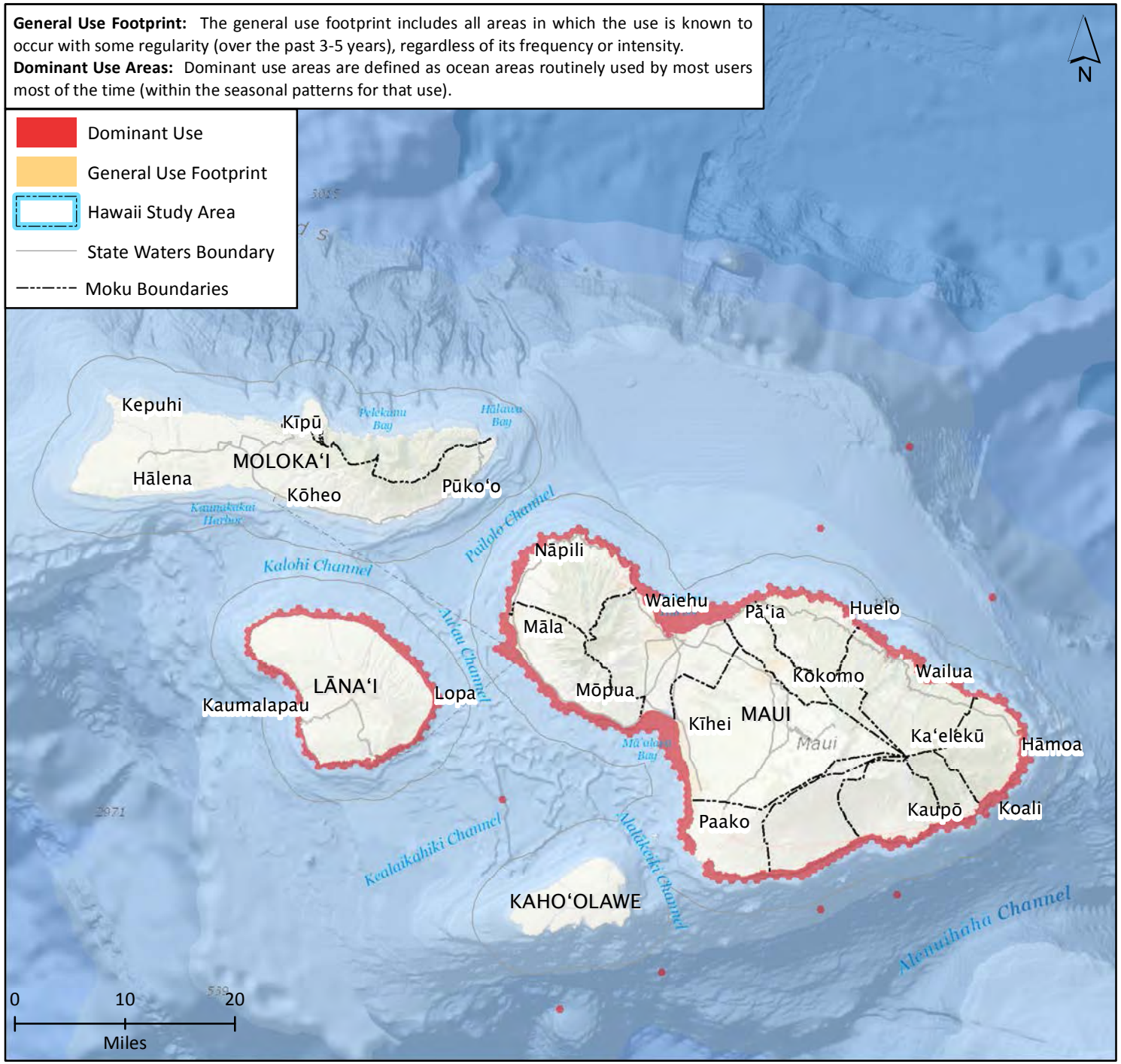
Island Use Notes:

Maui:
Non-commercial dive fishing occurs around the island generally to a depth of 90-100 feet. Dominant use areas are around the Fish Aggregation Devices and along the reef flat.

Lanai:
Lanai can be thought of as the 'biggest fish aggregation device in Hawaii'. Dominant use areas exist on the leeward side of the island for reef fish and opihi. The north side of the island has a shallow reef that is often accessed by spear fishers. Local dive fishing is mainly for subsistence and is highly dependent on ocean conditions. Lanai residents feel that they must compete for Lanai resources with fishermen from Maui, so local dive fishing sites are closely guarded secrets.

Molokai:
Information on non-commercial dive fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

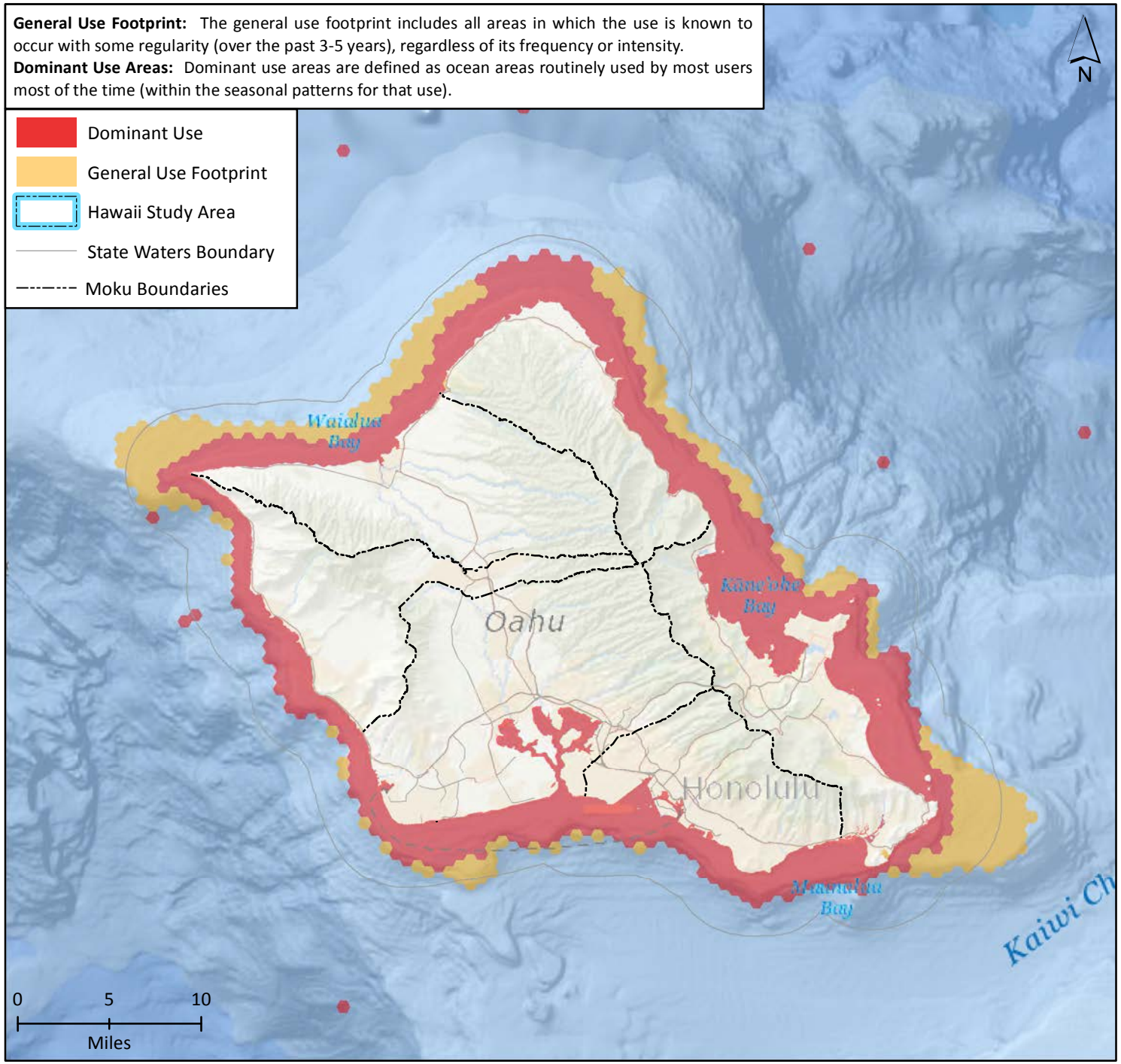
Non-Commerical Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices. Includes in-water use of spear for fish and he'e (octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest

Island Use Notes:
Non-commercial dive fishing occurs all around the island, generally free diving from shore to 90 feet depth and SCUBA to 150 feet depth. The dominant areas are along the shallow reef flat (in areas like Kahana Bay) and areas along the reef break. SCUBA is more prevalent, but free diving is increasing in popularity. Non-commercial fishermen will also blue water dive on the Fish Aggregation Devices down to ~100 feet depth. A controversial component of this activity is the targeted capture of live fish for the aquarium trade.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

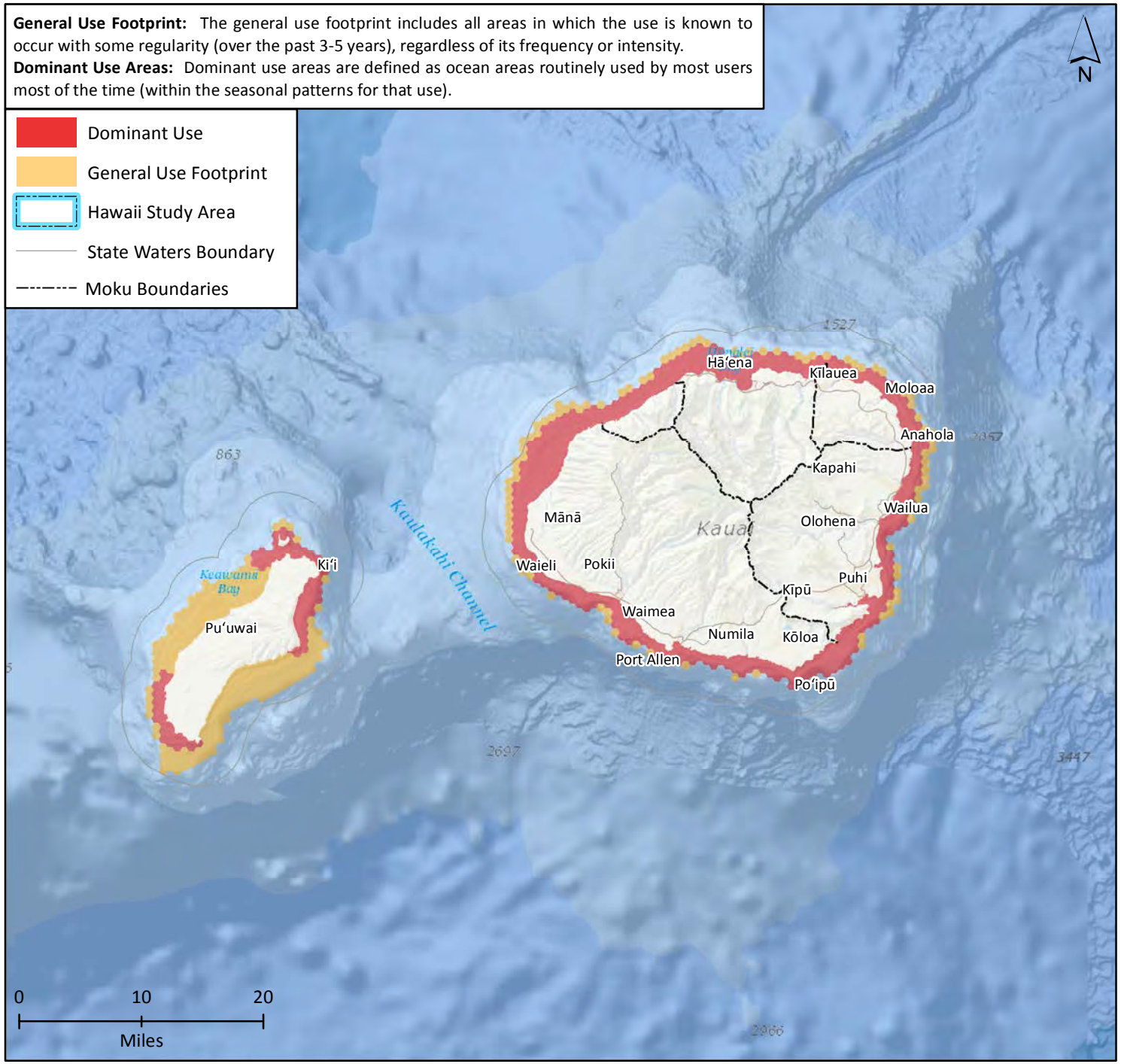
Non-Commerical Dive Fishing/Harvest

Includes:
Use of SCUBA, surface supply diving or free diving to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices. Includes in-water use of spear for fish and he'e (octopus), hand gathering of ula (lobster) and pupu (shells)

Excludes:
Commercial Dive Fishing/Harvest, Shore Fishing, Intertidal Harvest

Island Use Notes:
Commercial dive fishing is a weather dependent activity that occurs around Kauai and Niihau (mainly off the west coast of Niihau). Divers typically catch reef fish and sell to families and local markets. On Kauai, commercial divers will collect corals down to 180 feet deep; there is one dive boat licensed for this activity. Free diving is growing in popularity, and occurs to depths of 100 feet around Kauai. Blue water diving occurs less frequently offshore within 0.25 miles of Fish Aggregation Devices.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Non-Commercial Fishing (Benthic Fixed Gear)

Includes:
Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Statewide Use Notes:
As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity. Fishers are typically non-commercial but will occasionally sell the best of their catch.
Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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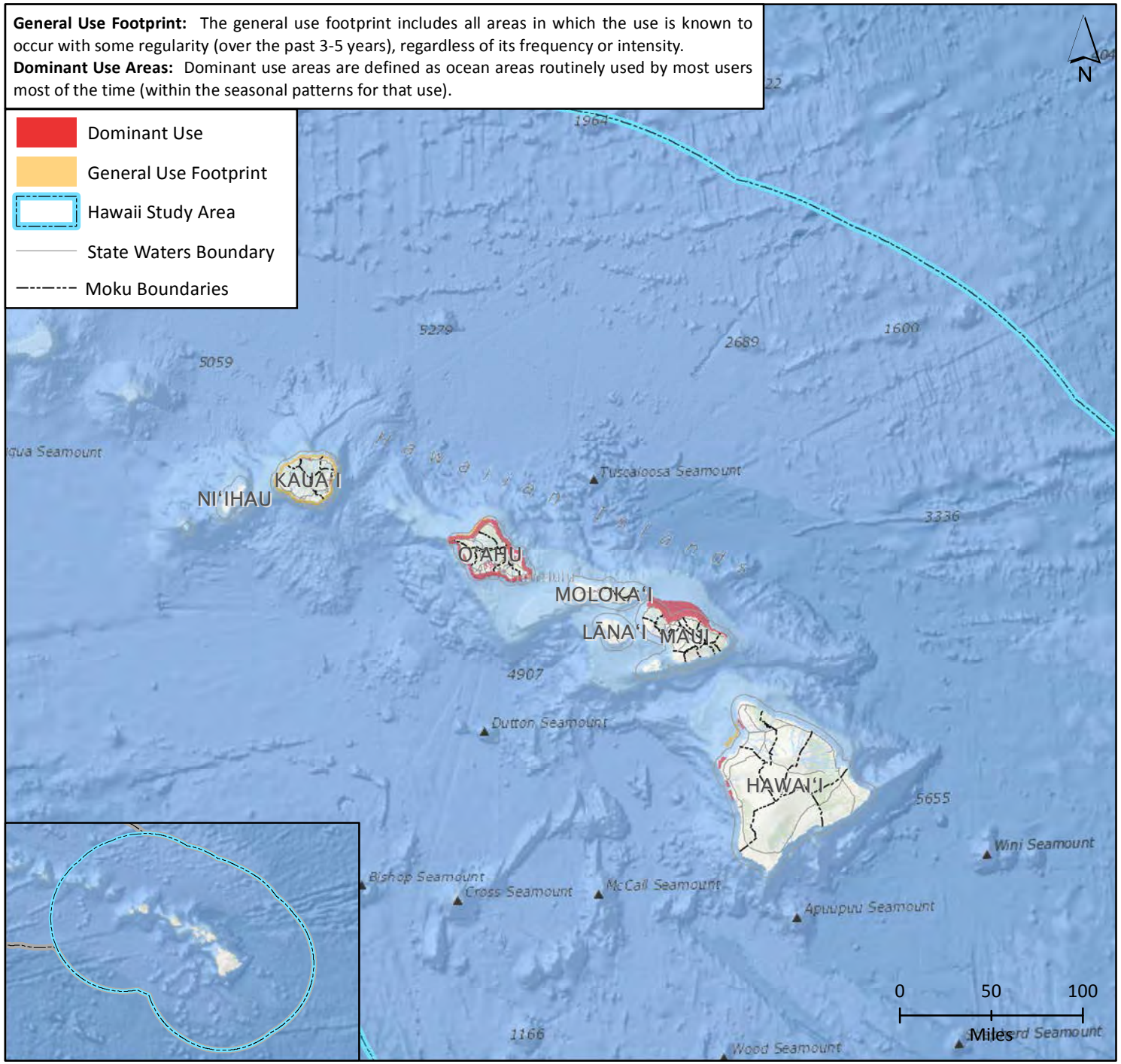


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

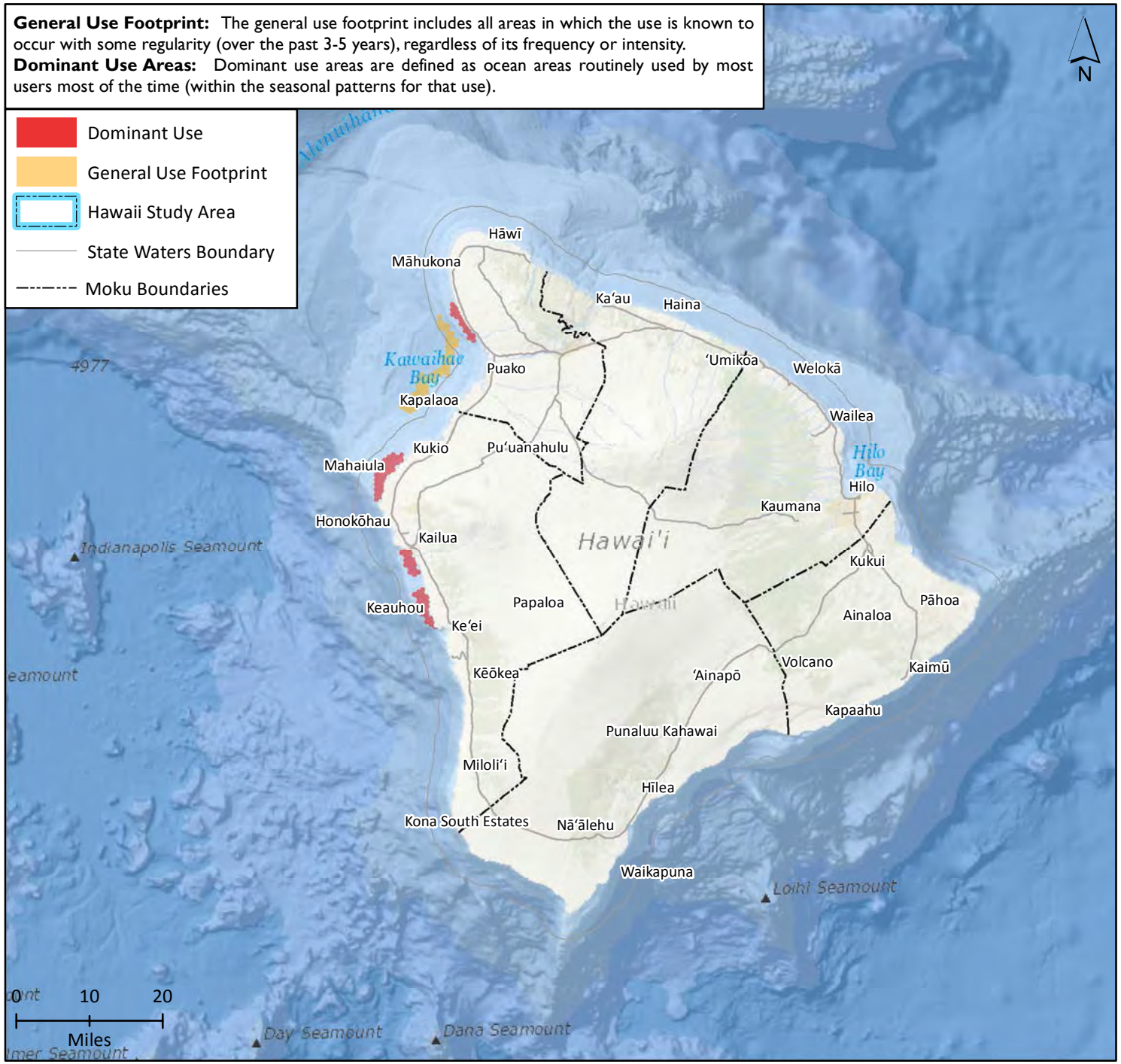
Non-Commercial Fishing (Benthic Fixed Gear)

Includes:
Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Island Use Notes:
Non-commercial fishing with benthic mobile & fixed gear occurs generally at depths of 20 - 220 fathoms along the whole coast of Hawaii Island. There are deep-water shrimp grounds from Kiholo to Kawaihae down to 200 fathoms but they are used by only a few fishers. Most of the use targets Kona crabs at 20 - 40 fathoms from Keauhou Bay to Kealakekua Bay and around Kailua Bay and Mahaiula.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Non-Commercial Fishing (Benthic Fixed Gear)

Includes:
Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

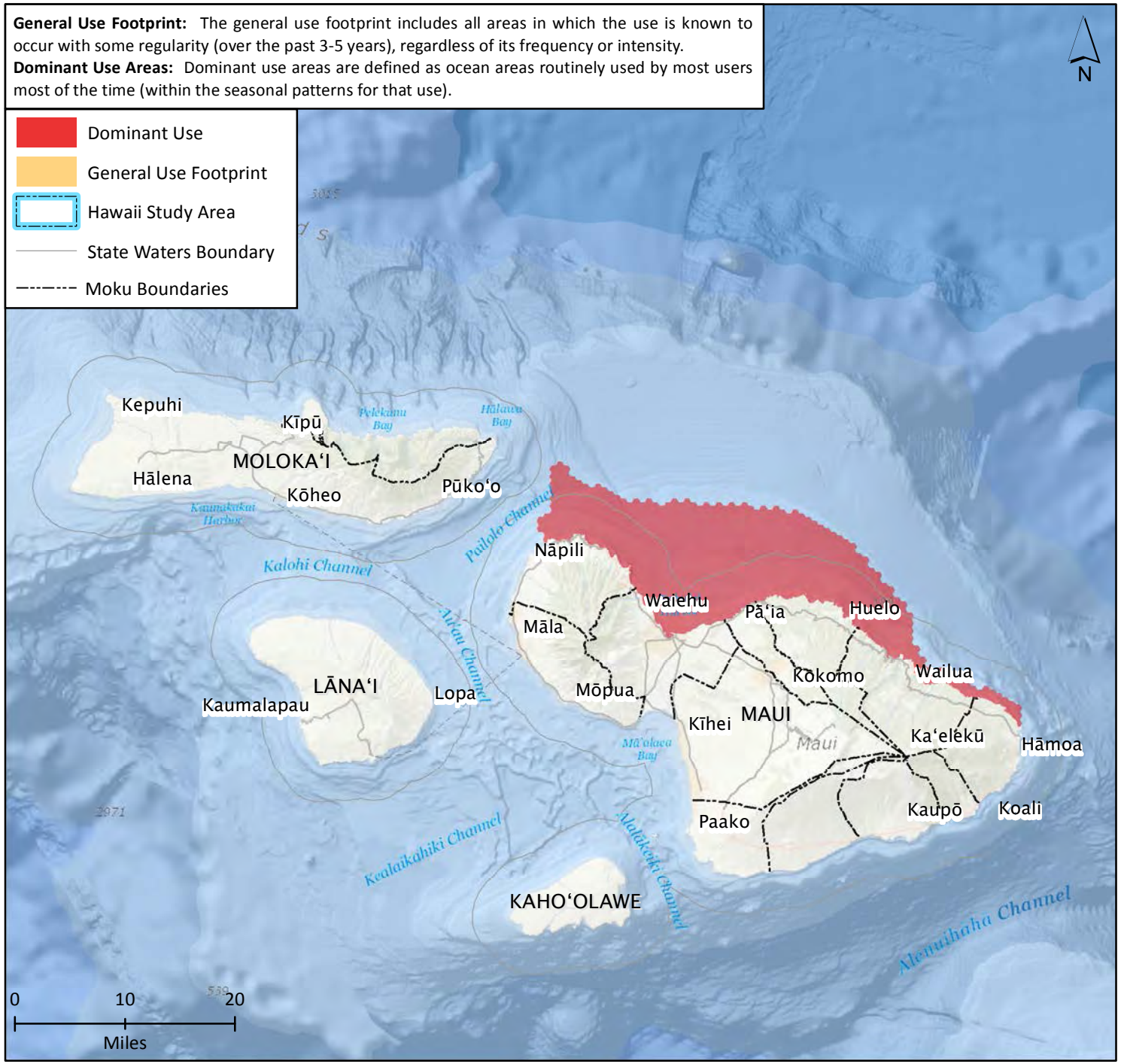
Island Use Notes:

Maui:
Non-commercial bottom fishing occurs predominantly around ledges and drop offs down to 275 fathoms excluding regulatory closures and protected areas.

Lanai:
During the lobster season, local residents commonly set traps in the nearshore area around Keomuku. Users are mainly non-commercial or subsistence fishers. Lanai fishers feel that they must compete for resources with fishermen from Maui. This use was discussed but use areas were not mapped during the workshop.

Molokai:
Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers. This use was discussed but use areas were not mapped during the workshop.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Non-Commercial Fishing (Benthic Fixed Gear)

Includes:
Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Island Use Notes:
Non-commercial fishing with benthic mobile and fixed gear is conducted mainly for subsistence, but occasionally for non-disclosed local sale. Traditional fishermen tend to fish close to shore and in shallow water, using lines made from plant material. One technique is dragging shell, whereby a lure (e.g. cowrie shell) gets dragged to tease out octopus or other benthic creatures. In recent years, some schools (e.g. PaePae o'Heia on the leeward side) have begun teaching traditional fishing techniques to educate youth on the historic practices and ways. Traditional fishermen follow the moku boundaries to maintain community kuleana to prevent overfishing.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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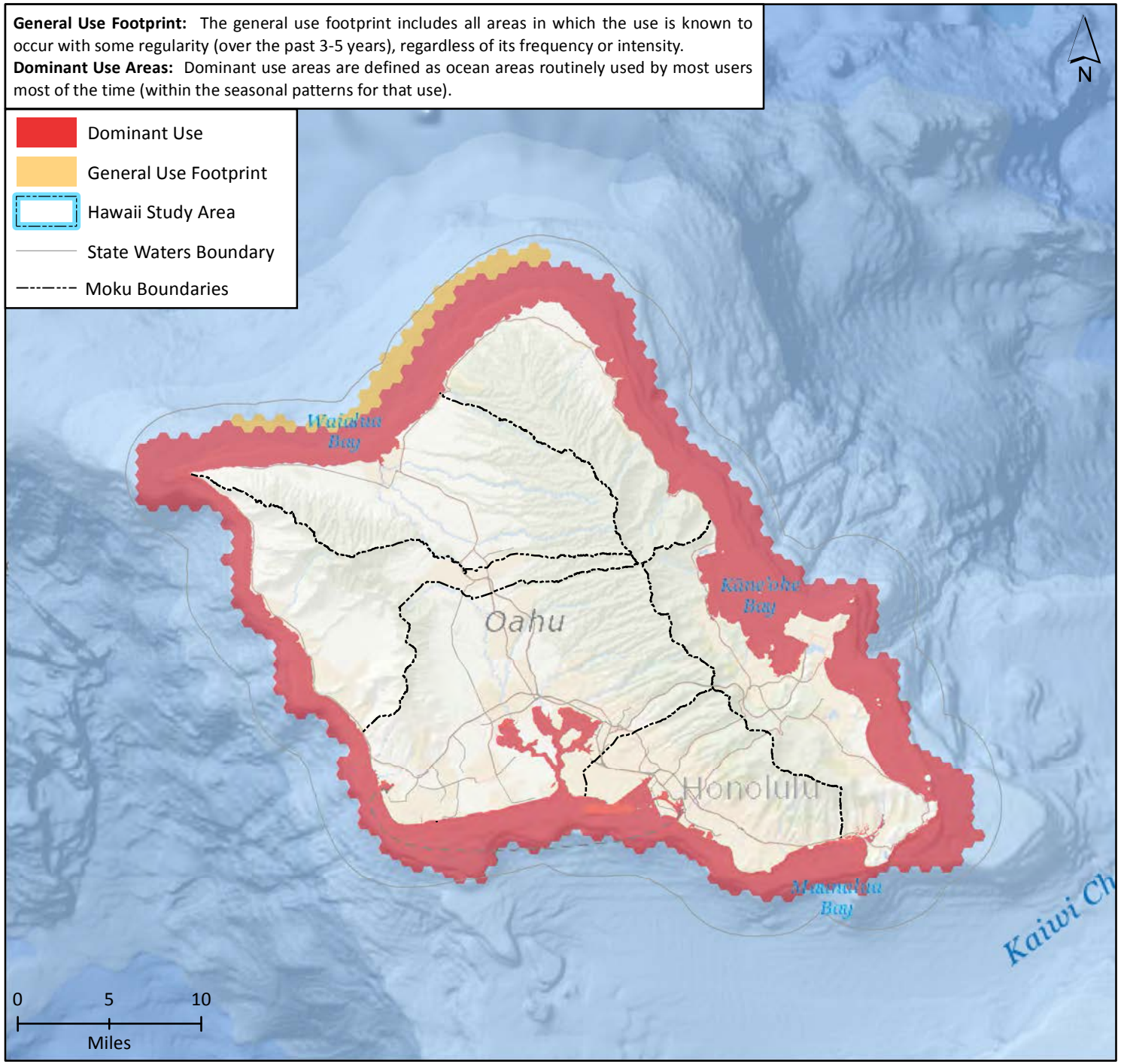


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

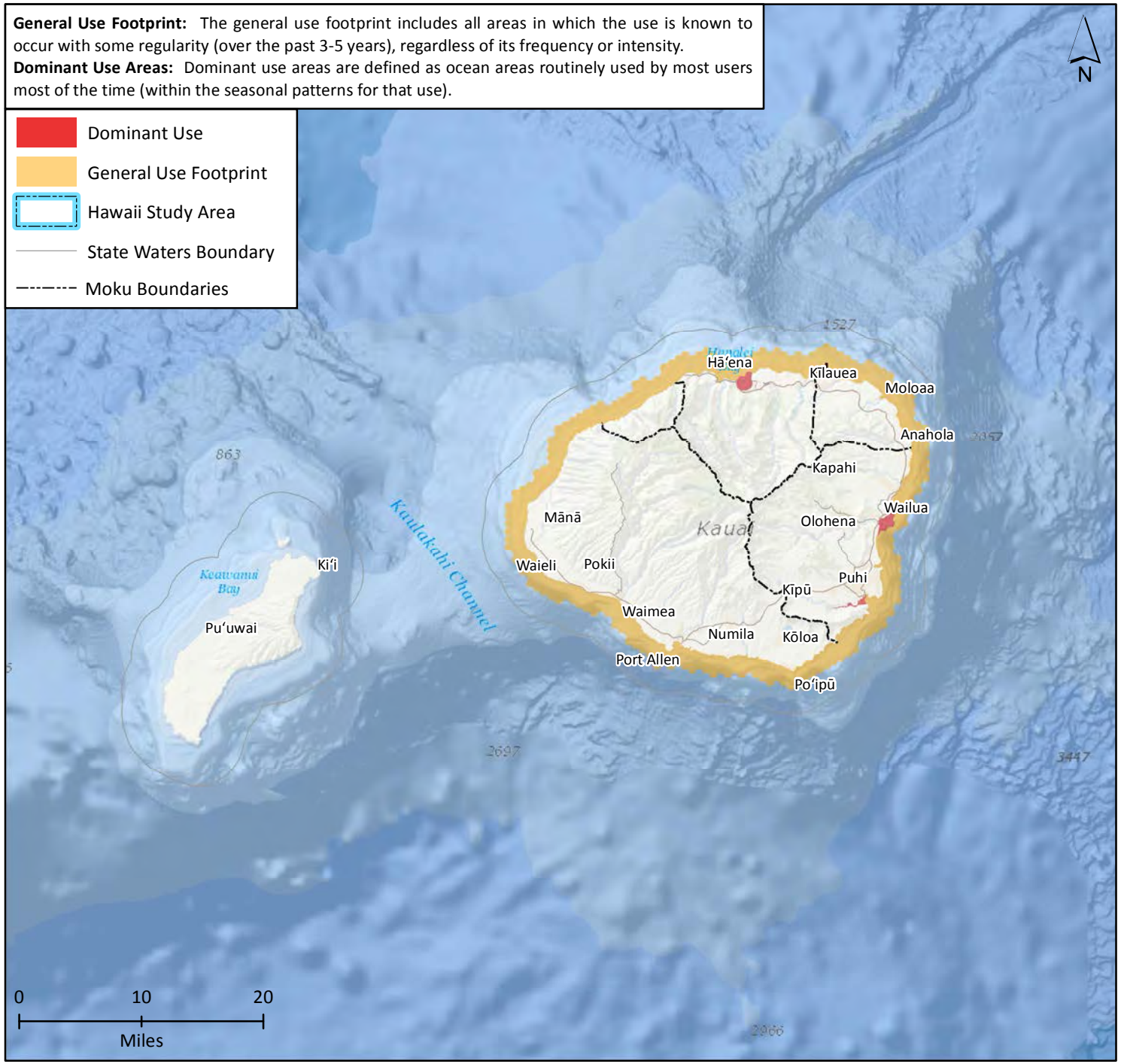
Non-Commercial Fishing (Benthic Fixed Gear)

Includes:
Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Island Use Notes:
Non-Commercial fishing with benthic mobile and fixed gear occurs mostly between 20-200 fathoms around the main islands of Kauai and Niihau. The limiting factor is often fuel costs. Near Haena, Wailua and Hanalei, there is a Samoan crab fishery in the brackish water at the river mouths. The dominant offshore areas are Kaula Rock and Lehua Seamount. (Limited use knowledge in workshop.)

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Non-Commercial Fishing (Benthic Mobile Gear)

Includes:
Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Statewide Use Notes:
As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity. Fishers are typically non-commercial but will occasionally sell the best of their catch.
Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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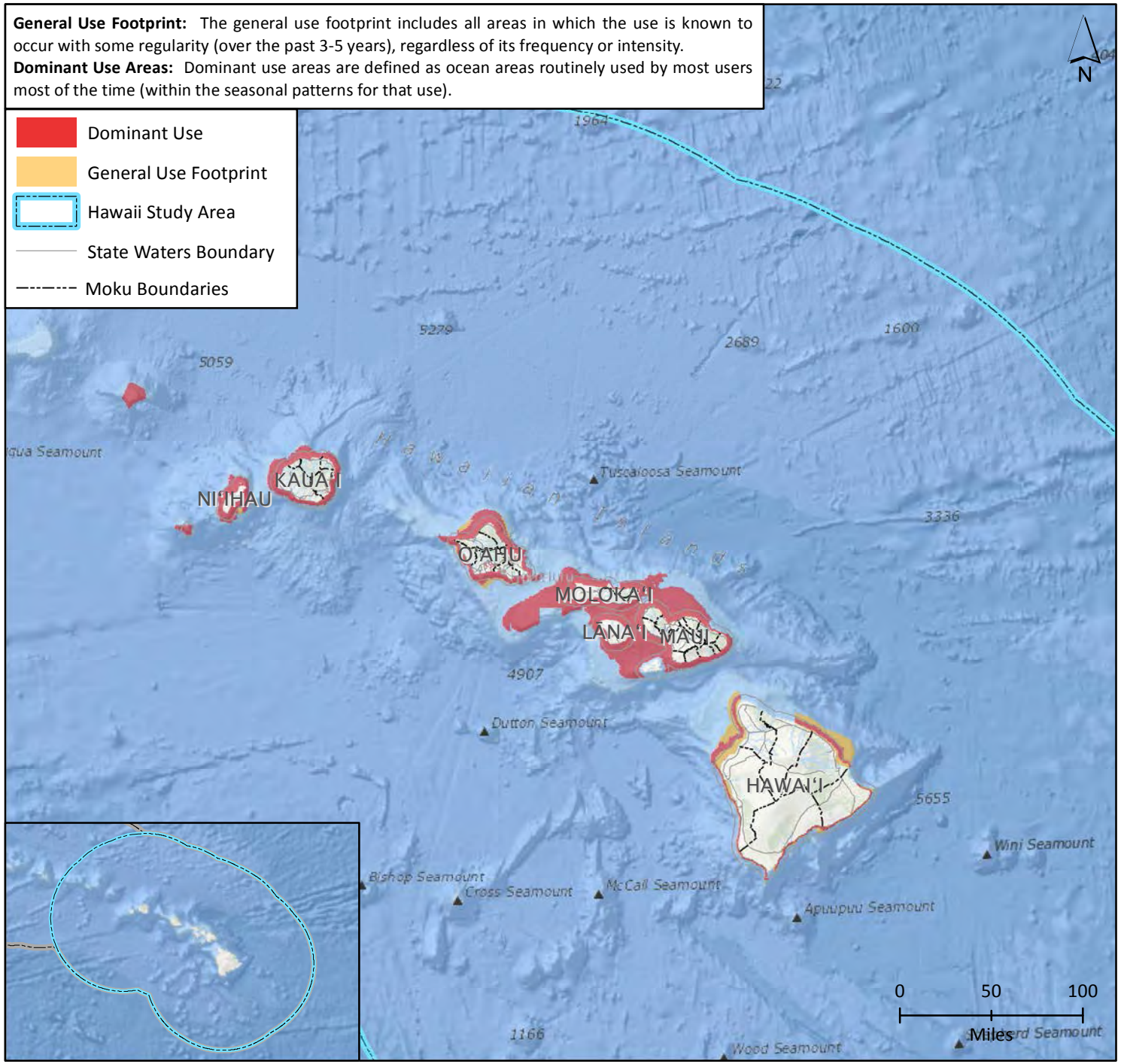


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

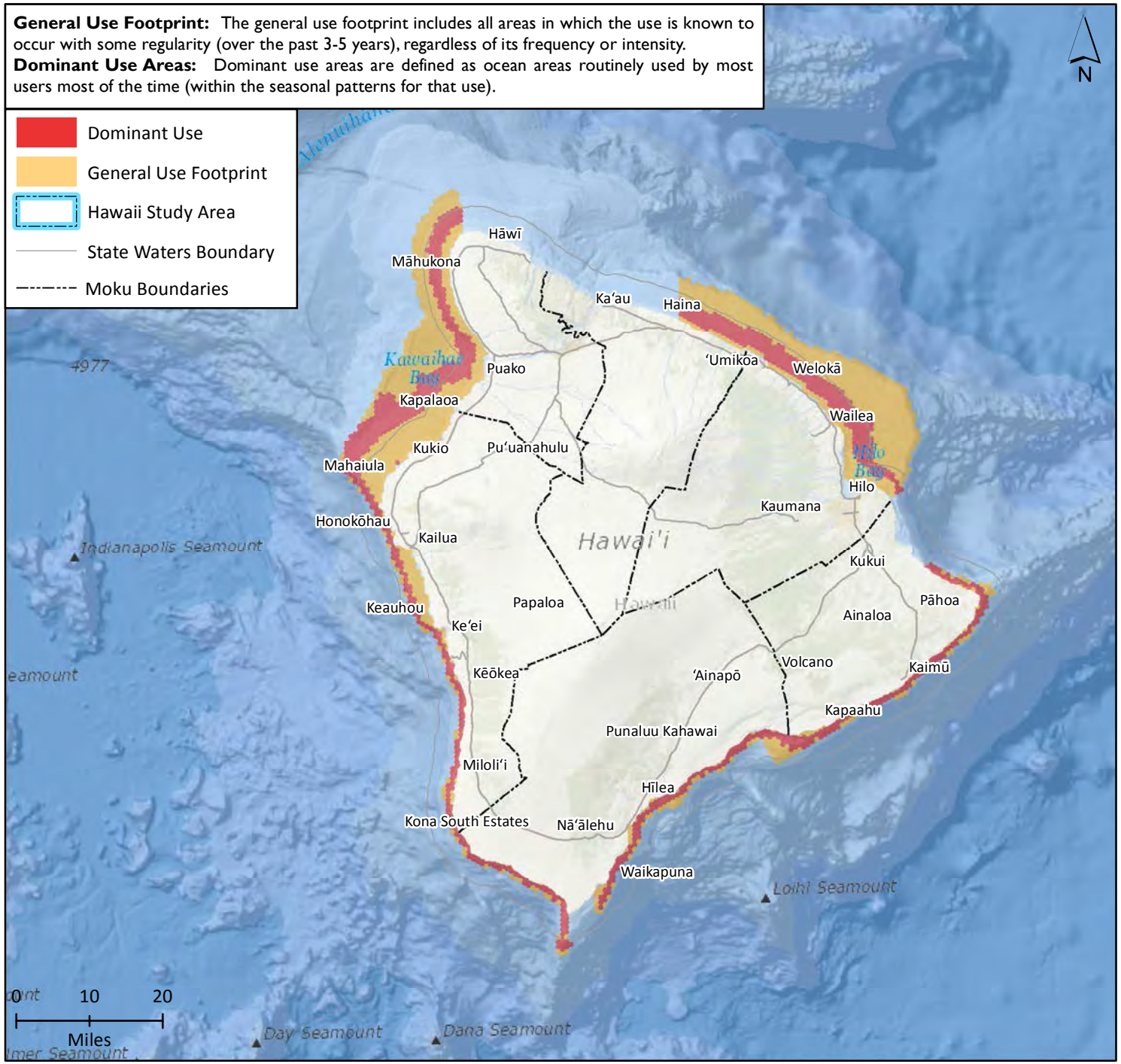
Non-Commercial Fishing (Benthic Mobile Gear)

Includes:
Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Island Use Notes:
Non-commercial fishing with benthic mobile & fixed gear occurs generally at depths of 20 - 220 fathoms along the whole coast of Hawaii Island. There are deep-water shrimp grounds from Kiholo to Kawaihae down to 200 fathoms but they are used by only a few fishers. Most of the use targets Kona crabs at 20 - 40 fathoms from Keauhou Bay to Kealakekua Bay and around Kailua Bay and Mahaiula.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Non-Commercial Fishing (Benthic Mobile Gear)

Includes:
Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

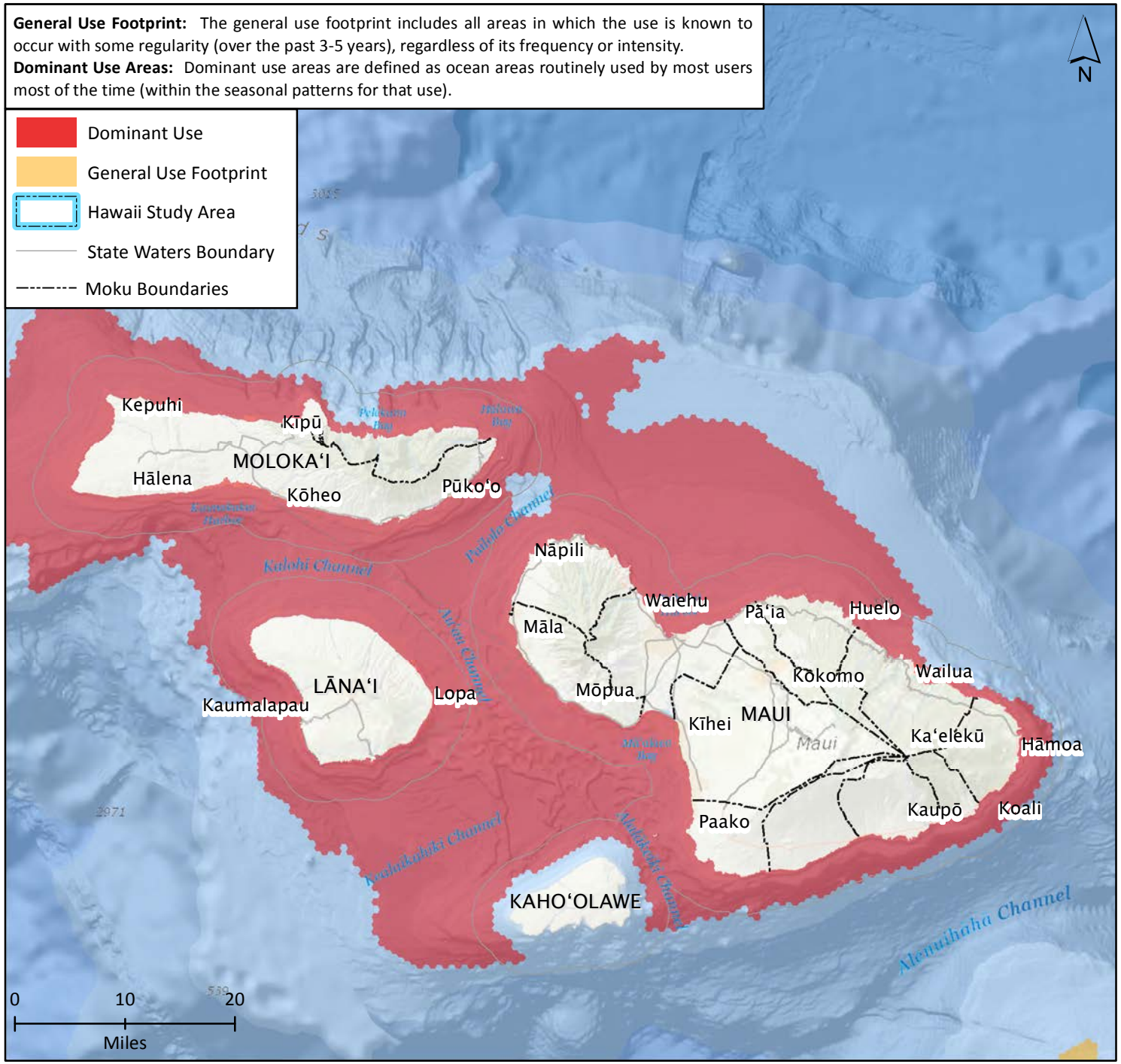
Island Use Notes:

Maui:
Non-commercial bottom fishing occurs predominantly around ledges and drop offs down to 275 fathoms excluding regulatory closures and protected areas.

Lanai:
During the lobster season, local residents commonly set traps in the nearshore area around Keomuku. Users are mainly non-commercial or subsistence fishers. Lanai fishers feel that they must compete for resources with fishermen from Maui.

Molokai:
Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

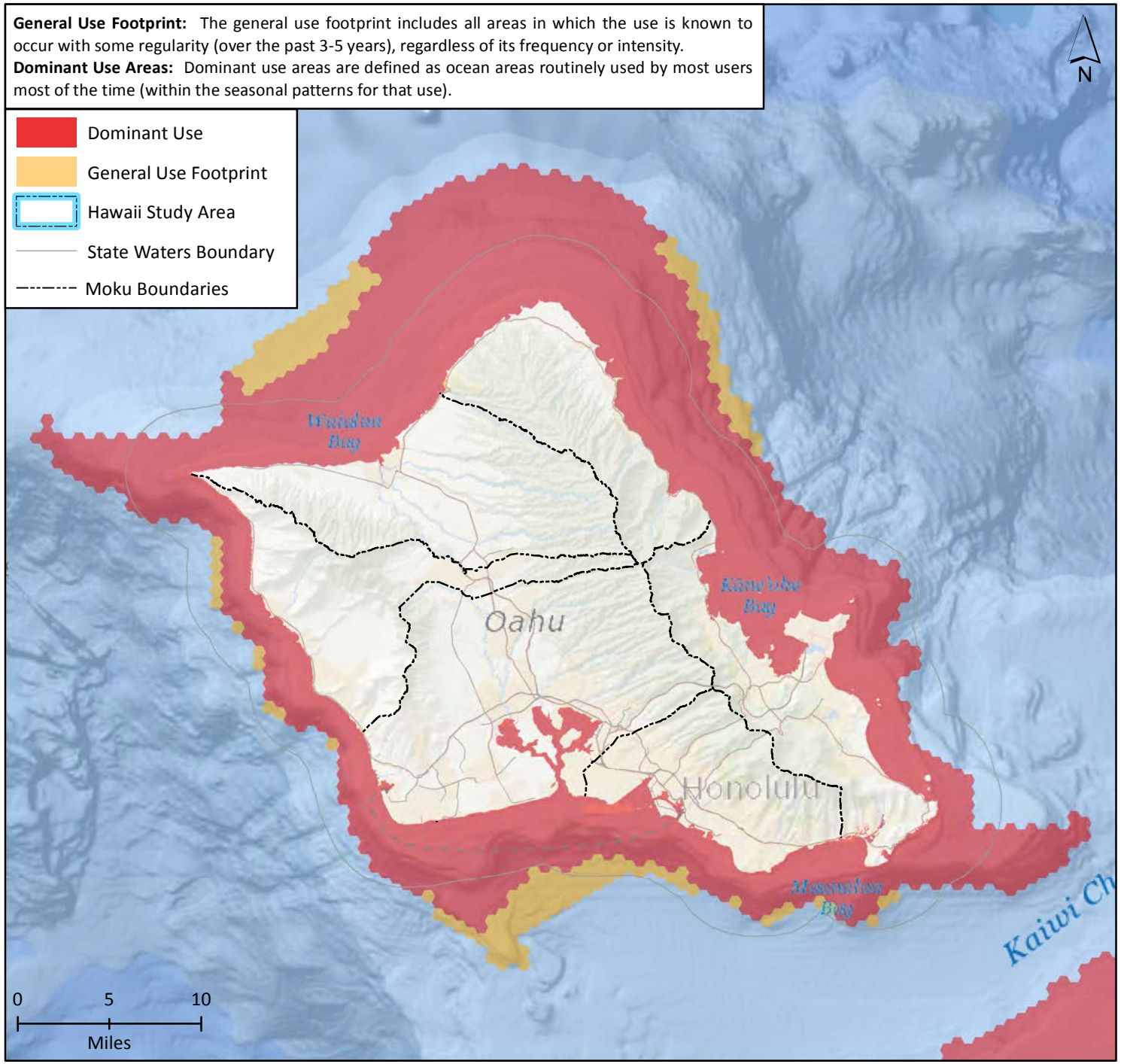
Non-Commercial Fishing (Benthic Mobile Gear)

Includes:
Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Island Use Notes:
Non-commercial fishing with benthic mobile and fixed gear is conducted mainly for subsistence, but occasionally for non-disclosed local sale. Traditional fishermen tend to fish close to shore and in shallow water, using lines made from plant material. One technique is dragging shell, whereby a lure (e.g. cowrie shell) gets dragged to tease out octopus or other benthic creatures. In recent years, some schools (e.g. PaePae o'Heia on the leeward side) have begun teaching traditional fishing techniques to educate youth on the historic practices and ways. Traditional fishermen follow the moku boundaries to maintain community kuleana to prevent overfishing.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

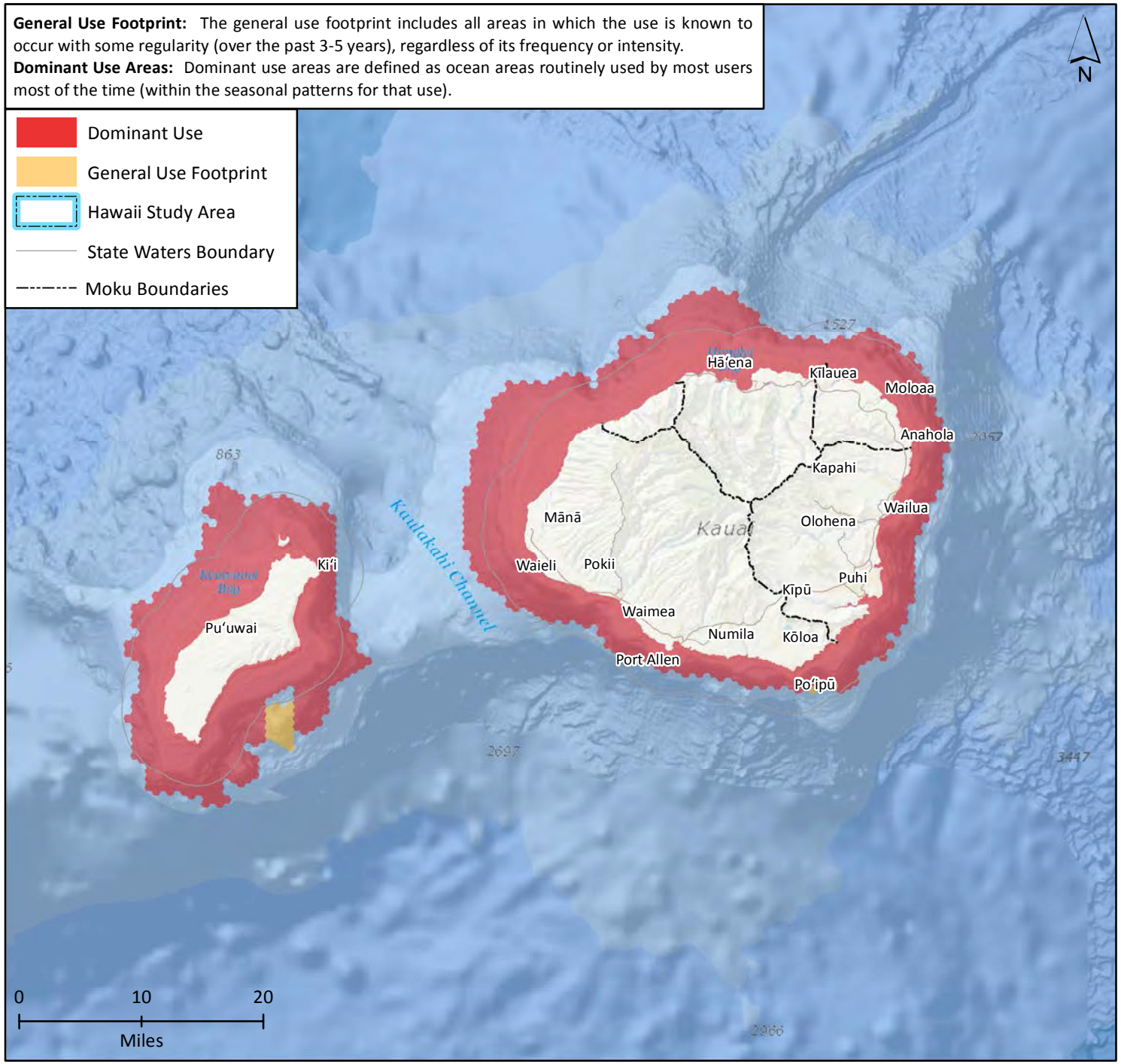
Non-Commercial Fishing (Benthic Mobile Gear)

Includes:
Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of Fishing

Island Use Notes:
Non-Commercial fishing with benthic mobile and fixed gear occurs mostly between 20-200 fathoms around the main islands of Kauai and Niihau. The limiting factor is often fuel costs. Near Haena, Wailua and Hanalei, there is a Samoan crab fishery in the brackish water at the river mouths. The dominant offshore areas are Kaula Rock and Lehua Seamount. (Limited use knowledge in workshop.)

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

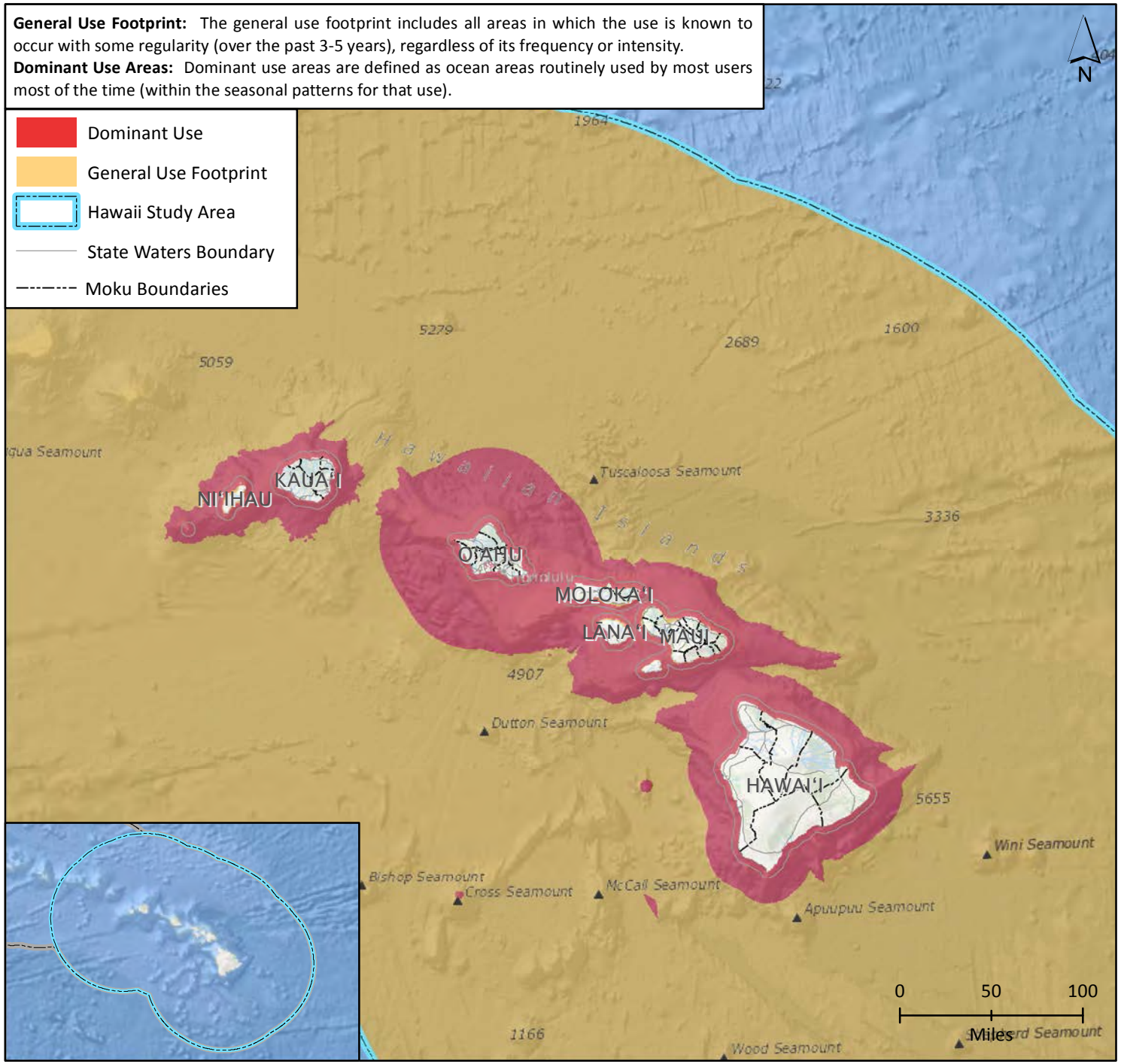
Non-Commercial Pelagic/Midwater Fishing

Includes:
Fishing from private or charter boats using mobile gear to catch pelagic fishes and mobile invertebrates for non-commercial purposes or traditional and customary practices. Includes sport fishing and fishing at Fish Aggregating Devices (FADs)

Excludes:
All other forms of Fishing

Statewide Use Notes:
Pelagic fishers use the all marine waters around the islands and venture beyond 200 nautical miles from shore. Dominant use areas are near submerged ledges and drop offs and surrounding seamounts and the state-maintained Fish Aggregation Devices (FADs). Prime fishing spots vary from island to island. Typical gear used are rod and reel (trolling) or kaka (hand) line from a boat. Kaka line fishing often occurs in smaller boats closer to shore. Commercial long liners follow seasonal and year-round regulatory closures. The primary target species are large pelagic fish including hebi (swordfish), ahi (tuna), akule (scad), and mahi (dolphin fish). Pelagic species' distributions vary seasonally. Non-commercial fishers use the same areas as the commercial pelagic fishers, the primary difference is non-commercial fishers will stay closer to shore to limit fuel costs (<15-20 miles). Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

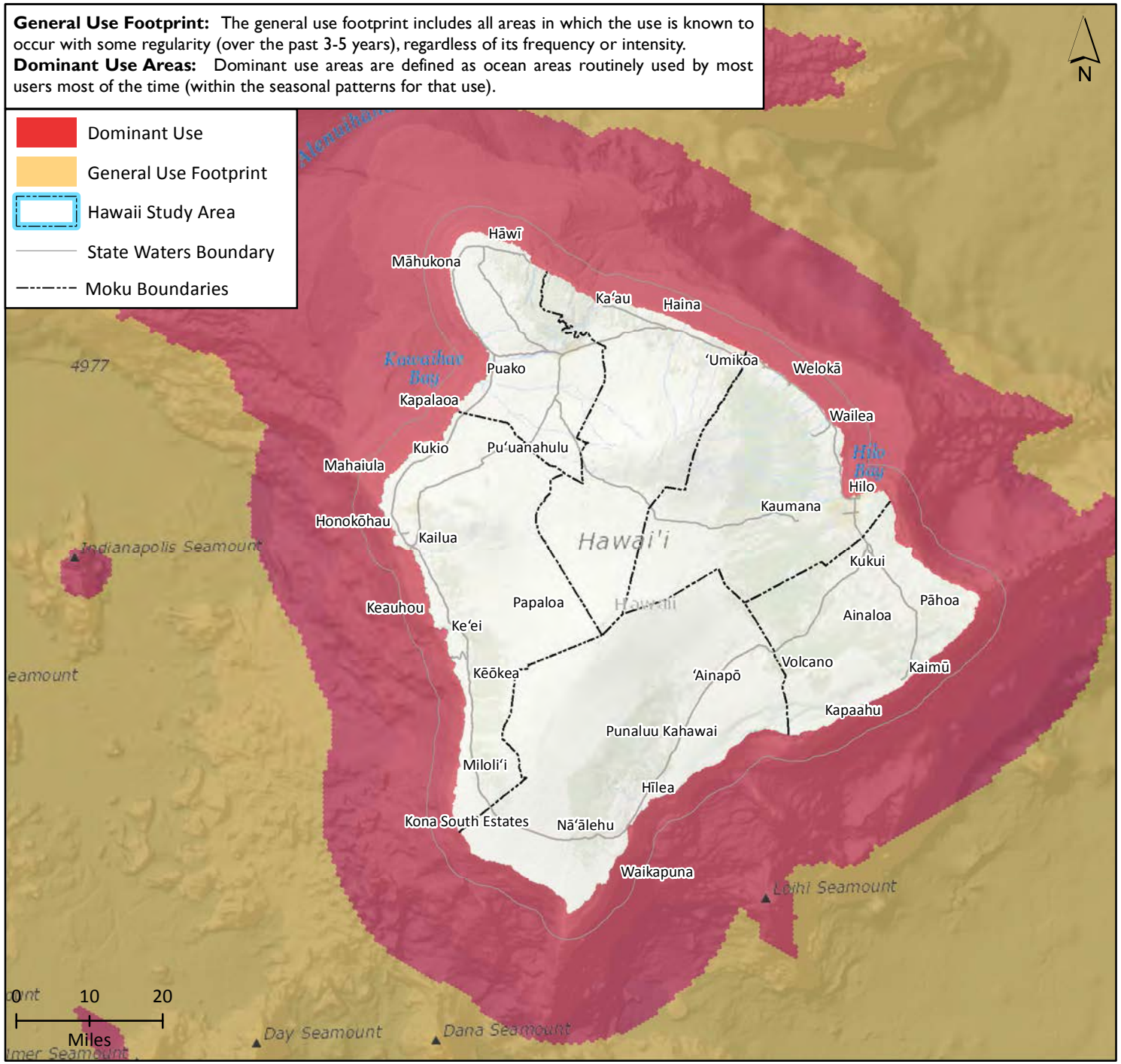
Non-Commercial Pelagic/Midwater Fishing

Includes:
Fishing from private or charter boats using mobile gear to catch pelagic fishes and mobile invertebrates for non-commercial purposes or traditional and customary practices. Includes sport fishing and fishing at Fish Aggregating Devices (FADs)

Excludes:
All other forms of Fishing

Island Use Notes:
The general areas are the same for non-commercial pelagic fishing as for commercial pelagic fishing, the only difference is the non-commercial fishers will stay closer to shore, not more than 15-20 miles offshore. There are ~50 – 70 private (illegal) FADs around the island that are ~75 miles offshore. Users also kayak fish for pelagic species on special sailing kayaks, up to 10 miles offshore. Access is dictated by launch areas. The Cross seamount is an important area for non-commercial fishers.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

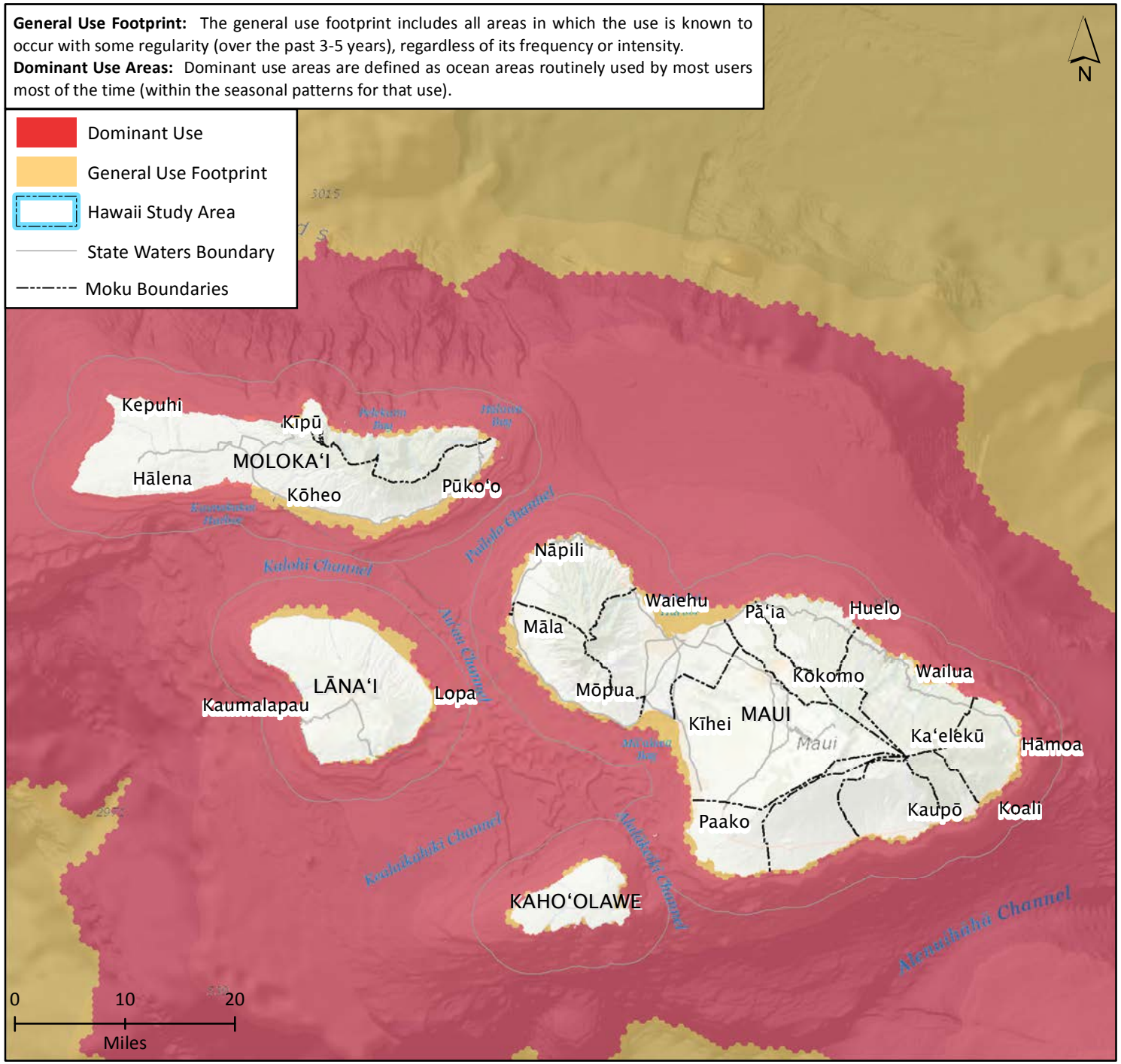
Non-Commercial Pelagic/Midwater Fishing

Includes:
Fishing from private or charter boats using mobile gear to catch pelagic fishes and mobile invertebrates for non-commercial purposes or traditional and customary practices. Includes sport fishing and fishing at Fish Aggregating Devices (FADs)

Excludes:
All other forms of Fishing

Island Use Notes:
Maui:
Non-commercial bottom fishing occurs predominantly around ledges and drop offs down to 275 fathoms excluding regulatory closures and protected areas
Lanai:
During the lobster season, local residents commonly set traps in the nearshore area around Keomuku. Users are mainly non-commercial or subsistence fishers. Lanai fishers feel that they must compete for resources with fishermen from Maui
Molokai:
Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

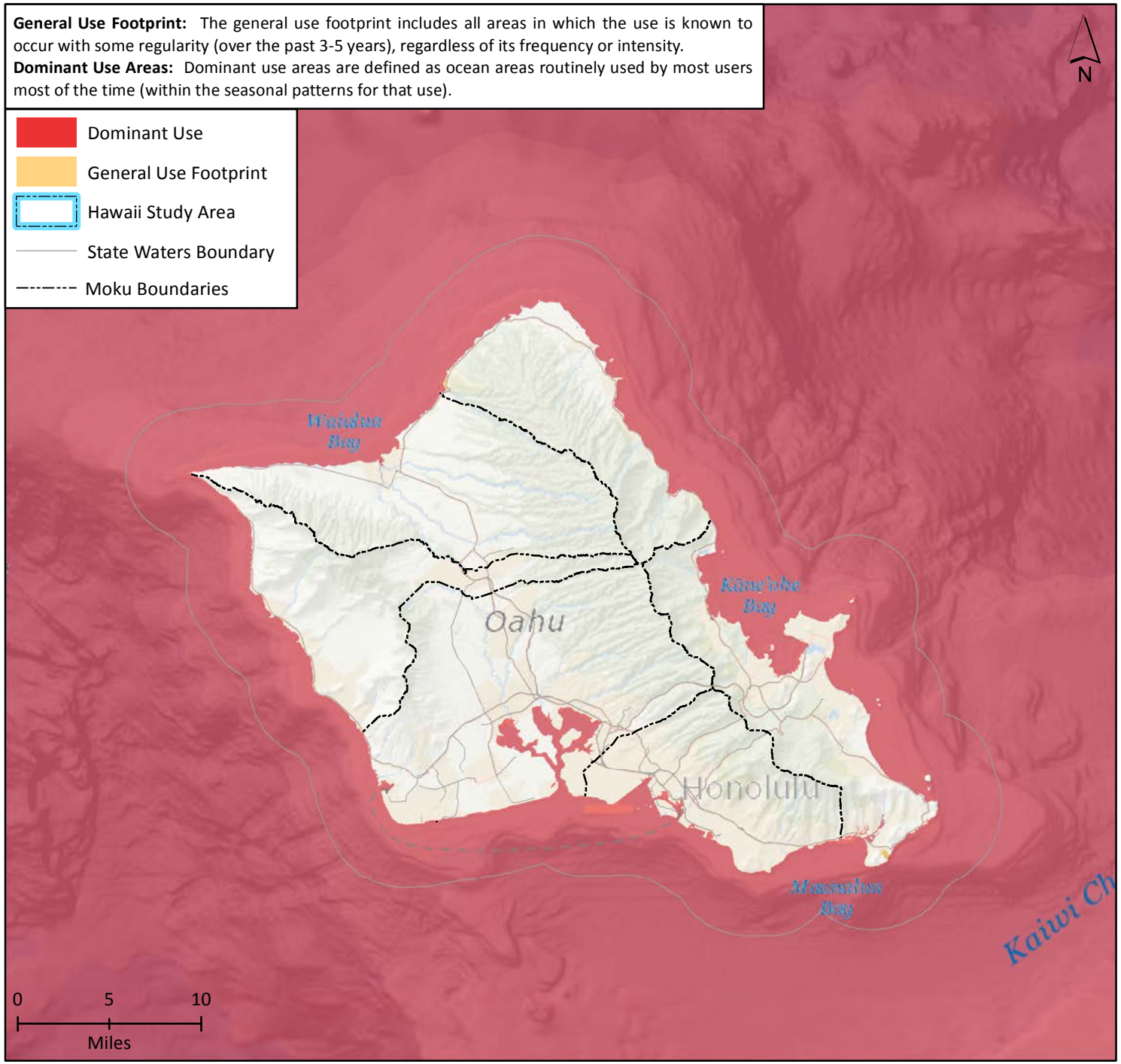
Non-Commercial Pelagic/Midwater Fishing

Includes:
Fishing from private or charter boats using mobile gear to catch pelagic fishes and mobile invertebrates for non-commercial purposes or traditional and customary practices. Includes sport fishing and fishing at Fish Aggregating Devices (FADs)

Excludes:
All other forms of Fishing

Island Use Notes:
Non-commercial pelagic fishers fish the same areas as the commercial fishers but tend to have smaller vessels and stay closer to shore (due to fuel costs).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

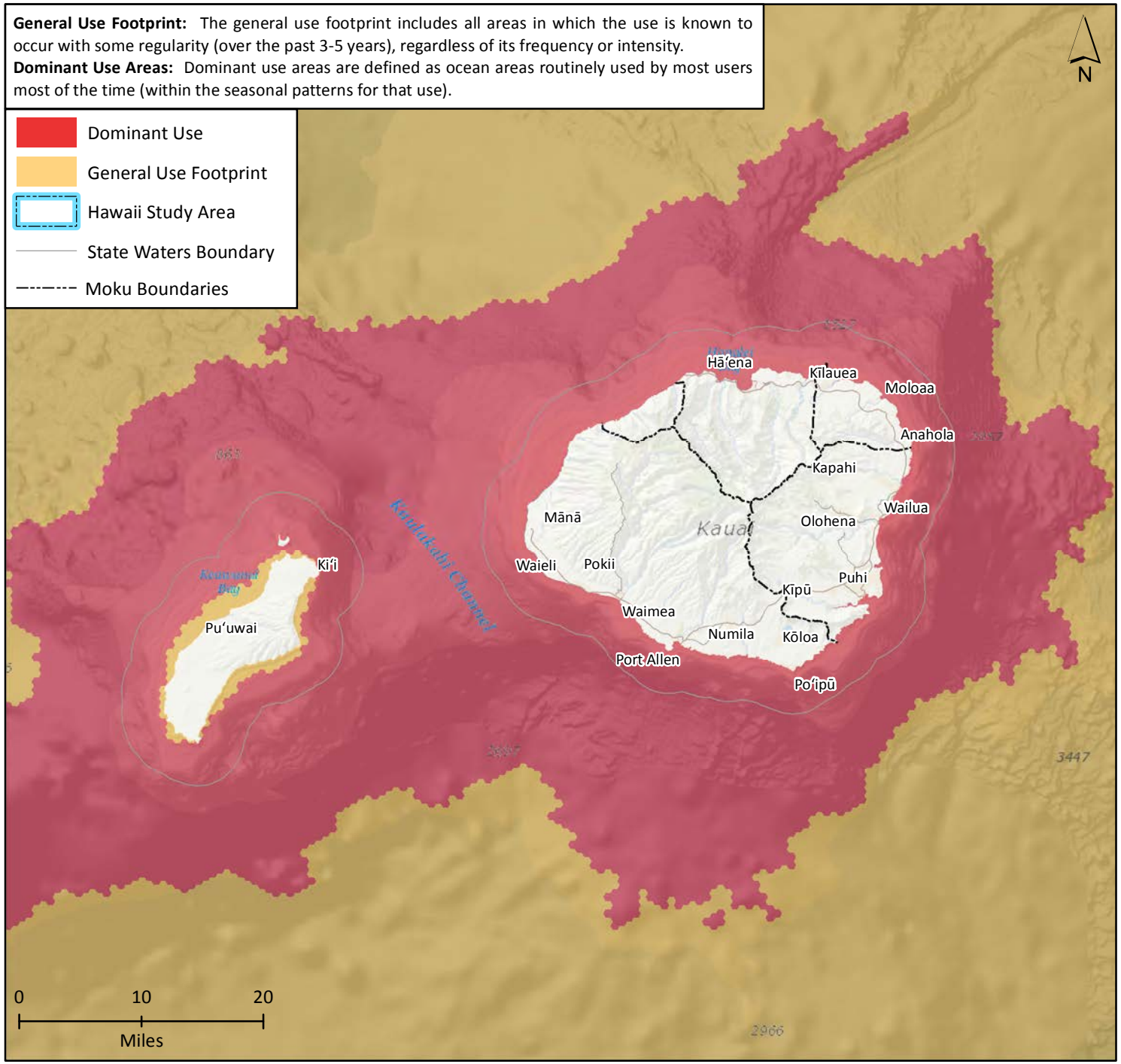
Non-Commercial Pelagic/Midwater Fishing

Includes:
Fishing from private or charter boats using mobile gear to catch pelagic fishes and mobile invertebrates for non-commercial purposes or traditional and customary practices. Includes sport fishing and fishing at Fish Aggregating Devices (FADs)

Excludes:
All other forms of Fishing

Island Use Notes:
Non-commercial pelagic fishing occurs all around the island out to ~ 1000 fathoms. Dominant use areas are influenced by seafloor morphology (seamounts, ledges), distance from shore and fuel costs.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

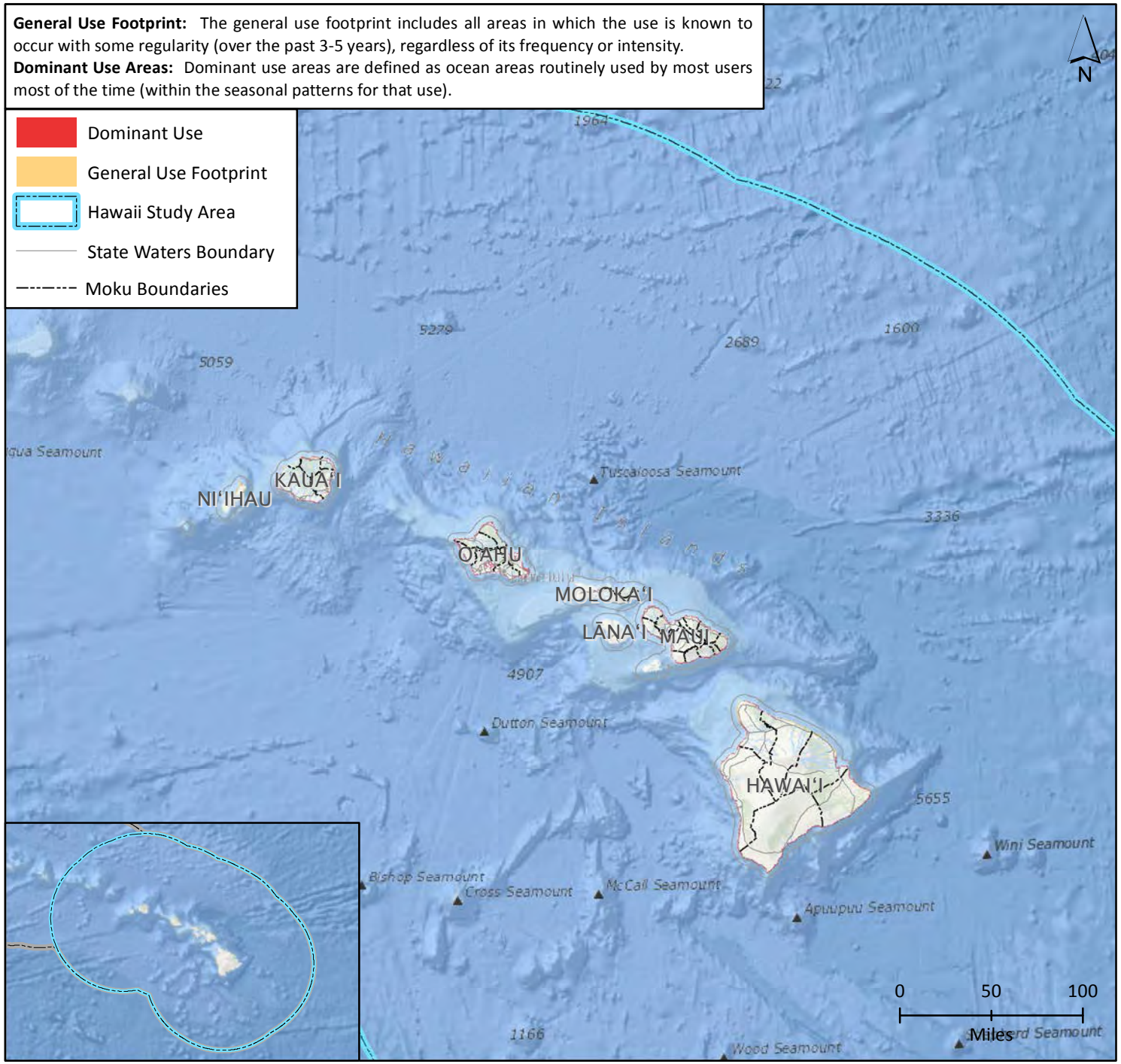
Non-Commercial Shore Fishing

Includes:
Fishing from piers, jetties or shore with pole and line (whipping/dunking), surf fishing and kite fishing for non-commercial purposes or traditional and customary practices. Includes use of shallow traps and nets (cast, lay, drift, surround, akule or throw nets)

Excludes:
Any boat-based fishing, Intertidal Harvest, Dive Fishing/Harvest

Statewide Use Notes:
Non-commercial fishing from shore occurs throughout the islands wherever there is shore access. In general, if people are using the shore they are likely fishing there as well. However, coastal access is not as limiting for fishing as it can be for beach/shore use, as even inaccessible areas can be fished using appropriate gear. Many types of gear are used, including the lay net (net laid over the reef at low tide and hauled in), cast net (actively casting a smaller net), pole and line, slide bait (casting a line with a lead weight and sliding bait down the line), paddle line (a line is paddled out from shore), bag line (using trash bags to blow bait out ~300 yards), and bowline (using a longbow to shoot fish from cliff tops). There are multiple target species for shore fishing, ranging from large pelagic fish (using bag/ paddle lines) to octopus. Every community has different environmental challenges (e.g., sandy bottom, rocky cliffs) so unique fishing techniques such as bowline fishing or bag line fishing have developed within each community. Peak fishing times are dictated by weather, moon phase and season. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

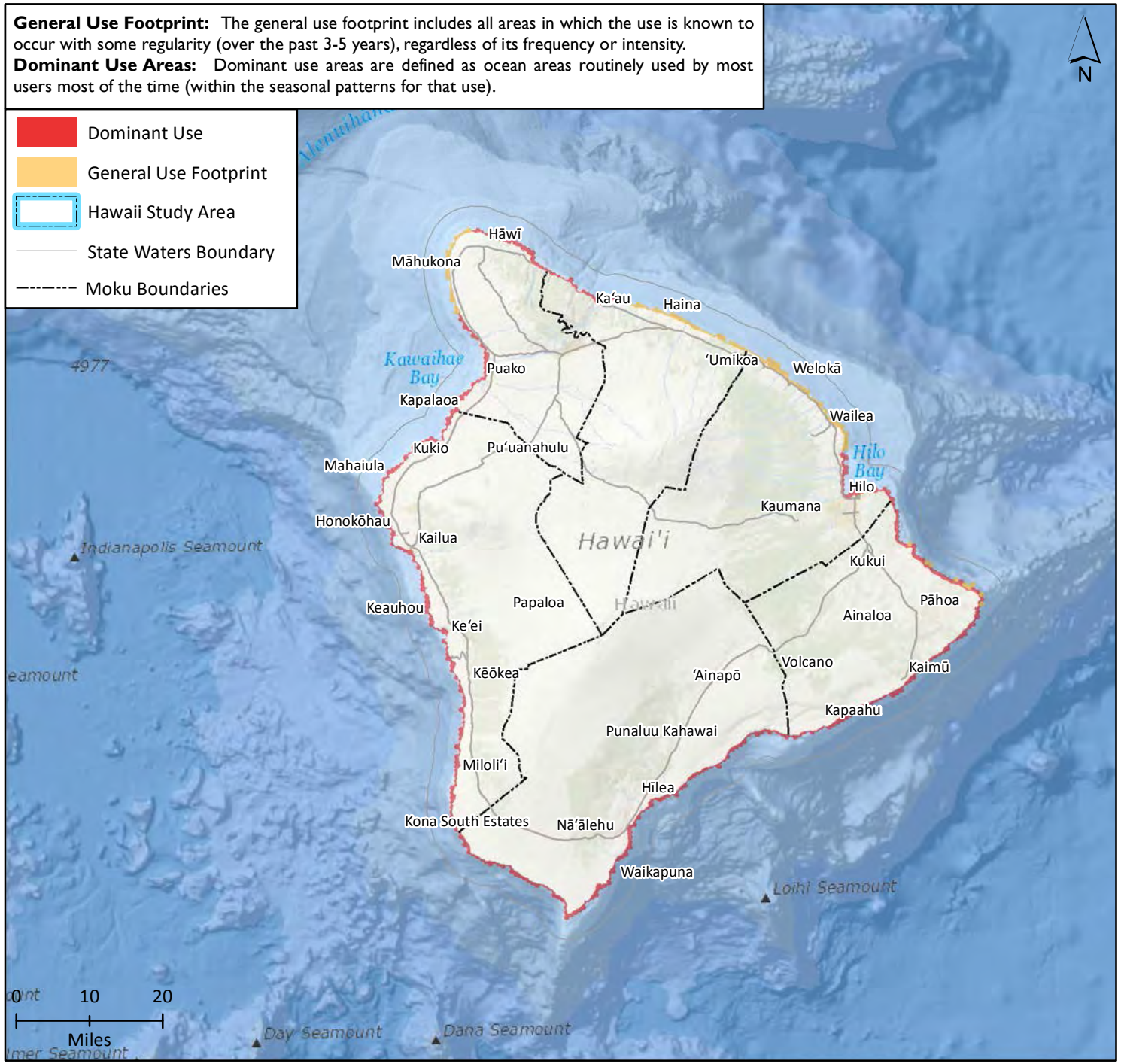
Non-Commercial Shore Fishing

Includes:
Fishing from piers, jetties or shore with pole and line (whipping/dunking), surf fishing and kite fishing for non-commercial purposes or traditional and customary practices. Includes use of shallow traps and nets (cast, lay, drift, surround, akule or throw nets)

Excludes:
Any boat-based fishing, Intertidal Harvest, Dive Fishing/Harvest

Island Use Notes:
Non-commercial fishing from shore occurs everywhere along the coast with a variety of methods and gear depending on the location. Use areas can change over time (e.g., Hosaka was a famous historical fishing spot but not regularly used now) and with changes in coastal access (e.g., Haumakoa coast plantation landings). Fishing techniques are unique to each community, but the primary methods include cast net, pole and line, coastline to slide bait (cast lead weight and slide bait down the line), bag line fishing (using trash bags to blow bait offshore). The bag line fishing occurs mainly around South Point and requires the trade winds to blow the bag out. The use is mainly non-commercial, but there may be some limited commercial use.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

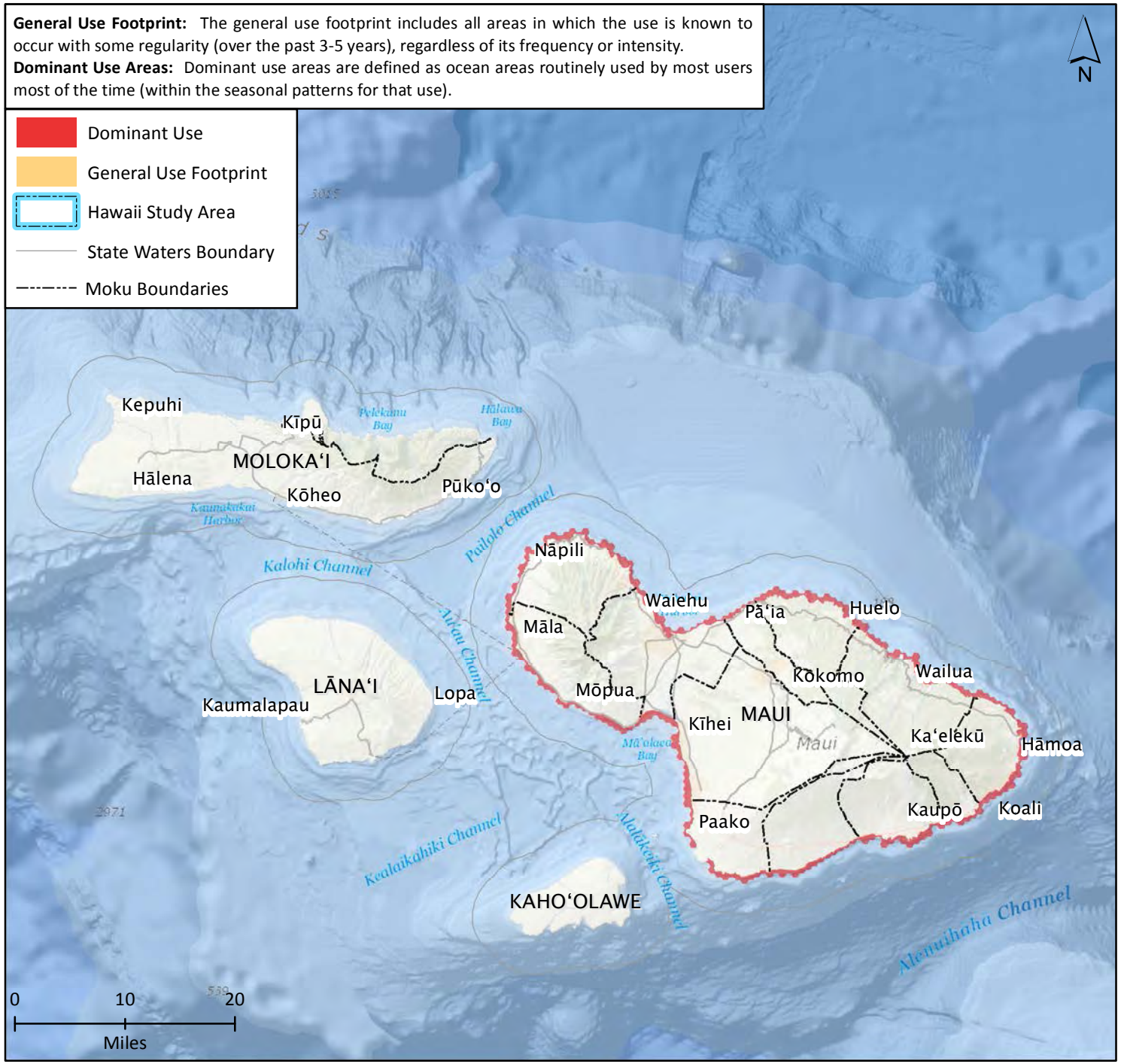
Non-Commercial Shore Fishing

Includes:
Fishing from piers, jetties or shore with pole and line (whipping/dunking), surf fishing and kite fishing for non-commercial purposes or traditional and customary practices. Includes use of shallow traps and nets (cast, lay, drift, surround, akule or throw nets)

Excludes:
Any boat-based fishing, Intertidal Harvest, Dive Fishing/Harvest

Island Use Notes:
Maui:
Non-commercial fishing from shore on Maui is exclusively a subsistence-based use. The entire shoreline is used for shore fishing, but degree of use is influenced by ease of coastal access. However, some there are inaccessible areas that are still used by a select number of daring fishers.
Lanai:
Non-commercial fishing from shore is conducted mainly for subsistence and occurs on all accessible coastal areas along the shoreline on Lanai.
Molokai:
Information on non-commercial shore fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

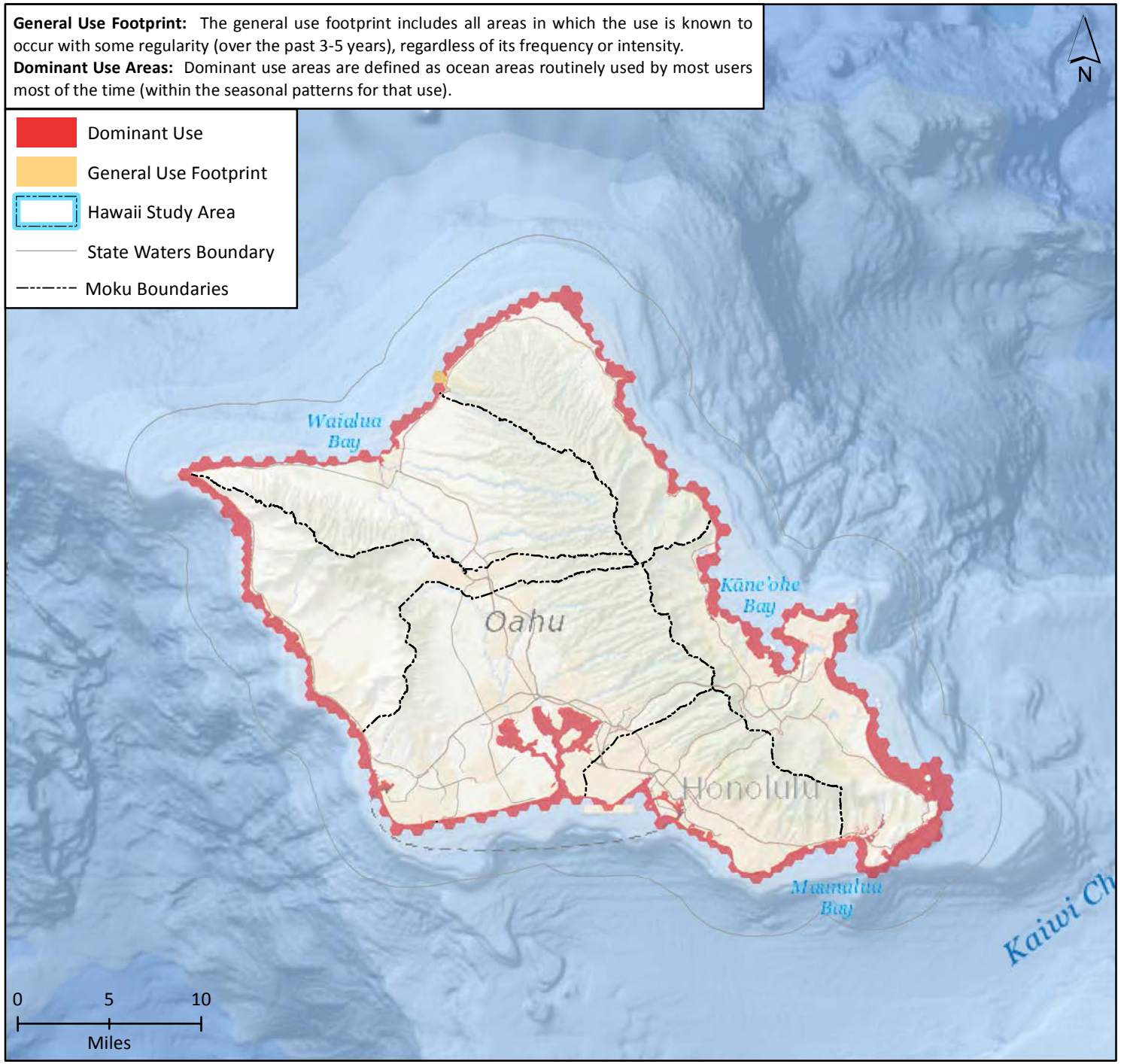
Non-Commercial Shore Fishing

Includes:
Fishing from piers, jetties or shore with pole and line (whipping/dunking), surf fishing and kite fishing for non-commercial purposes or traditional and customary practices. Includes use of shallow traps and nets (cast, lay, drift, surround, akule or throw nets)

Excludes:
Any boat-based fishing, Intertidal Harvest, Dive Fishing/Harvest

Island Use Notes:
Shore fishing occurs around the entire island depending on regulatory seasons and access. The weather, moon phase and season dictate the peak times to fish. Lines cast from the shore can reach 100 yards, although people will paddle a line out to 0.5 miles offshore with their pole on land. Dominant use areas include Kaena Point, Barbers Point, Kaneohe Bay, Turtle Bay, Kailua Bay, Sandy's Beach to Makapuu. There is no kite/trash bag fishing on Oahu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

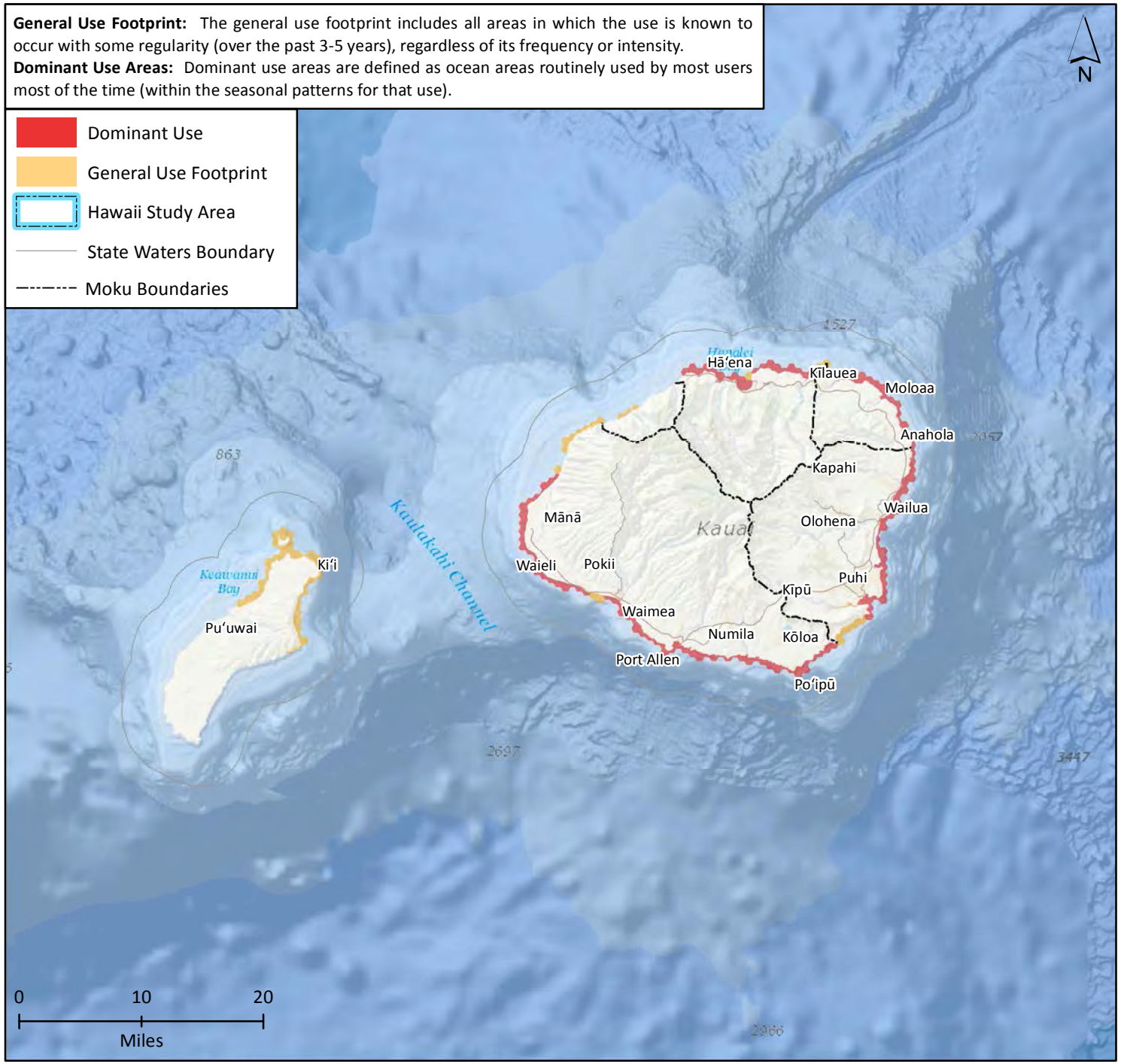
Non-Commercial Shore Fishing

Includes:
Fishing from piers, jetties or shore with pole and line (whipping/dunking), surf fishing and kite fishing for non-commercial purposes or traditional and customary practices. Includes use of shallow traps and nets (cast, lay, drift, surround, akule or throw nets)

Excludes:
Any boat-based fishing, Intertidal Harvest, Dive Fishing/Harvest

Island Use Notes:
Non-commercial shore fishing occurs all around the island with shoreline access and where the use is not prohibited (i.e. wildlife refuges). Dominant use areas include the piers at Waimea and Hanamaulu, but degradation to shoreline access in recent years has reduced use in areas like Papaa Bay. Fishers cast lines out to 150-200 yards from shore and are mostly fishing for moi and oopu. Moi fishing uses a throw net and fishing pole and occurs in Haena from June to September. Oopu spawn in the river from August to September and are dependent on heavy rains to trigger their migration. Local communities fear that degrading water quality caused by the tourist industry will influence the quality of the near shore fisheries.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

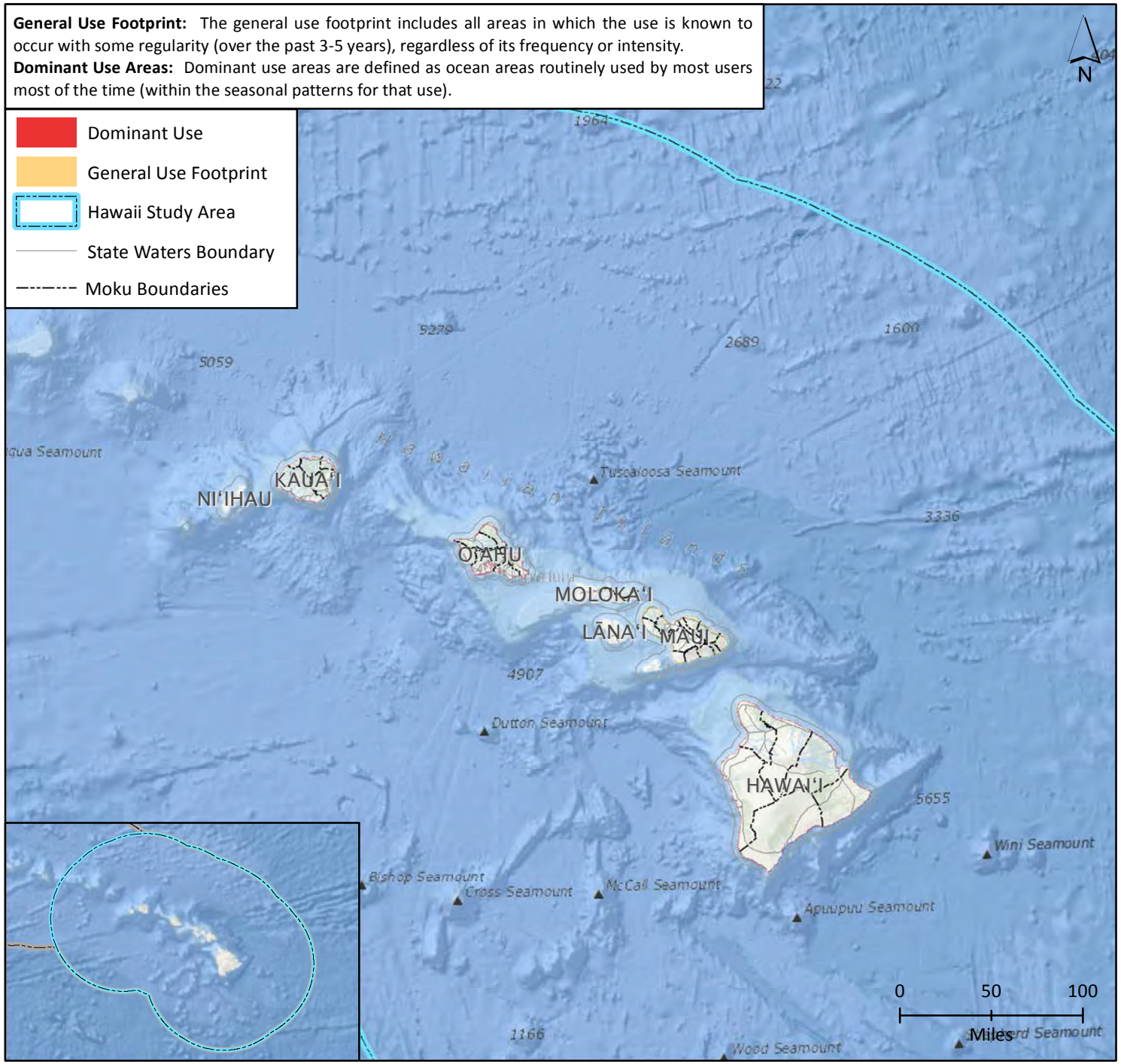
Non-Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for consumption, education or research purposes or traditional and customary practices. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab, and sea cucumbers

Excludes:
Tide Pooling, SCUBA/Snorkeling, net fishing

Statewide Use Notes:
Intertidal gathering occurs everywhere there is coastal access in the Hawaiian Islands as a non-commercial or subsistence activity. Dominant use areas are public access zones close to population centers that have unique conditions for the target species, such as access to brackish water, rocky headlands or sandy beach. Areas that prohibit access or harvest may still be used, but to a lesser extent. The collection zones are between high and low tide, although users will wade depending on depth . Gathering zones are seasonal based on species availability and ocean conditions for safe access. Gathering seasons can often be indicated by terrestrial environmental cues (e.g., blossoms on specific tree species) that vary from island to island. Primary target species are limu (seaweed), opihi (limpets) and he'e/ tako (octopus). These species taste different depending on whether they are collected from exposed or calm areas. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

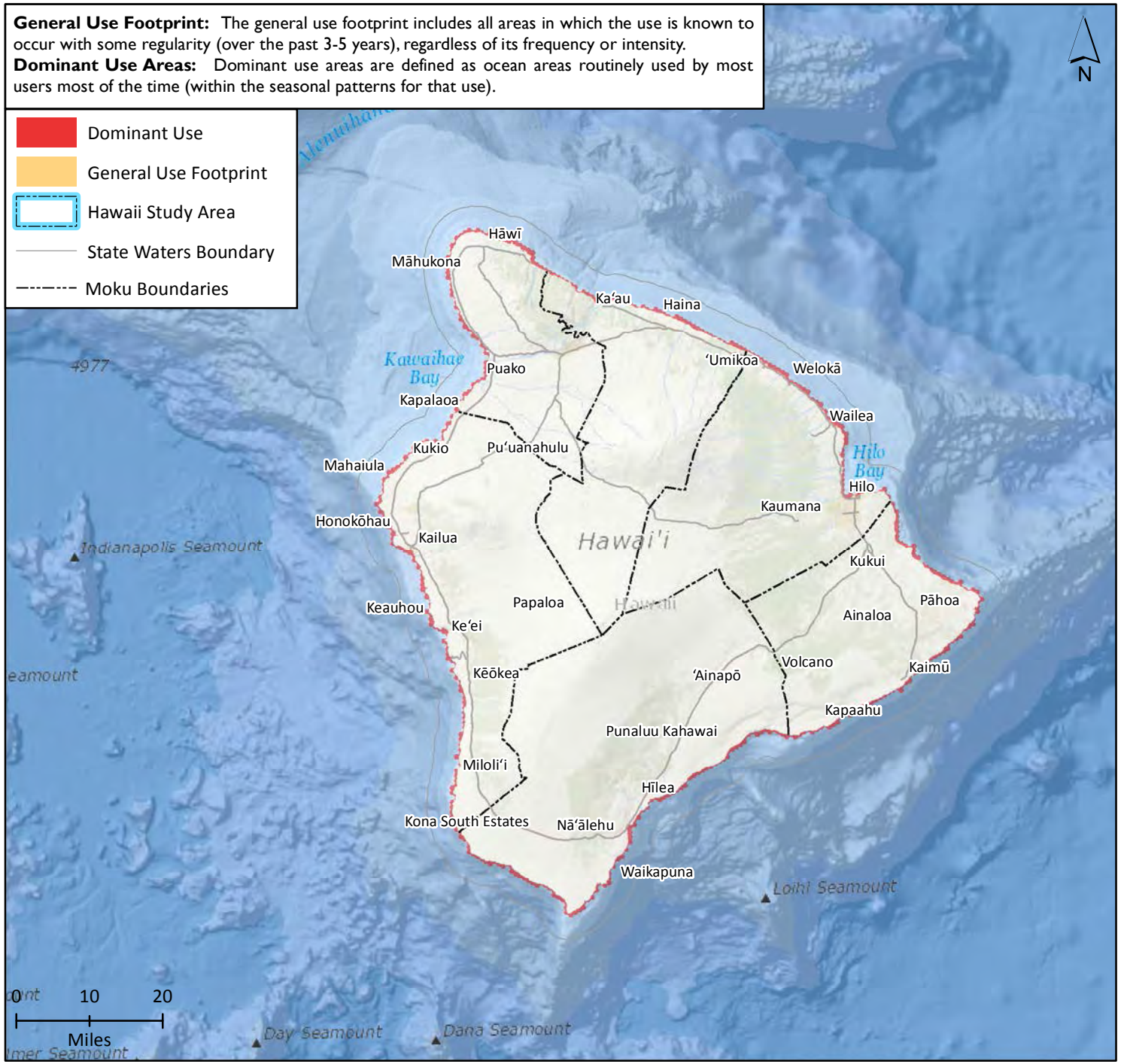
Non-Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for consumption, education or research purposes or traditional and customary practices. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab, and sea cucumbers

Excludes:
Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
Non-commercial intertidal harvest is an important activity for subsistence and cultural practice. Use occurs throughout the island and is most dominant around public access sites with a few less-used areas accessible only by boat.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Non-Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for consumption, education or research purposes or traditional and customary practices. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab, and sea cucumbers

Excludes:
Tide Pooling, SCUBA/Snorkeling, net fishing

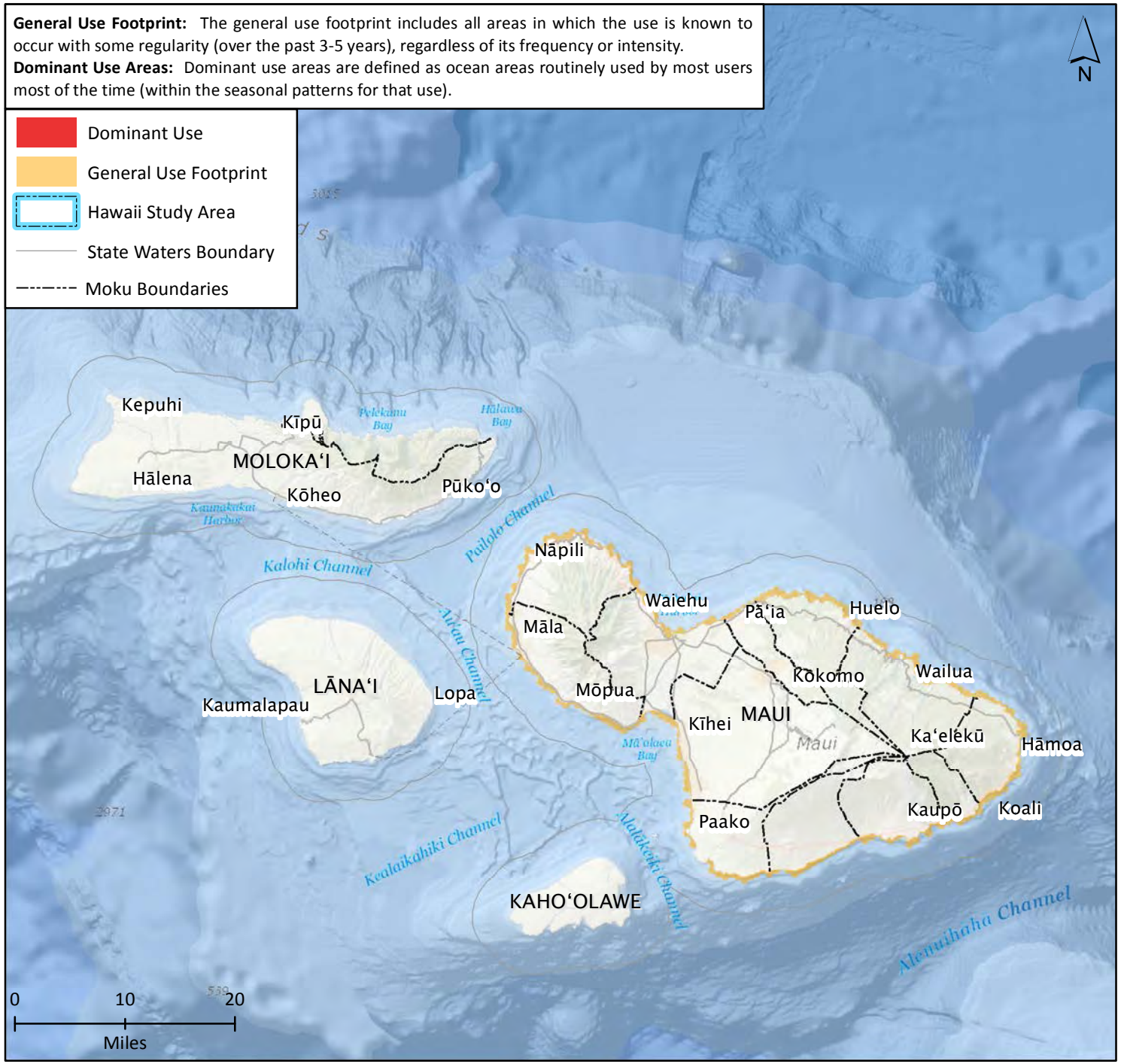
Island Use Notes:

Maui:
Non-commercial intertidal harvest occurs around the island wherever there is safe shoreline access. Locals have observed a significant decrease of resources (e.g. opihi) in recent years, attributed to non-traditional management of coastal resources on Maui.

Lanai:
Information on non-commercial intertidal harvest was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.

Molokai:
Information on non-commercial intertidal harvest was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

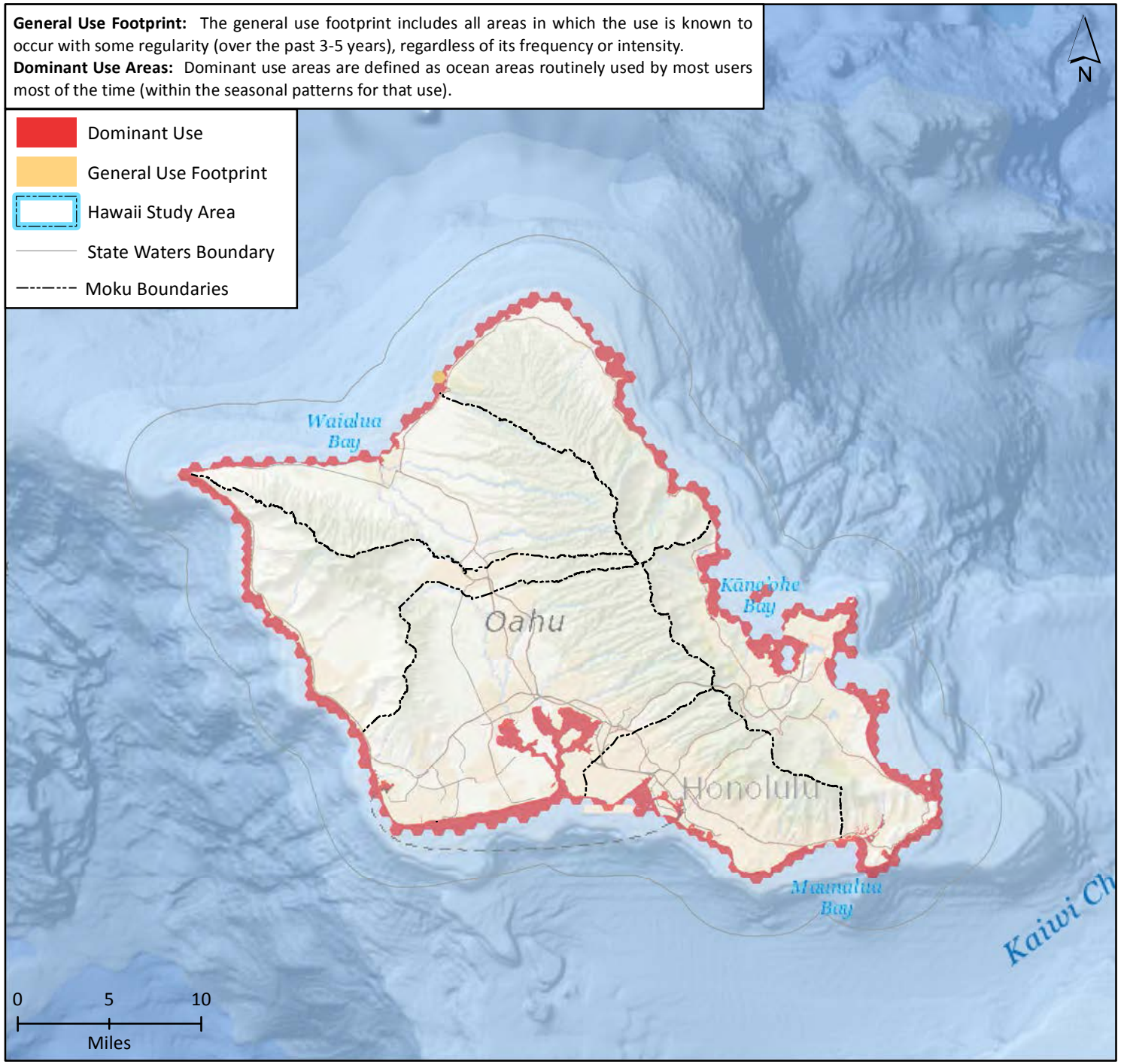
Non-Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for consumption, education or research purposes or traditional and customary practices. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab, and sea cucumbers

Excludes:
Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
Non-commercial intertidal gathering occurs all along the shoreline on Oahu. Species availability dictates the dominant use areas e.g. rocky areas for opihi, sandy areas for limu, and reef areas for tako (octopus). Quality of the harvest also varies with collection site, e.g. opihi collected from an exposed rock will taste different to those collected in calm water. Local residents observe environmental cues on the land that guide what can be harvested at the shore. These cues vary from island to island and with the season. Intertidal gathering is difficult to regulate due to seasonal flexibility.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

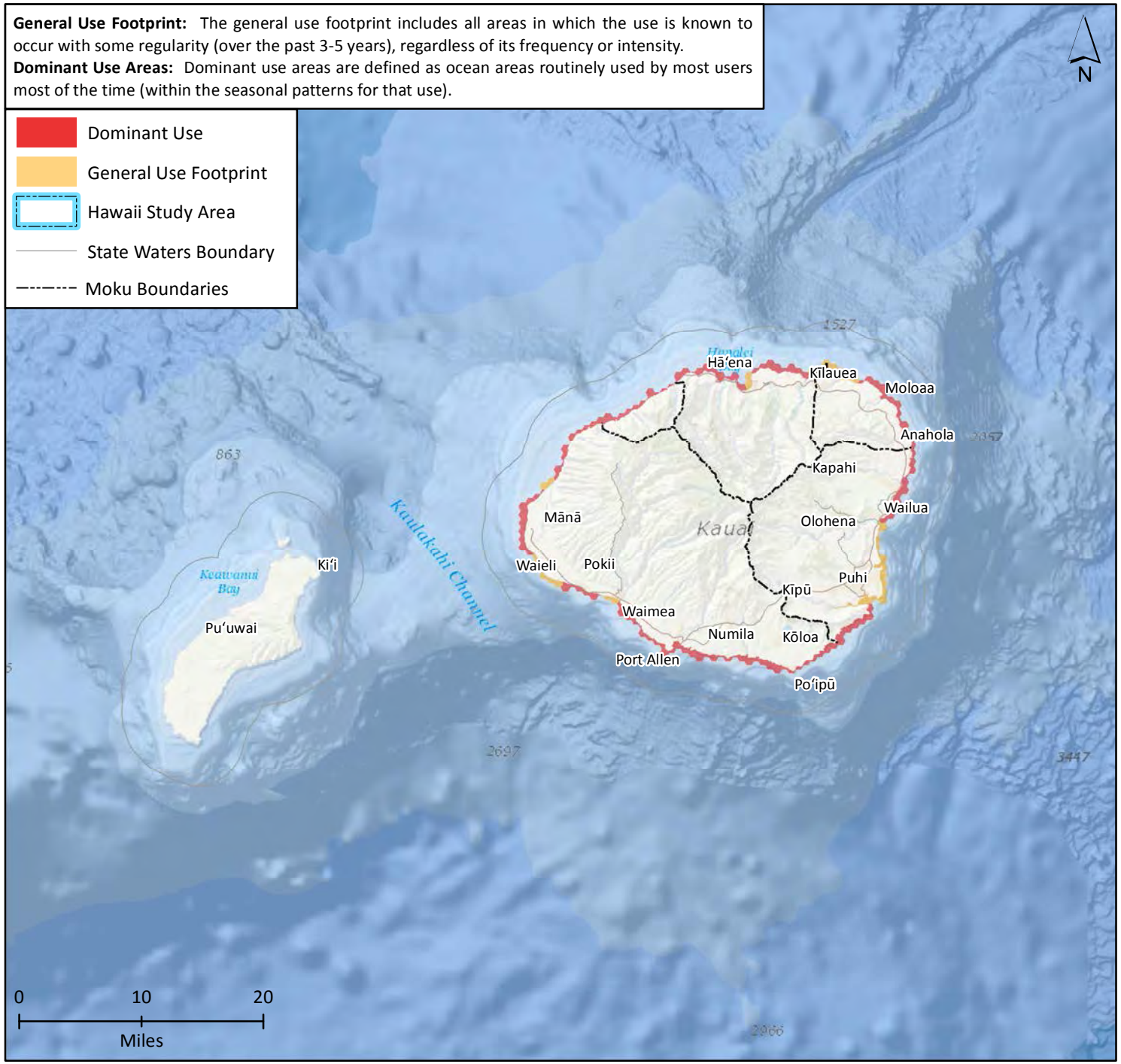
Non-Commercial Intertidal Harvest

Includes:
Intertidal and shallow water gathering from shore of living marine plant and animal species for consumption, education or research purposes or traditional and customary practices. Includes collection of invertebrates including ʻopihi , hāʻukeʻuke/wana (urchin), limu, crab, and sea cucumbers

Excludes:
Tide Pooling, SCUBA/Snorkeling, net fishing

Island Use Notes:
Non-commercial intertidal harvest is highly seasonal and occurs around rocky points and shallow coral platforms all around the island where there is access. Dominant areas are Makahoa Point and Polihale Beach. The use is prohibited in the wildlife refuges.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

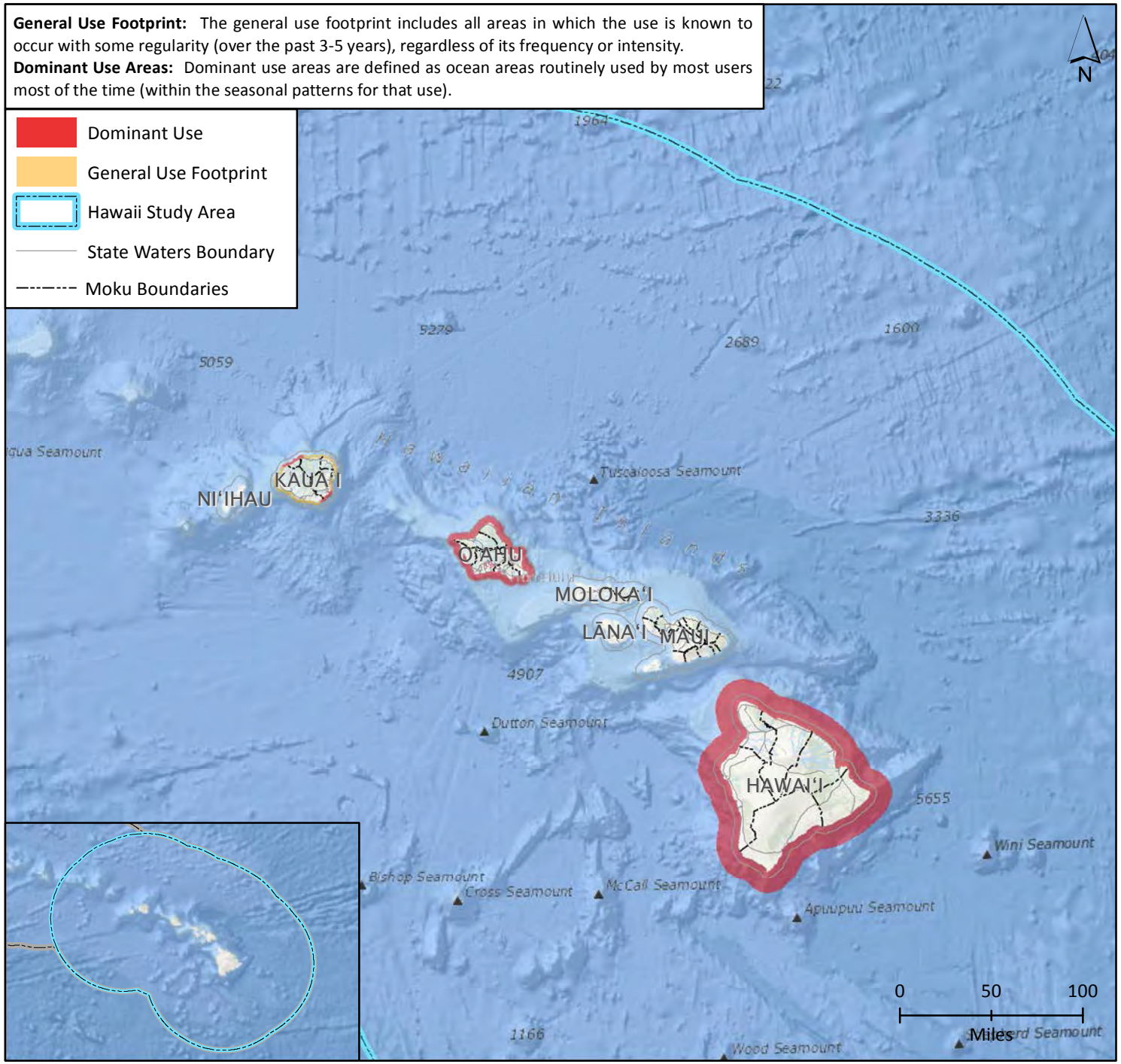
Non-Commercial Kayak Fishing

Includes:
Use of hook and line and other gear from kayaks, canoes or any other similar vessel to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of fishing

Statewide Use Notes:
Kayak fishing can generally occur anywhere in the Hawaiian Islands with safe coastal access and favorable ocean conditions. The dominant use area is within one nautical mile from shore, although this is highly dependent on season, access, weather and ocean conditions. Kayak can be a generic term in Hawaii that refers to both paddle craft and the larger sailing vessels that travel farther and catch larger fish. Target species range from large pelagic fish like au (marlin) to the smaller reef fish and octopus. Gear types can be modern rod and monofilament line or traditional hand woven line and dragging shells for benthic species. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

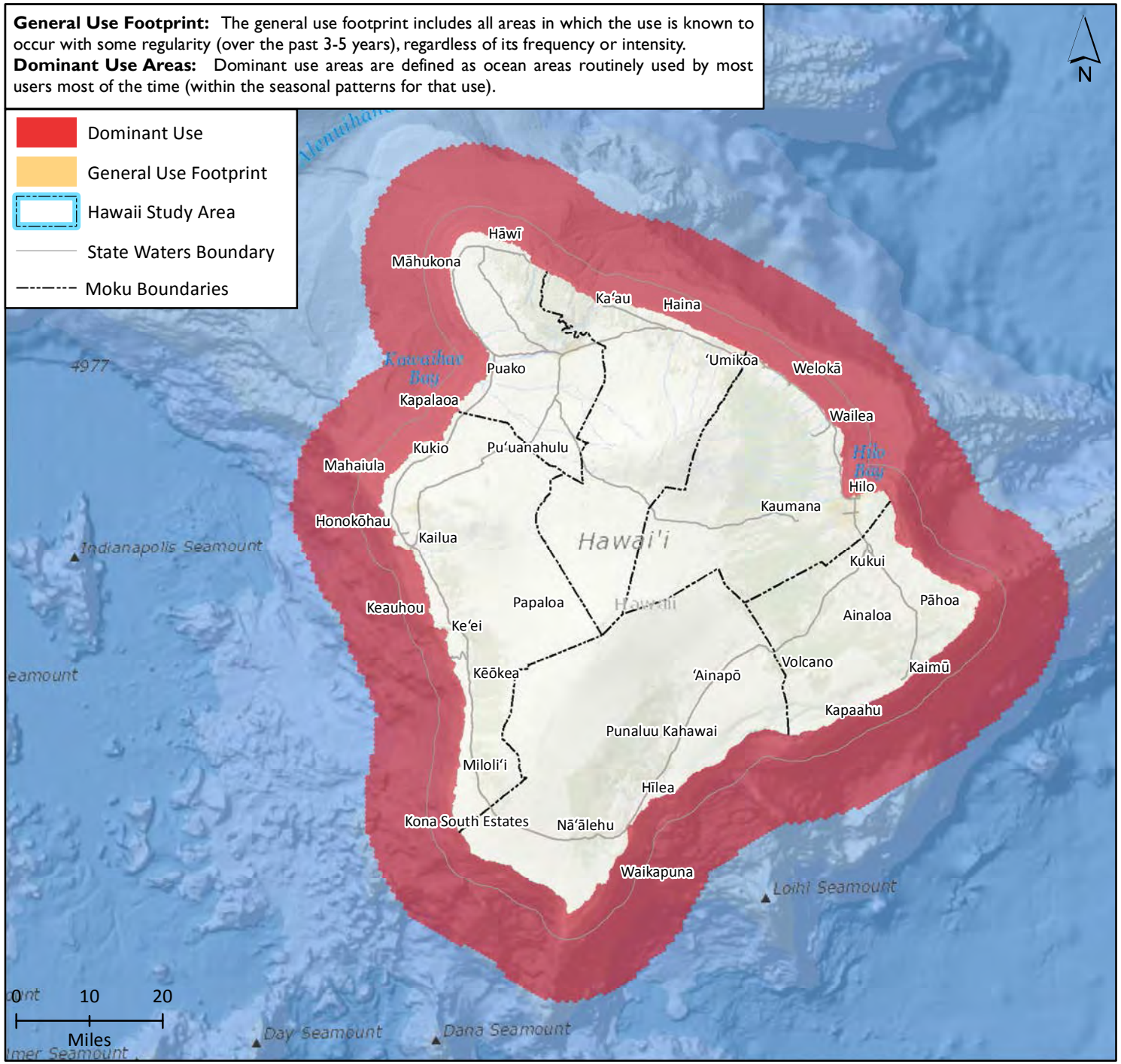
Non-Commercial Kayak Fishing

Includes:
Use of hook and line and other gear from kayaks, canoes or any other similar vessel to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of fishing

Island Use Notes:
Non-commercial kayak fishing occurs all along the coast wherever there is safe coastal access, but the degree of use is highly dependent on ocean and weather conditions. Hilo Bay is a prime location for kayak fishing with an east side kayak club that runs annual fishing competitions. Typically users stay closer to shore within waters less than 100 fathoms.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Non-Commercial Kayak Fishing

Includes:
Use of hook and line and other gear from kayaks, canoes or any other similar vessel to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of fishing

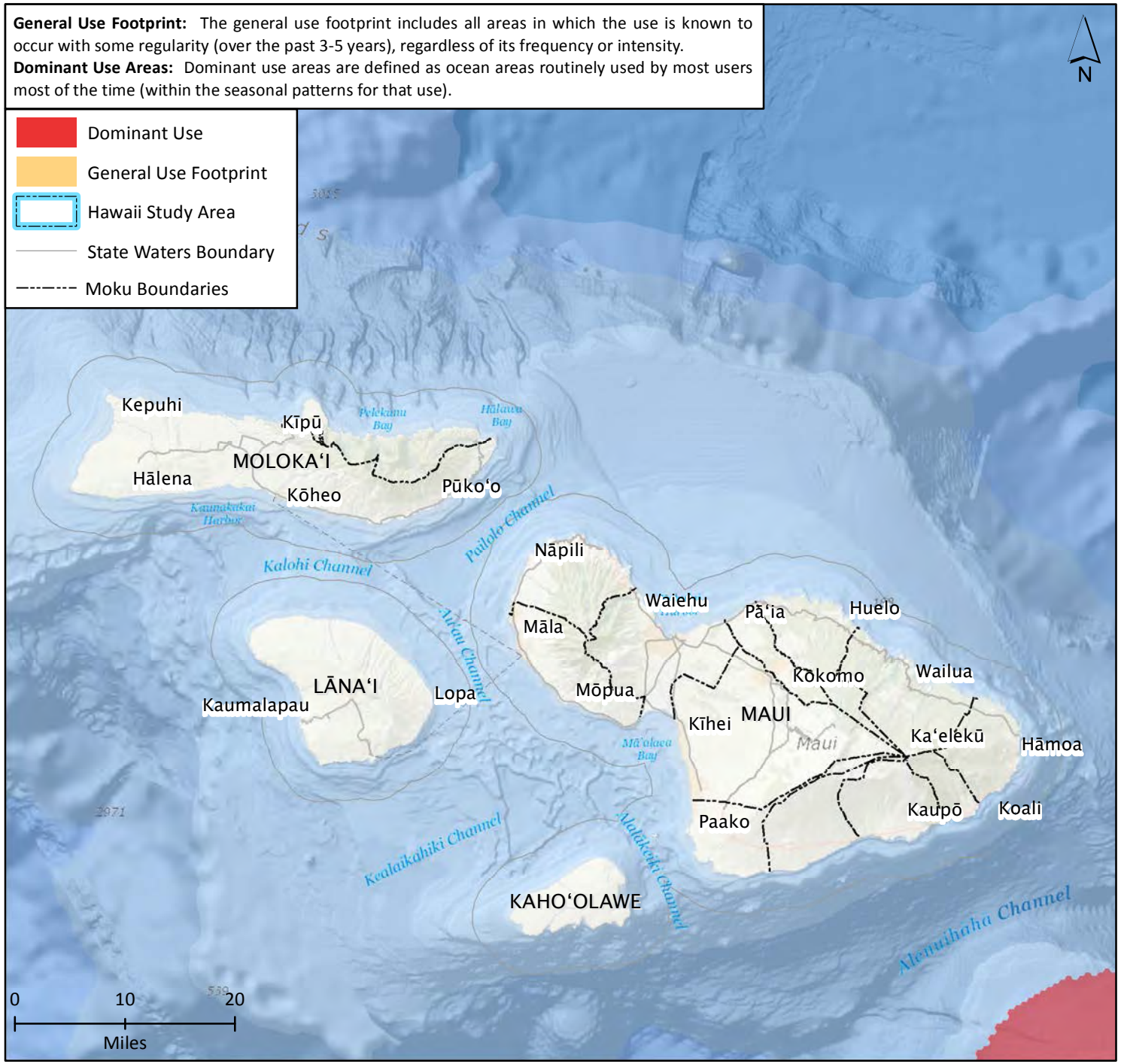
Island Use Notes:

Maui:
Information on non-commercial kayak fishing was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.

Lanai:
Information on non-commercial kayak fishing was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.

Molokai:
Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers. This use was discussed but use areas were not mapped during the workshop.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Non-Commercial Kayak Fishing

Includes:
Use of hook and line and other gear from kayaks, canoes or any other similar vessel to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of fishing

Island Use Notes:
Non-commercial kayak fishing occurs around the island from shore out to one mile offshore depending on the presence of a fringing reef. Dominant use areas are more commonly found on the leeward side where conditions are more favorable. Weather and ocean conditions influence fishing zones. Kayak fishers will drift with the local currents, launching at one location and drifting to the target location. Techniques can include shell dragging from 60-120 feet deep for octopus. Or in places like Kaneohe Bay, octopus can be caught tidally by placing bait at low tide and reeling in the catch at high tide.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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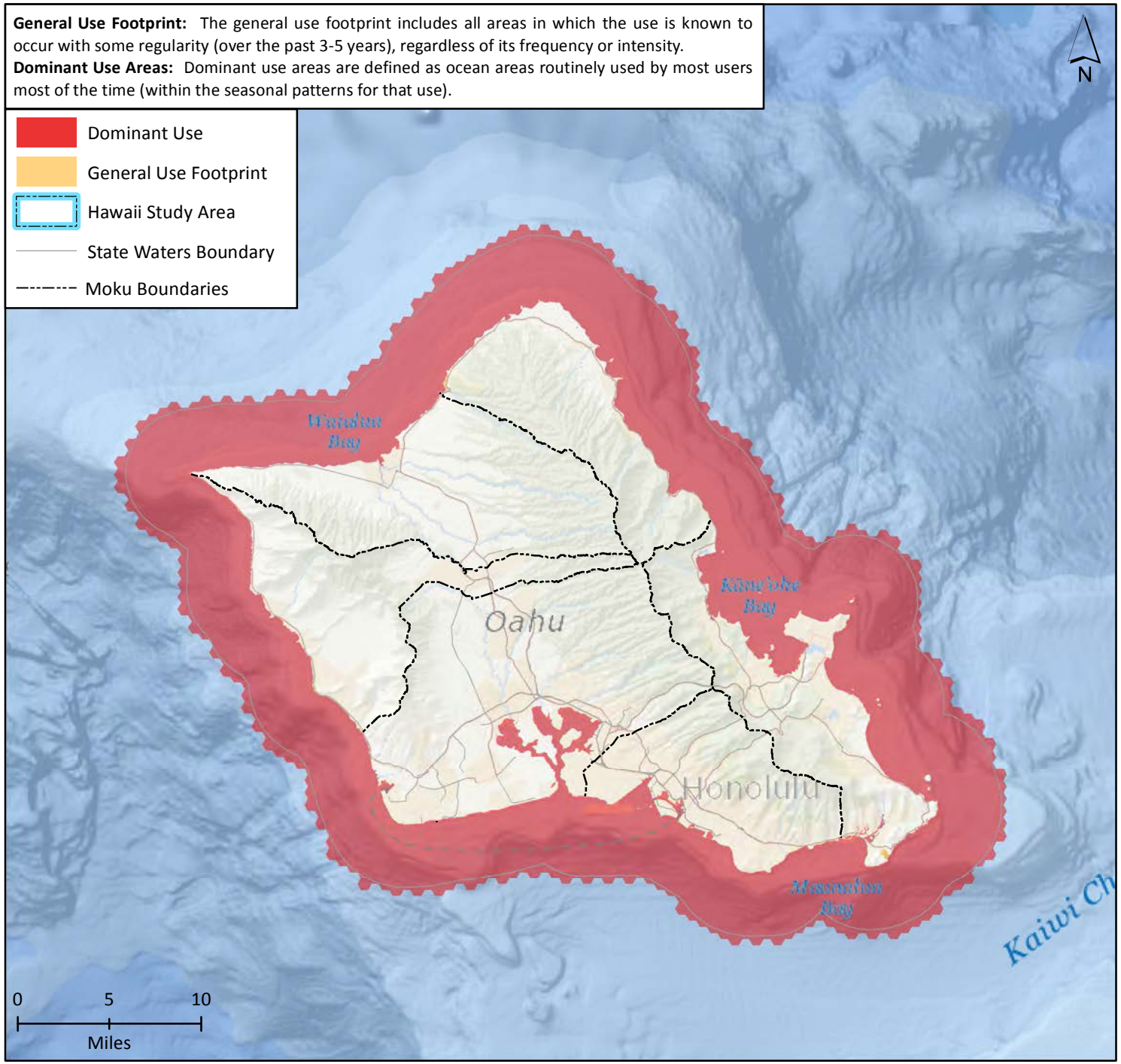


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

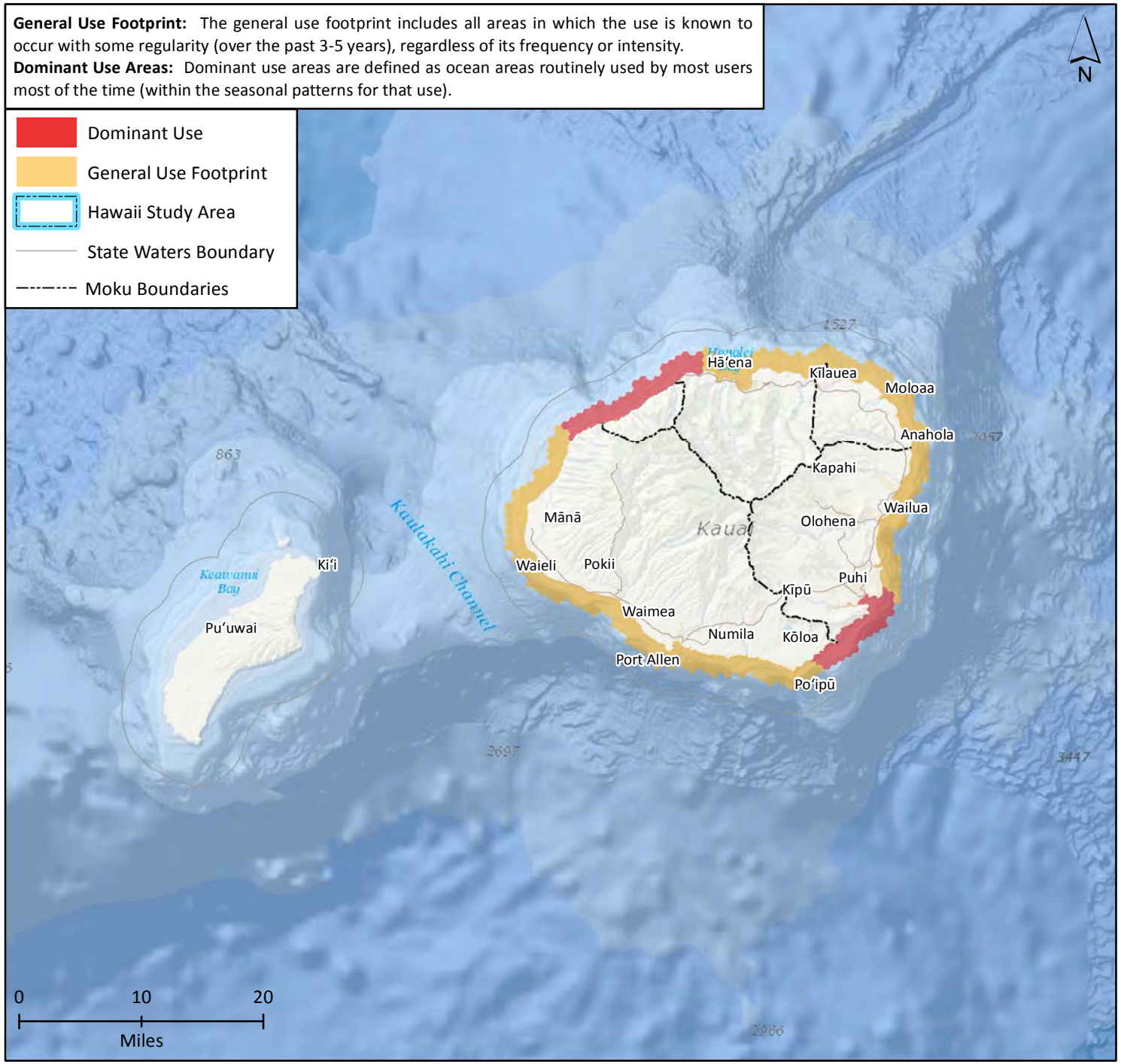
Non-Commercial Kayak Fishing

Includes:
Use of hook and line and other gear from kayaks, canoes or any other similar vessel to catch fishes and invertebrates for non-commercial purposes or traditional and customary practices

Excludes:
All other forms of fishing

Island Use Notes:
Kayak fishing occurs mainly in the protected bays and coves with safe shoreline access. Activity occurs mainly within one mile from shore and is highly driven by weather and ocean conditions.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships
Excludes:
Recreational Motorized Boating, Commercial Shipping

Statewide Use Notes:
Cruise ships are not common in Hawaii, but there are a few small inter-island cruises that operate among the main eight islands. Occasionally, larger cruise vessels from Alaska will land at Honolulu Harbor. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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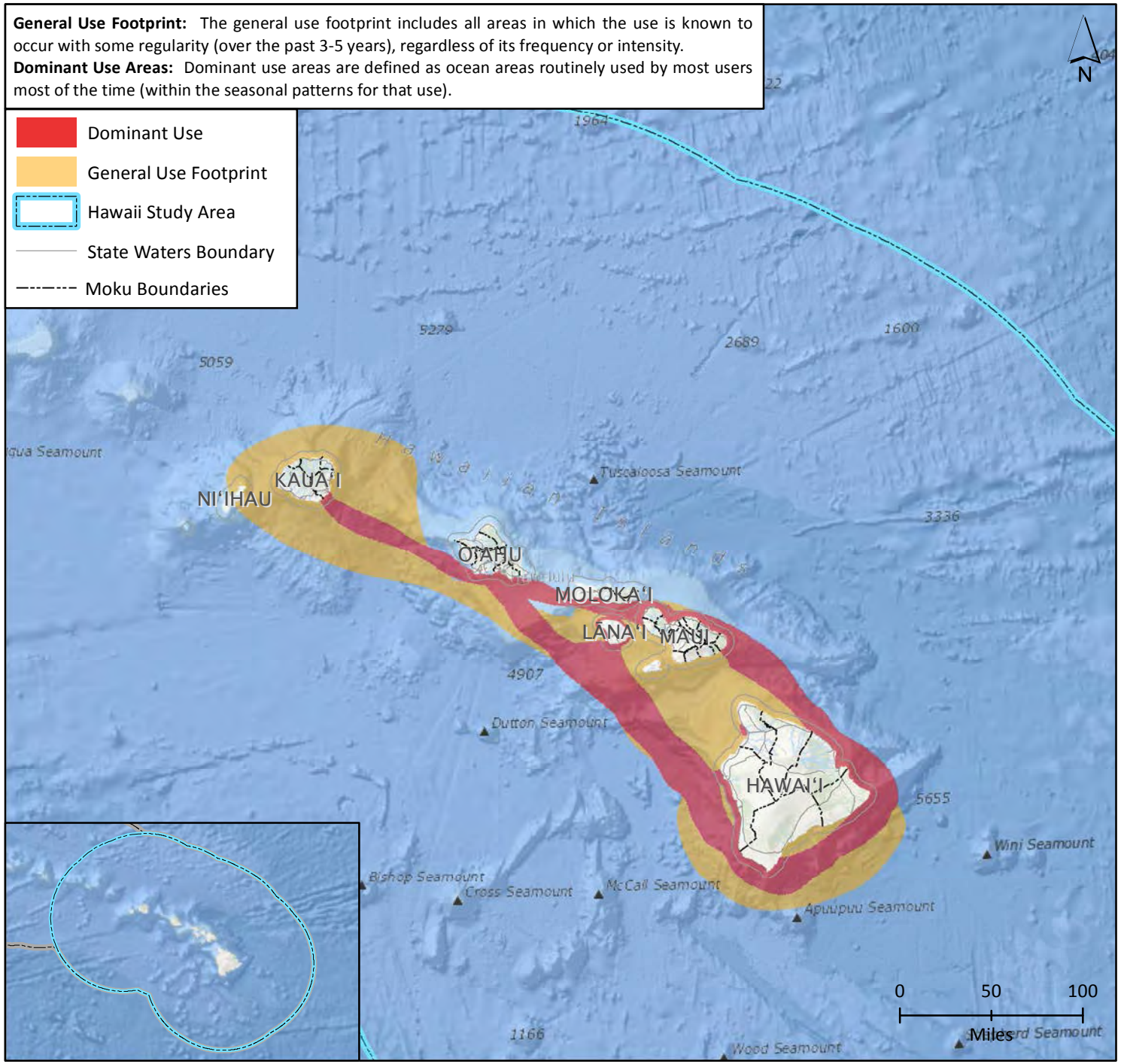


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

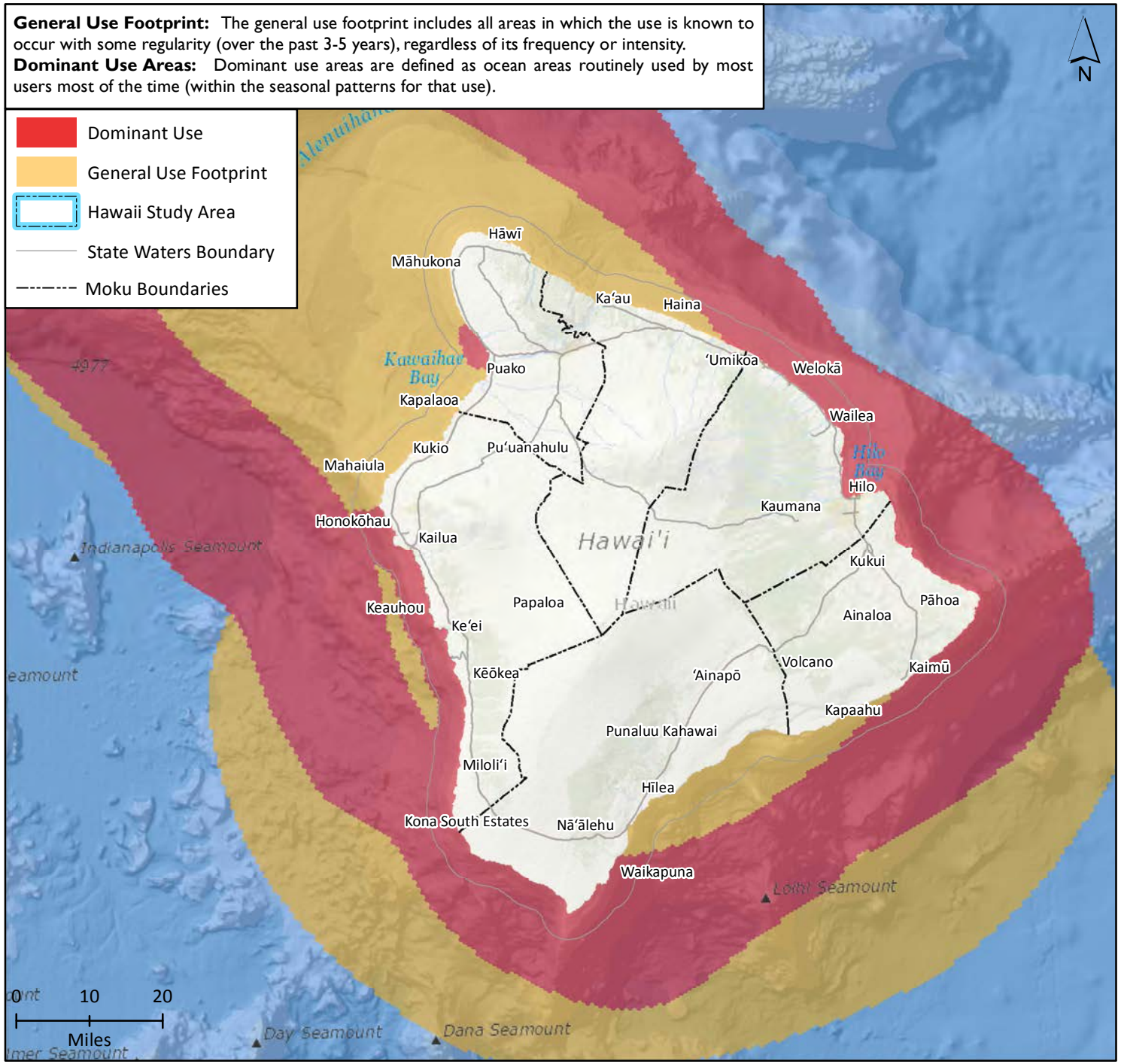
Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships

Excludes:
Recreational Motorized Boating, Commercial Shipping

Island Use Notes:
Cruise ships are seasonal and arrive in winter to Hawaii Island, Maui, Oahu and Lanai. These are mainly smaller cruise ships (18-36 people), but some operators will run larger scale inter-island cruises. There is a Kona-based cruise ship that runs along the west coast of the island. Landing ports include Kailua Bay, Kaunakakai (Molokai) and Honolulu (Oahu).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

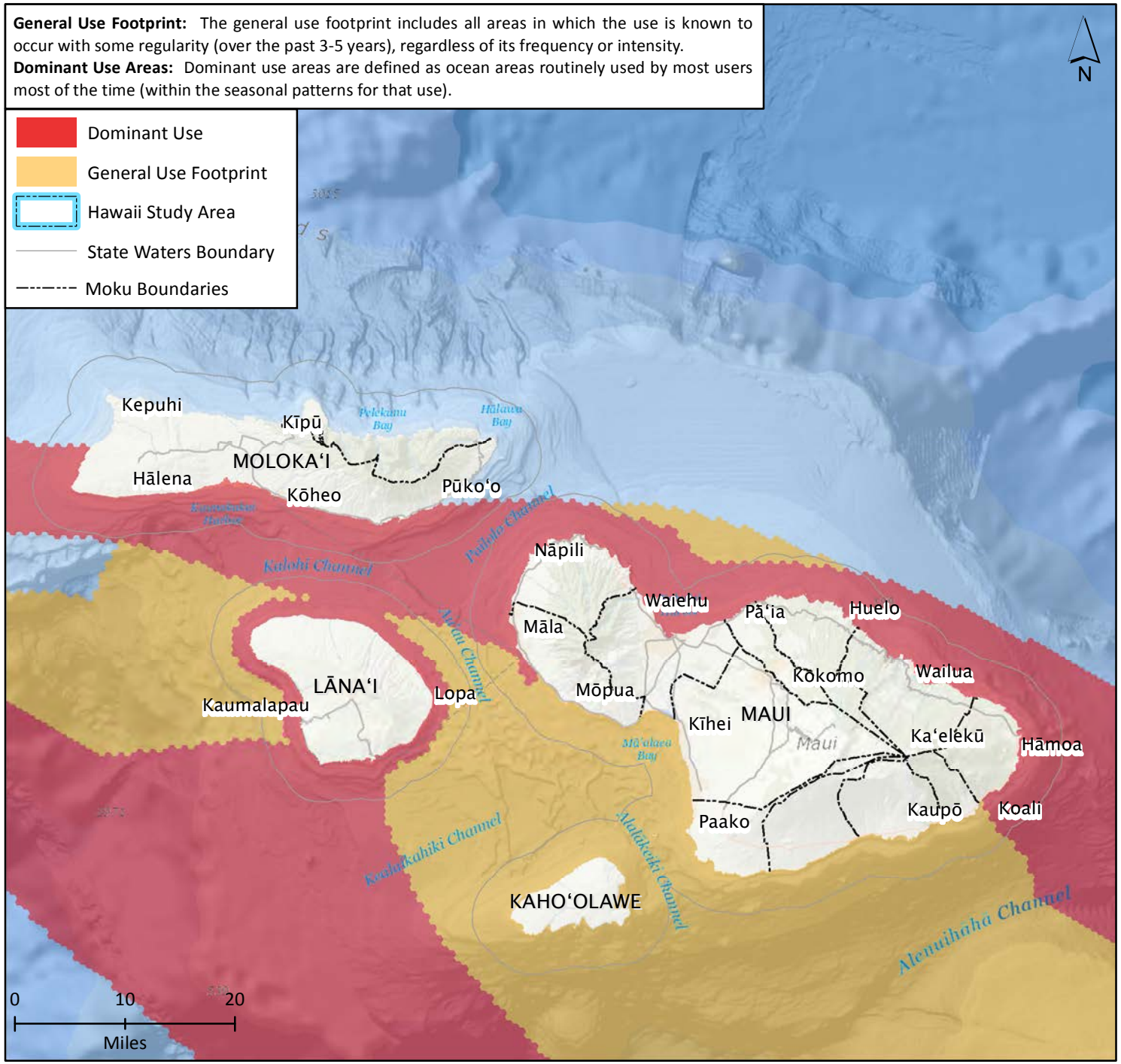
Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships

Excludes:
Recreational Motorized Boating, Commercial Shipping

Island Use Notes:
Maui:
Cruise ships are seasonal around Maui; dominant areas are the docks in Lahaina or Kahului. Seasonally there are Alaska cruise ships that arrive during winter. Typically these larger vessels will cruise the entire Hawaiian Islands.
Lanai:
Cruise ships rarely land in Lanai. The few that do, are small vessels (~15 cabins).
Molokai:
There is no cruise ship activity on Molokai.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

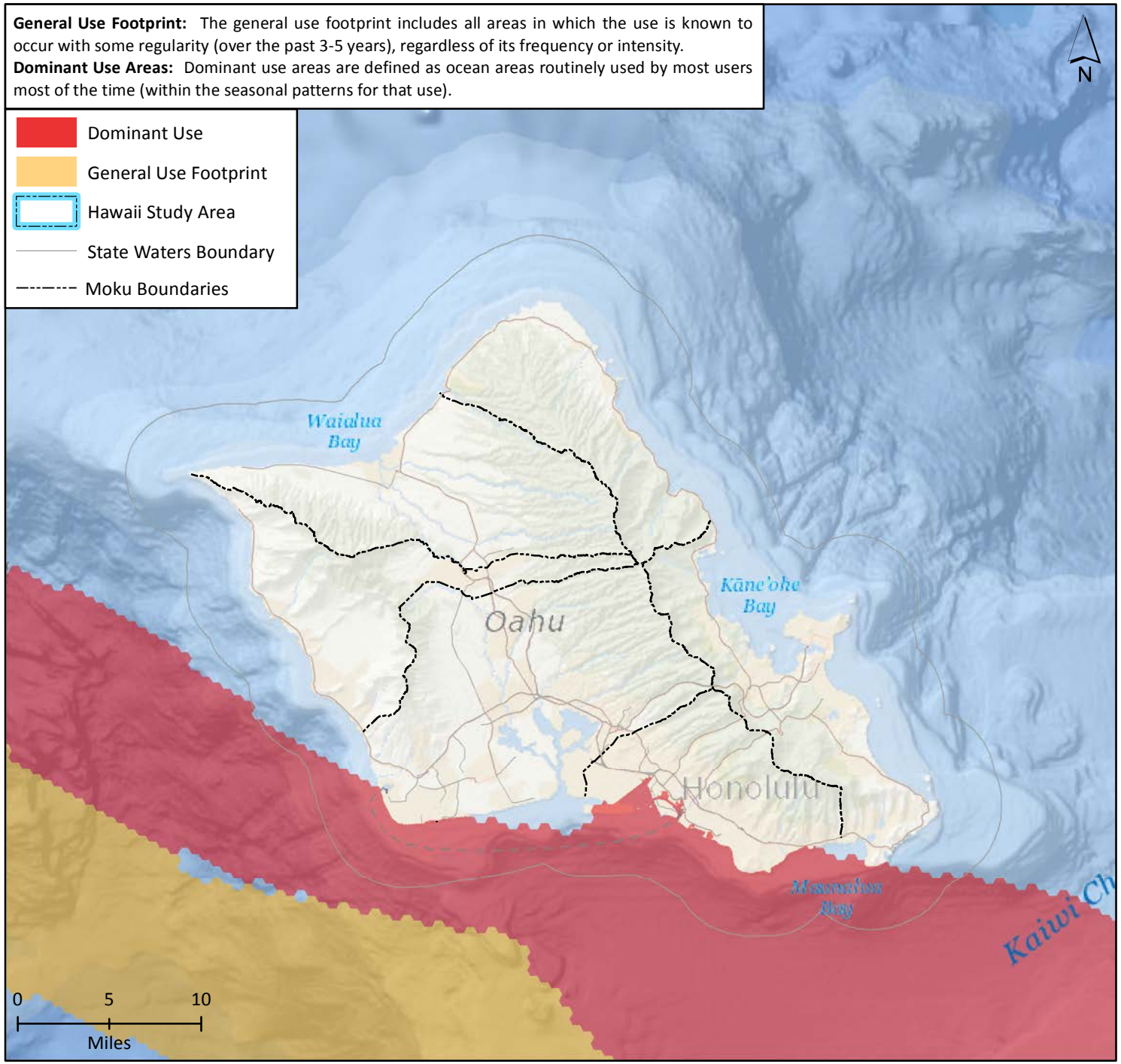
The Pacific Regional Ocean Uses Atlas

Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships
Excludes:
Recreational Motorized Boating, Commercial Shipping

Island Use Notes:
Cruise ship activity is mainly centralized around the Honolulu Harbor and peaks in winter months. There are also a number of small interisland cruises that run year round throughout the islands.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

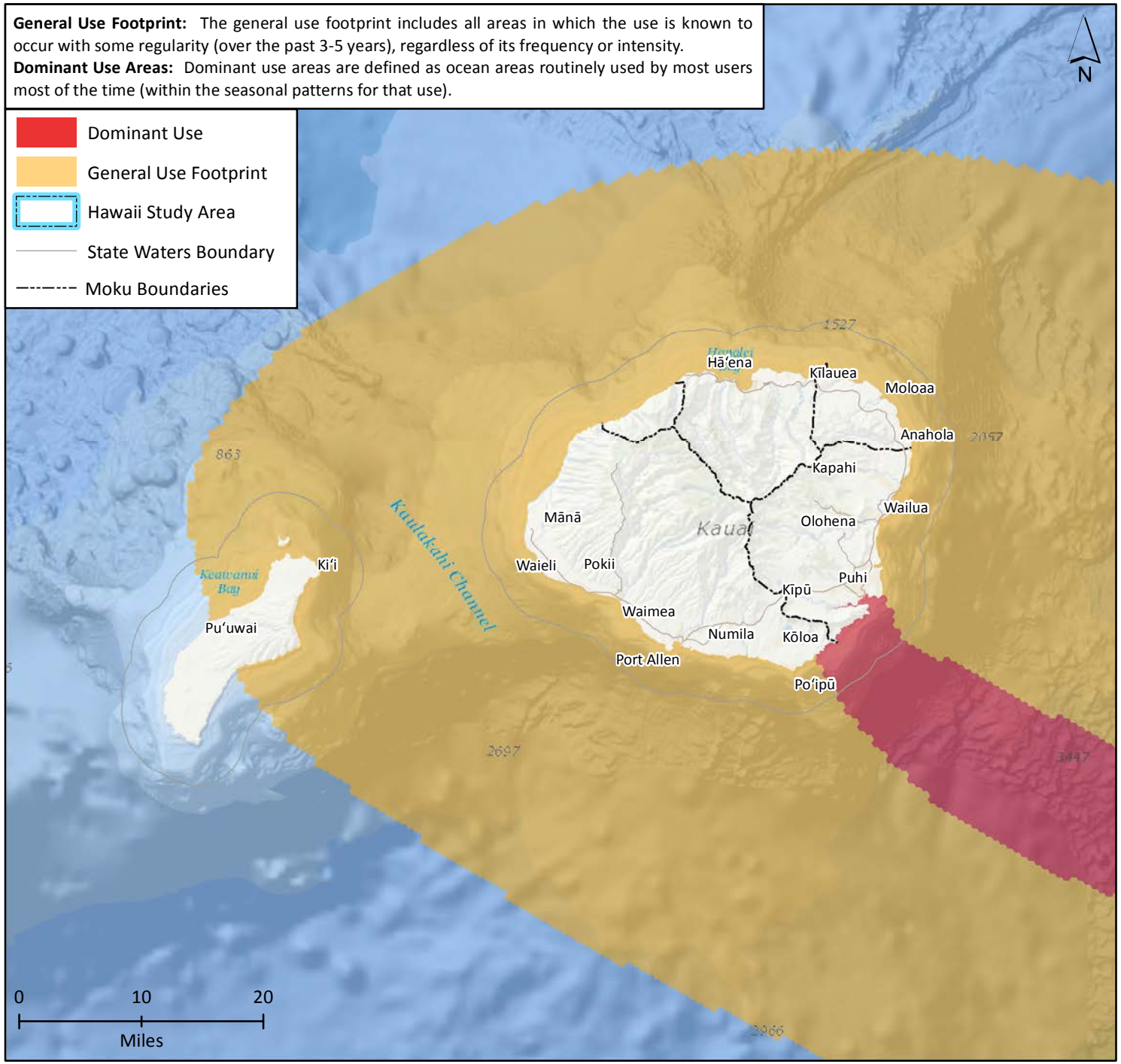
Cruise Ships

Includes:
Transit, mooring or anchoring for extended overnight recreational travel on commercial ships

Excludes:
Recreational Motorized Boating, Commercial Shipping

Island Use Notes:
Information on cruise ships was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils, ballast water and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

Statewide Use Notes:
Ocean dumping in Hawaii consists mainly of ballast water release from large vessels. Legislation restricts this activity within 3 nautical miles from shore. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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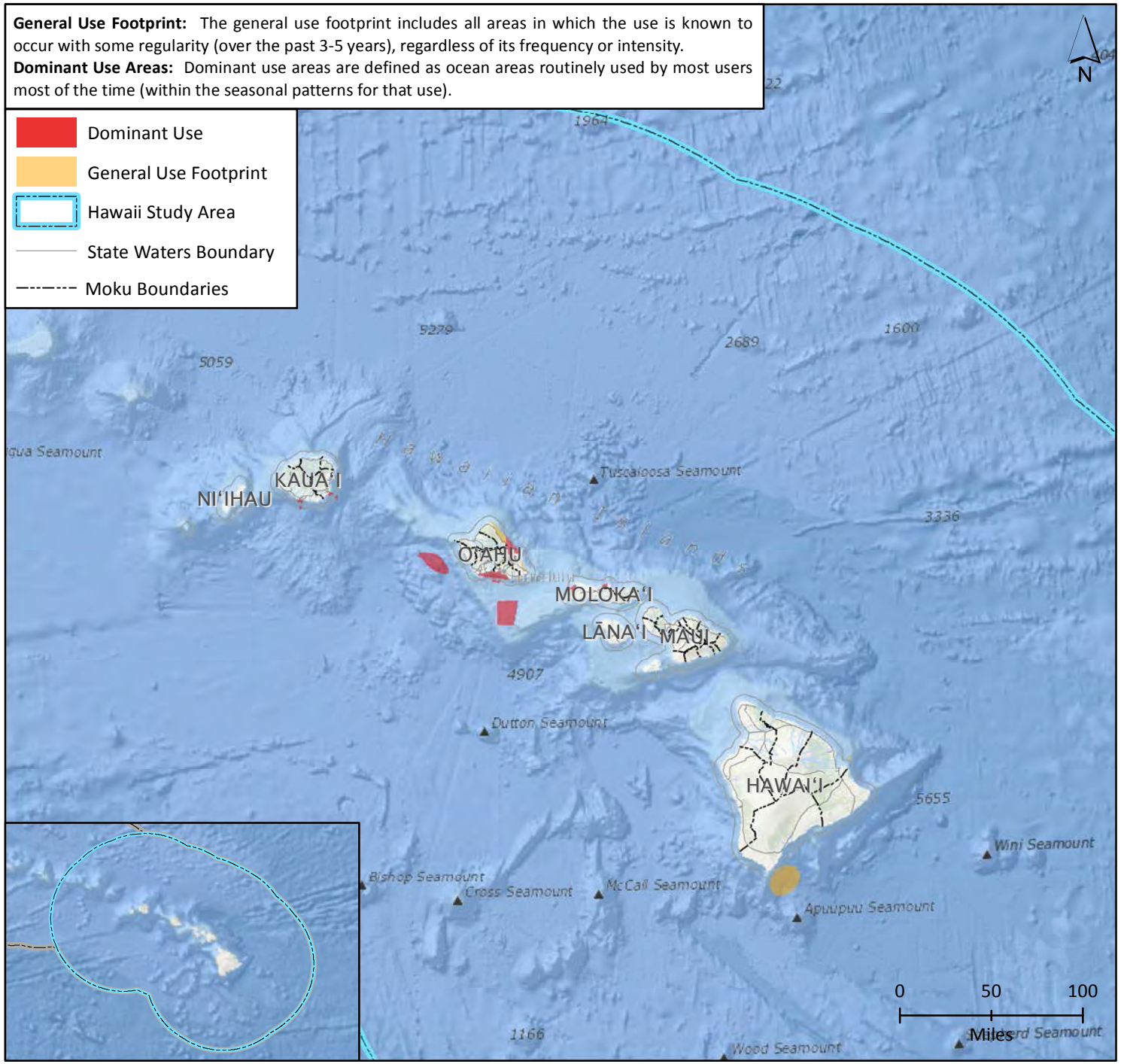


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

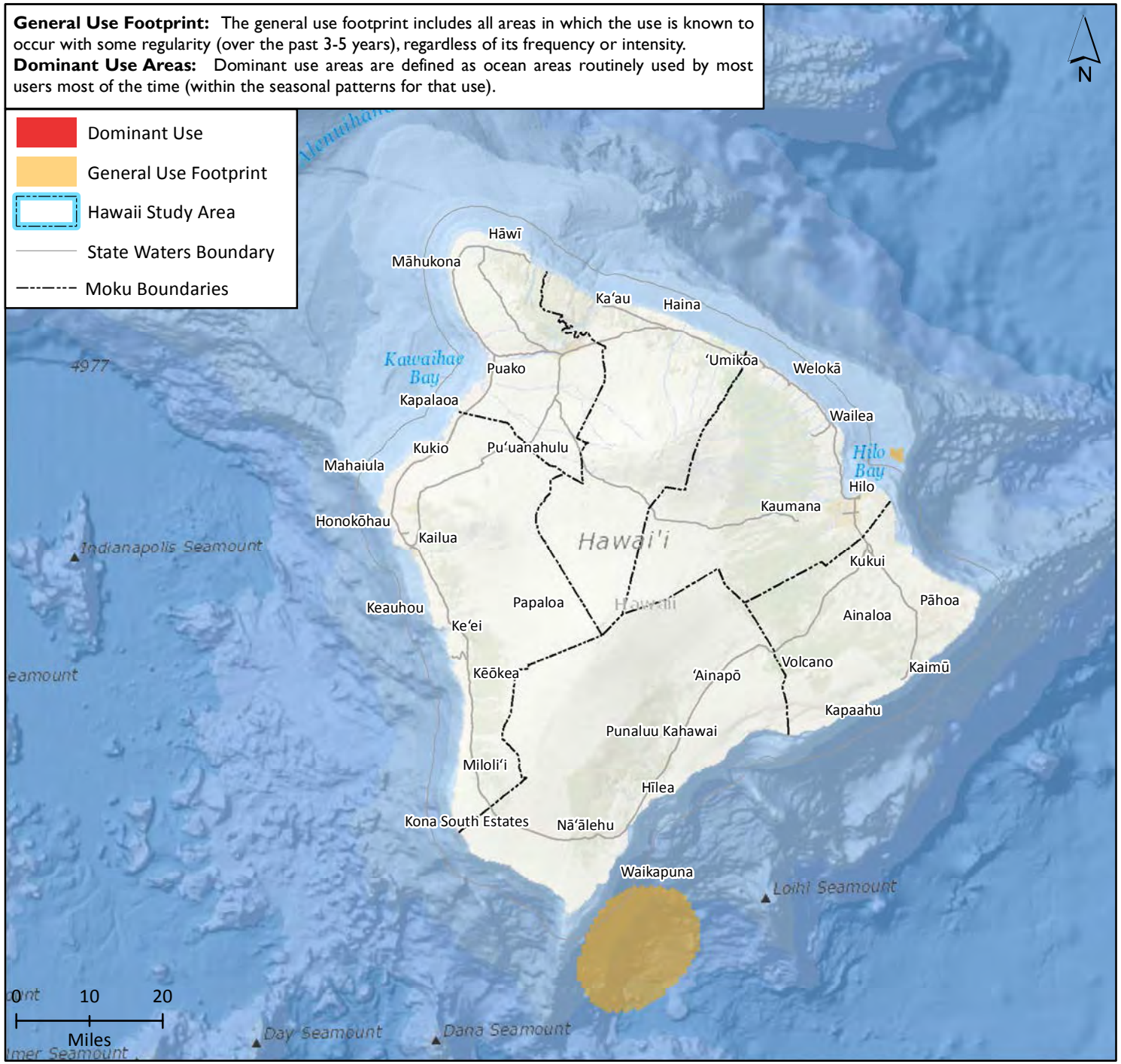
Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils, ballast water and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

Island Use Notes:
Workshop participants did not provide additional contextual information for this use.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils, ballast water and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

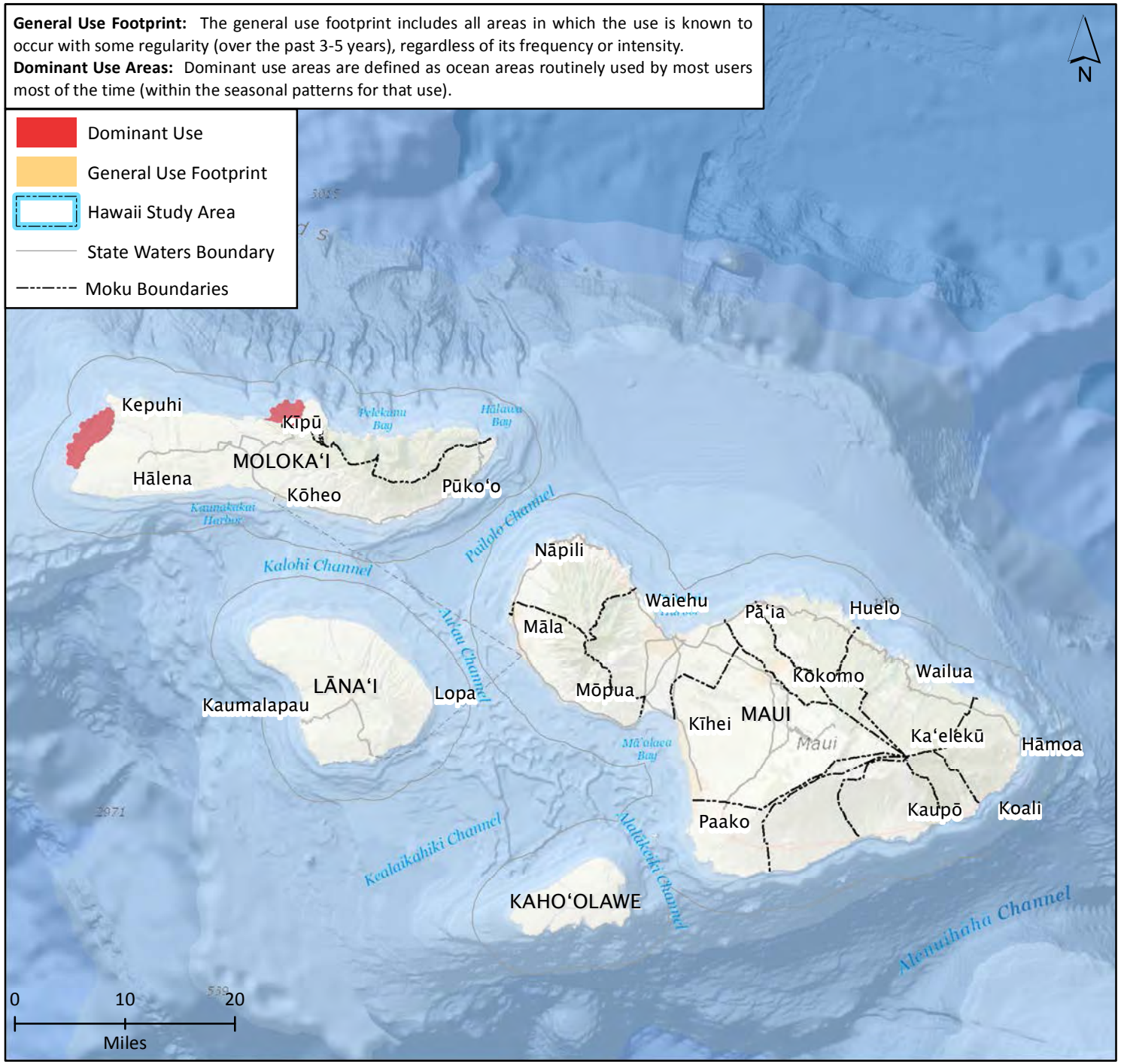
Island Use Notes:

Maui:
Ocean dumping is not a common use on Maui. There are federal regulations regarding waste dumping in the Humpback Whale National Marine Sanctuary.

Lanai:
Ocean dumping is not a common activity around Lanai, but commercial ships may dump ballast and waste water in the AuAu channel. There is growing community concern about non-point source pollution caused by run off from local golf course leading to overgrowth of algae and increased turbidity in nearshore waters.

Molokai:
There are no active ocean dumping zones surrounding Molokai. Although no longer in use, areas have historically been used by the military.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

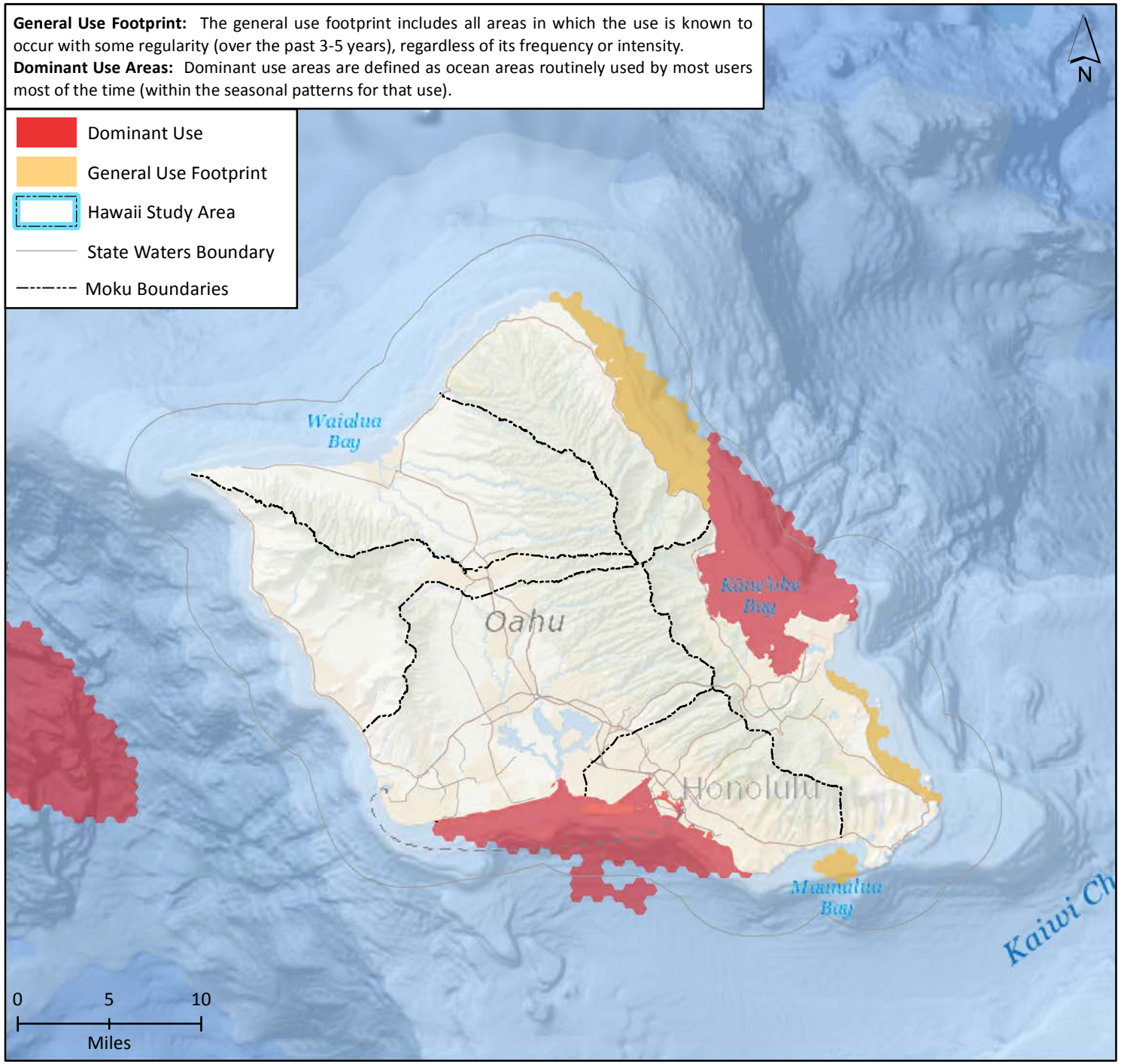
Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils, ballast water and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

Island Use Notes:
There are few ocean dumping sites around Oahu. A dredge spoil dump area exists offshore of Mamala Bay. Occasionally, the US Coast Guard will allow 'sinkboat' operations and the US Environmental Protection Agency (EPA) has a number of designated dredge disposal sites. On the leeward side, there are known areas where chemical munitions have been dumped (at depths of ~6000 fathoms), but these areas are not depicted on official maps.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

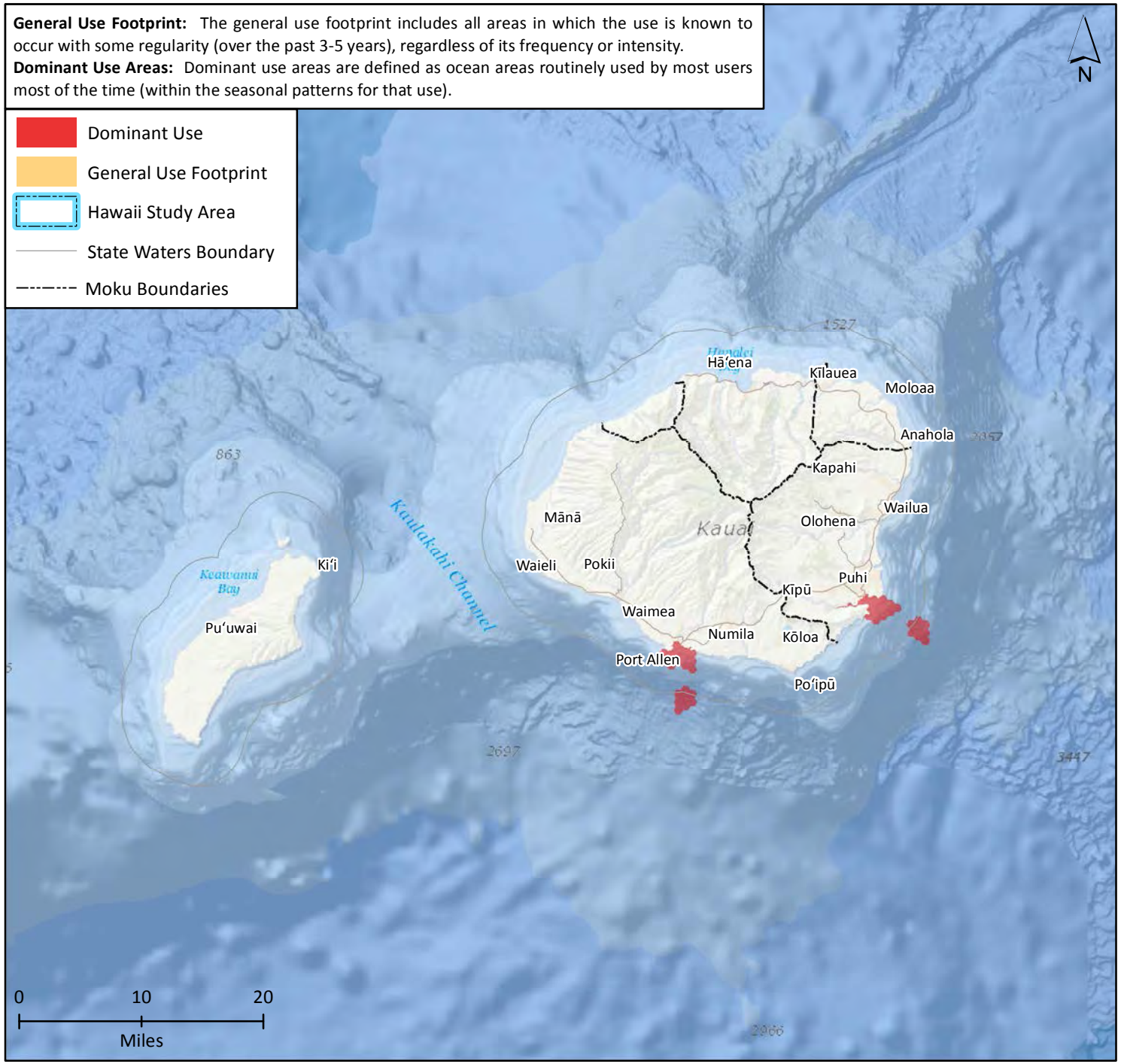
Ocean Dumping

Includes:
The deliberate legal dumping of dredged spoils, ballast water and other materials into ocean waters

Excludes:
Sewage Discharge, Mining and Mineral Extraction

Island Use Notes:
Ocean dumping around Kauai is limited to dumping of ballast water near the entry of Port Allen. But with limited port facilities for large vessels, this is not a common activity. Sewage dumping may also occur, but most local vessels dump outside of state waters.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

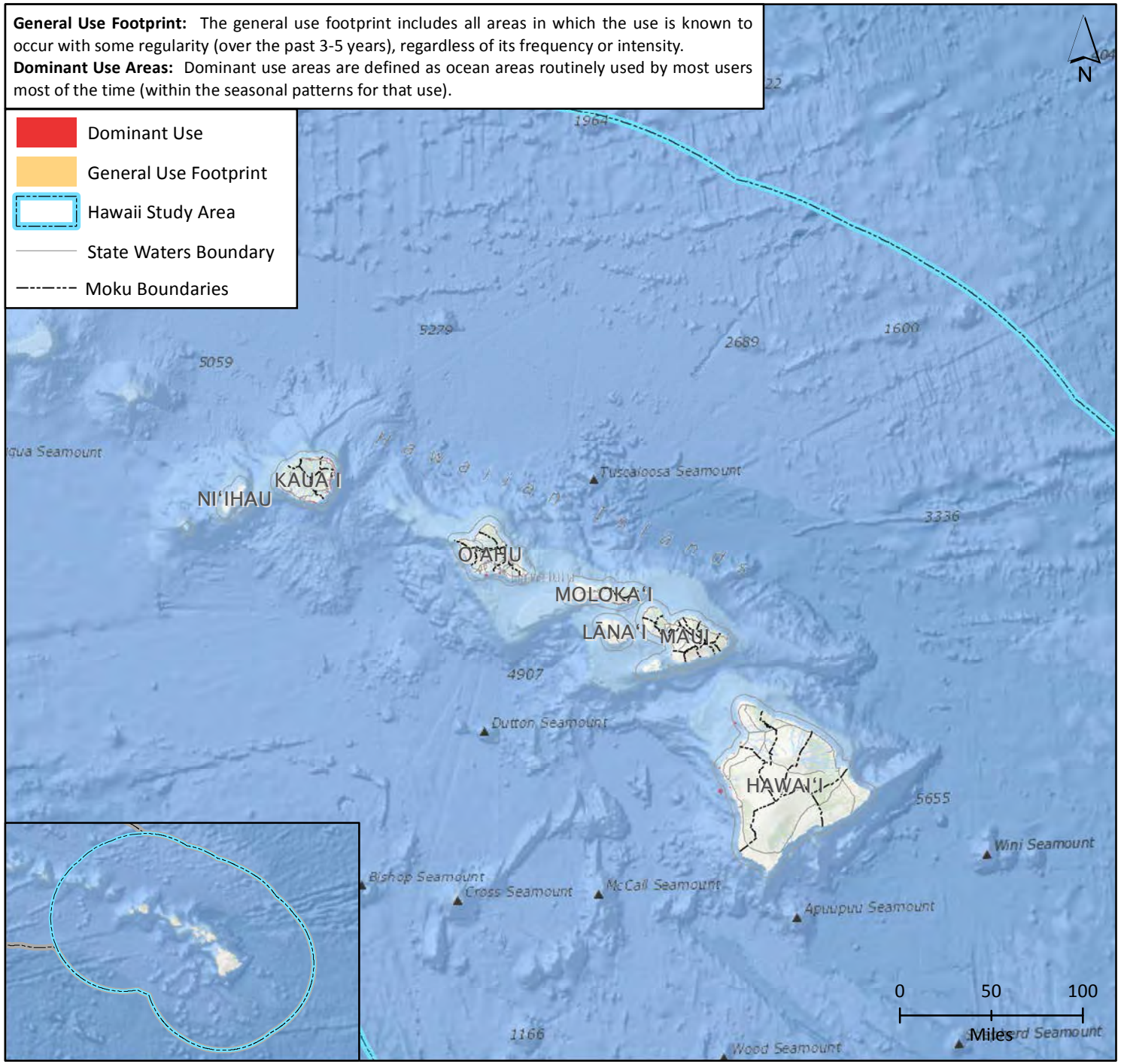
Mariculture & Fishponds

Includes:
Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) for commercial purposes or traditional and customary practices

Excludes:
Aquaculture wholly pursued on land

Statewide Use Notes:
Mariculture in the Hawaiian Islands is of commercial interest with existing offshore aquaculture test sites off Hawaii and Oahu. In general, mariculture faces community resistance due to fears of environmental degradation. Native Hawaiian fishponds exist throughout the islands, although few are actively used. Fishpond restoration is underway in select locations to preserve the local cultural heritage and educate youth on traditional fishing practices. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

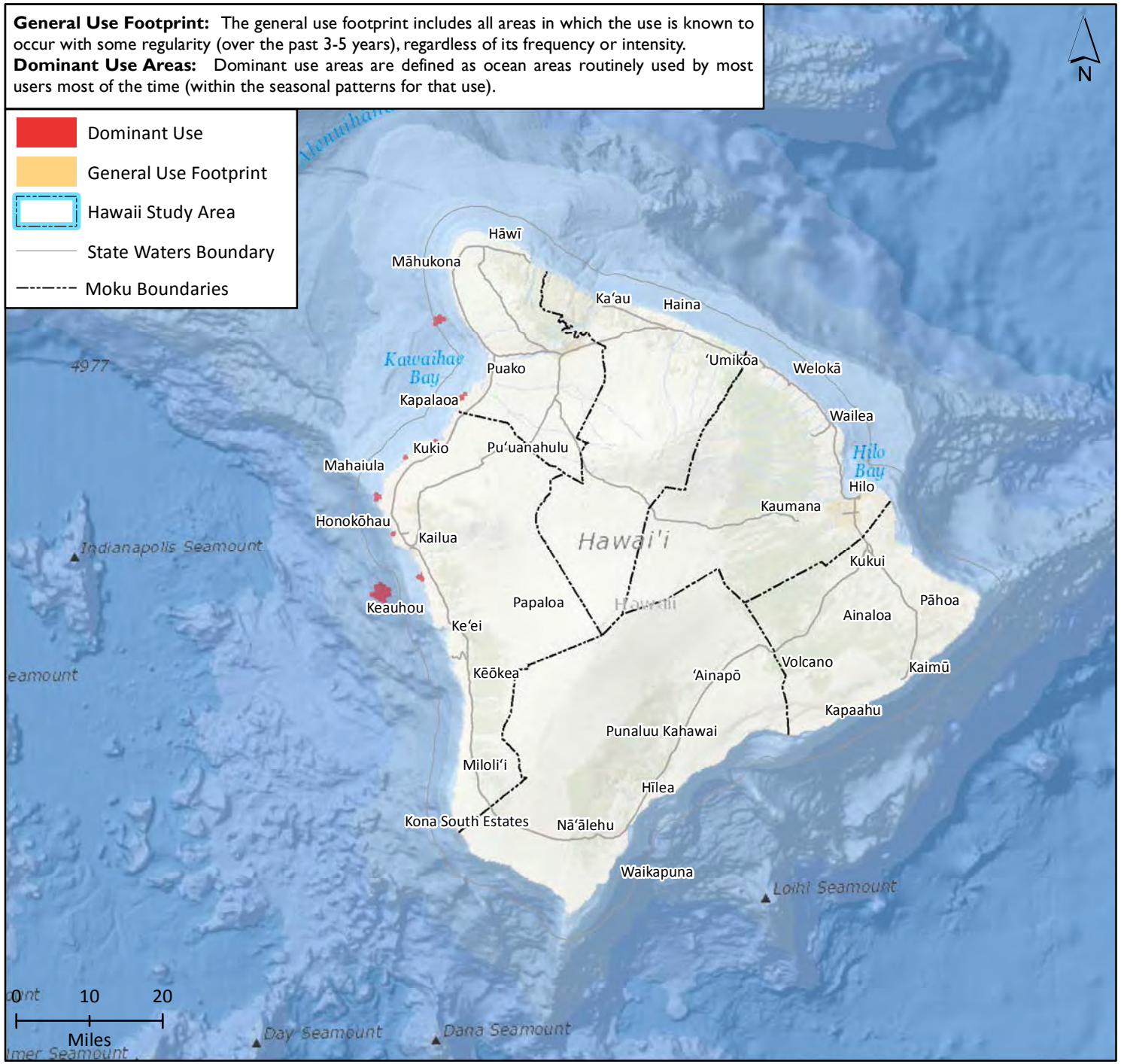
Mariculture & Fishponds

Includes:
Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) for commercial purposes or traditional and customary practices

Excludes:
Aquaculture wholly pursued on land

Island Use Notes:
There are a number of experimental mariculture systems (both anchored and free floating) around Hawaii Island. Some new technologies are being tested to farm tuna at an offshore site located ~6 miles off Keauhou Bay and at a coastal site near Kawaihae. Local communities between Keawaiki Bay and Kohala fear that future mariculture technologies will affect current ocean conditions, migration patterns and animal behavior, and impact terrestrial fishponds and coastal resources. Traditionally, terrestrial fishponds and anchialine pools were used as holding pens for fish and turtles. Examples of these can be found around Kiholo Bay, Anaeho'omalu and Kukio Bay, Kahalou Bay and Kapoho.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Mariculture & Fishponds

Includes:
Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) for commercial purposes or traditional and customary practices

Excludes:
Aquaculture wholly pursued on land

Island Use Notes:

Maui:
Mariculture is not a common use on Maui. Locations of native Hawaiian fishponds throughout the state have been mapped by Hui Malama Loko Ia. Hawaiian Oceanic Technology (HOT) has a permit near Kawaihae to farm ahi tuna.

Lanai:
Mariculture operations have been proposed for an area off of Kaumalapau. Fishpond restoration efforts have been proposed and funded, but are not yet operational.

Molokai:
Traditional fish ponds are predominantly situated along the southern shore of Molokai. Although not commercially harvested, these ponds are ecologically active because they were built to work in harmony with the ecosystem. Fishponds are vital to the subsistence harvest community as evidenced in the Governors Molokai Subsistence Task Force Final Report (pg. 20).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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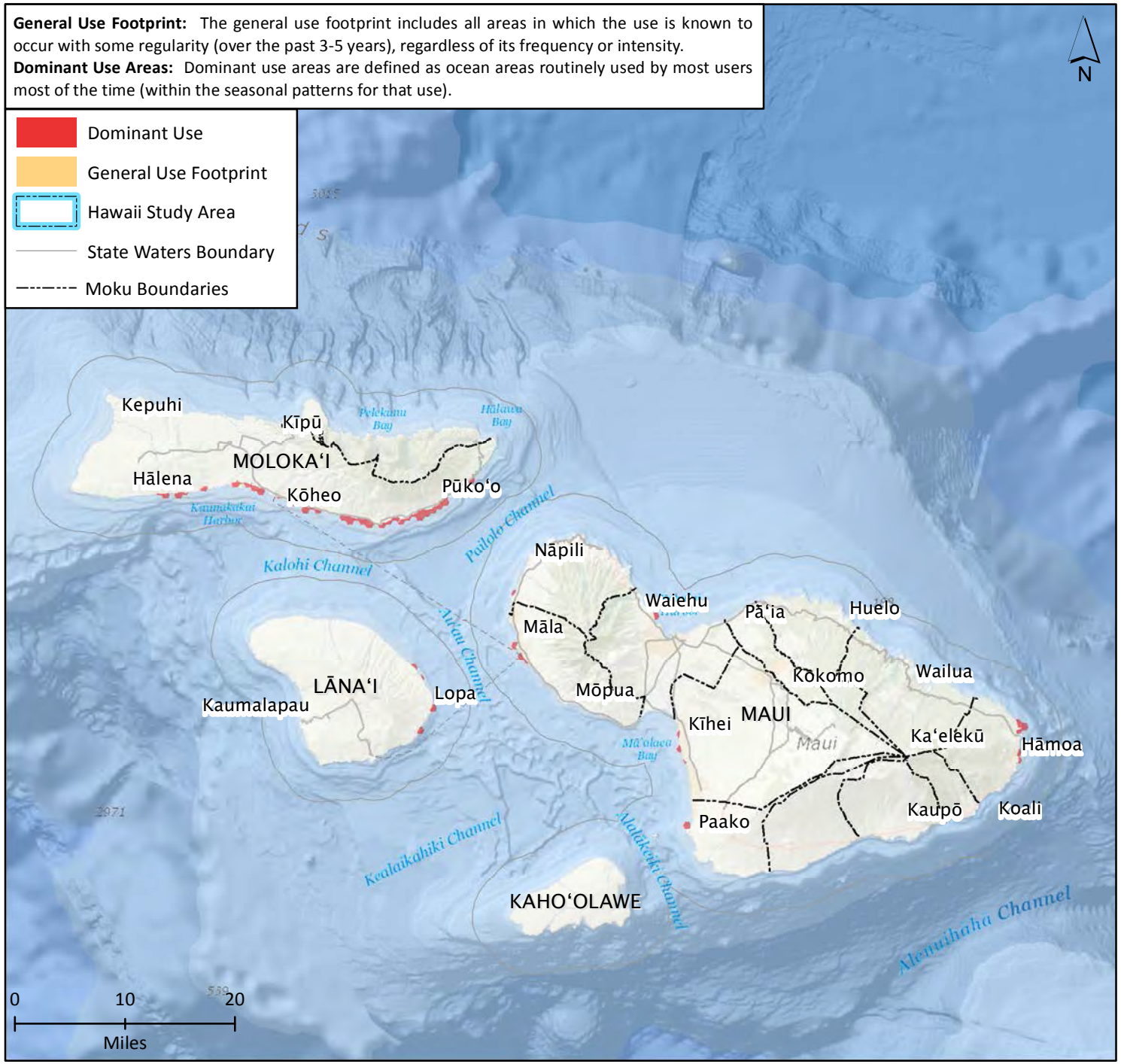


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

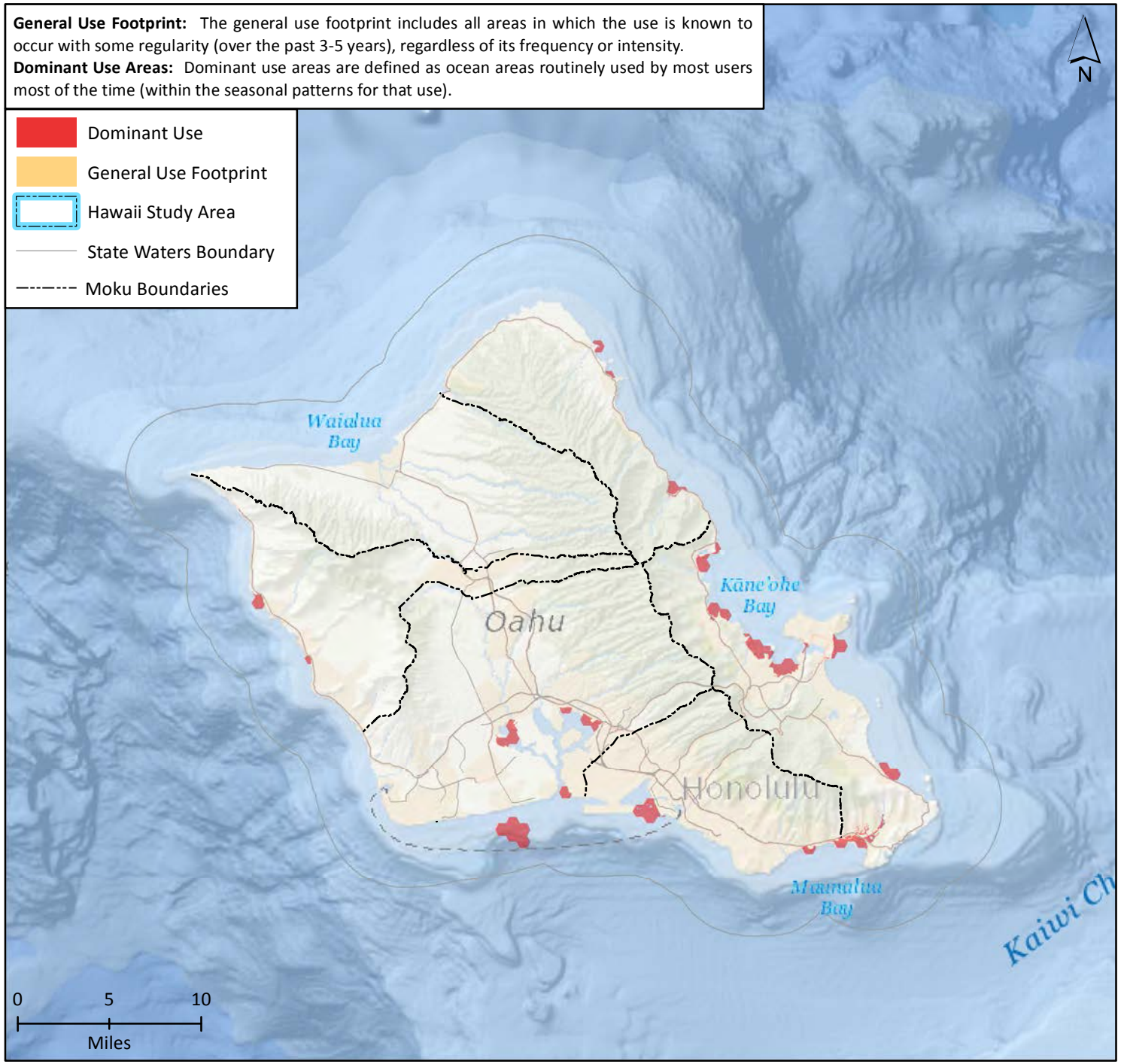
Mariculture & Fishponds

Includes:
Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) for commercial purposes or traditional and customary practices

Excludes:
Aquaculture wholly pursued on land

Island Use Notes:
Commercial mariculture is fairly limited, but a few test sites can be found on the south shore of Oahu. There is community concern relating to abandoned equipment and sea anchors after the testing periods are complete. A number of traditional Hawaiian fishponds are present around the island in varying states of restoration. The fishponds in Heia and around Kaneohe are under active restoration and restoration by the Navy is also occurring in the Mahia'au fishpond, adjacent to Maku Point and Kalau'ao fishponds. Although these efforts mainly have community support, there are concerns about the Kalau'ao project diverting the Kalau'ao river water away from residential properties to maintain the fishponds.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

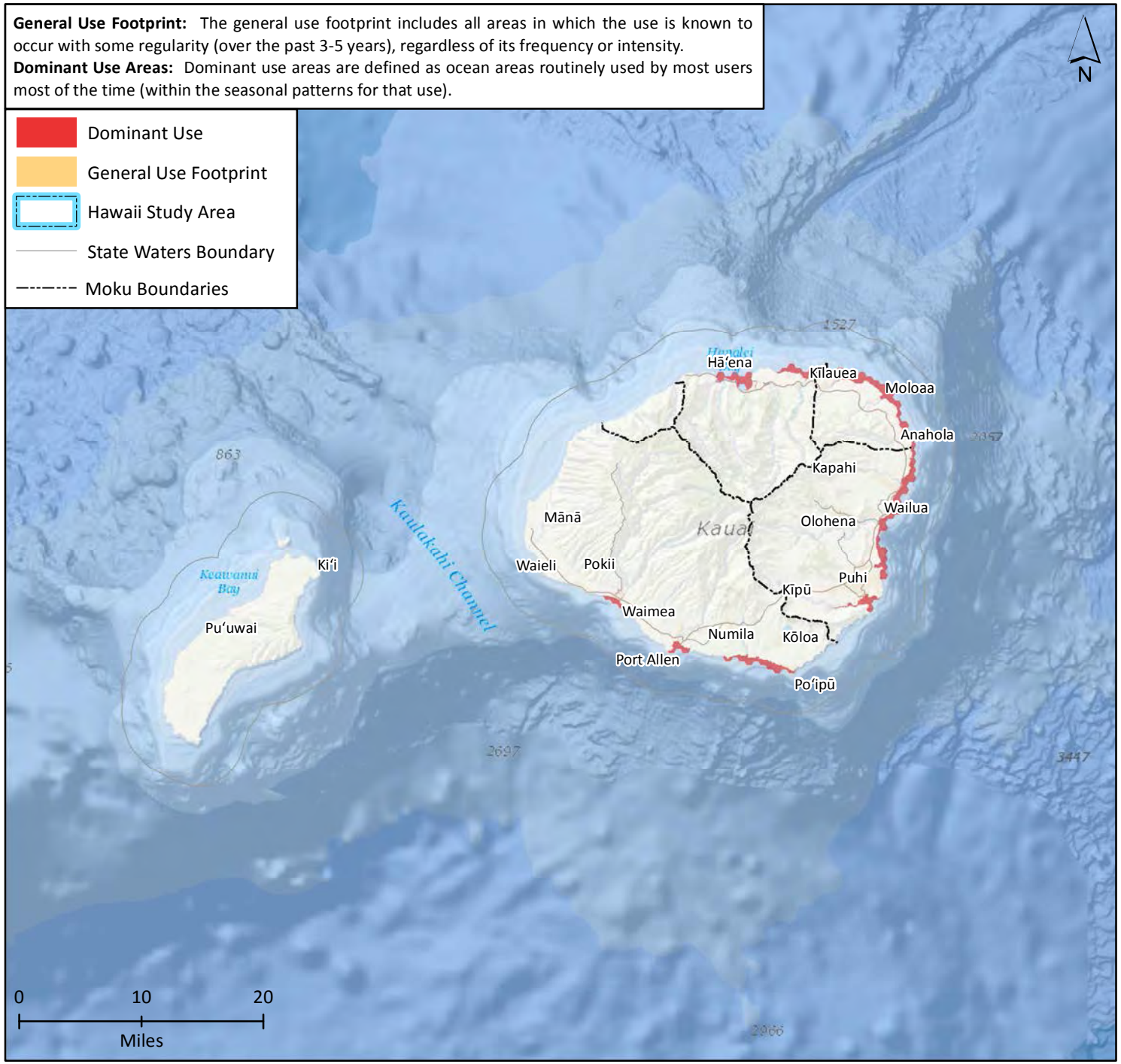
Mariculture & Fishponds

Includes:
Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) for commercial purposes or traditional and customary practices

Excludes:
Aquaculture wholly pursued on land

Island Use Notes:
The Kauai community is not interested in developing commercial mariculture or aquaculture. There are traditional Hawaiian fishponds on the island, however most are non-operational. Those that have been restored are challenging to operate effectively due to external fouling caused by degraded habitat upstream and local theft of fish.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, and fleet readiness training activities

Excludes:
Wartime military operations

Statewide Use Notes:
Military operations occur throughout the Hawaiian Islands. The US Coast Guard is involved in regular military operations and provides rescue services all throughout Hawaiian waters year round. The biennial Rim of the Pacific Exercise (RIMPAC) (the world's largest international maritime warfare exercise) brings military ships from around the world to Hawaii; foreign Naval forces routinely train in Hawaii. On Oahu, there are regular military exercises primarily at Pearl Harbor and Kaneohe Bay and public access is limited throughout the year. Across the other islands,military use is less visible to the communities onshore,but there are areas designated for operations in the federal register and Hawaii Range Complex Final EIS/OEIS, and noted on nautical charts. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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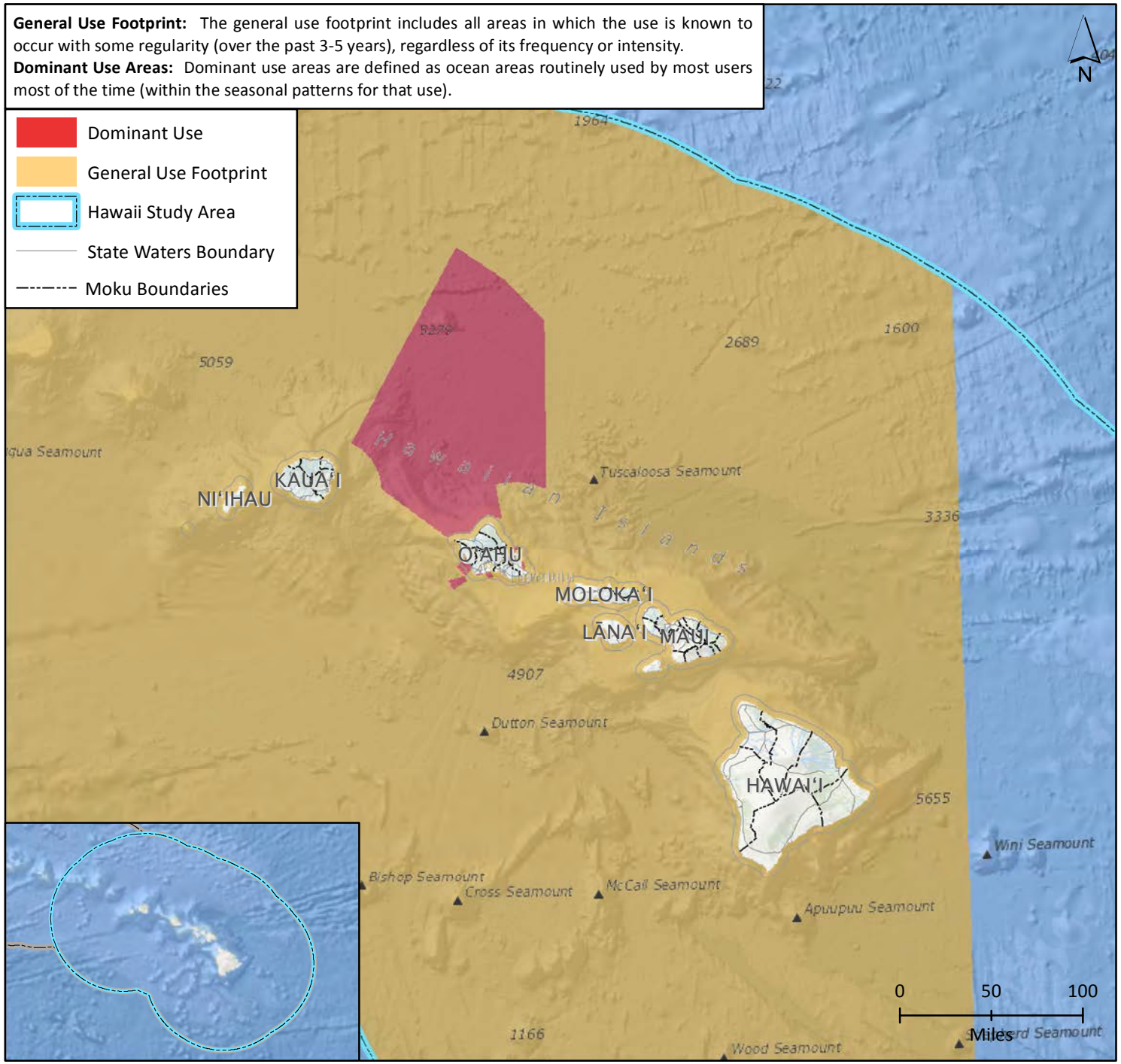

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, and fleet readiness training activities

Excludes:
Wartime military operations

Island Use Notes:
There are a number of documented military installation and training areas on and around Hawaii Island used for exercises, training and specifically for helicopters and other aviation transiting to Pohakuloa Training area and C-17 transporters practicing touch-and-go. The biennial RIMPAC Exercise is a particularly visible military activity to other ocean users.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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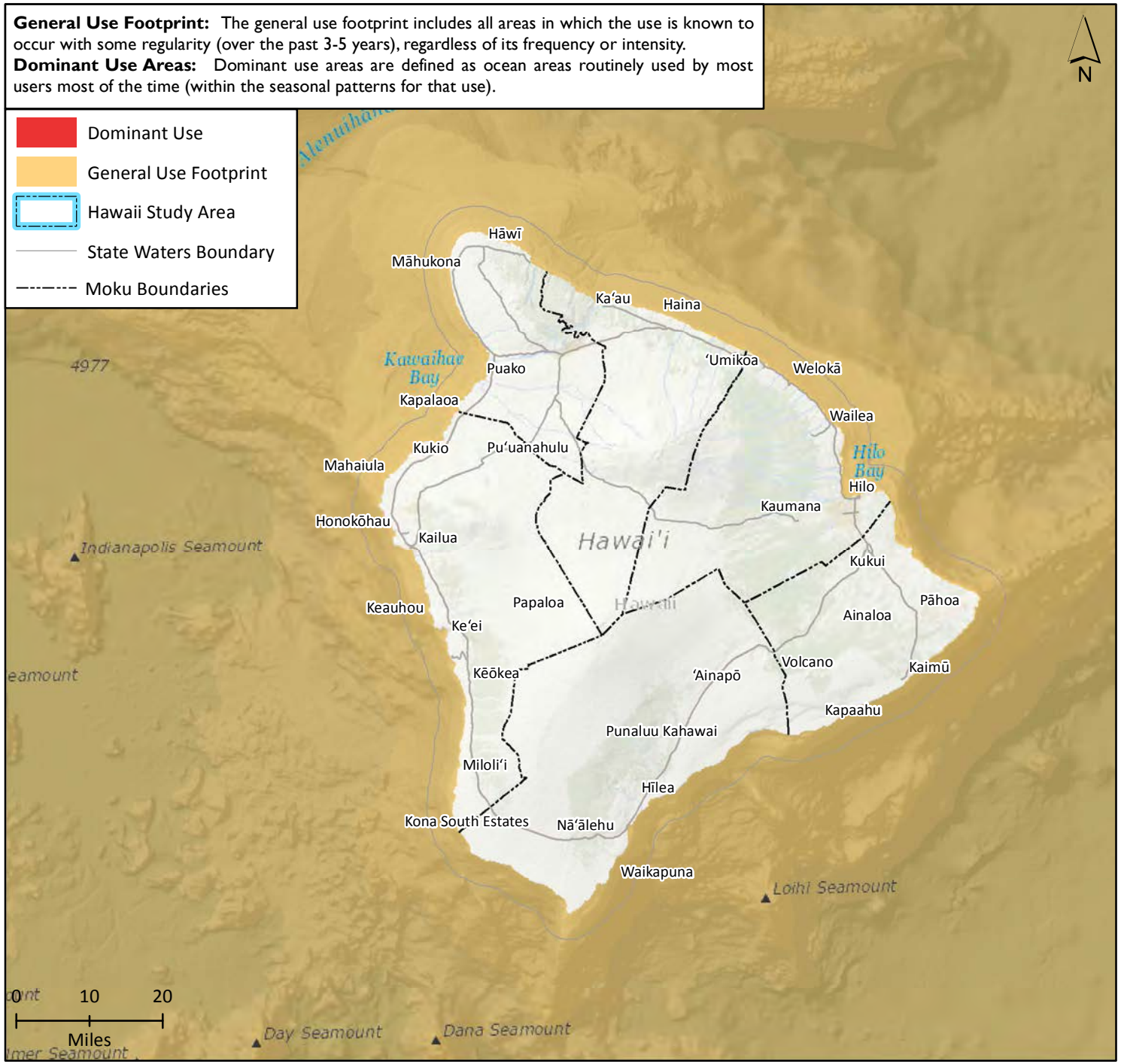

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, and fleet readiness training activities

Excludes:
Wartime military operations

Island Use Notes:

Maui:
Maui is a transit area for the military, there are no permanent military bases on the island but there are National Guard facilities. The area around Kahoolawe was used for target practice and training until 1990 and unexploded ordnance has been found in surrounding waters.

Lanai:
Military operations are limited in and around Lanai, with no official military areas on the island. Submarines are observed operating in the waters surrounding Hawaii. There are also two wrecks, call symbols YOG-18 and YOG-141 in the surrounding waters of Lanai.

Molokai:
Military use areas surrounding Molokai include the Kalohi channel and Turtle Island, areas used historically as training areas although they are no longer used for that purpose. The Marine Corps maintains 11 acres adjacent to the Molokai Airport (topside). Kalaupapa Airport is routinely used for helicopter training.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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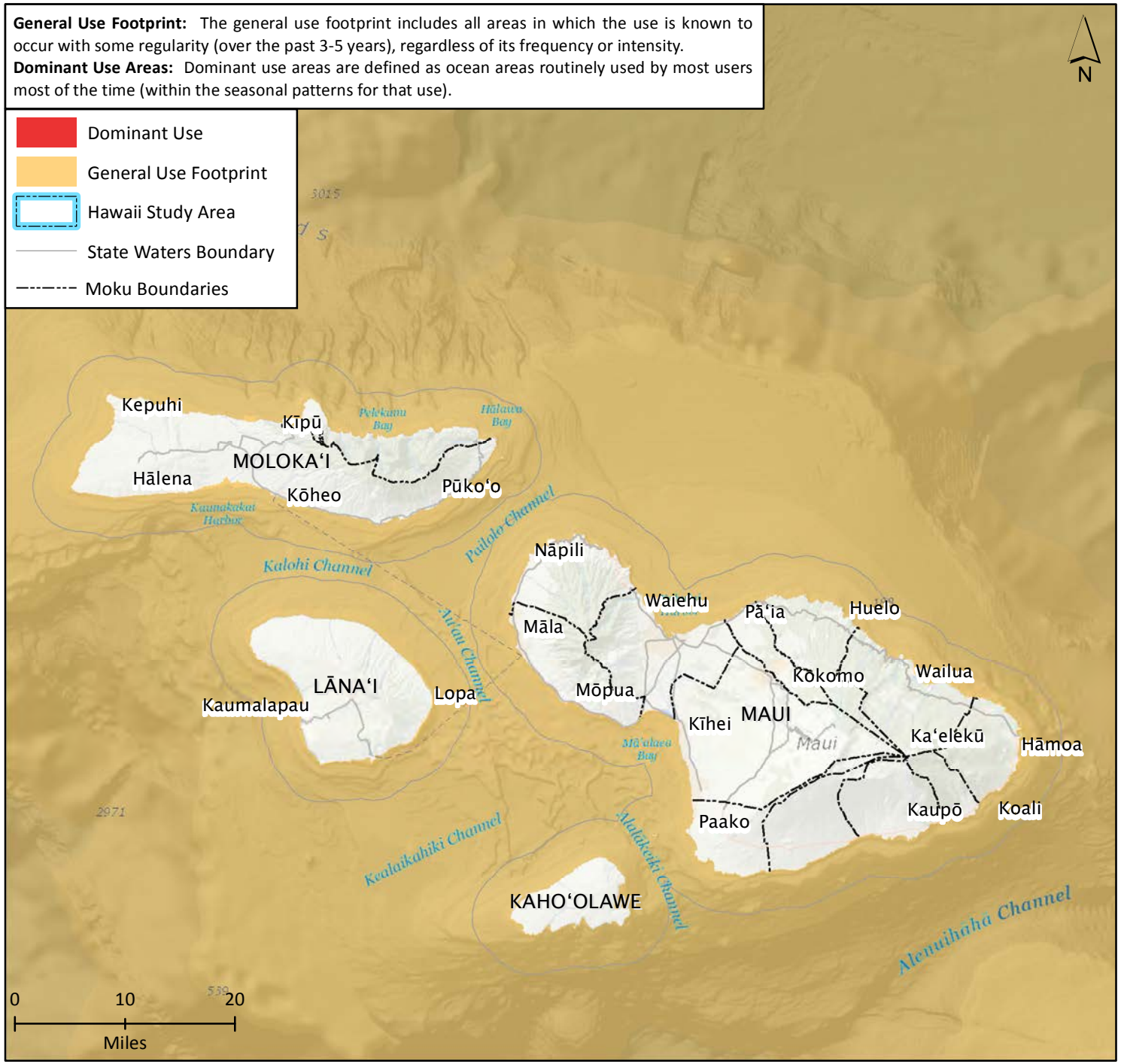

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, and fleet readiness training activities

Excludes:
Wartime military operations

Island Use Notes:
The Navy trains regularly off south and east Pearl Harbor and all waters surrounding Oahu. Within Kaneohe Bay, there is a naval defensive sea area that serves as a buffer to Marine Corps Base Hawaii on the Mokapu Peninsula. Amphibious landing trainings take place on the peninsula and on Marine Corps Training Area Bellows (MCTAB) in Waimanalo. Marine aviation assets routinely transit from Mokapu Peninsula along the east coast of Oahu to the Whiskey 189 (W189) warning area on the northeast corner of Oahu and the Pacific Missile Range Facility as well as south to MCTAB, Molokai and Hawaii Island. MCTAB is opened to the public on most weekends and holidays.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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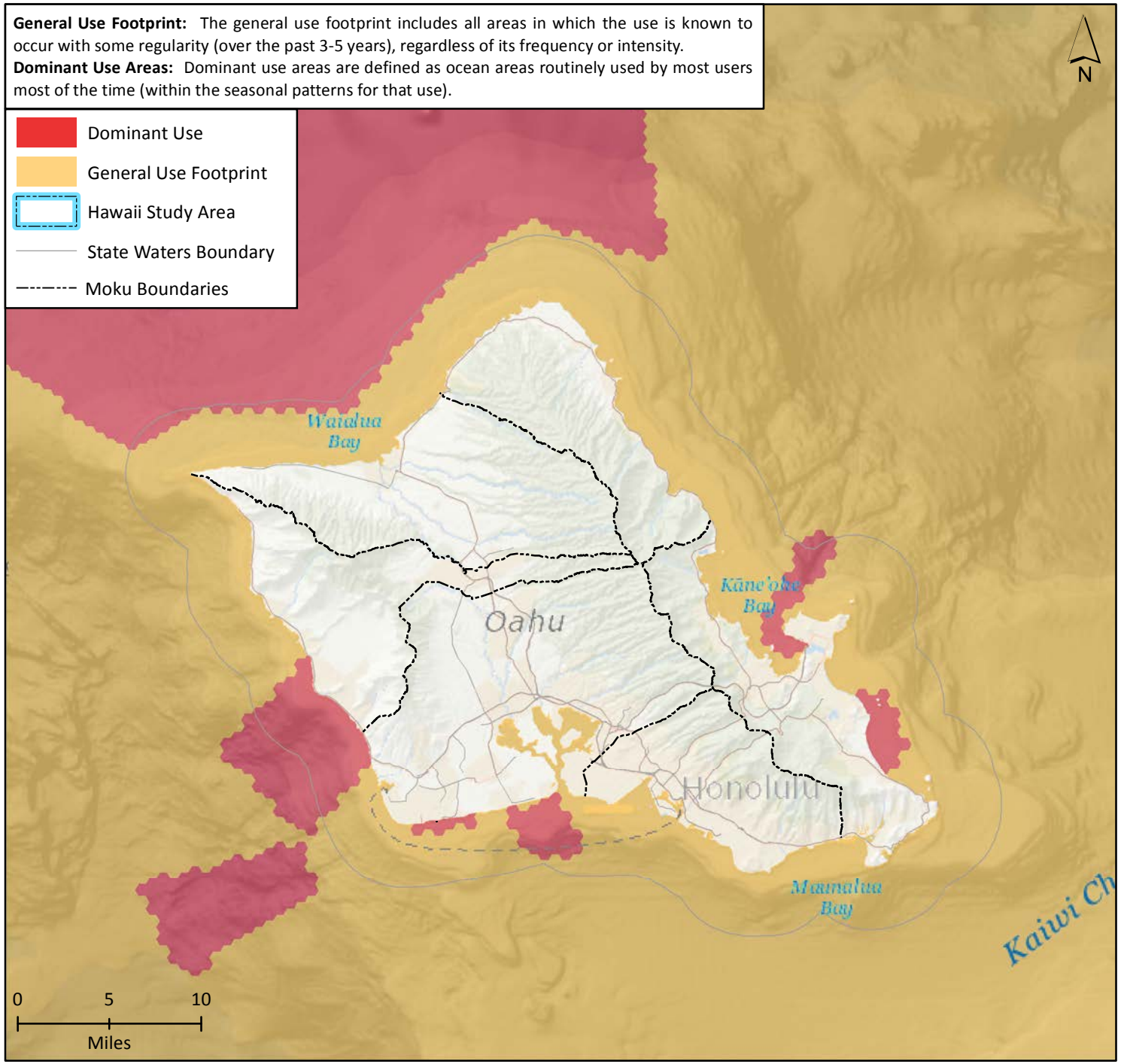

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Military Operations

Includes:
Transit of military vessels related to training activities, ship and submarine maneuvers, and fleet readiness training activities

Excludes:
Wartime military operations

Island Use Notes
There are a number of documented military areas around Kauai, these are displayed in the federal register and nautical charts. These areas are used by the Navy for training and exercises, including torpedo recoveries. One such area is in the channel between Kauai and Niihau. While operational safety zones are broadcast publicly, the nature of the activities conducted within the zones is often unknown to other ocean users.There is also an acoustic listening array off of Niihau below 200 fathoms depth.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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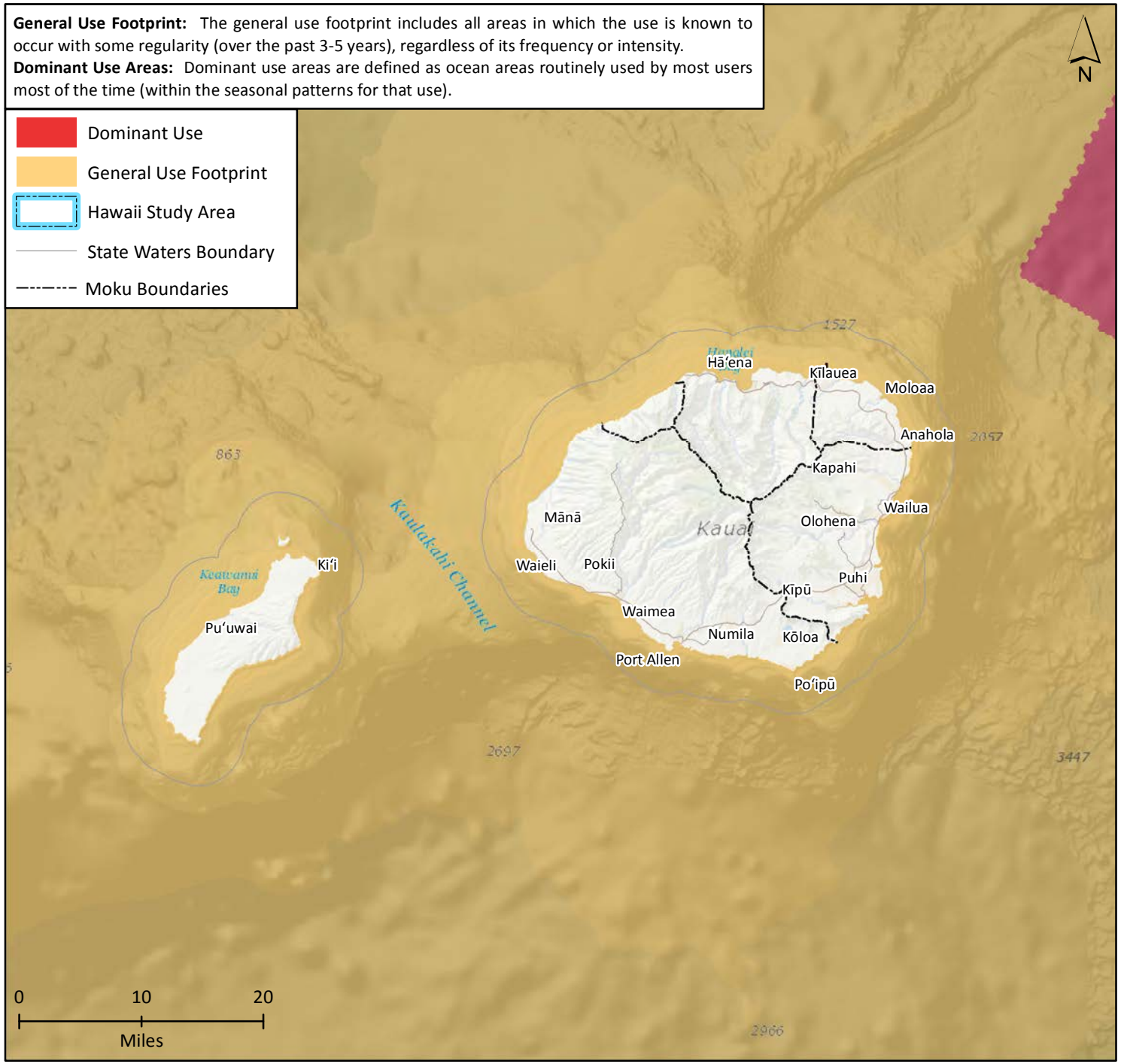

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Mining & Mineral Extraction

Includes:
Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging and beach re-nourishment

Excludes:
Energy production

Statewide Use Notes:
Mining and mineral extraction is limited throughout the islands and mainly consists of dredging of harbor channels and river mouths, or beach renourishment projects. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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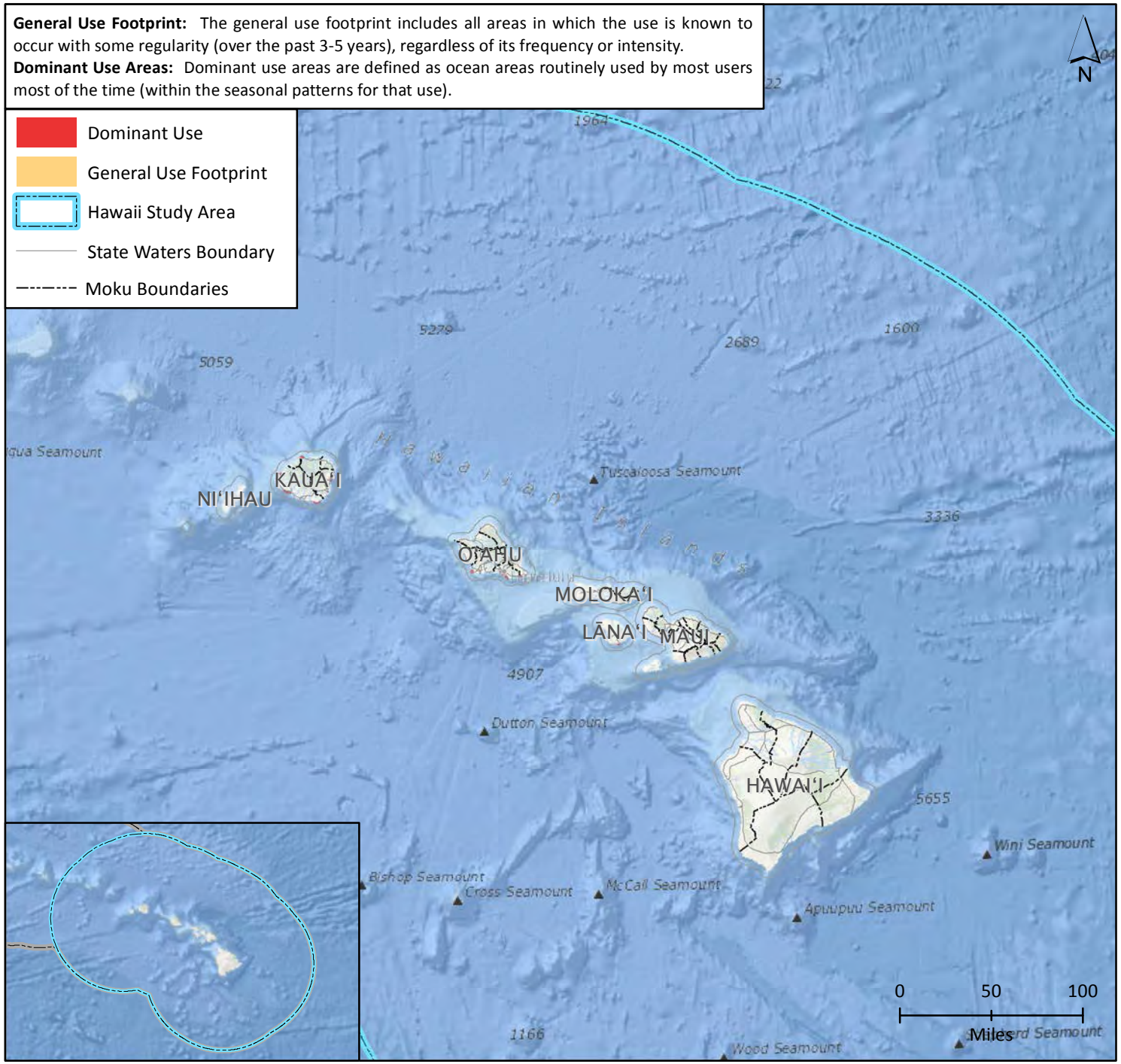

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Mining & Mineral Extraction

Includes:
Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging and beach re-nourishment

Excludes:
Energy production

Island Use Notes:
The primary mining and mineral extraction around the island is associated with manganese nodule mining around the offshore seamounts. This resource was investigated by the GLOMAR Explorer over 20 years ago, but extraction was not considered cost-effective given the technology available at that time. There are community fears that this type of mining, if pursued, would adversely impact fish habitat. There are rumored cobalt resources off the southeast side of Hawaii Island but this has not yet been mined or thoroughly explored.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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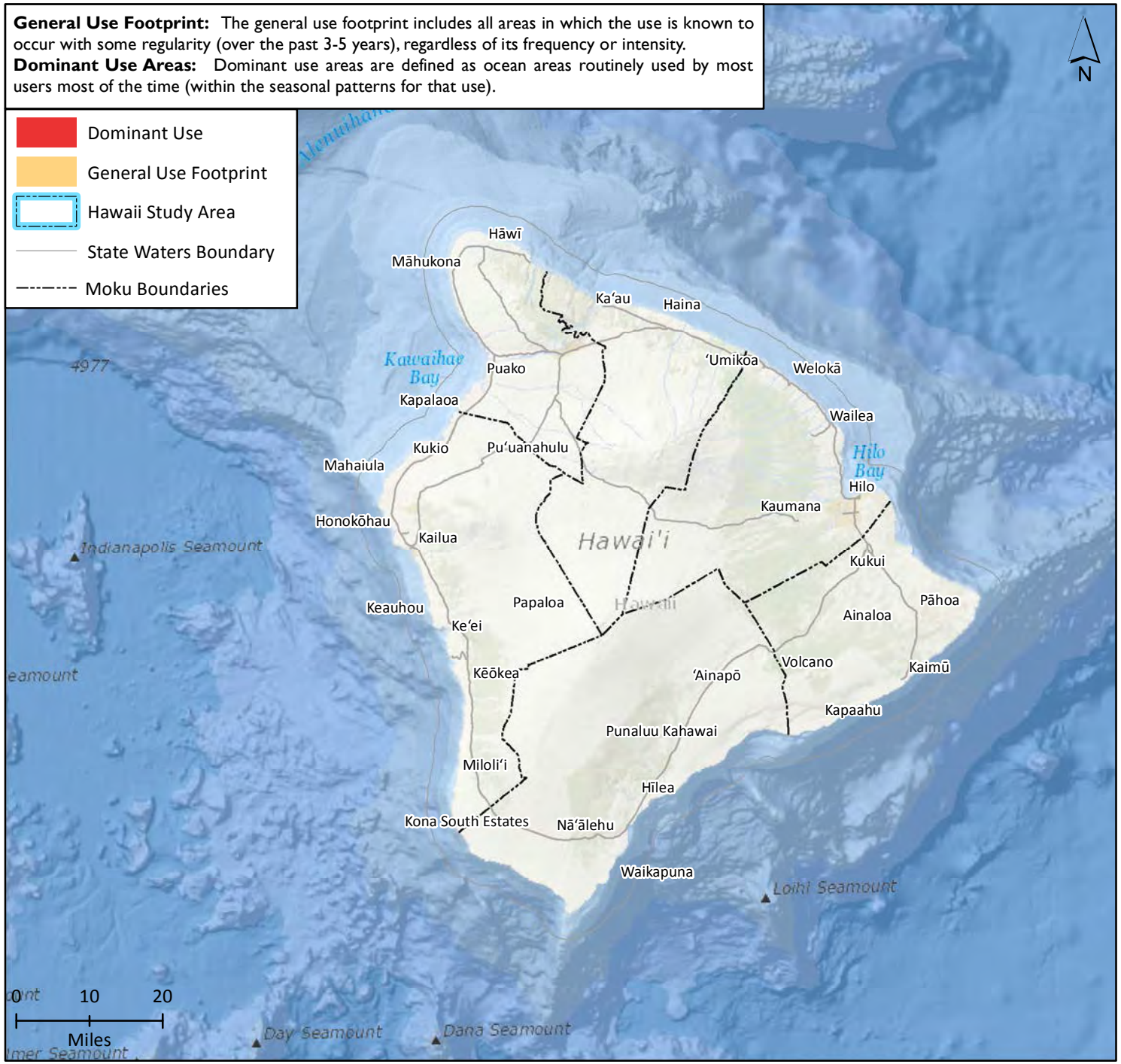

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Mining & Mineral Extraction

Includes:
Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging and beach re-nourishment

Excludes:
Energy production

Island Use Notes:
Maui:
Information on mining and mineral extraction was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.
Lanai:
There is no known mining or mineral extraction around Lanai with the exception of regular dredging in Manele Bay to keep the channels clear for boat traffic.
Molokai:
Mining and mineral extraction is not a common use on Molokai. In the 1950's, sand from Papohaku beach was mined for beach renourishment on Oahu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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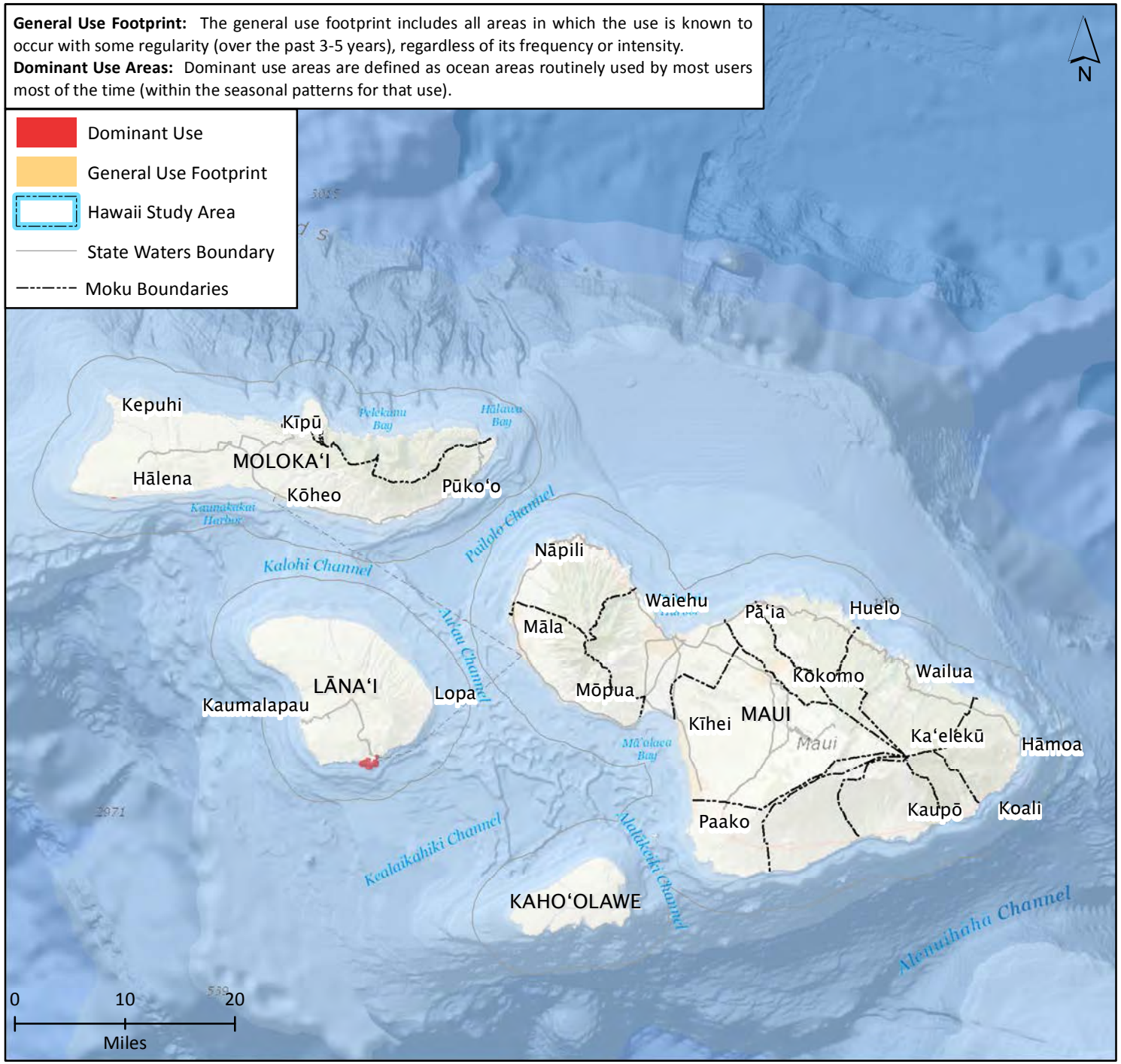


THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

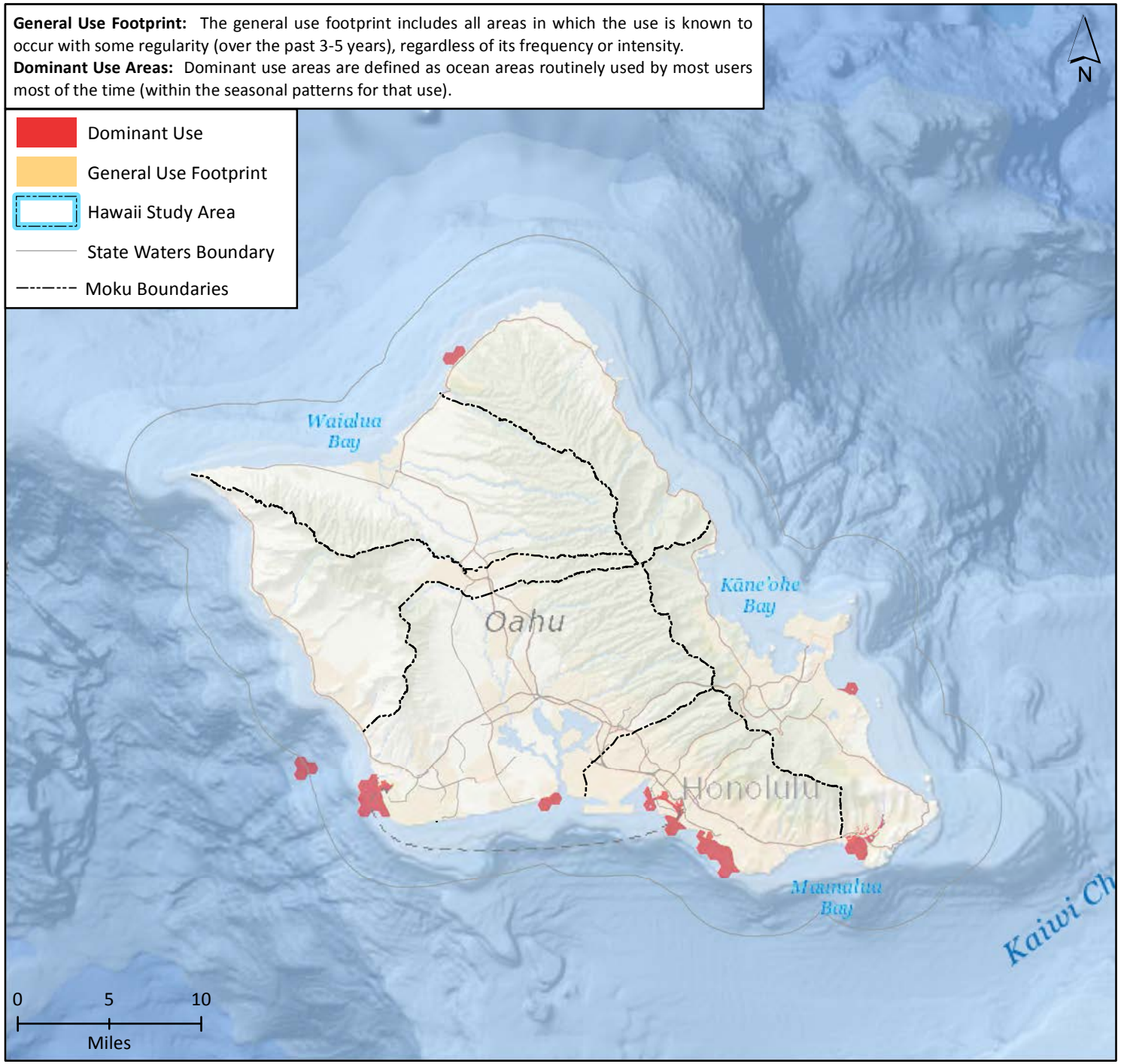
Mining & Mineral Extraction

Includes:
Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging and beach re-nourishment

Excludes:
Energy production

Island Use Notes:
Mining and mineral extraction is prohibited within Hawaii state waters. There are beach nourishment projects at Waikiki, Kailua, Kapiolani, Pupukea, Hawaii Kai (Koko bay), and Kaula Bay, as well as dredging sites at Barbers Point, Honolulu Harbor and Hawaii Kai.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Mining & Mineral Extraction

Includes:
Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging and beach re-nourishment

Excludes:
Energy production

Island Use Notes:
The only known mining and mineral extraction on Kauai involved sand dredging and beach nourishment. Active dredging occurs in Kikiaola, Waiakea and Nawiliwili harbors. The mouth of the Wailua River is dredged to prevent flooding, but other river mouths are not dredged to protect the Oopu, an anadromous fish that lays eggs in the sand. Dredging is a contentious activity on Kauai, as some dredging efforts have had adverse impacts on reef resources (e.g., reef at Kuaehu Point covered by sand from nearby beach nourishment project).

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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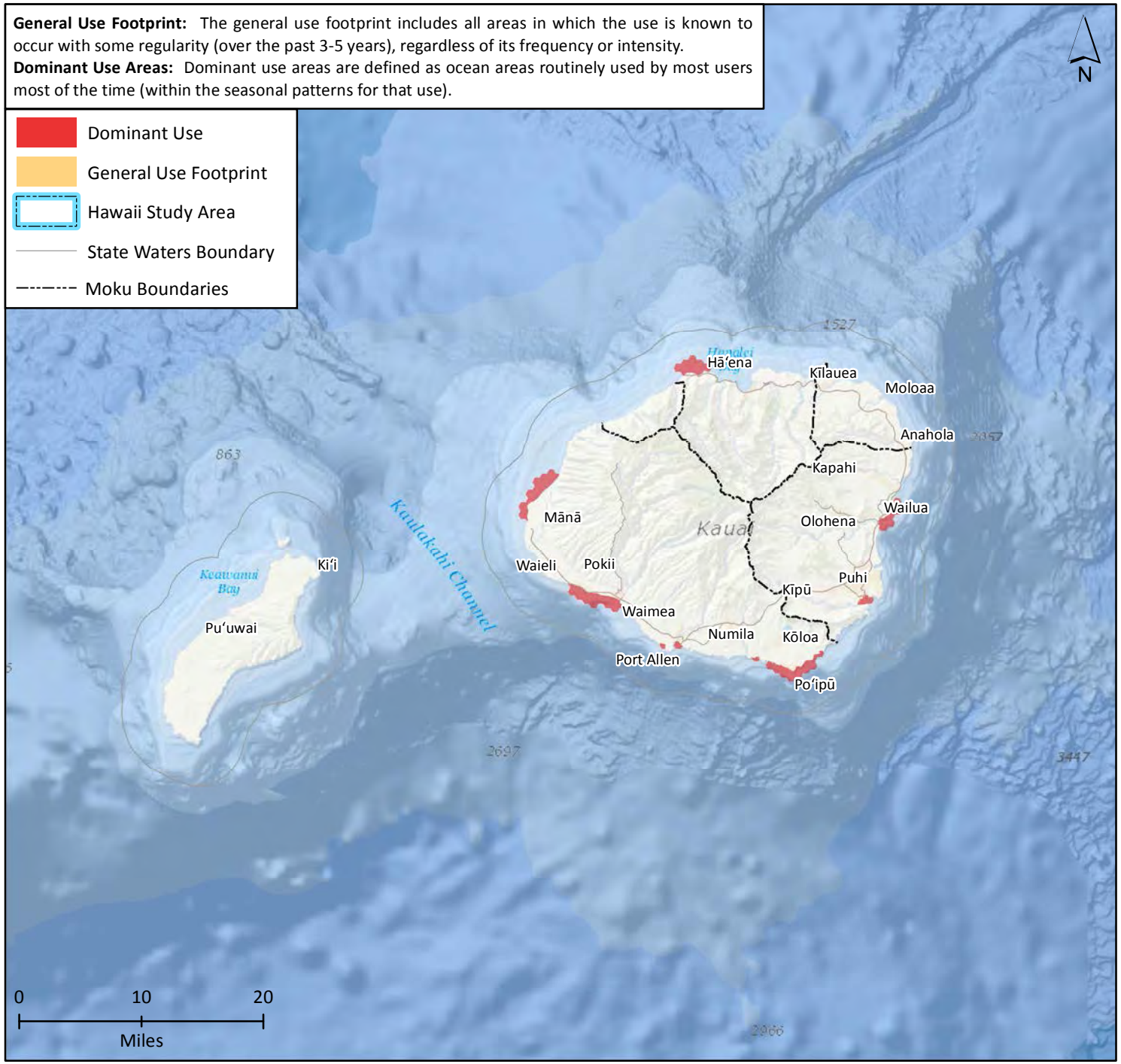

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Underwater Pipelines

Includes:
Any submerged pipe system used to transport oil, gas, sewage or other fluid
Excludes:
Underwater cables

Statewide Use Notes:
Information on underwater pipelines is specific to each island. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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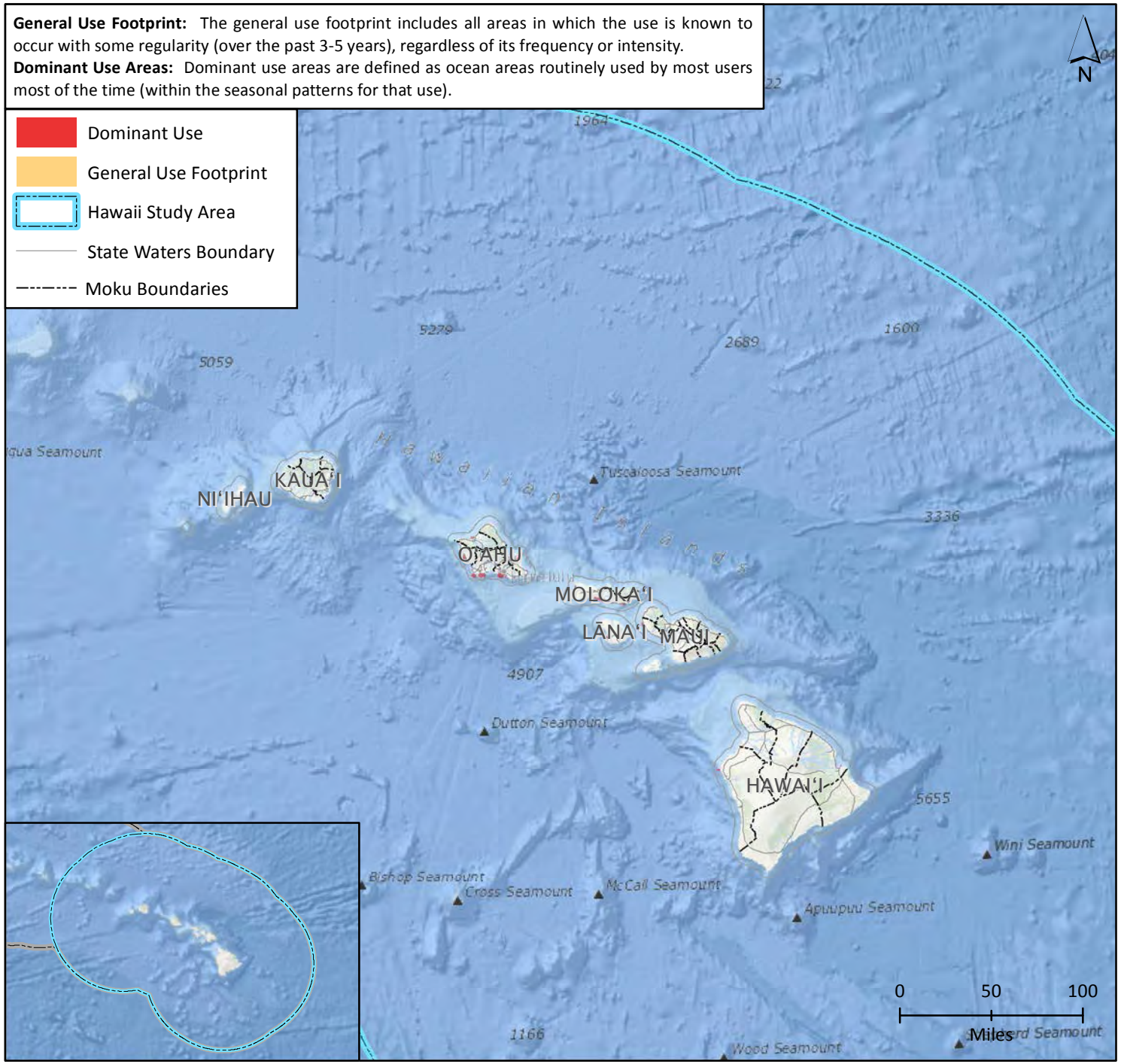

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Underwater Pipelines

Includes:
Any submerged pipe system used to transport oil, gas, sewage or other fluid

Excludes:
Underwater cables

Island Use Notes:
For information on underwater pipelines, workshop participants suggested referring to existing data layers hosted by the State of Hawaii.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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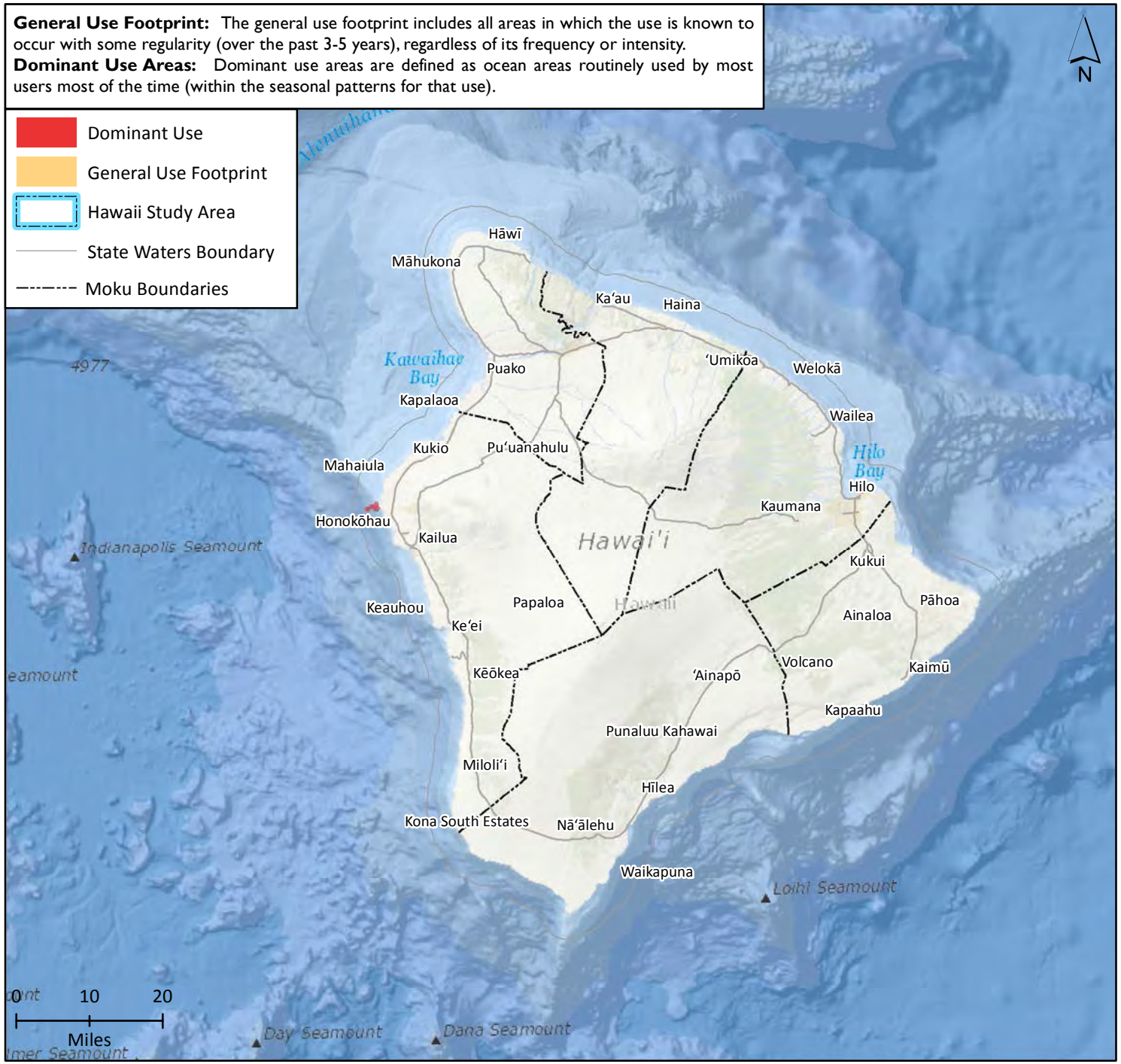

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Underwater Pipelines

Includes:
Any submerged pipe system used to transport oil, gas, sewage or other fluid
Excludes:
Underwater cables

Island Use Notes:
Maui:
Workshop participants did not provide additional contextual information for this use.
Lanai:
Sewage discharge is treated by terrestrial plants so there are no existing sea bound pipelines.
Molokai:
Underwater pipelines on Molokai include the seawater intake pipe that feeds shrimp farms near Kaunakakai, and the sewage pipe from Hotel Molokai.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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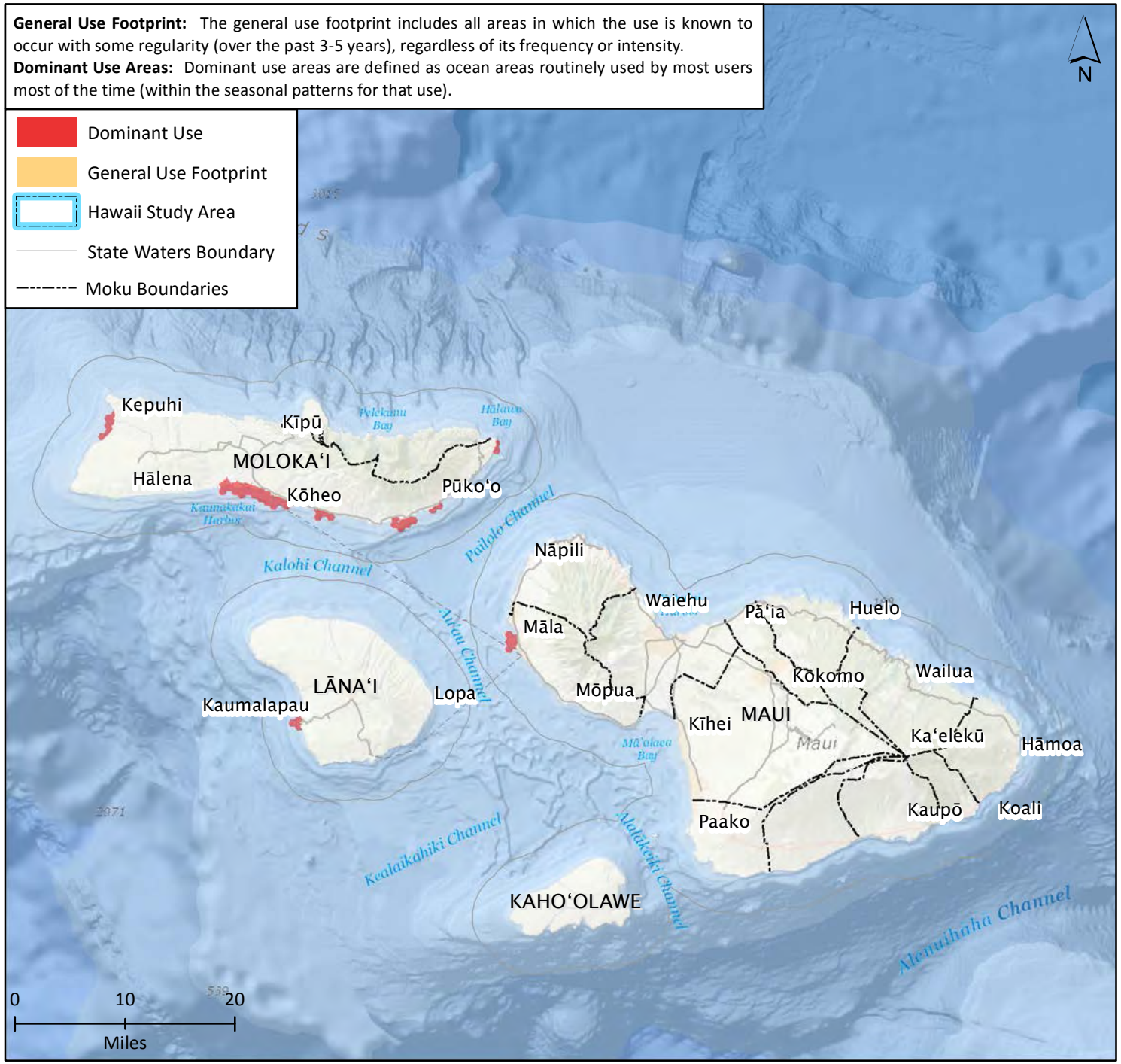


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

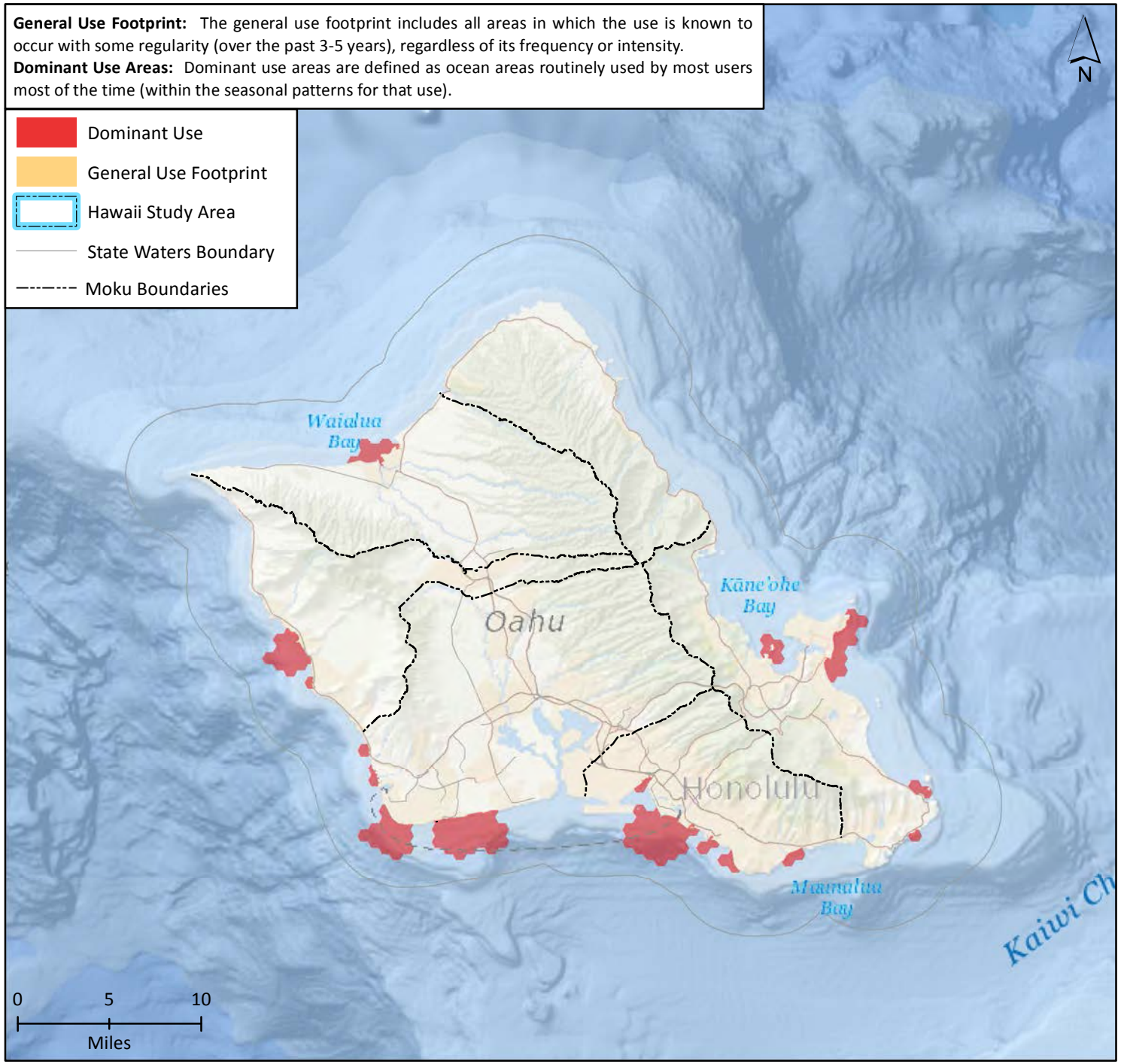
The Pacific Regional Ocean Uses Atlas

Underwater Pipelines

Includes:
Any submerged pipe system used to transport oil, gas, sewage or other fluid
Excludes:
Underwater cables

Island Use Notes:
Underwater pipelines on Oahu are predominantly sewer pipes. Commonly, these pipes have leaks and contribute to non-point source pollution. Several pipelines run out of the Waikiki area, (e.g., at Kaimana Beach and the Waikiki Aquarium). Kaneohe Bay has a large pipeline that extends offshore for ~ 6 miles. Fuel dolphins (containers with associated pumping lines) are present near Mamala Bay and pipelines are present off Coconut Island and Sand Island. Pipelines for seawater air conditioning run from Honolulu Harbor offshore to the shelf break.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Underwater Pipelines

Includes:
Any submerged pipe system used to transport oil, gas, sewage or other fluid

Excludes:
Underwater cables

Island Use Notes:
Information on underwater pipelines was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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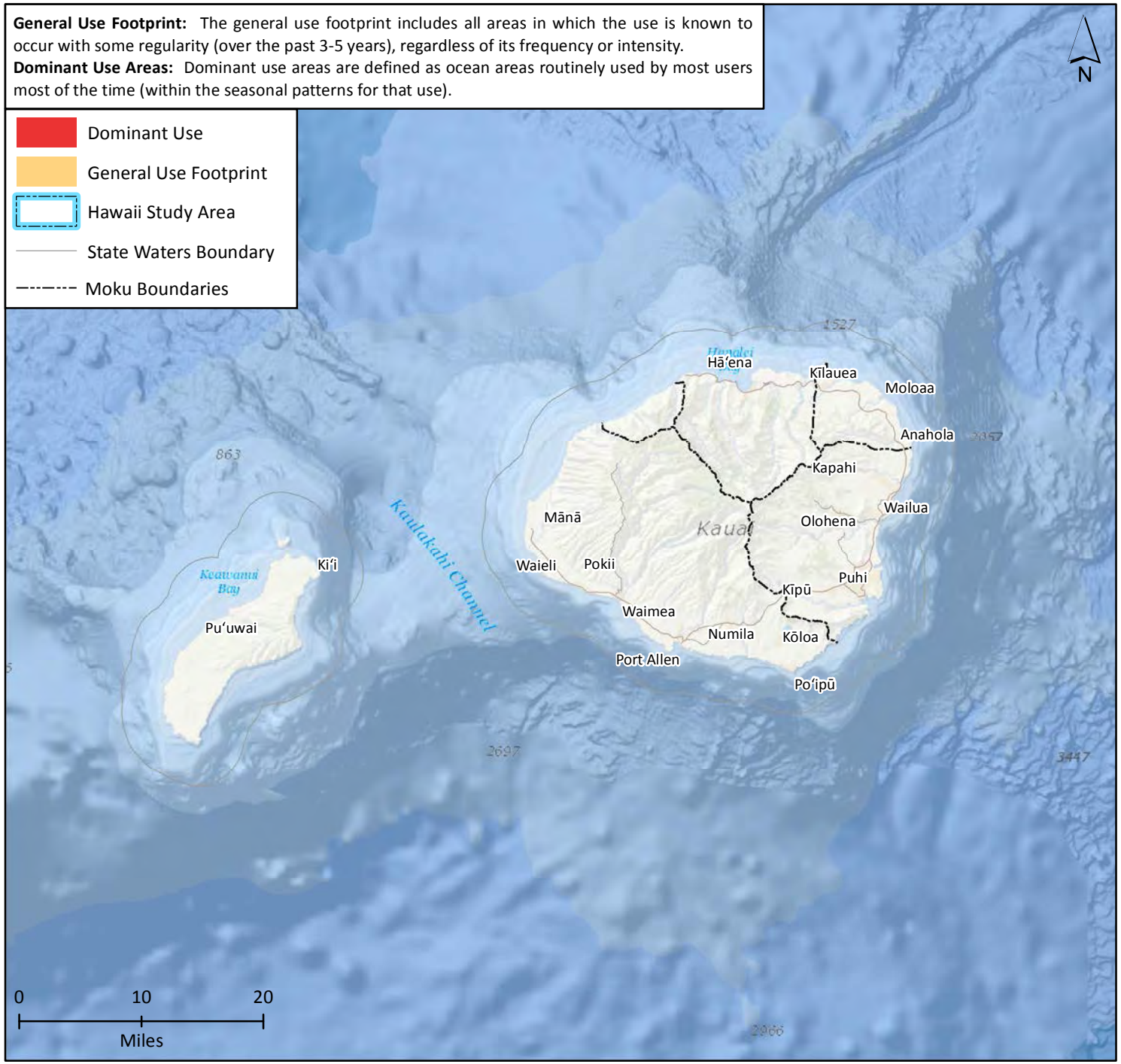


THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

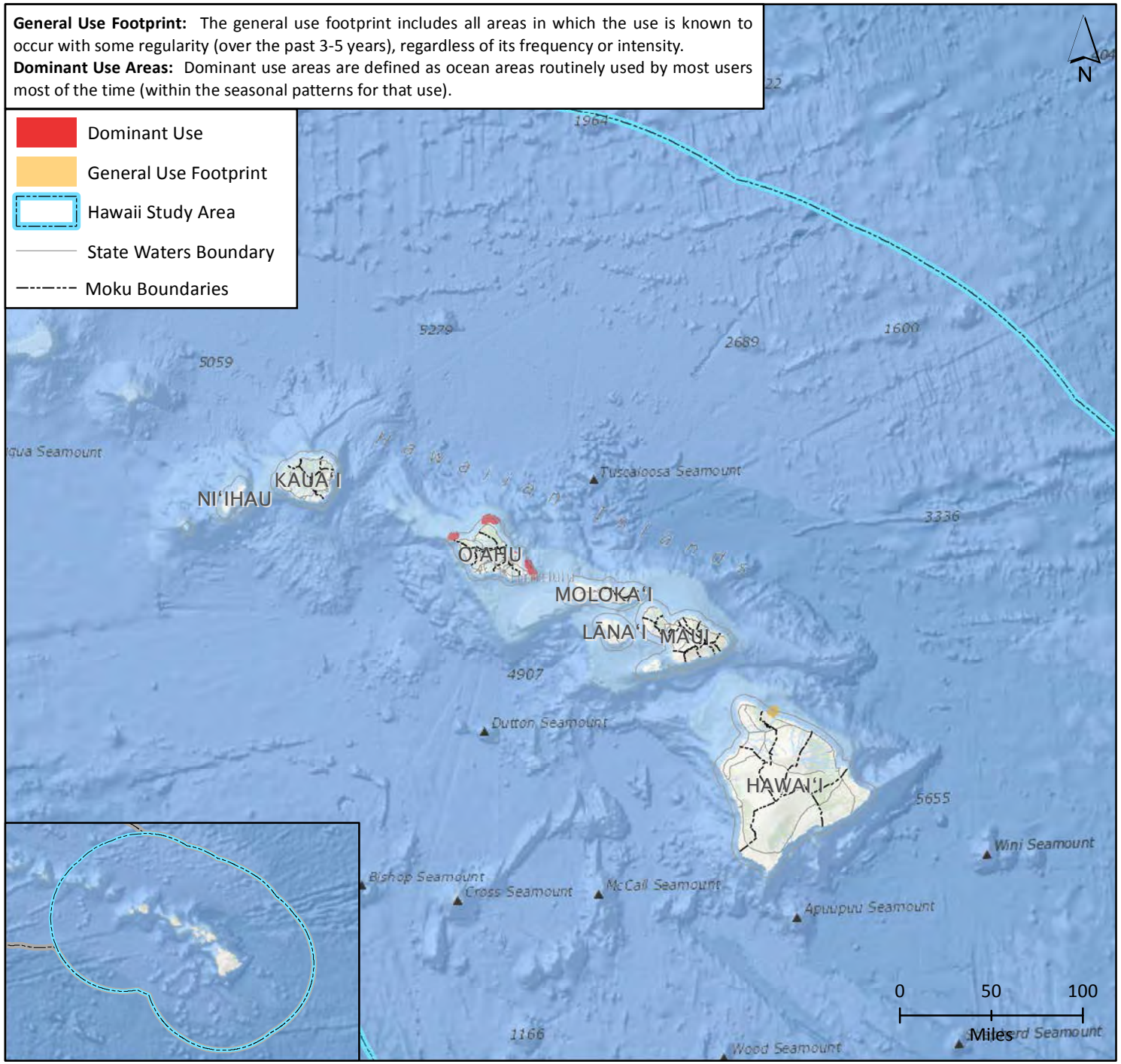
Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Statewide Use Notes:
Renewable energy on Hawaii consists mainly of terrestrial projects and some marine testing sites. Test sites for ocean thermal energy conversion (Hawaii island) and wave generation (Oahu) indicate interest in the Hawaiian Islands for ocean energy development. There are community concerns about development of ocean energy and its potential impacts on viewsheds, coastal and marine environment, fishing communities and traditional cultural practices. All planning for ocean renewable energy development must involve local communities. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

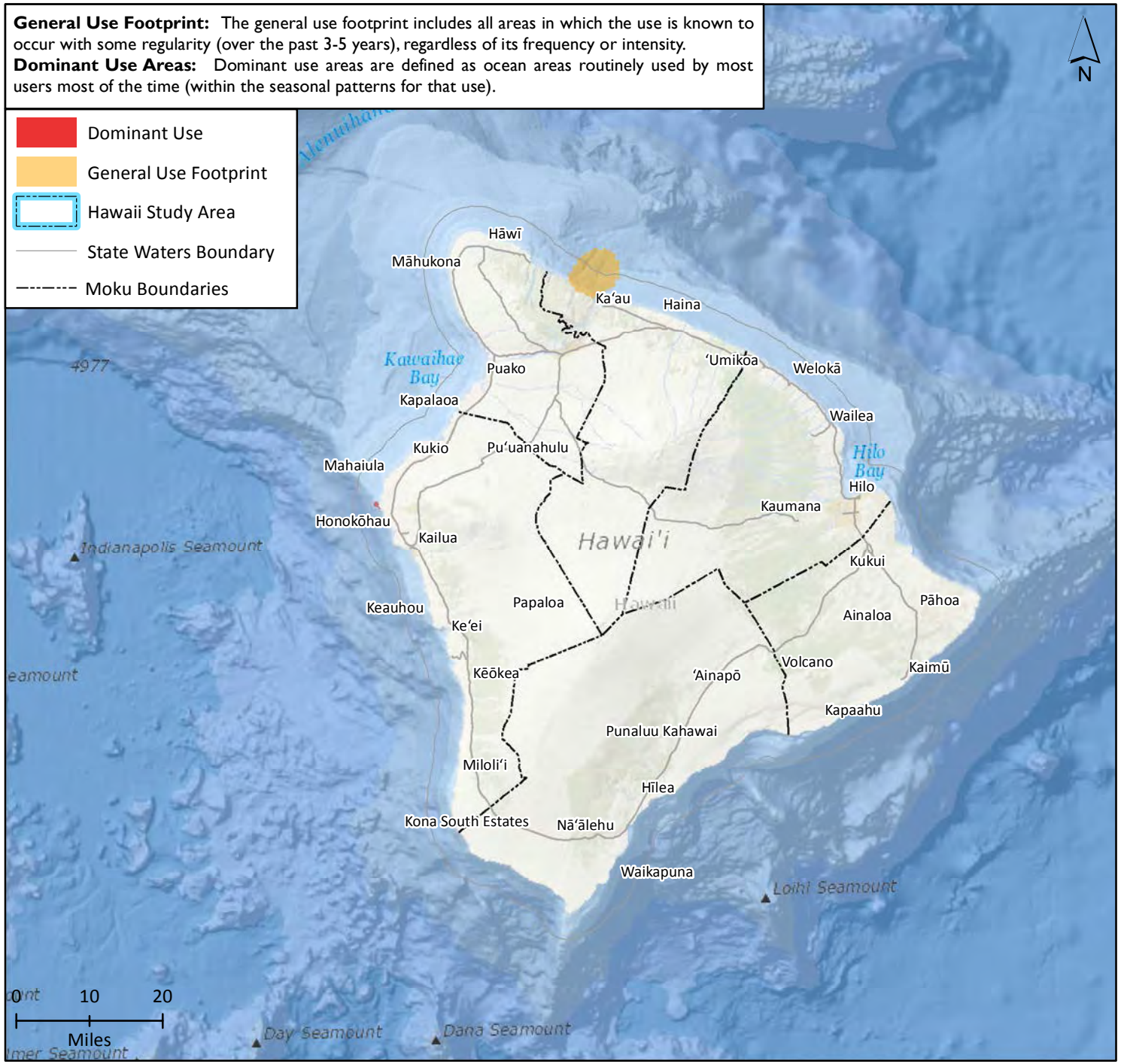
Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Island Use Notes:
Renewable energy activities around Hawaii Island are mainly for research and development and temporary instrument testing. There is an existing ocean thermal energy conversion (OTEC) test site off of Keahole Bay that is currently in a research and development phase. There is a proposed desalination plant in South Kohala, but there are strong community reservations regarding environmental effects of hyper-saline or heated water on coral reef environments. There is also an ocean water cooling device being test at Kaiwi point. With various emerging forms of renewable energy, there are community concerns that these efforts will impact the local ecology (e.g., breeding grounds, reef structures) and not give back to the local community.
Communities also worry that planning for renewable energy will proceed without appropriate stakeholder involvement.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

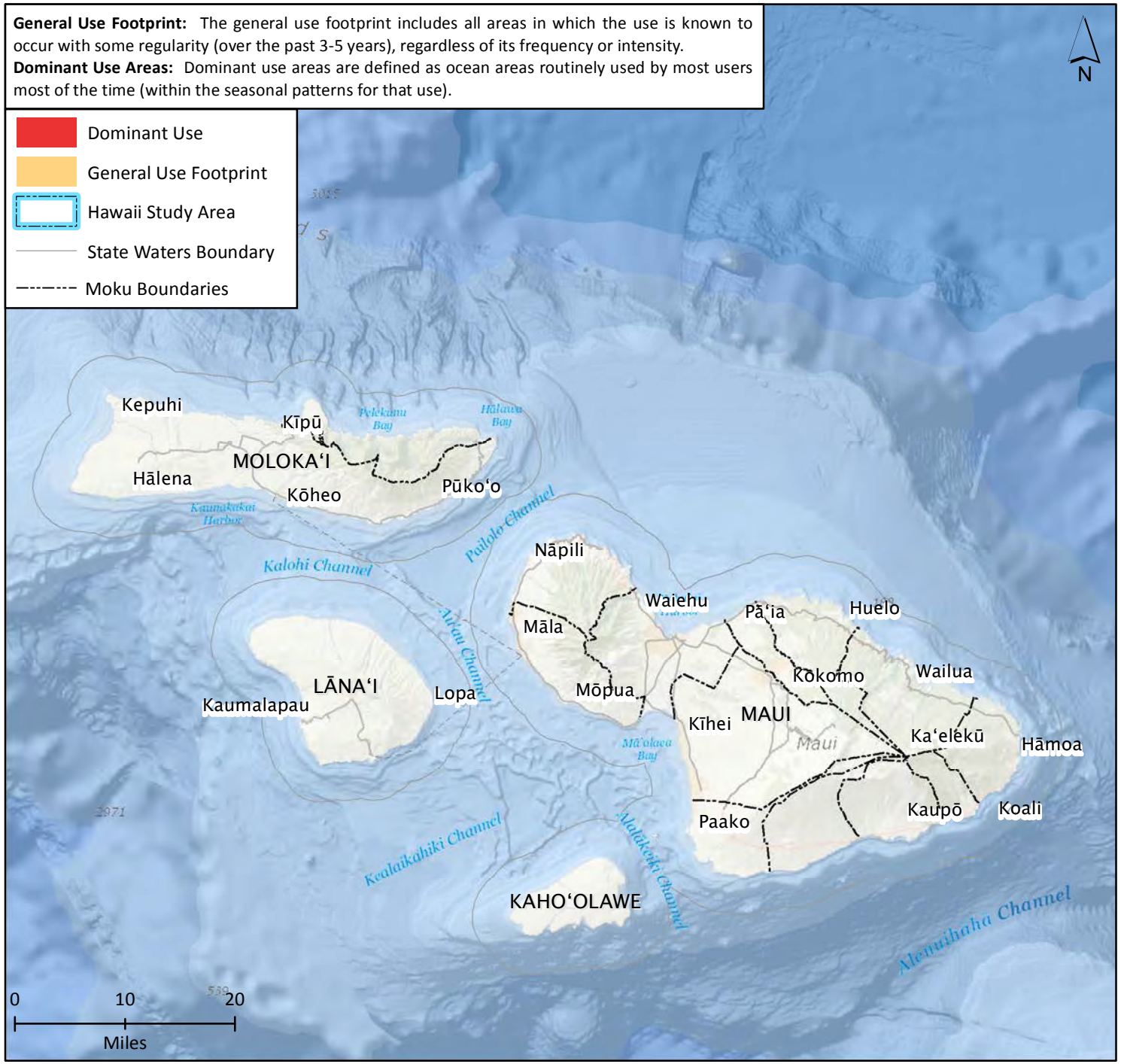
Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Island Use Notes:
Maui:
Information on renewable energy was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.
Lanai:
Workshop participants did not provide additional contextual information for this use.
Molokai:
Renewable energy on Molokai consists of ~8 terrestrially-based projects, most of which were completed without community input.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Island Use Notes:
The Hawaiian Islands have great renewable energy potential, most of which has been harnessed on land. In the ocean, there are a limited number of test sites for Ocean Thermal Energy Conversion (OTEC) and wave energy (e.g., wave buoys near Pearl Harbor). A number of community concerns exist regarding renewable energy on and around Oahu. These include the potential for impact on the view shed, the coral reef ecosystem and traditional fishing practices. Mooring systems and marine cables will likely cross many ecological zones, so the cumulative impact of all aspects of renewable energy need to be considered.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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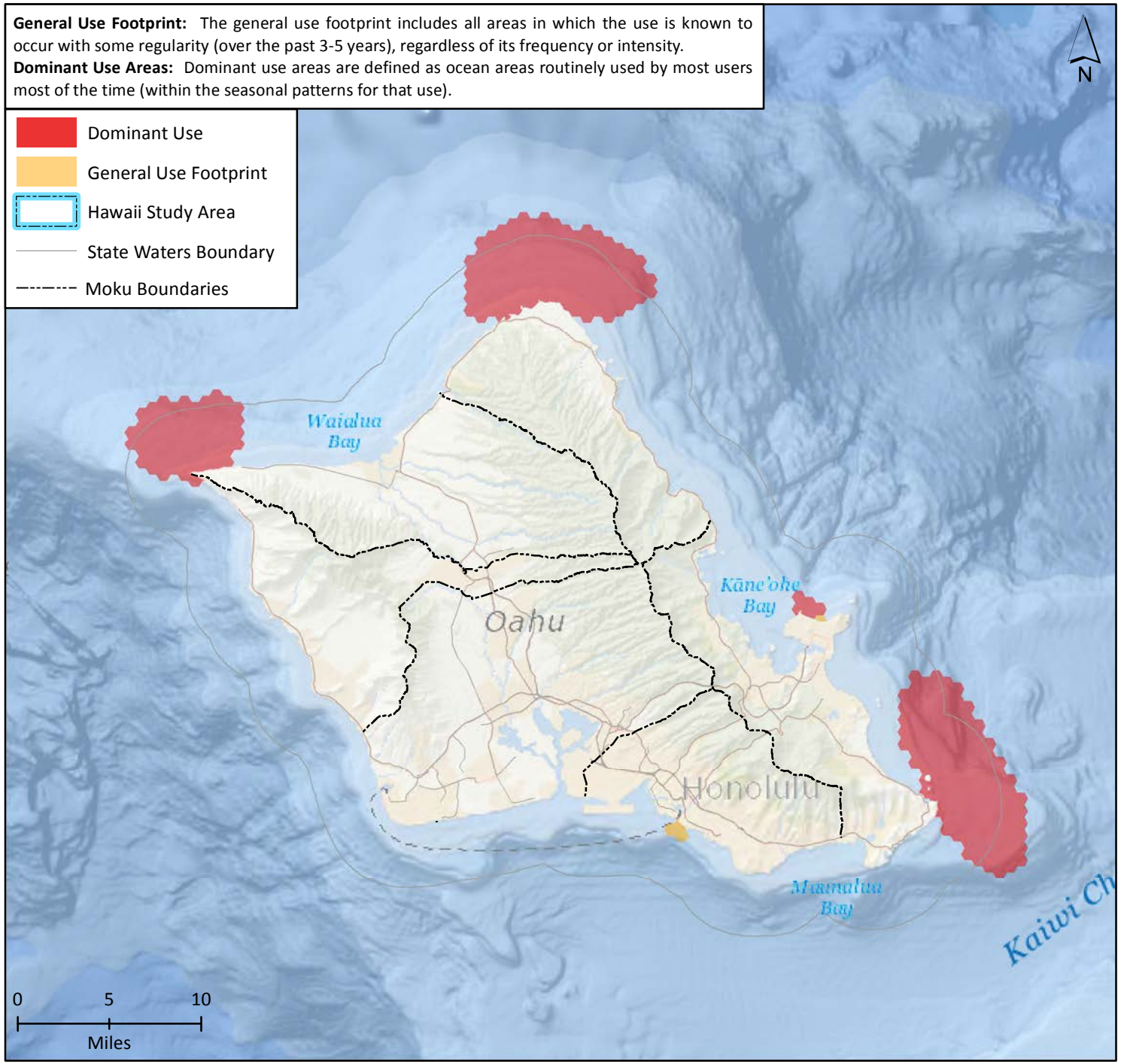


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

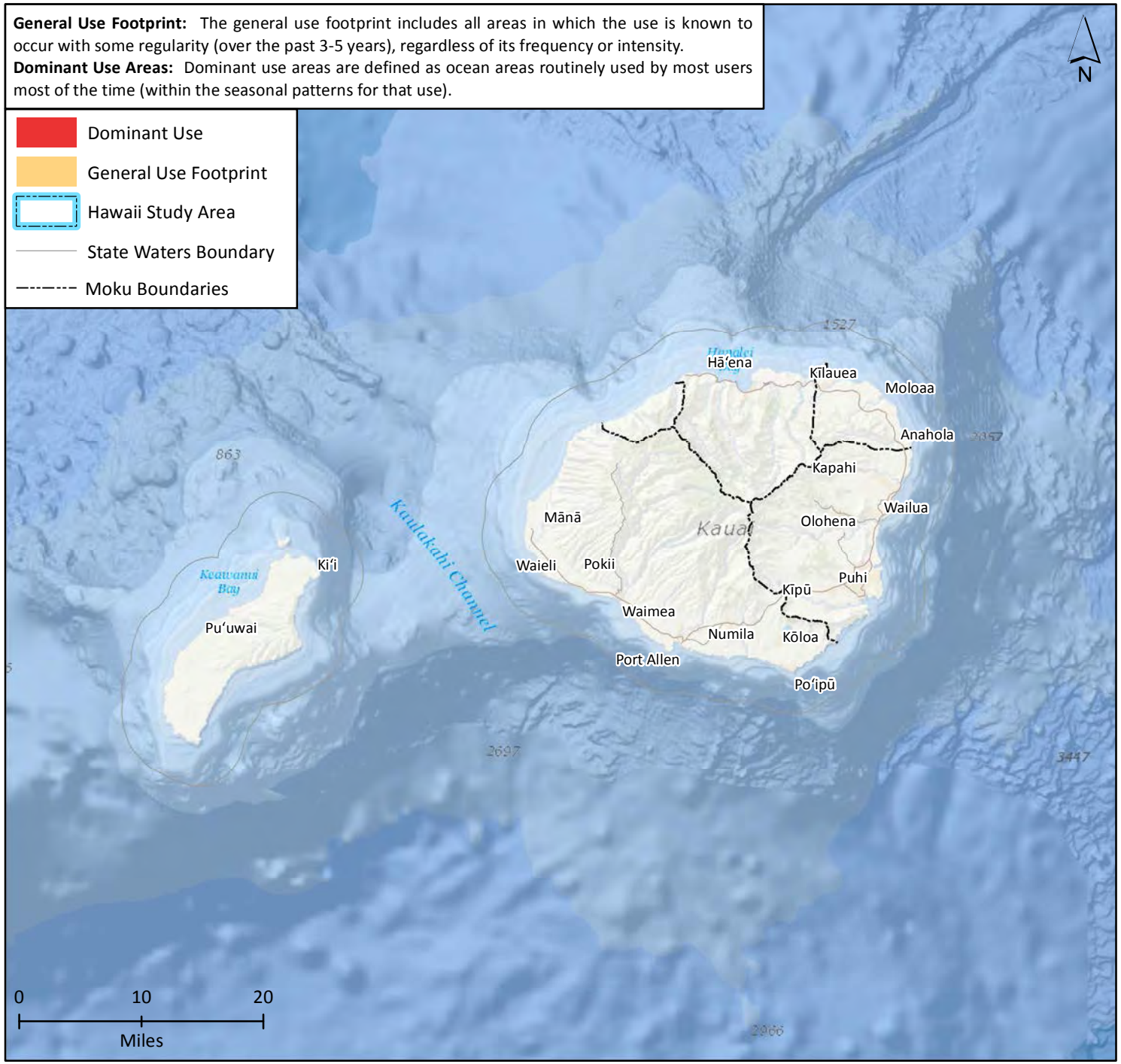
Renewable Energy

Includes:
Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms

Excludes:
Onshore power grids

Island Use Notes:
Renewable energy development is a contentious topic in Kauai and all around the Hawaiian islands. Local communities feel that they should have more control over management of existing resources, as well as the development of future renewable energy options. Communities feel that regulatory agencies should require more research and consideration of traditional knowledge and the tradeoffs between benefits such as energy independence and impacts to the local communities and the environment. Proposals for future project should also clearly define the benefits of proposed development to the local economy. There has been discussion on Niihau about investigating clean energy strategies.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Statewide Use Notes:
Commercial shipping in Hawaii centers on Oahu, which receives Pacific Basin traffic from the west and east. Within the islands, there are major commercial shipping routes to each island and ferry routes exist around Maui Nui. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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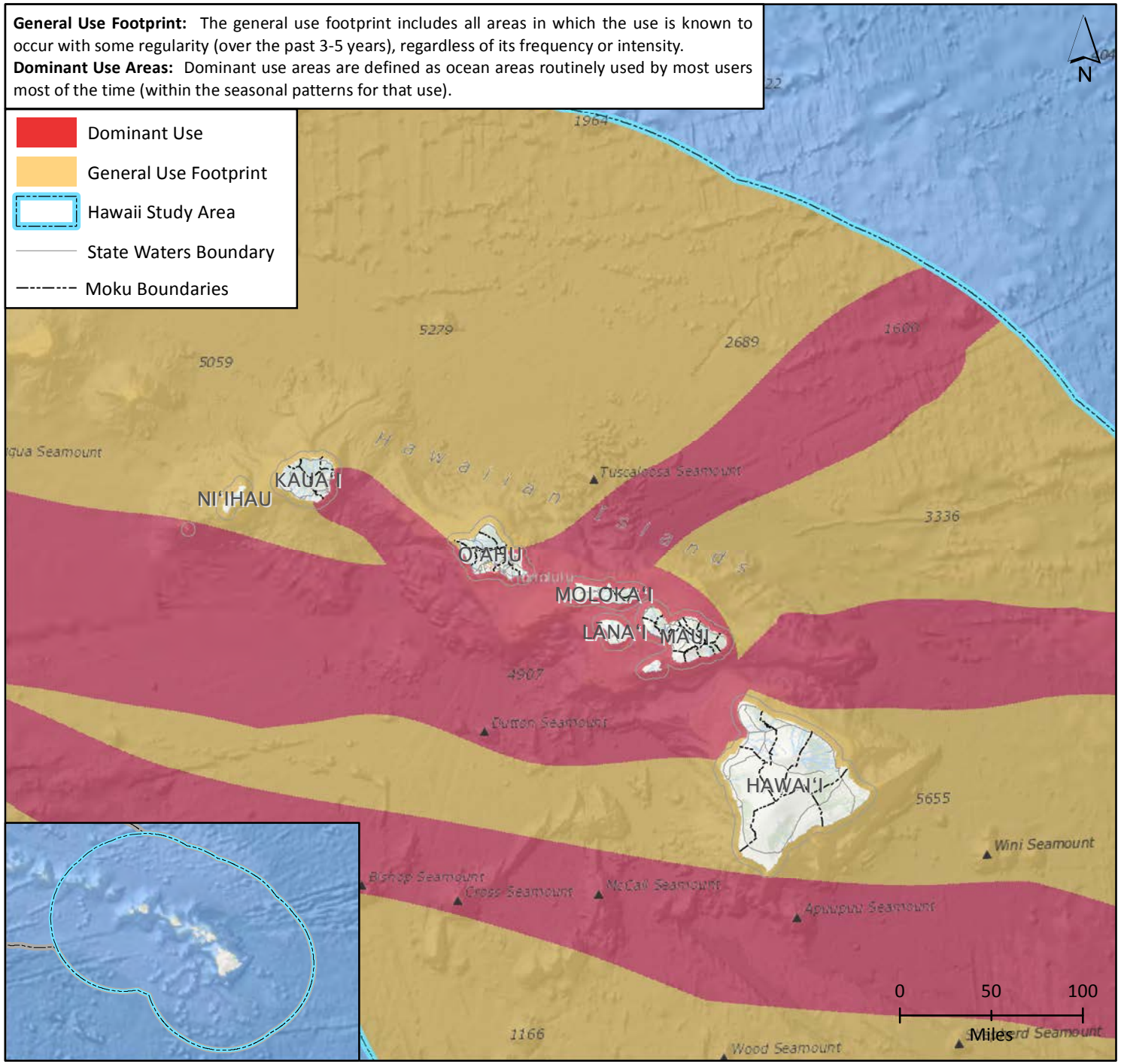


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

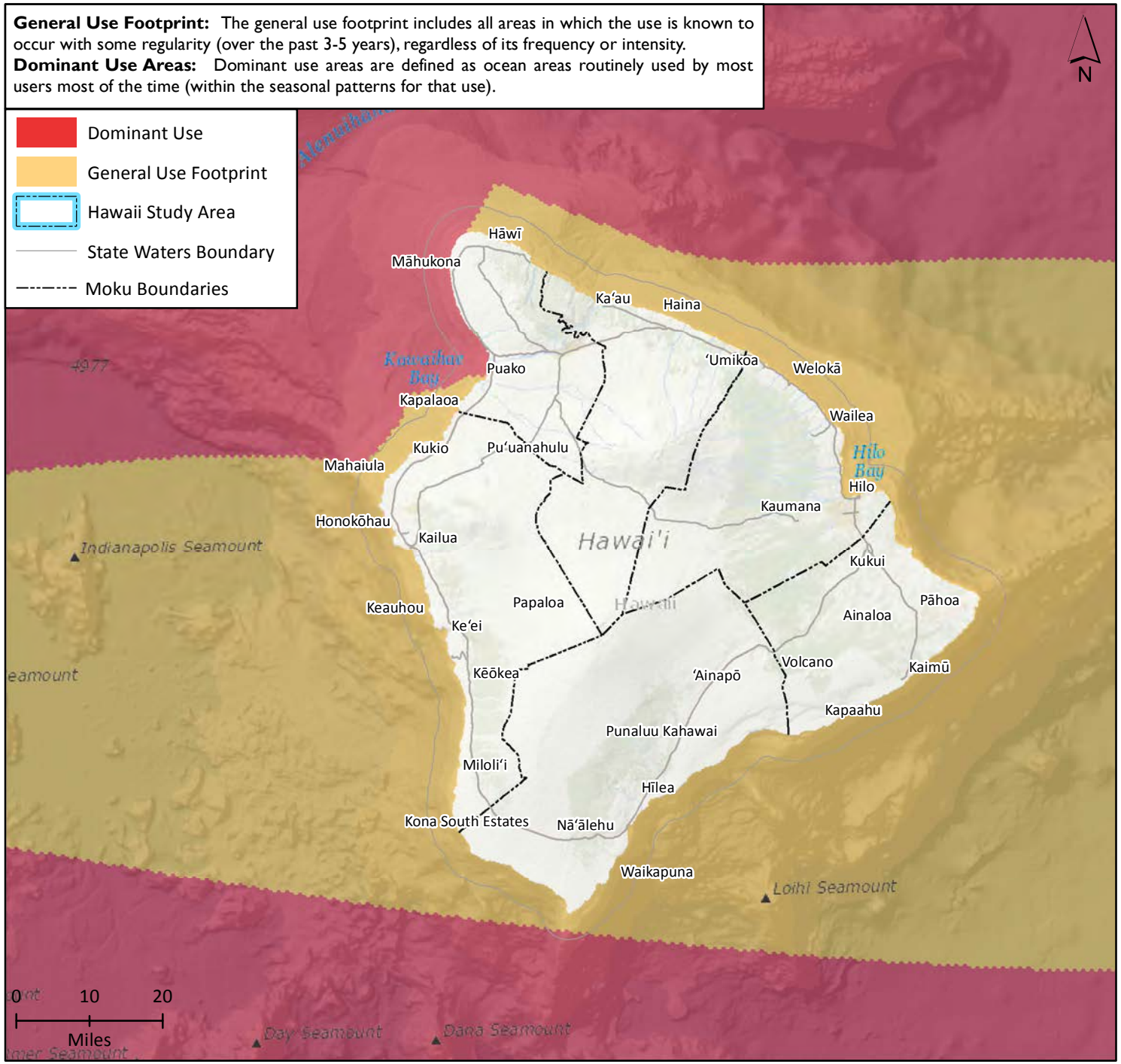
Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Island Use Notes:
Commercial shipping routes around Hawaii Island extend from Kawaihae harbor to China, the US mainland and beyond. There are daily inter-island barges that run from Kawaihae to Oahu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

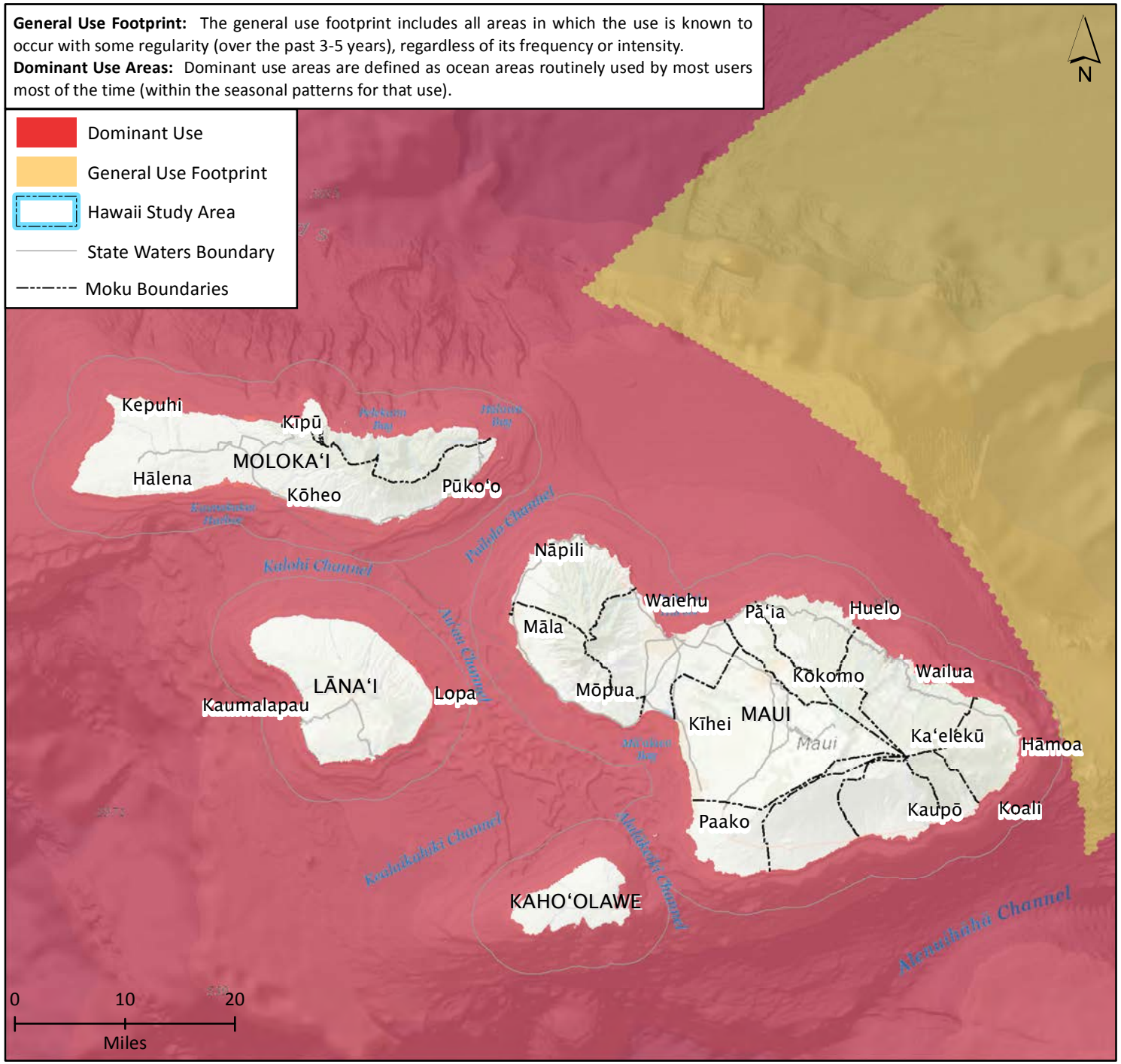
Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Island Use Notes:
Maui:
Information on commercial shipping was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.
Lanai:
Commercial shipping is not a regular use around Lanai. Interisland ferries run from Lahaina to Kaunakakai, and Young Brothers operate a regular barge service between Oahu and Molokai.
Molokai:
Commercial shipping is not an active use on Molokai. Regular ferries operate between from Kaunakakai to Lahaina.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Island Use Notes:
Commercial shipping around the islands is likely best mapped using Automated Identification System (AIS) data for routes that traverse the Pacific. There is some interisland shipping activity operated by Young Brothers and Matson which use the two commercial harbors on the south shore of Oahu in Kapolei and Honolulu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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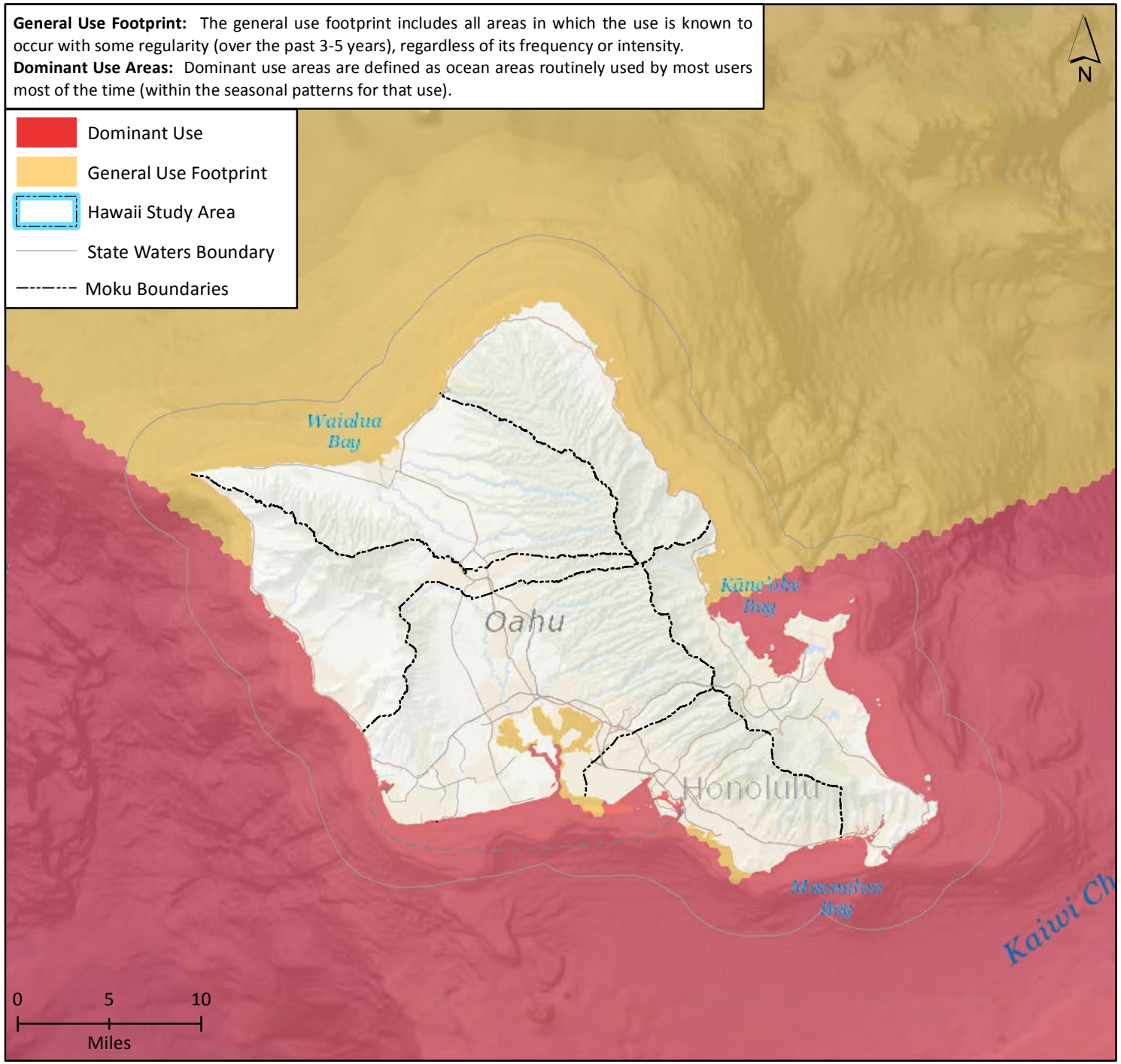

 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Commercial Shipping

Includes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels

Excludes:
Cruise Ships, Military Vessels

Island Use Notes:
Information on commercial shipping was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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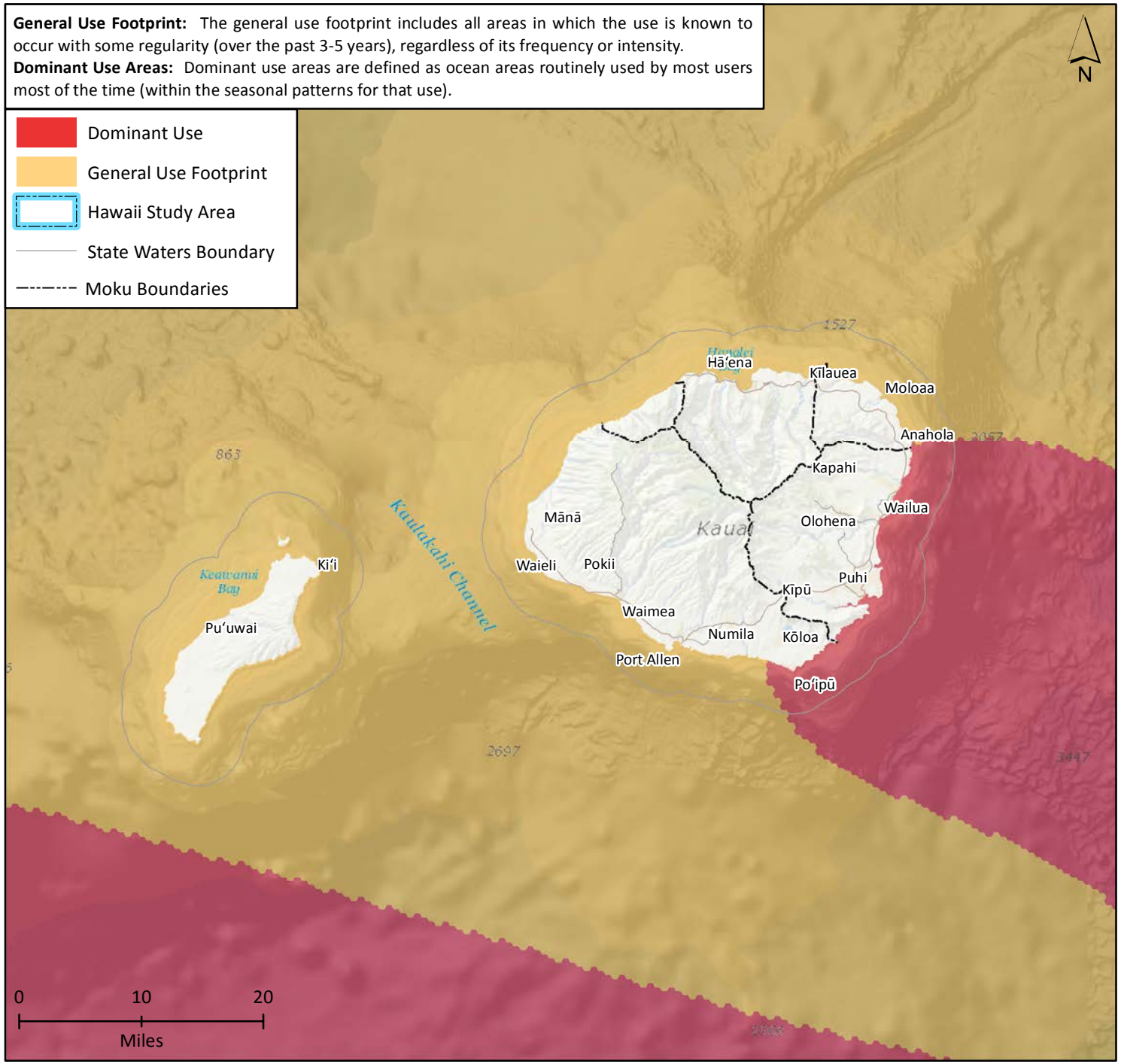

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Underwater Cables

Includes:
Cables installed on the seafloor to transmit data, communications and electricity

Excludes:
Lost fishing gear, renewable energy transmission cables

Statewide Use Notes:
Information on underwater cables is specific to each island. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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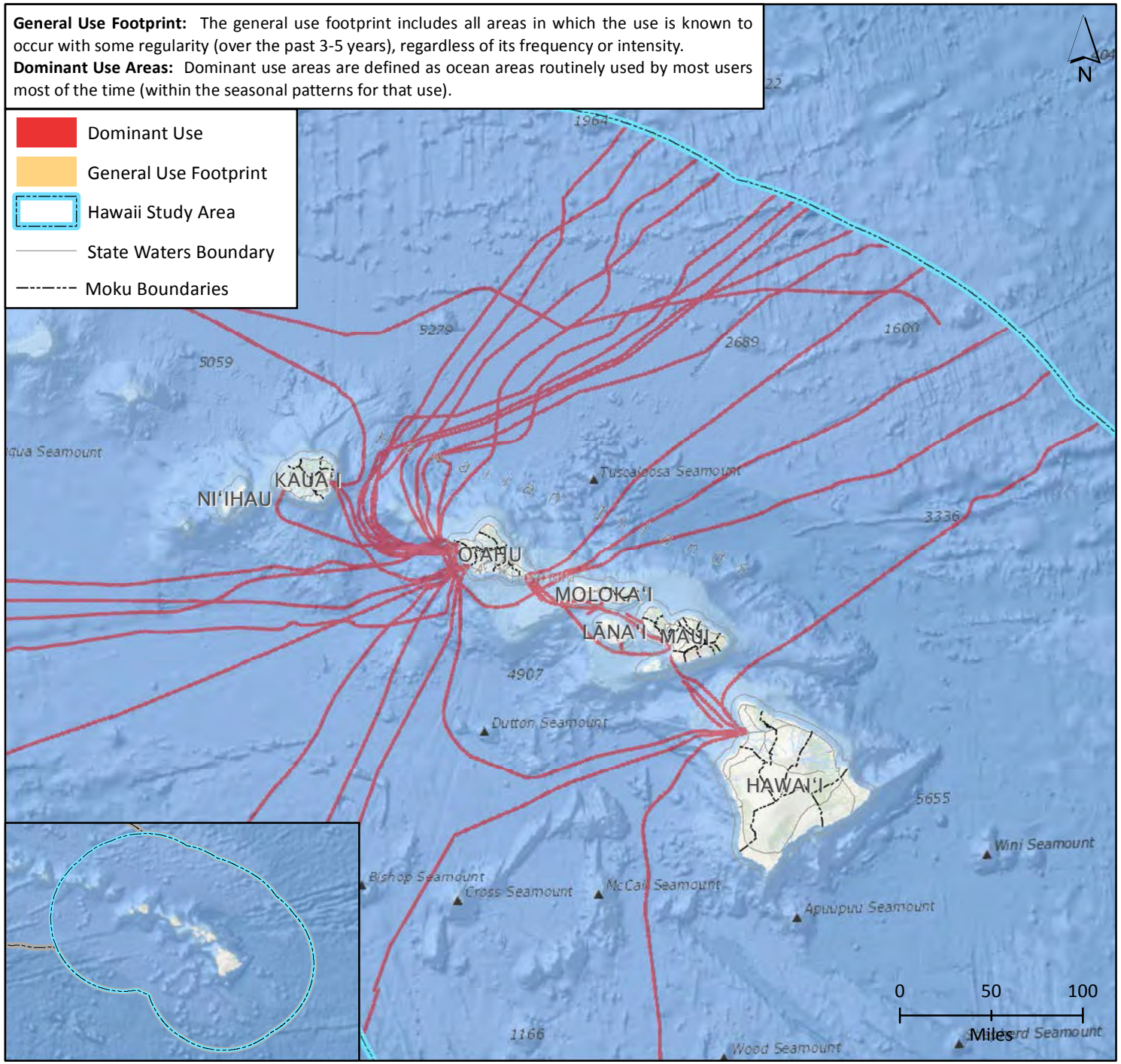

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Underwater Cables

Includes:
Cables installed on the seafloor to transmit data, communications and electricity

Excludes:
Lost fishing gear, renewable energy transmission cables

Island Use Notes:
Information on underwater cables was not collected during the workshops on Hawaii Island due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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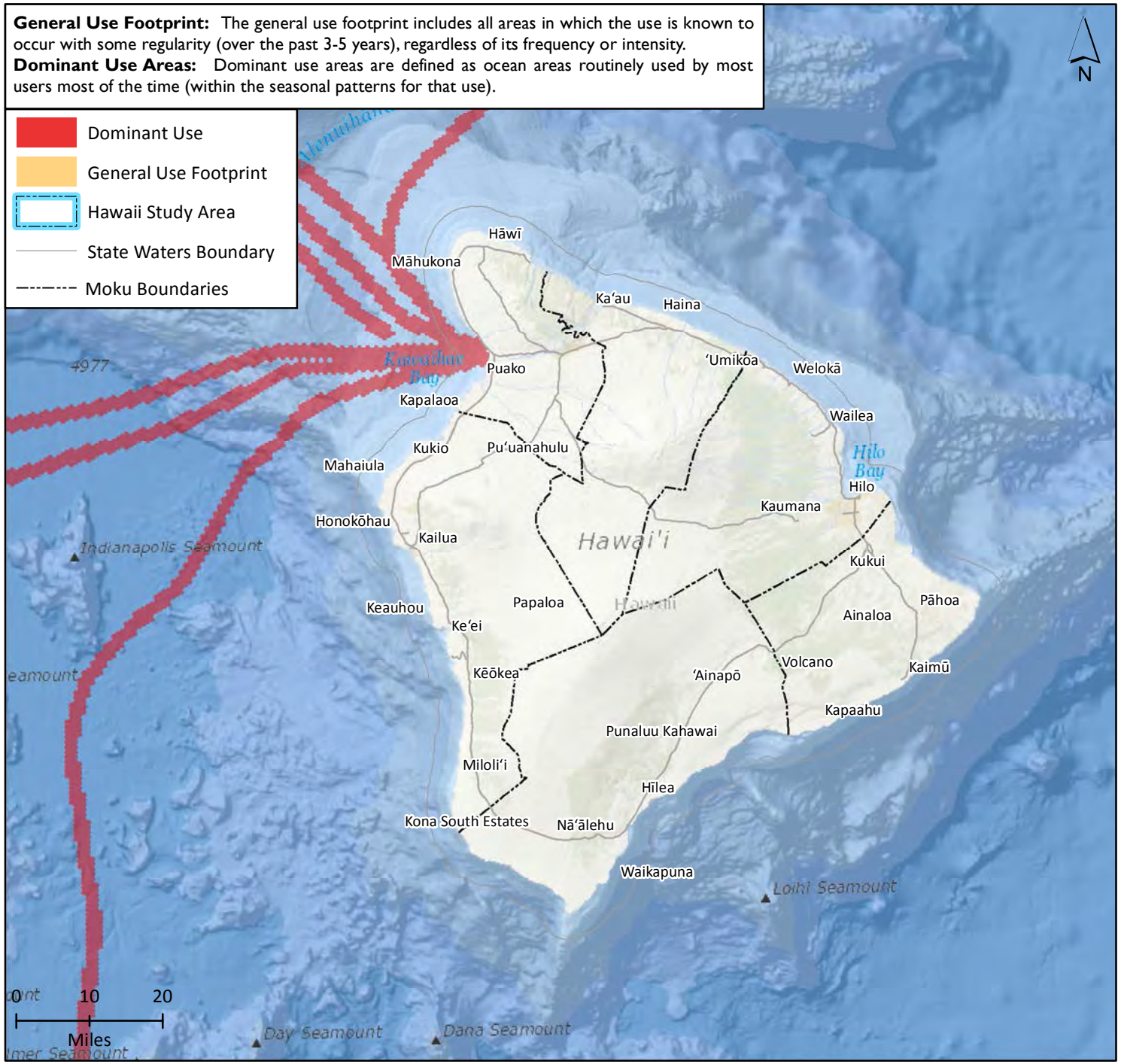

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Underwater Cables

Includes:
Cables installed on the seafloor to transmit data, communications and electricity

Excludes:
Lost fishing gear, renewable energy transmission cables

Island Use Notes:
Maui:
Information on underwater cables was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic.
Lanai:
Information on underwater cables was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic.
Molokai:
Information on underwater cables was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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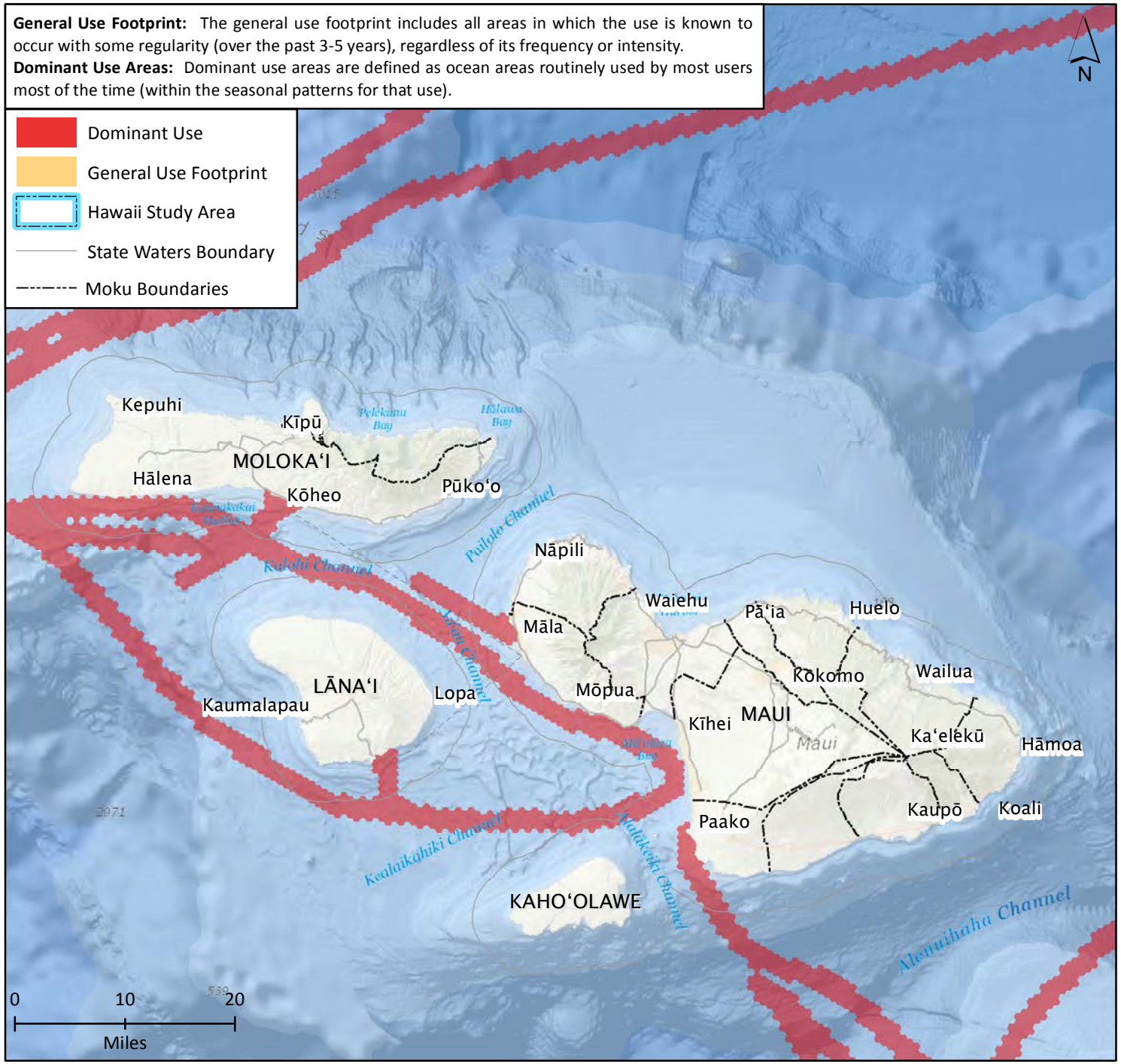


THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

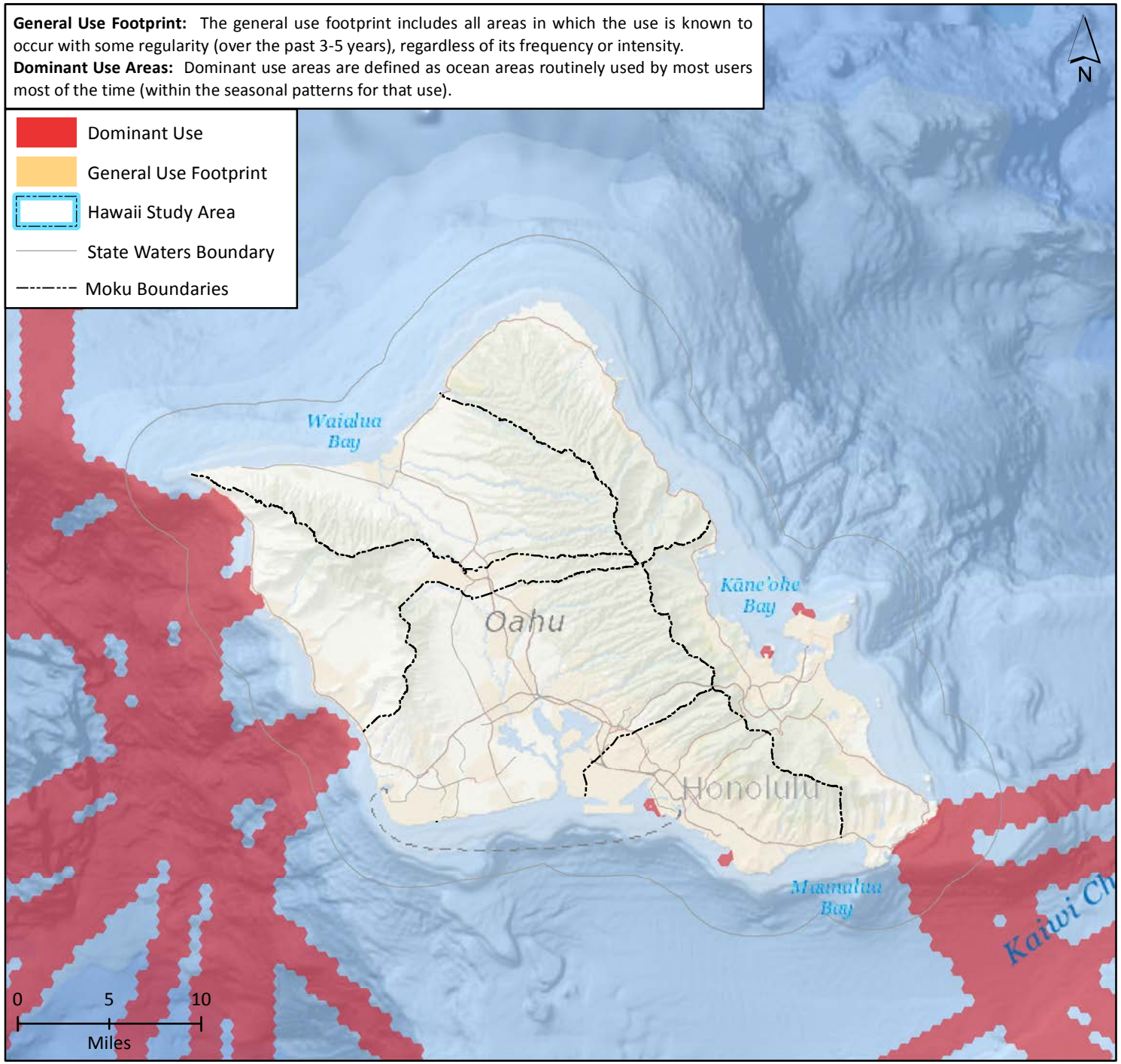
Underwater Cables

Includes:
Cables installed on the seafloor to transmit data, communications and electricity

Excludes:
Lost fishing gear, renewable energy transmission cables

Island Use Notes:
Underwater cables are well represented in the existing spatial data. Other cables which may not be mapped include ones in and around Waikiki near Kapiolani Beach, and between Sand Island to Mokauea and Heia to Coconut Island.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Underwater Cables

Includes:
Cables installed on the seafloor to transmit data, communications and electricity

Excludes:
Lost fishing gear, renewable energy transmission cables

Island Use Notes:
Information on underwater cables was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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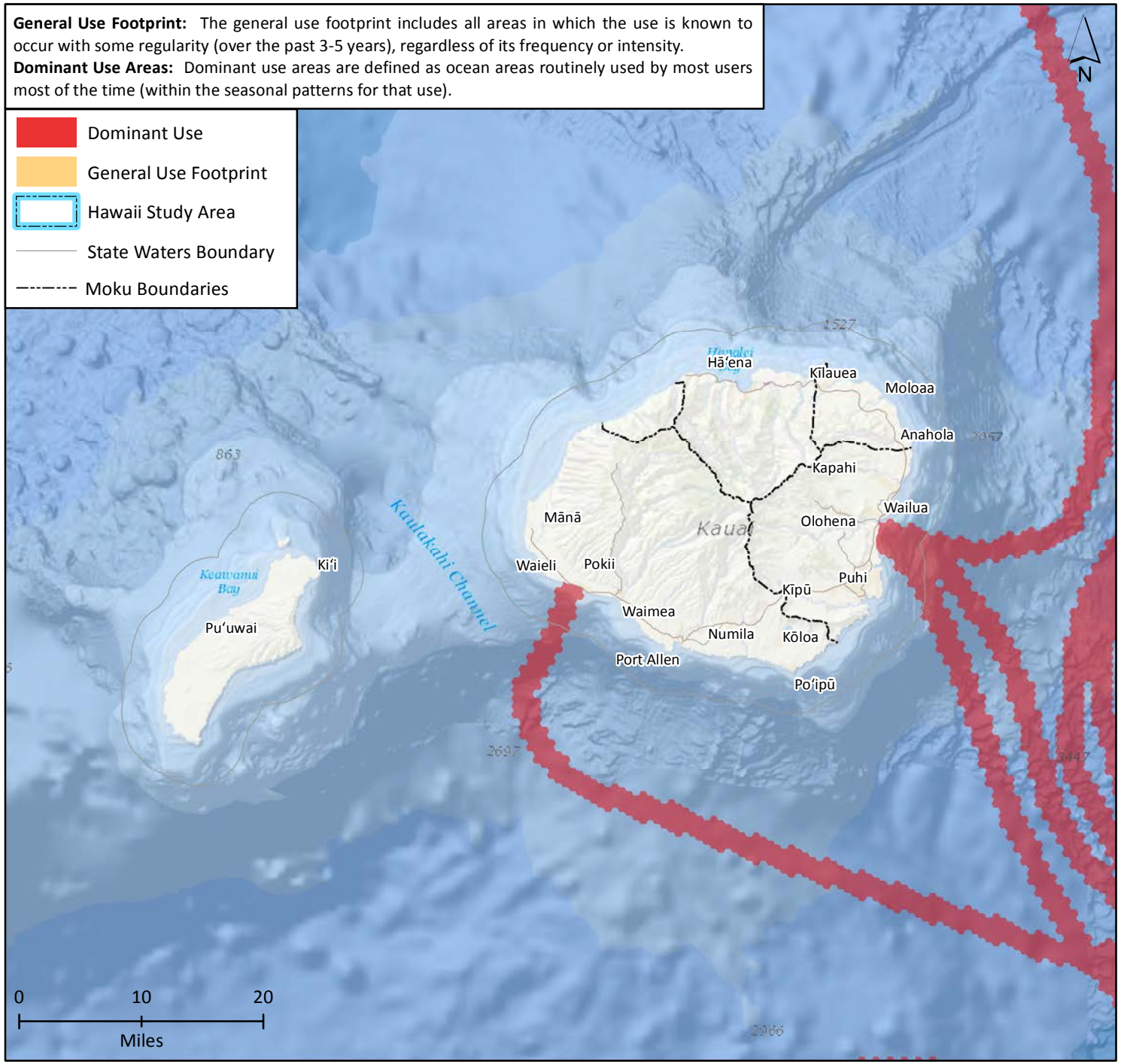

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Beach Use

Includes:
Walking, running, tide pooling, wildlife viewing from shore, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding for recreation or traditional and customary practices

Excludes:
Intertidal Harvest, Mining and Mineral Extraction, Surface Board Sports, Swimming, Mariculture

Statewide Use Notes:
Beach use is active around the Hawaiian Islands wherever there are beach parks, access roads or trails. The primary limiting factors on use are legal restrictions prohibiting access, and physical barriers preventing access. Overall, dominant areas tend to be found near population centers and tourist hotspots like hotels or resorts. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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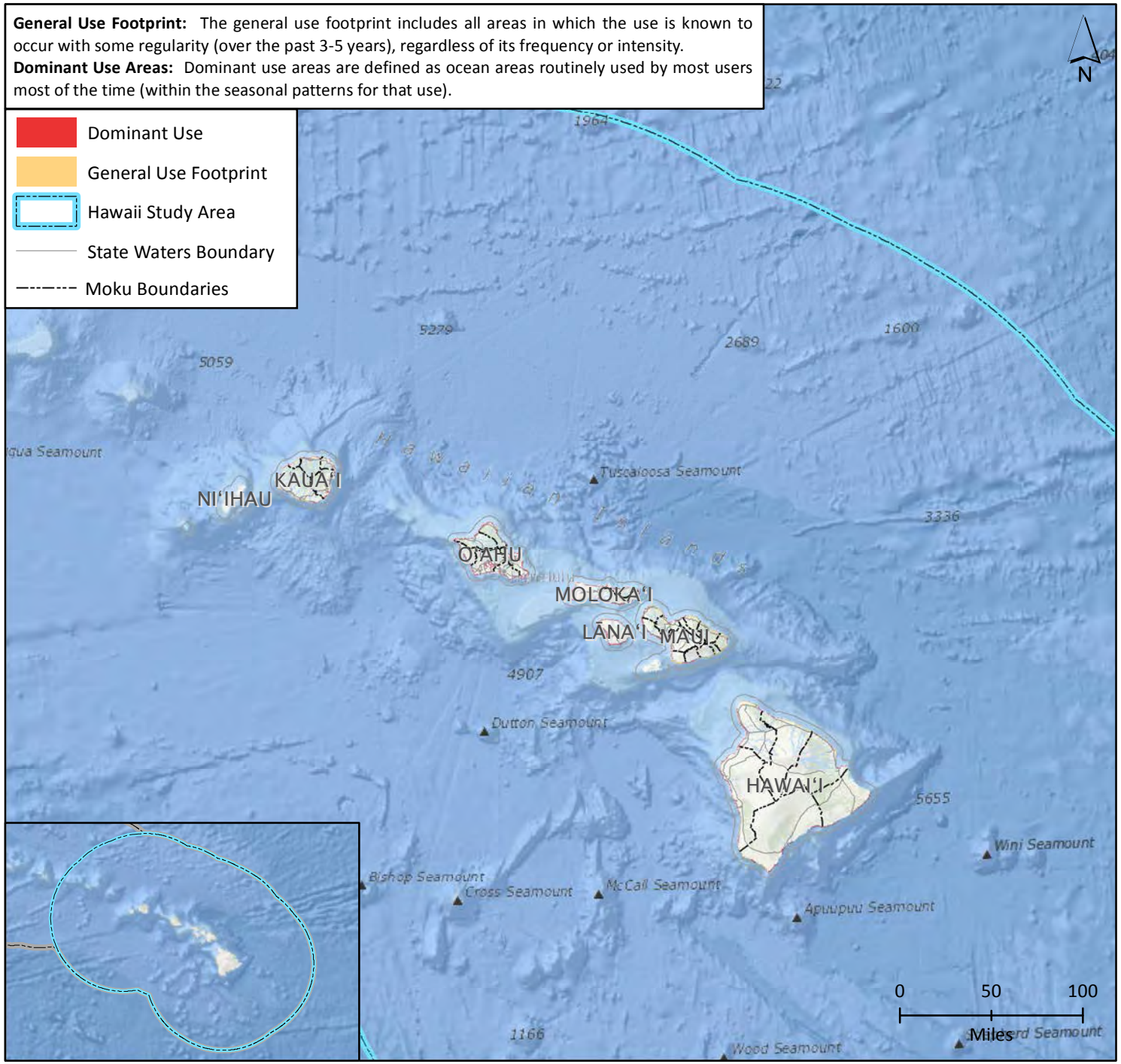

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Beach Use

Includes:
Walking, running, tide pooling, wildlife viewing from shore, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding for recreation or traditional and customary practices

Excludes:
Intertidal Harvest, Mining and Mineral Extraction, Surface Board Sports, Swimming, Mariculture

Island Use Notes:
Beach use is common around Hawaii Island wherever there are access roads or trails. Beaches are used for a variety of activities ranging from flower picking for leis (Poihoiki) to camping and marine debris beach clean ups. Most of the beaches on the Kona side are used heavily, although it is difficult to differentiate specific beach use from terrestrial use (e.g., hiking). For example, the Ala Kahakai National Historic Trail, which connects all state parks, begins and ends in a beach area. The Na Ala Hele trails are also part of this trail system and are well used. The shore along the south coast to South Point is commonly used for overnight camping, specifically at Kohala beach, Polulu beach, Waipio beach, Mahukona beach, Keokea beach, Black Point (before Mahukona), and Lapakahi State Park. Beach parks on the windward side are often collection areas for marine debris and organized clean ups occur regularly at a number of beaches, including Kaupulehu, Kamilo, Koloko, Keauhou Bay, Honuapo, Pohue, Ka'ilikii, Ho'okena and Upolu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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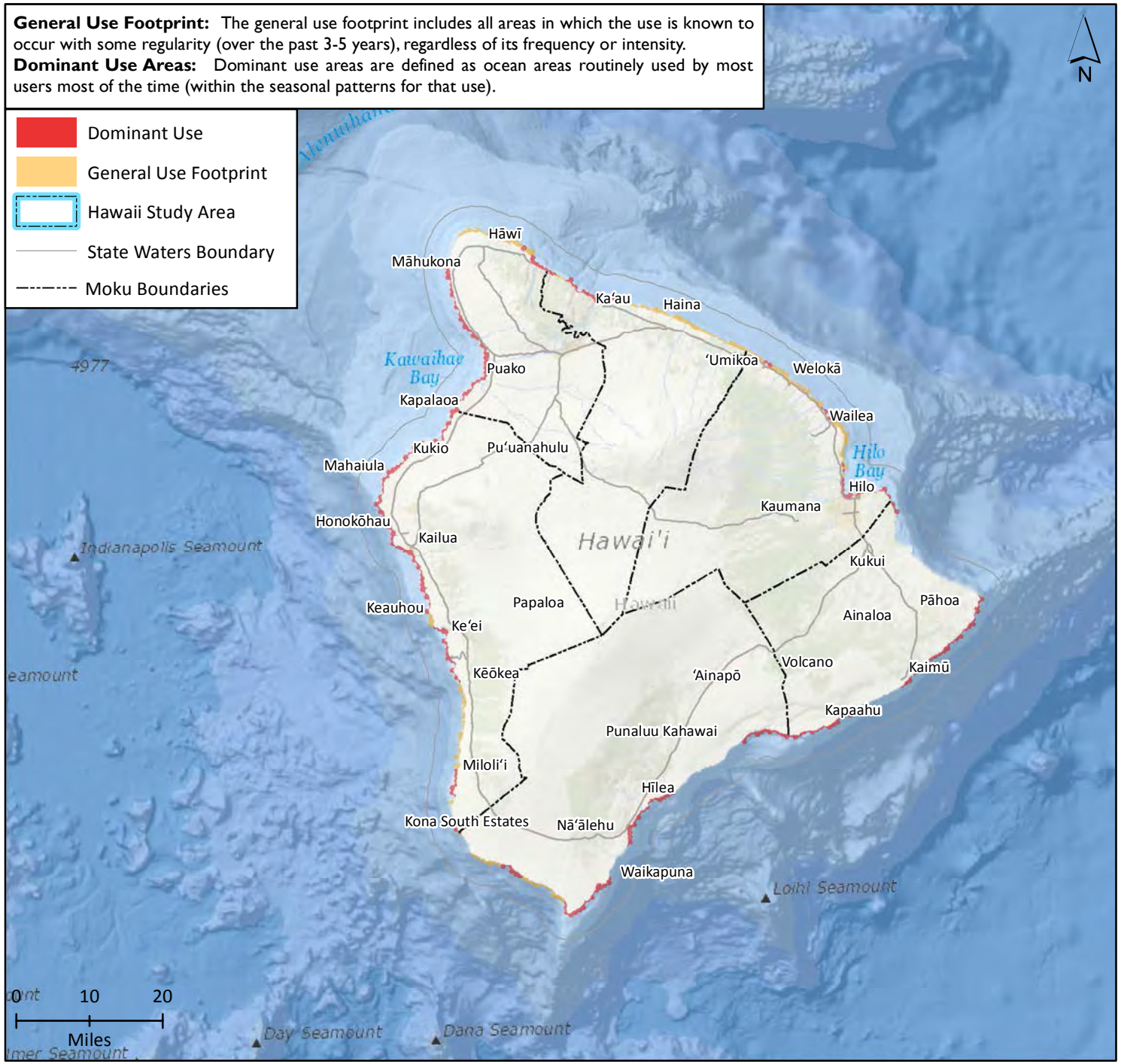


THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Beach Use

Includes:
Walking, running, tide pooling, wildlife viewing from shore, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding for recreation or traditional and customary practices

Excludes:
Intertidal Harvest, Mining and Mineral Extraction, Surface Board Sports, Swimming, Mariculture

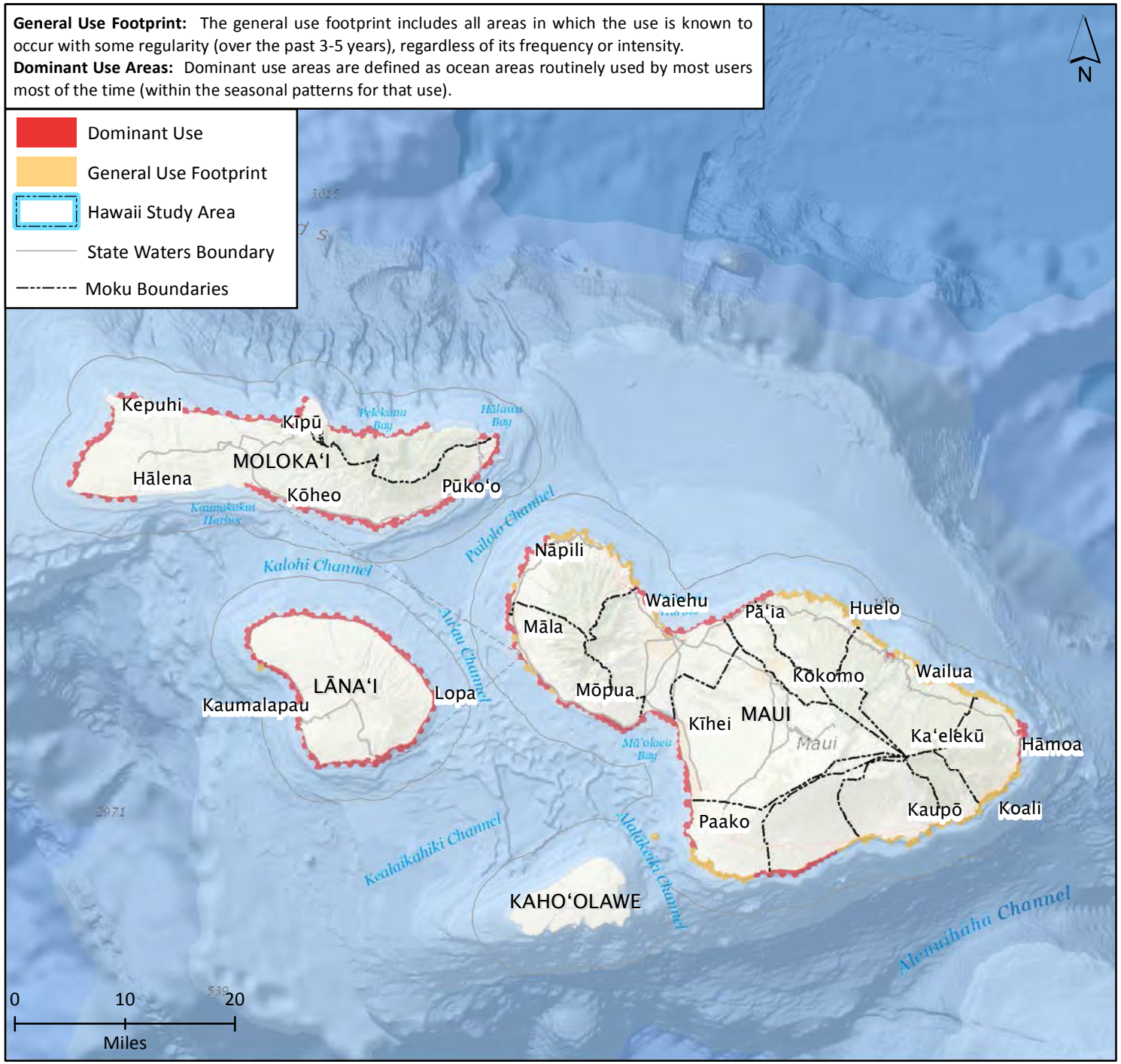
Island Use Notes:

Maui:
Beach use occurs all around the island of Maui and is most concentrated around the coastal beach parks. Availability of fresh water, free parking, and restrooms also influence use patterns. Dominant use areas include Keawakapu, Maalaea Bay, Manuwainui to La Perouse, Hawea Point, and Makalua-puna Point. However, large portions of the coast are private lands leased to ranchers and are inaccessible to the public. The resorts and black sand beaches on the west and south sides of the island are heavily used for camping, tidepooling and birding.

Lanai:
Beach use occurs on all accessible coastal areas along the shoreline on Lanai. Local residents mainly use the west side of the island, while tourists commonly use the coastal areas around the resorts in Manele bay. Some areas that are not easily accessed by land are used by boaters. Beach/shore use can cause disputes with neighboring islanders over littering and fouling of coastal areas.

Molokai:
Beach use occurs on all accessible coastal areas along the shoreline. Dominant use areas are those with safe and easy access to the shore.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Beach Use

Includes:
Walking, running, tide pooling, wildlife viewing from shore, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding for recreation or traditional and customary practices

Excludes:
Intertidal Harvest, Mining and Mineral Extraction, Surface Board Sports, Swimming, Mariculture

Island Use Notes

Beach use is common around Hawaii Island wherever there are access roads or trails. Beaches are used for a variety of activities ranging from flower picking for Lei's (Poihoiki) to camping and marine debris beach clean ups. Most of the beaches on the Kona side are used heavily, although it is difficult to differentiate specific beach use from terrestrial use (e.g., hiking). For example, the Ala Kahakai National Historic Trail, which connects all state parks, begins and ends in a beach area. The Na Ala Hele trails are also part of this trail system and are well used. The shore along the south coast to South Point is commonly used for overnight camping, specifically at Kohala beach, Pololu beach, Waipio beach, Mahukona beach, Keokea beach, Black Point (before Mahukona), and Lapakahi State Park. Beach parks on the windward side are often collection areas for marine debris and organized clean-ups occur regularly at a number of beaches, including Kaupulehu, Kamilo, Koloko, Keauhou Bay, Honuapo, Pohue, Ka`ilikii, Ho`okena and Upolu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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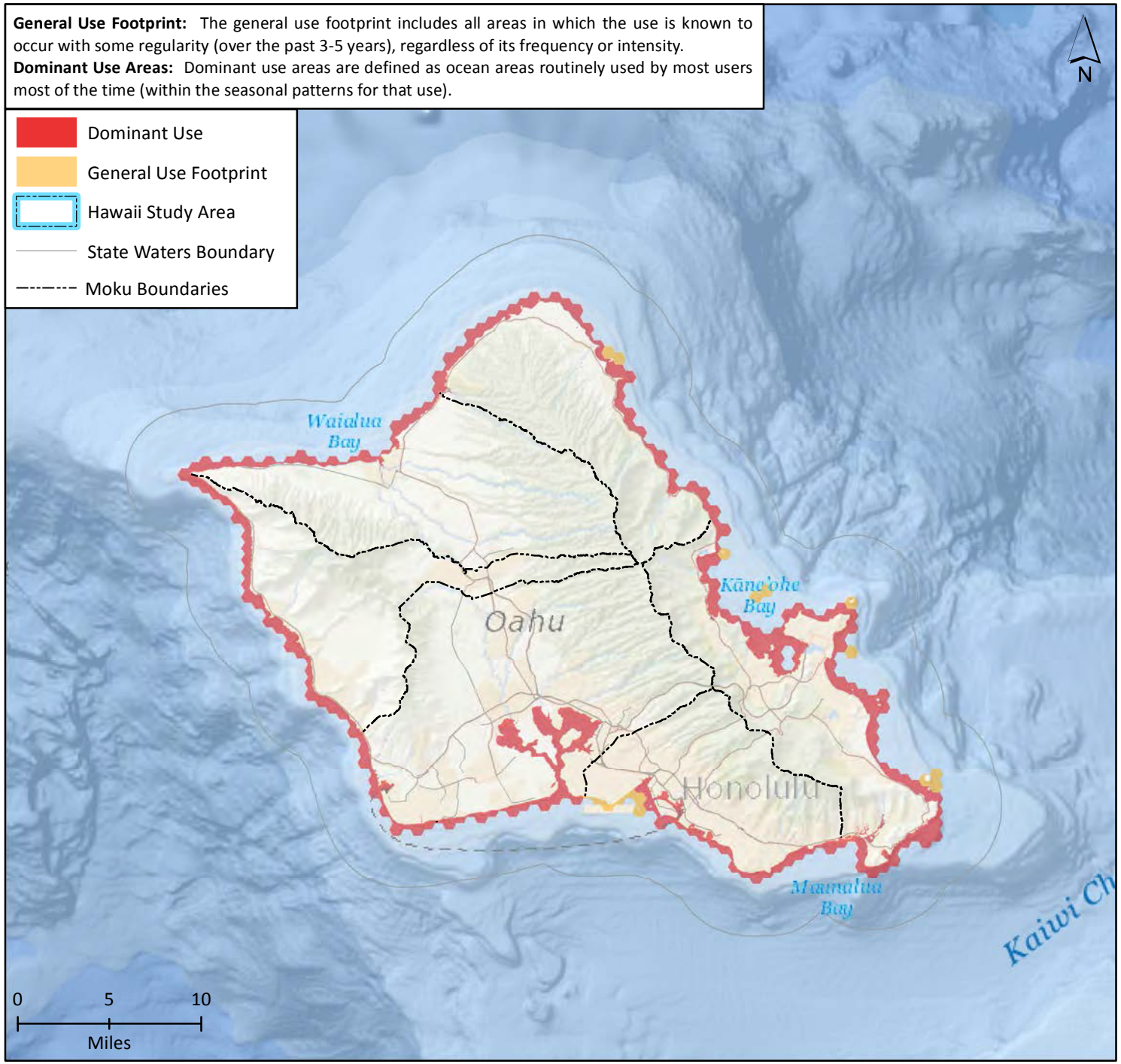


THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

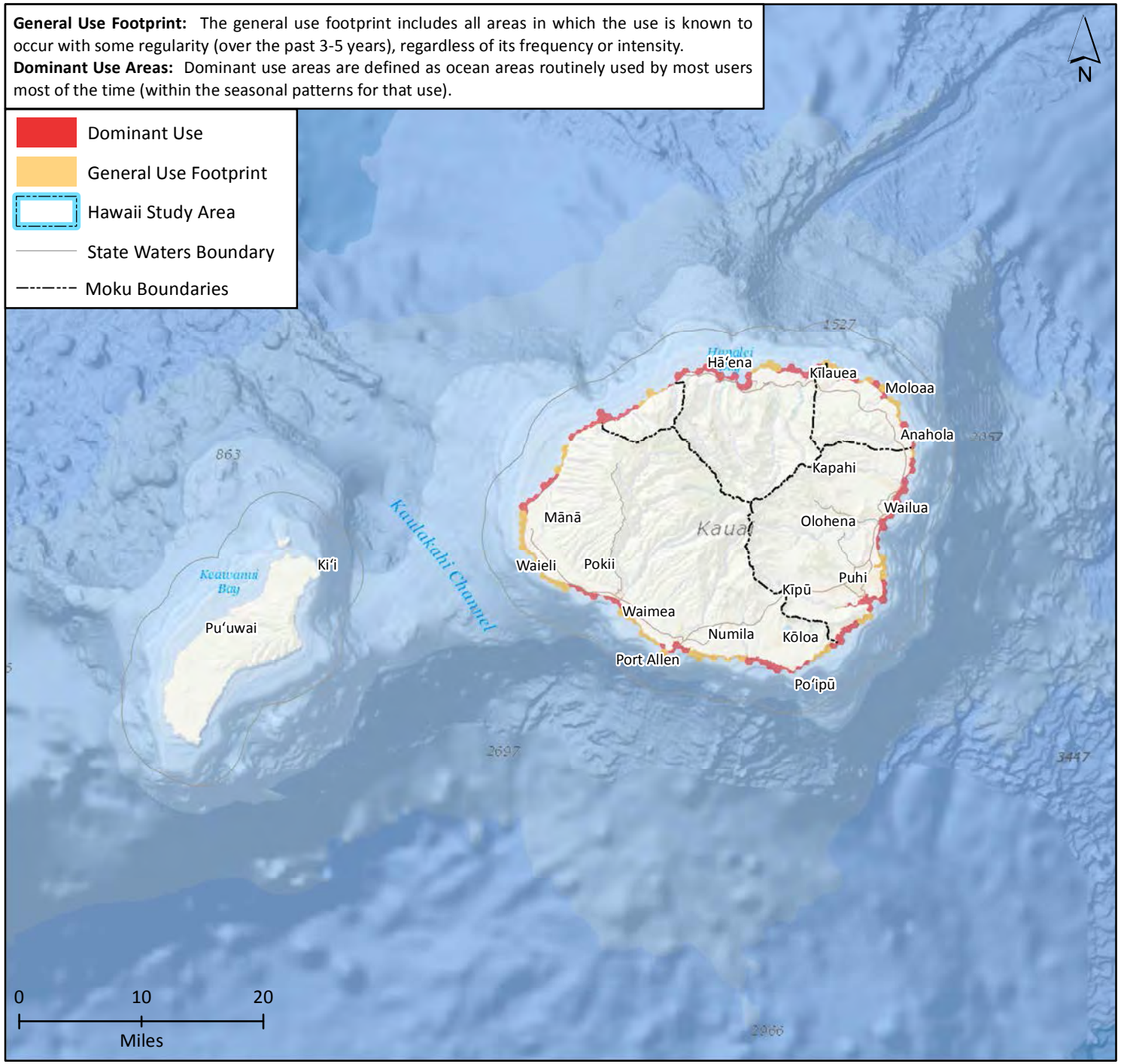
Beach Use

Includes:
Walking, running, tide pooling, wildlife viewing from shore, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding for recreation or traditional and customary practices

Excludes:
Intertidal Harvest, Mining and Mineral Extraction, Surface Board Sports, Swimming, Mariculture

Island Use Notes:
Beach use occurs on all accessible coastal areas along the shoreline. The most commonly used areas include Kekaha, Nohili, Waimea, and Hanamaulu, as well as the beach parks, piers and Kilauea lighthouse area. Areas limited by land-based access are often used by boaters. These include Secret beach to Kalihaiwai and beaches and coves along the Na Pali coast. The only restricted beach area on Kauai is Larsen's beach which is a military restricted zone.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Boating

Includes:
Transit, mooring or anchoring by vessels for recreation or traditional and customary practices. Includes sailboats, personal watercraft (PWC), parasailing, jet boats, jet skis, sailing kayaks and canoes, voyaging canoes, thrill craft rentals and lava tours

Excludes:
Fishing Charters, Wildlife Viewing at Sea, Cruise Ships, Shipping, Military Operations

Statewide Use Notes:
In the Hawaiian Islands, recreational boating areas are adjacent to tourist hot spots. Boating is rarely a recreational activity for local Hawaiians, with the exception perhaps of inter-island sailing canoe races. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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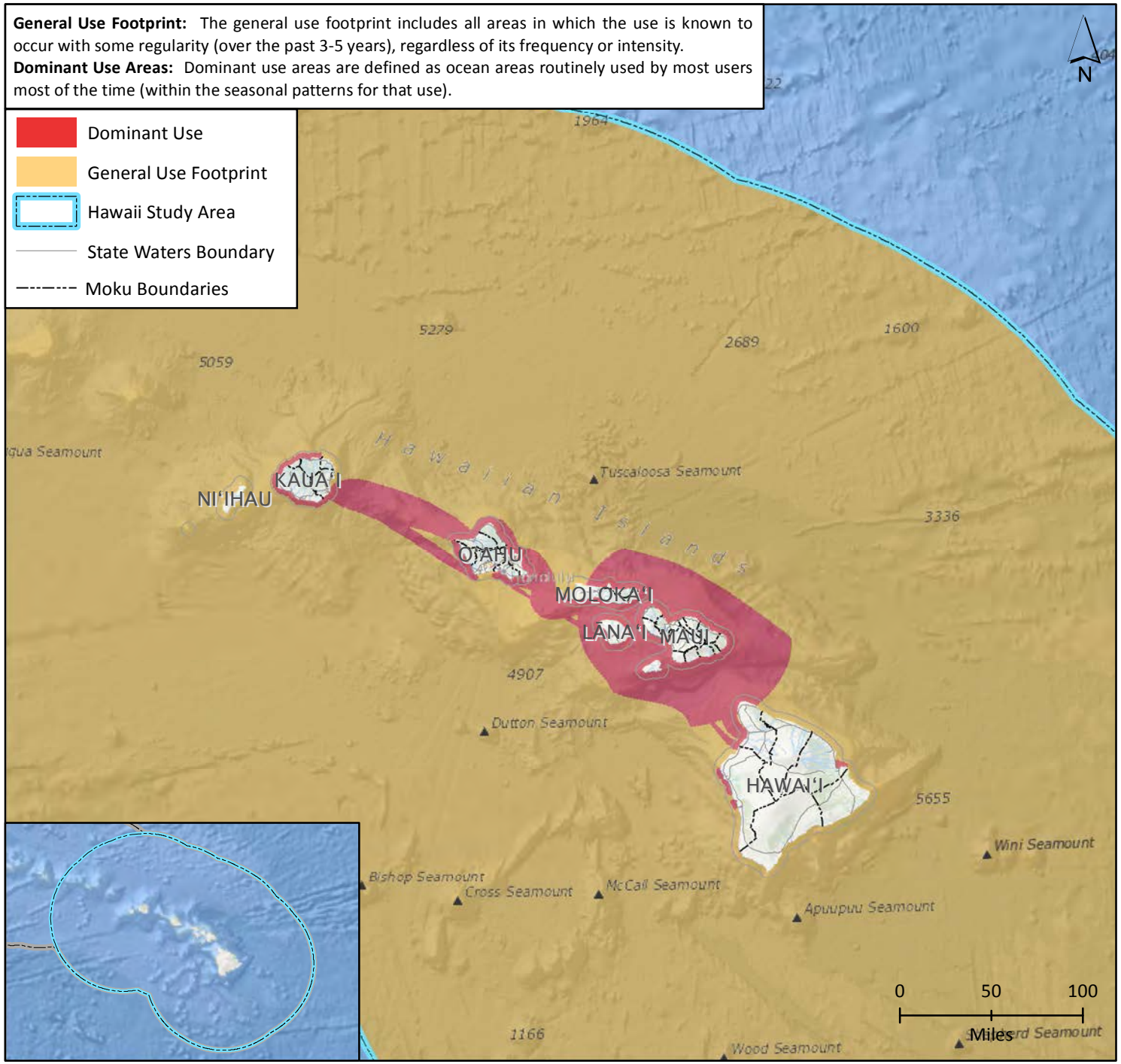

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Boating

Includes:
Transit, mooring or anchoring by vessels for recreation or traditional and customary practices. Includes sailboats, personal watercraft (PWC), parasailing, jet boats, jet skis, sailing kayaks and canoes, voyaging canoes, thrill craft rentals and lava tours

Excludes:
Fishing Charters, Wildlife Viewing at Sea, Cruise Ships, Shipping, Military Operations

Island Use Notes:
Around Hawaii Island, recreational boating occurs mainly near the harbors of Hilo Bay, Kawaihae, Honokohau, Kailua-Kona, Keauhou and Kealakekua. Activities often include sailing (occasional races) and seasonal trips for fishing and wildlife viewing.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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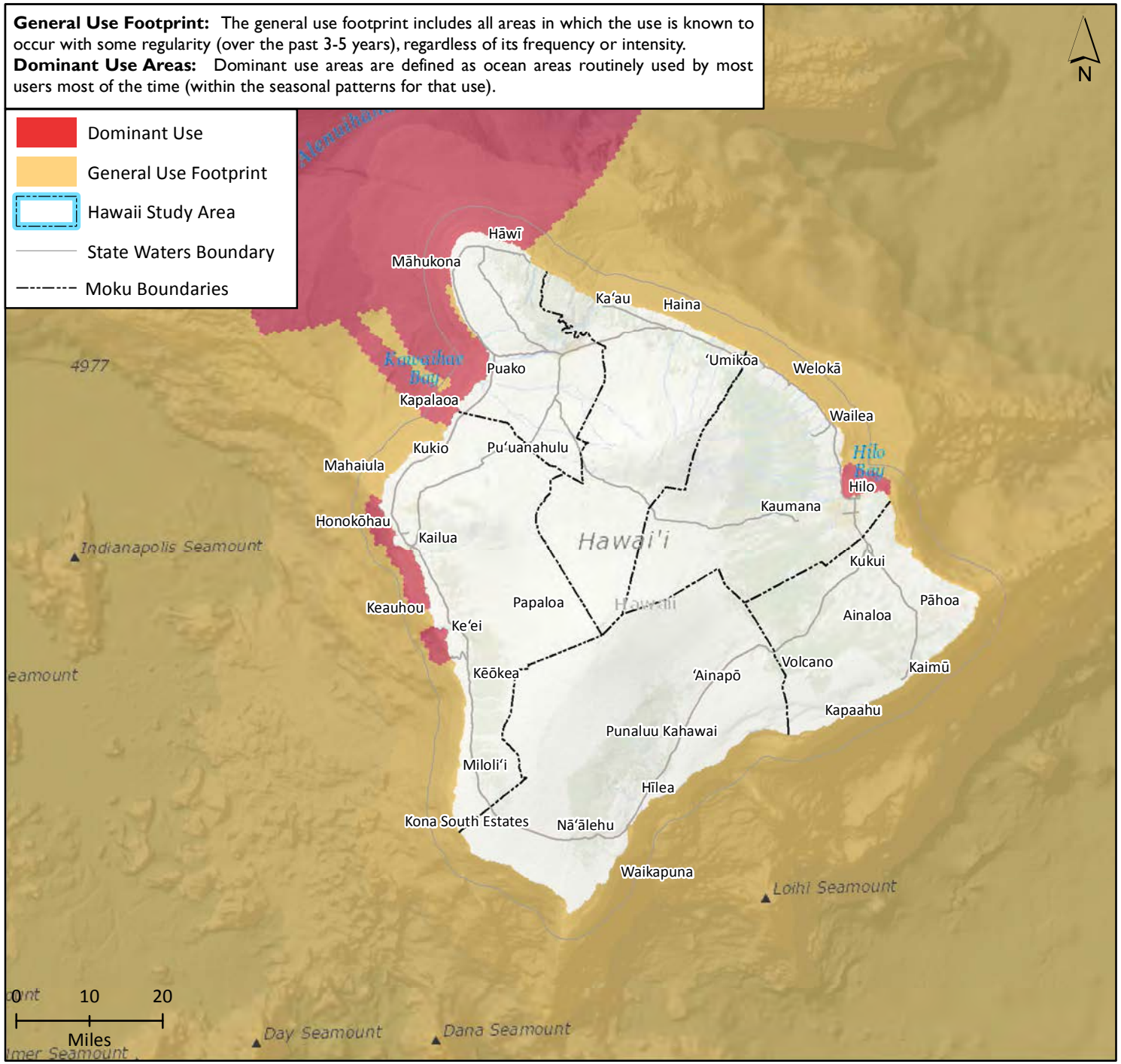

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Boating

Includes:
Transit, mooring or anchoring by vessels for recreation or traditional and customary practices. Includes sailboats, personal watercraft (PWC), parasailing, jet boats, jet skis, sailing kayaks and canoes, voyaging canoes, thrill craft rentals and lava tours

Excludes:
Fishing Charters, Wildlife Viewing at Sea, Cruise Ships, Shipping, Military Operations

Island Use Notes:

Maui:
Boating occurs in and around the interisland channels in the Maui Nui region. Dominant areas are from Maui to Molokai and Molokini, with regular sunset cruises and tourist charters from Maalaea to Molokini among other destinations. The south side of the island is used more by locals than tourists. High speed boating activities with personal watercraft and thrill craft are restricted during whale season.

Lanai:
Recreational boating around Lanai is mainly conducted by tourists and is highly limited by fuel costs. Most of the boating activity occurs in Manele Bay and around Kaumalapau Harbor.

Molokai:
Boating on Molokai is not a recreational activity on Molokai. All boating activity is conducted for transportation or some type of commercial or subsistence-based activity.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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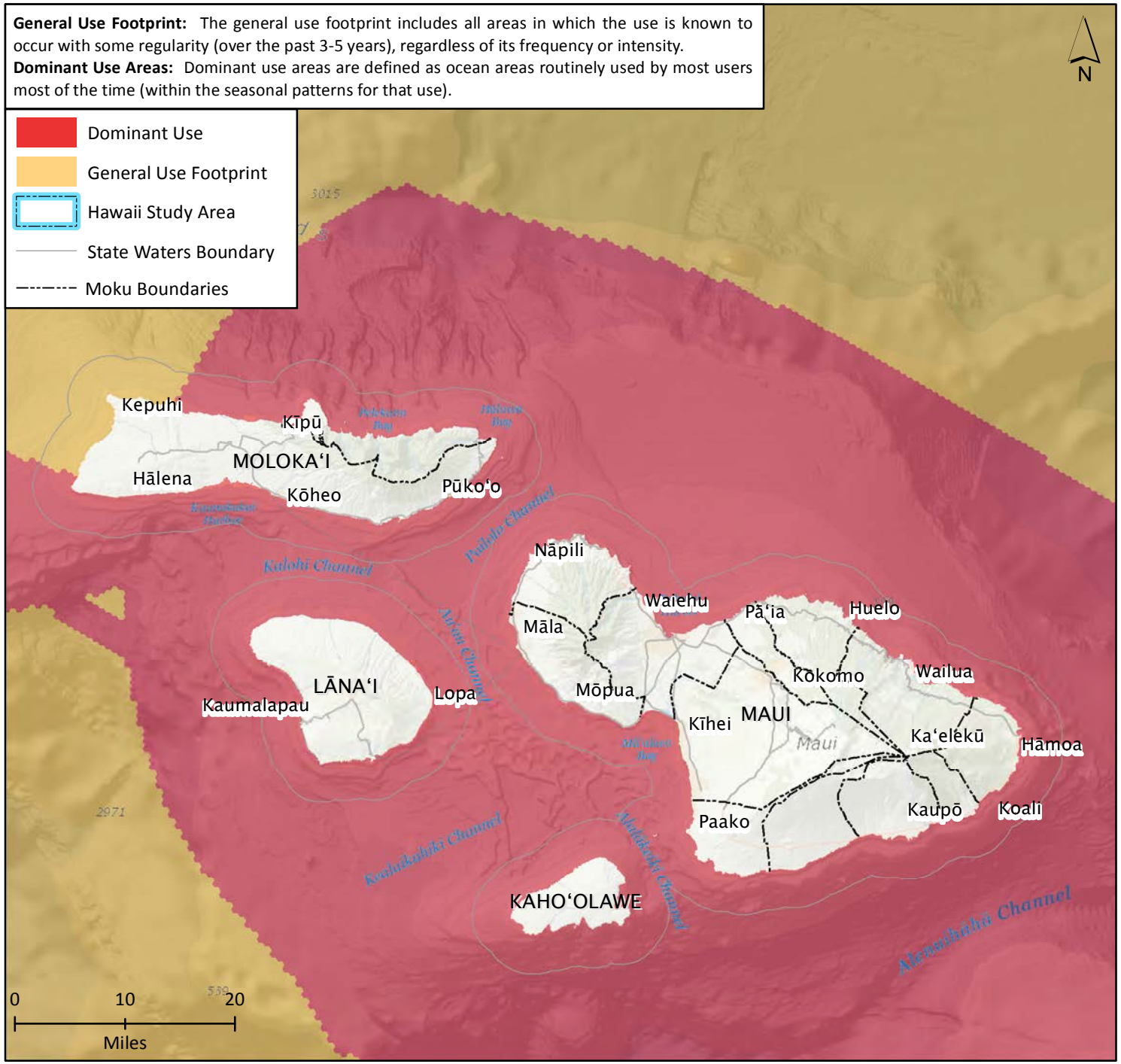

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Boating

Includes:
Transit, mooring or anchoring by vessels for recreation or traditional and customary practices. Includes sailboats, personal watercraft (PWC), parasailing, jet boats, jet skis, sailing kayaks and canoes, voyaging canoes, thrill craft rentals and lava tours

Excludes:
Fishing Charters, Wildlife Viewing at Sea, Cruise Ships, Shipping, Military Operations

Island Use Notes:
Recreational boating around Oahu occurs mostly within the Ala Wai canal and around Sand Island, Haleiwa and Kaneohe Bay. Parasailing, cultural tours (e.g. Pearl Harbor) and sunset cruises operate out of the Honolulu Harbor and Waikiki area and run along the south shore around Diamond Head to Waialua bay. Recreational boating usually occurs within 20 nautical miles from shore, with the exception of sailing. Sailing occurs all around the island, launching mostly from Koolina and Ala Moana Harbors. There are annual inter-island races for traditional sailing canoes and yachts that follow specific routes and are accompanied by safety boats. Some boating conflicts have emerged in recent years (e.g. Kahana Bay) resulting in the designation of management areas to restrict the use of thrill craft motorized vehicles to specific areas.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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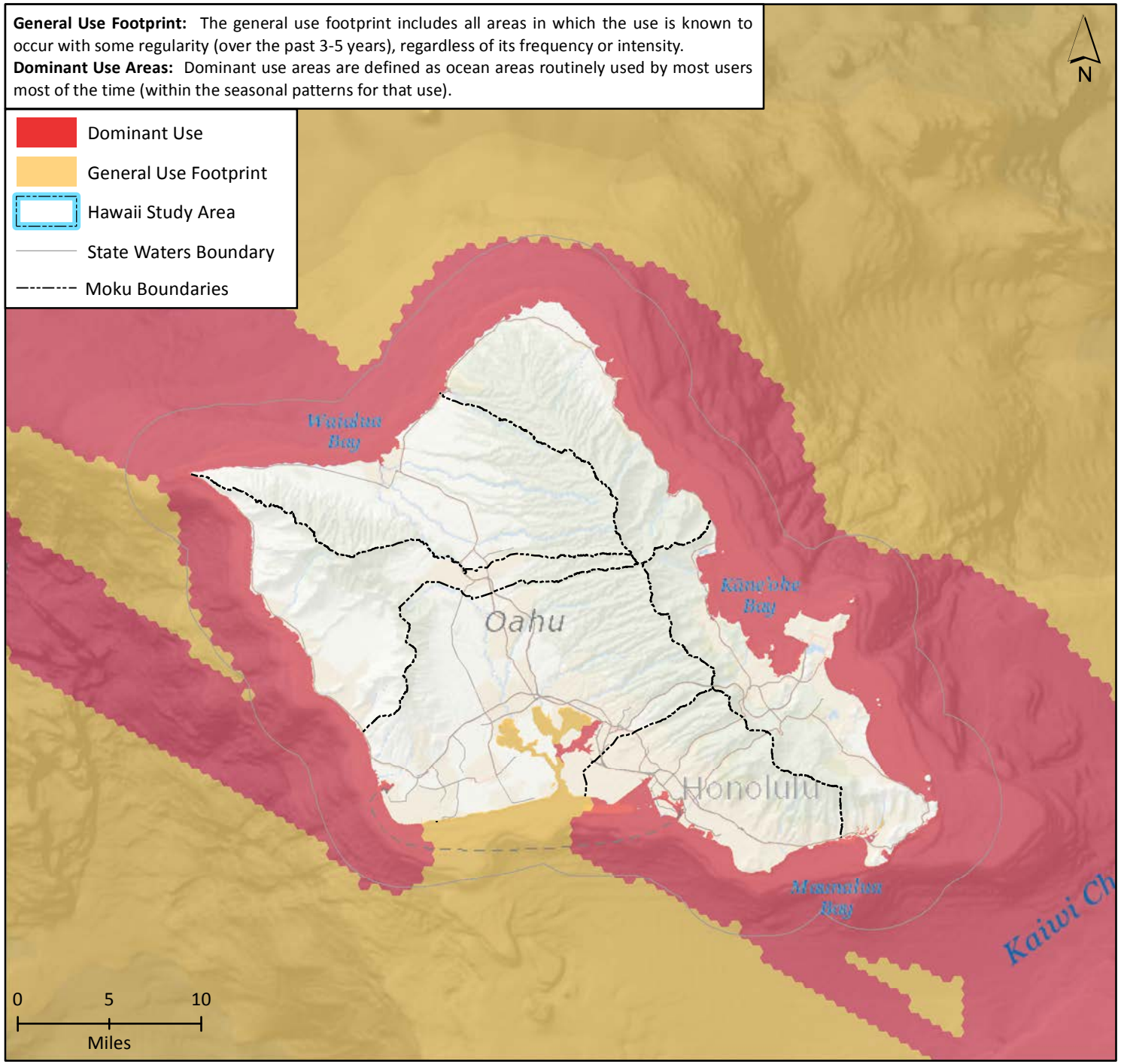


THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

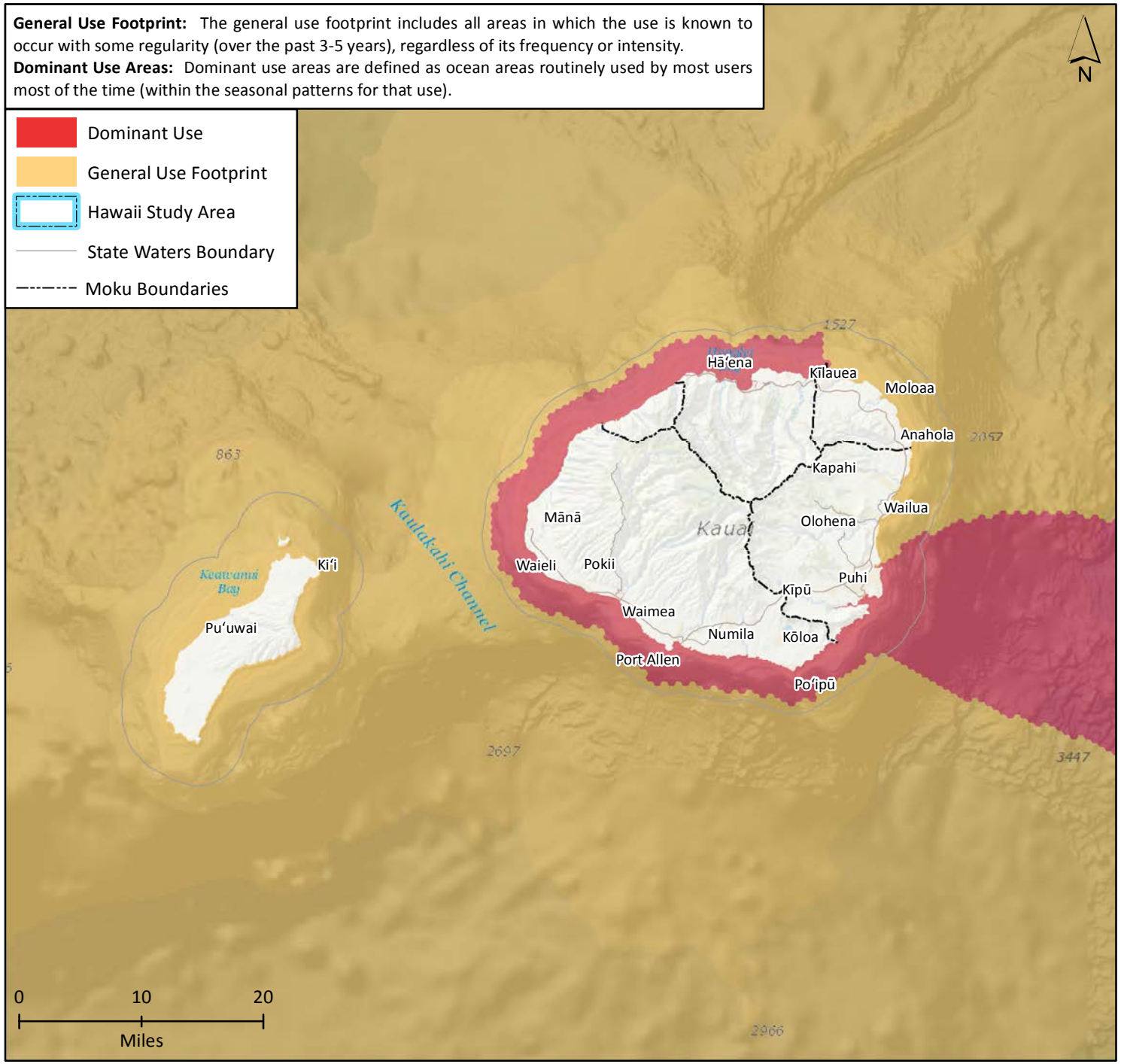
Boating

Includes:
Transit, mooring or anchoring by vessels for recreation or traditional and customary practices. Includes sailboats, personal watercraft (PWC), parasailing, jet boats, jet skis, sailing kayaks and canoes, voyaging canoes, thrill craft rentals and lava tours

Excludes:
Fishing Charters, Wildlife Viewing at Sea, Cruise Ships, Shipping, Military Operations

Island Use Notes:
Boating activity is heavily regulated by the state of Hawaii. It occurs mainly in and around the harbors on Kauai, but is not generally a recreational activity. Most boaters are on the water for other purposes, .e.g. to fish or run a tour or charter. There are a number of charter boats that operate sunset tours and trips around Niihau.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Paddling

Includes:
Outrigger canoe paddling, paddle-driven kayaking, kayak-based snorkeling or free diving, and flat-water stand up paddle boarding for recreation or traditional and customary practices

Excludes:
Charter/commercial boating, use of motorized vessels, surf-style stand up paddling

Statewide Use Notes:
Paddling in general is a dominant use across all Hawaiian Islands. The use area is limited by ocean conditions and coastal access. Dominant canoe paddling areas are adjacent to the paddling clubs, while dominant areas for standup and kayak paddling are often near population or tourist centers. Paddlers will generally travel a maximum of 3 nautical miles offshore unless paddling inter-island. Inter-island paddlers will have an accompanying support boat. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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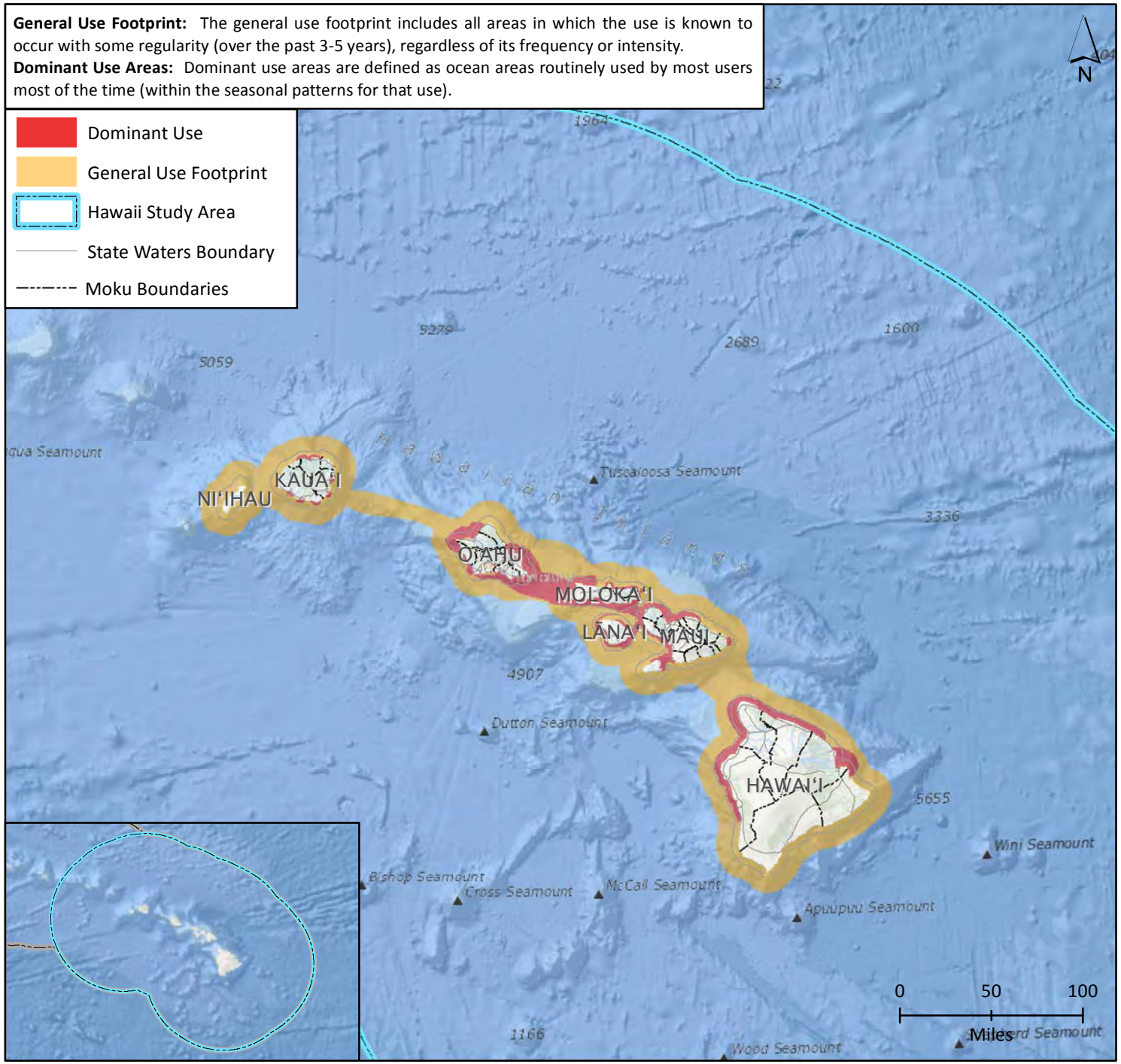

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Paddling

Includes:
Outrigger canoe paddling, paddle-driven kayaking, kayak-based snorkeling or free diving, and flat-water stand up paddle boarding for recreation or traditional and customary practices

Excludes:
Charter/commercial boating, use of motorized vessels, surf-style stand up paddling

Island Use Notes:
Paddling is a very popular activity throughout the island. On the windward side, Hilo Bay is the most commonly used area for both outrigger canoe paddling and stand-up paddle boarding, with use concentrated mainly on the west side of the bay away from boat launches and jet skis. Within Hilo Bay, one-man canoe paddling has increased in popularity in recent years; ~40 canoes can be observed on any given day, paddling out to ~1 nautical mile from shore. The one-man race season runs from December through March (although it is a year-round activity). Similarly, there are seasonal stand-up paddle races at Keokea, Kawaihae and Kiholo run by the Live Strong foundation. Ka'alu'alu Bay is a very popular place for stand-up paddle boarding and surfing. On the leeward side, canoe paddling occurs within 2 miles from shore from Ho'okena to Laupahoehoe. There are interisland paddle races and Pacific voyaging sailing canoes run by the Makali'i Voyage Canoe Club (Na Kalai Wa'a non-profit organization).

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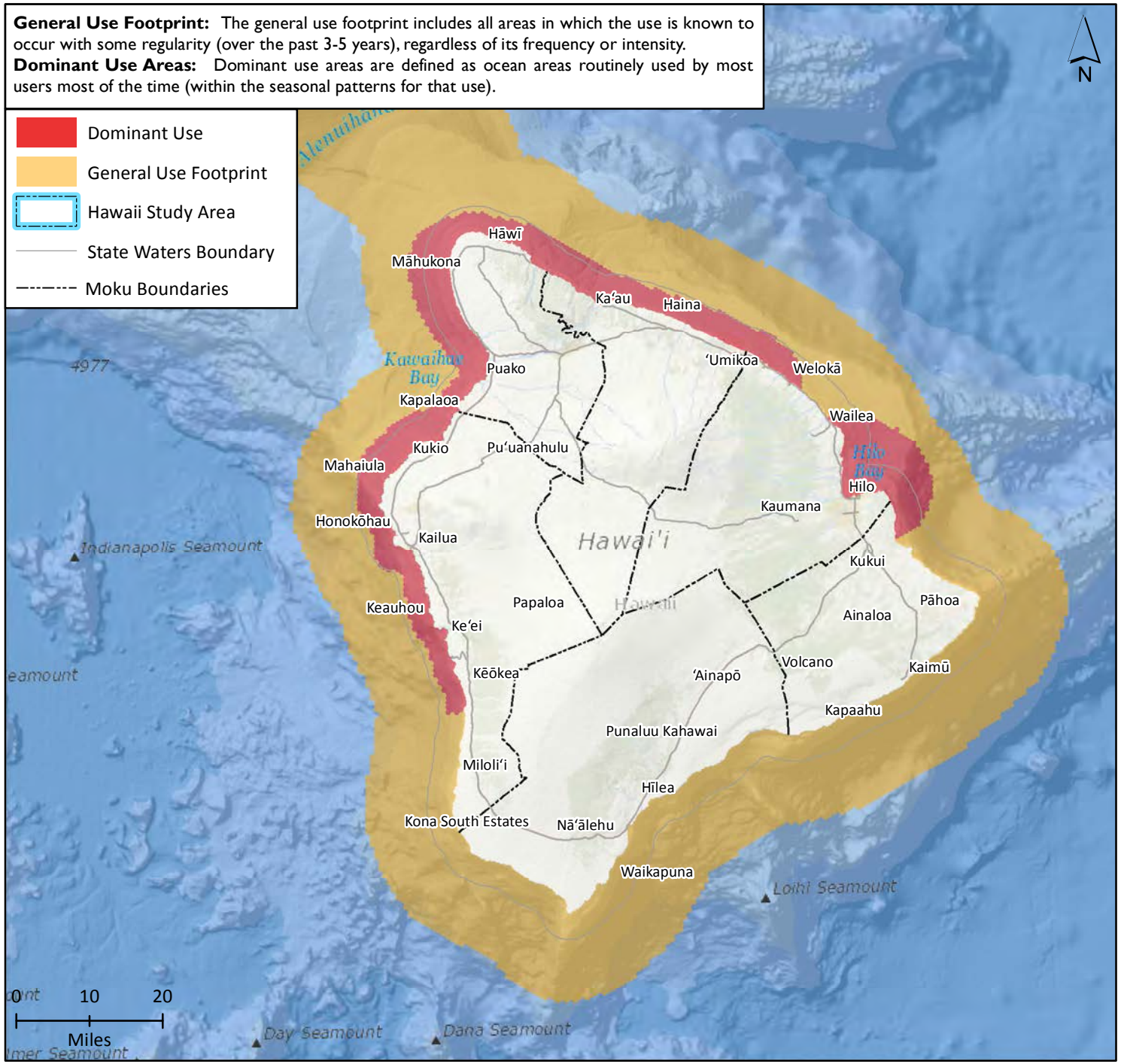


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Paddling

Includes:
Outrigger canoe paddling, paddle-driven kayaking, kayak-based snorkeling or free diving, and flat-water stand up paddle boarding for recreation or traditional and customary practices

Excludes:
Charter/commercial boating, use of motorized vessels, surf-style stand up paddling

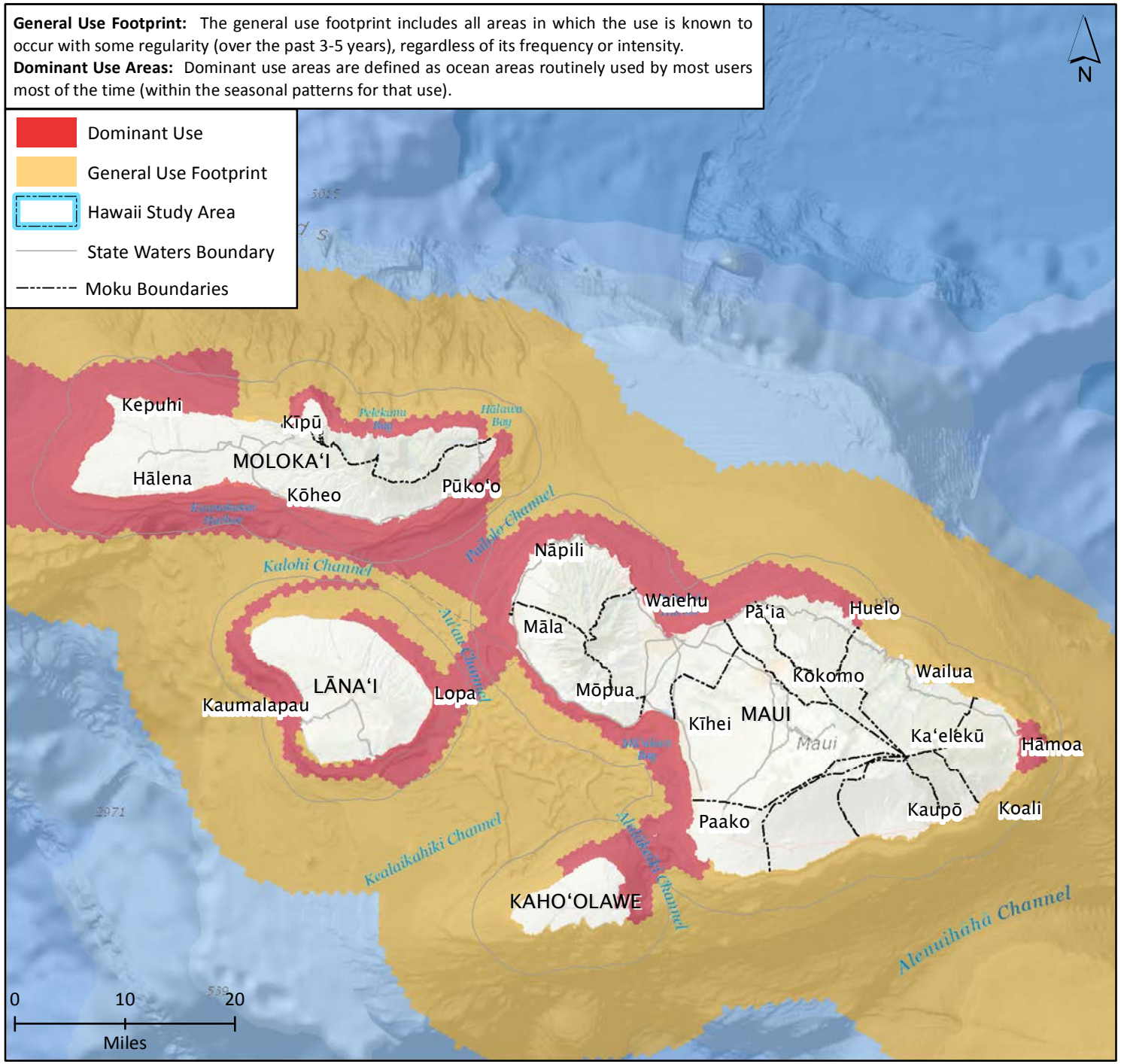
Island Use Notes:

Maui:
Generally, paddling occurs all around Maui out to 5 miles offshore. Dominant paddling areas are found around Kihei and Wailea, Maliko Bay to Kahului Bay, and Maalaea to Makena. There are canoe clubs in Lahaina, Napili and Kahana, Na Kai Ewalu, and Lae Ula O Kai. Practice routes for paddlers can be found around the island with one of the more common routes out to and around Kahoolawe. There are also numerous inter-island paddle races.

Lanai:
Traditional paddling occurs mainly near Manele Bay and along the beaches at Kaiolohia and Lopa. Kayaking and stand-up paddleboarding are also very common in Manele Bay. Paddling is more common on the south side of the island due to more favorable conditions.

Molokai:
Paddling occurs mainly along the south coast. The dominant use area extends ~ 2-3 miles offshore between Kamalo and Haleolono Harbor. Paddle regattas occur inside the Kaunakakai Harbor and the Pailolo Channel with regular inter-island races between from Molokai to Oahu and Maui to Molokai. Stand-up and prone paddleboards and one-man canoes tend to stay closer to shore (within 2 miles) while outrigger canoes venture significantly furtherlonger distances. Guided and self-guided kayak tours are available on the northeast of the island.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Paddling

Includes:
Outrigger canoe paddling, paddle-driven kayaking, kayak-based snorkeling or free diving, and flat-water stand up paddle boarding for recreation or traditional and customary practices

Excludes:
Charter/commercial boating, use of motorized vessels, surf-style stand up paddling

Island Use Notes:
Paddling occurs all around the island out to a distance of ~ 6 nautical miles from shore, but the use is highly seasonal. November to February is the training season; March to May is one-man season; and June to August the racing season. Paddle clubs tend to have designated practice areas, while the interisland channels are used for both paddling practice and races. The Kaiwi channel is widely used for several annual inter-island races (e.g., Hawaii Island to Molokai). In addition to outrigger teams, these races can be run by standup paddlers and one man canoes. Some farther race routes e.g. Kauai or Niihau to Oahu are completed by sailing canoes. Weather and ocean conditions will influence these races and boats on long races will be escorted by fishing boats.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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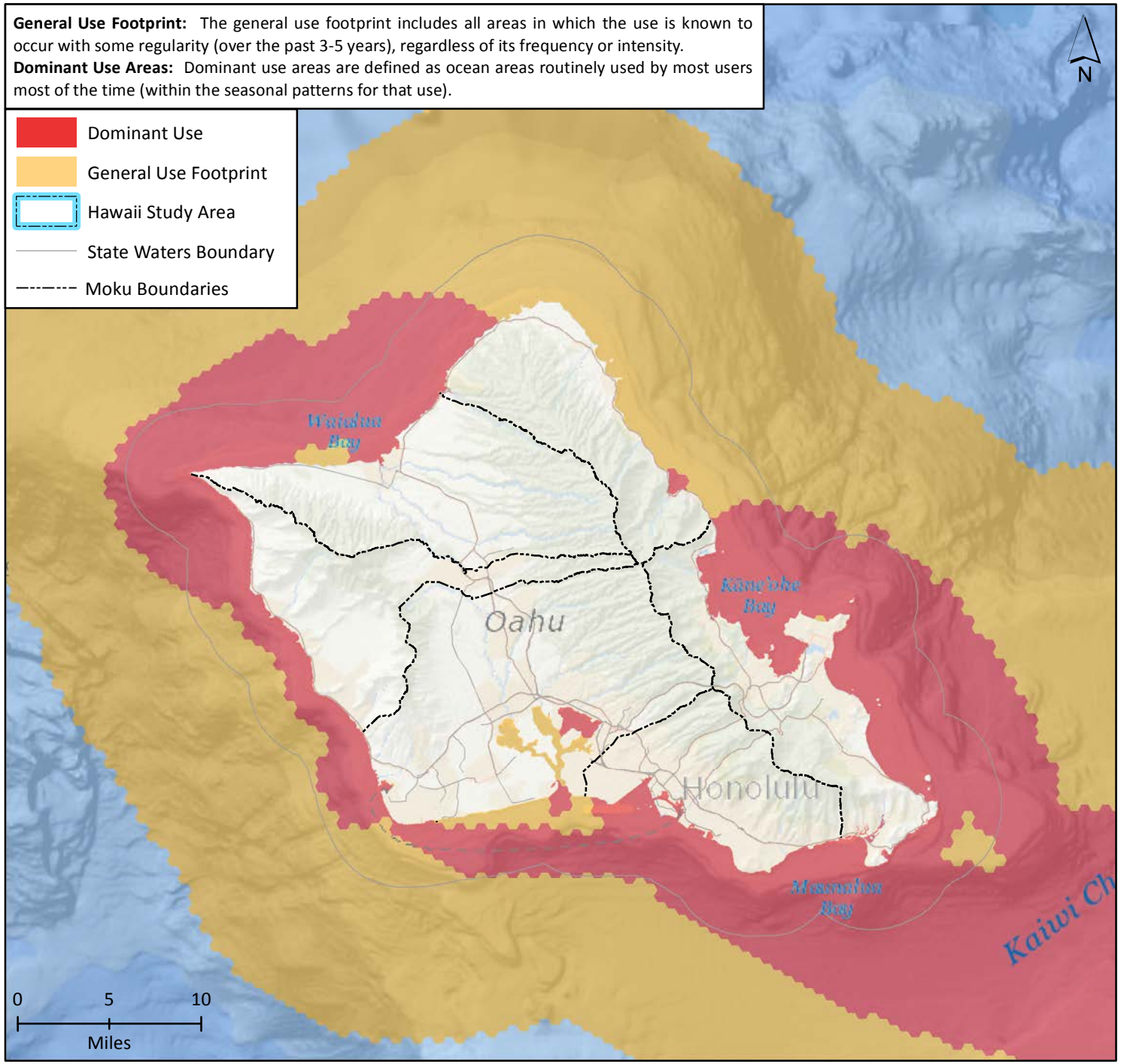

 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Paddling

Includes:
Outrigger canoe paddling, paddle-driven kayaking, kayak-based snorkeling or free diving, and flat-water stand up paddle boarding for recreation or traditional and customary practices

Excludes:
Charter/commercial boating, use of motorized vessels, surf-style stand up paddling

Island Use Notes:
Paddling and paddleboarding occurs all around the island and in the coastal river areas with access being the primary limiting factor. The area surrounding the canoe clubs are most widely used from the shoreline out to a distance of one mile. Hanalei Bay, Wailua River, Anahola Bay, Niumalu, Koloa, Hanapepe, and Waimea are commonly used areas for this activity. There are a number of paddling races on Kauai (e.g. annual Na Pali coast standup paddleboard race) but these rarely cross the Kauai channel with the exception of sailing canoe races. There are a number of restrictions that prohibit the landing of paddle boats and canoes in the wildlife refuge and restrict use in specific areas along the Huleia and Hanepepe river to protect cultural resources.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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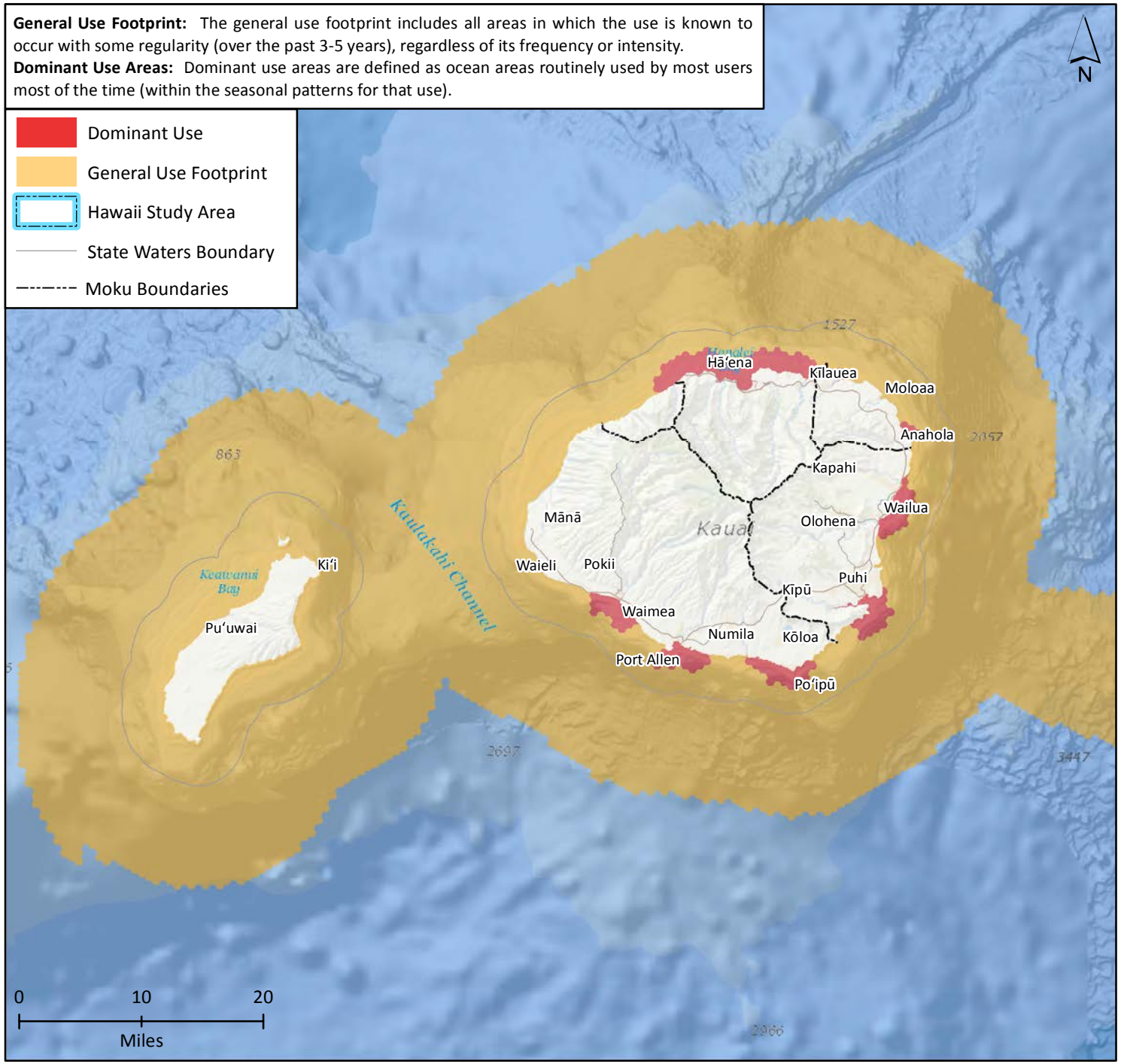

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Permanent Research Areas

Includes:
Sites, transects, and specific areas monitored or studied for research or traditional and customary practices

Excludes:
Motorized Boating, Commercial Shipping

Statewide Use Notes:
Permanent research is being conducted throughout the islands by a wide range of universities, government agencies and NGOs. Much of the ocean research is focused on water quality, reef health and climate change impacts. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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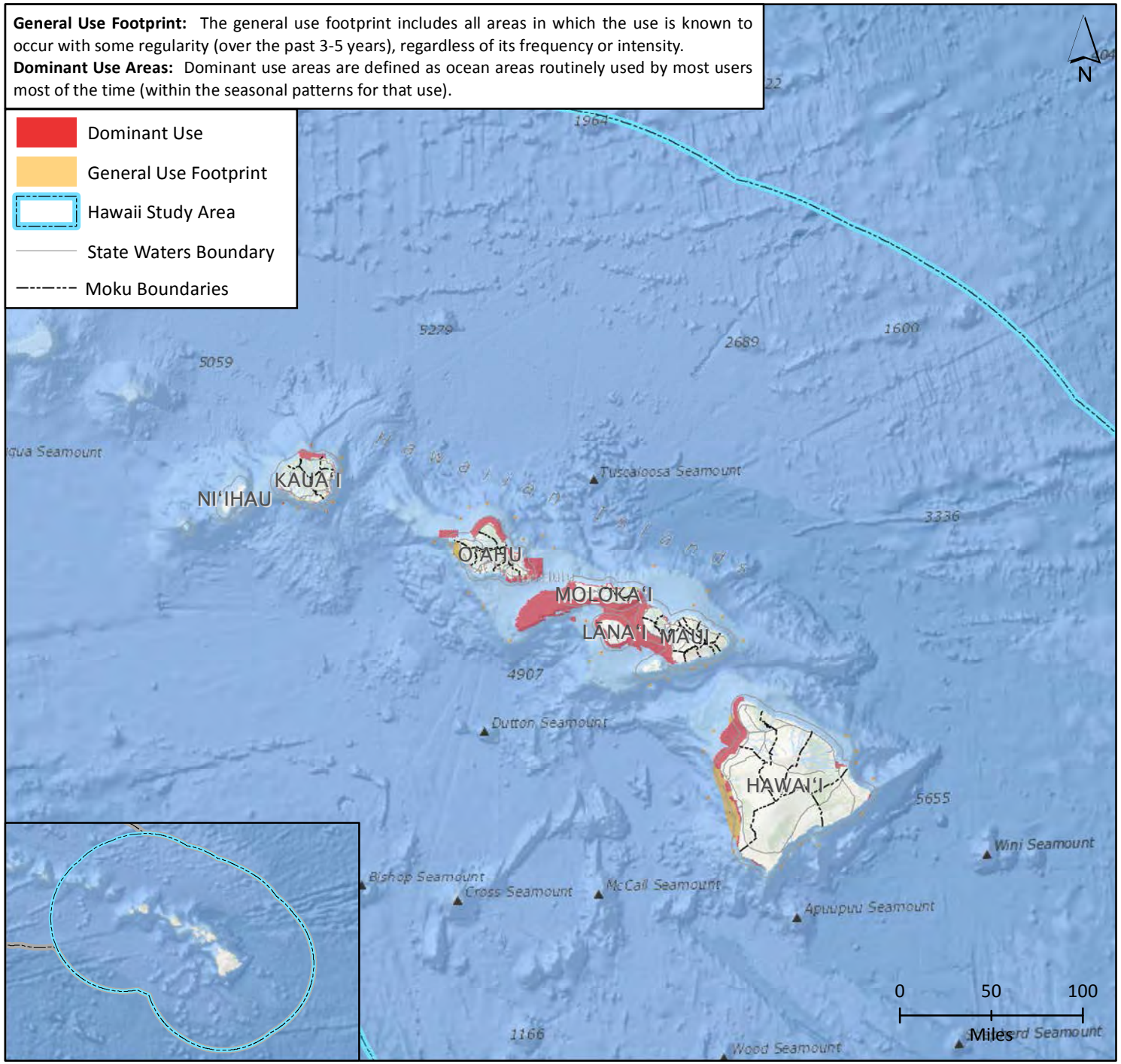

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Permanent Research Areas

Includes:
Sites, transects, and specific areas monitored or studied for research or traditional and customary practices

Excludes:
Motorized Boating, Commercial Shipping

Island Use Notes:
The primary permanent research areas surrounding Hawaii island are fishing related and include the state-managed Fish Aggregation Devices (FADs), Fish Replenishment Areas (FRA), and Fishery Management Areas (FMA) (see Hawaii fishing regulations booklets for more details). In addition, there is a network of PacIOOS, NOAA weather and tsunami warning buoys whose locations can be found on their respective websites. On the Kona side of the island, two organizations run regular scientific monitoring, Liquid Robotics (Kawaihae) running drones and Jupiter Research foundation (Puako), both of which use the area 3 - 5 miles offshore around their launch points. More localized projects include fishpond monitoring and restoration and phytoplankton counts for algal bloom monitoring in Hilo Bay.

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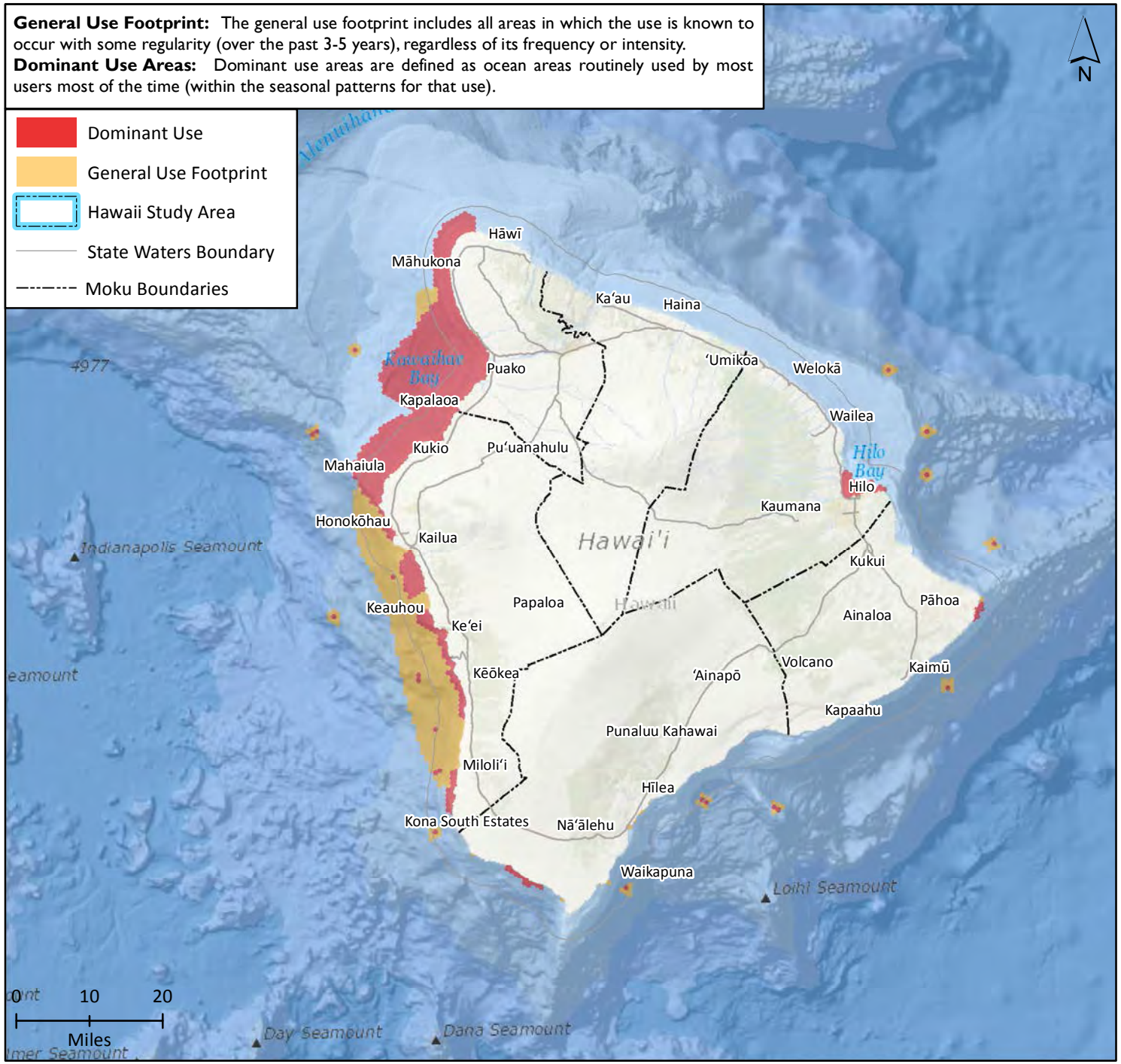

 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Permanent Research Areas

Includes:
Sites, transects, and specific areas monitored or studied for research or traditional and customary practices

Excludes:
Motorized Boating, Commercial Shipping

Island Use Notes:

Maui:
Permanent research areas exist throughout Maui. The dominant areas include La Perouse Bay to Honolua Bay (Humpback Whale National Marine Sanctuary monitoring of whales, monk seal, and turtles); South and West Maui uplands (water quality studies); Kahana wetland (bird monitoring); Waiehu (limu study and restoration); and Aha Moku (changes in opelu run).

Lanai:
Permanent research areas exist throughout the island, with some of the more well-known areas used for monk seal tagging, traditional fishpond restoration, water quality studies (to assess the impacts of terrestrial manmade features such as golf courses and their effects on local reefs and bays) and whale counts (part of the Humpback Whale National Marine Sanctuary monitoring program).

Molokai:
Permanent research sites operated by the US Geological Survey and The Nature Conservancy (and others) on Molokai are designed to monitor land use watershed, water quality, stream runoff, and coral reef health on the south side of the island. The north side of Kamalo Bay is also a monitoring site with turtle and shearwater nesting areas and bird sanctuary.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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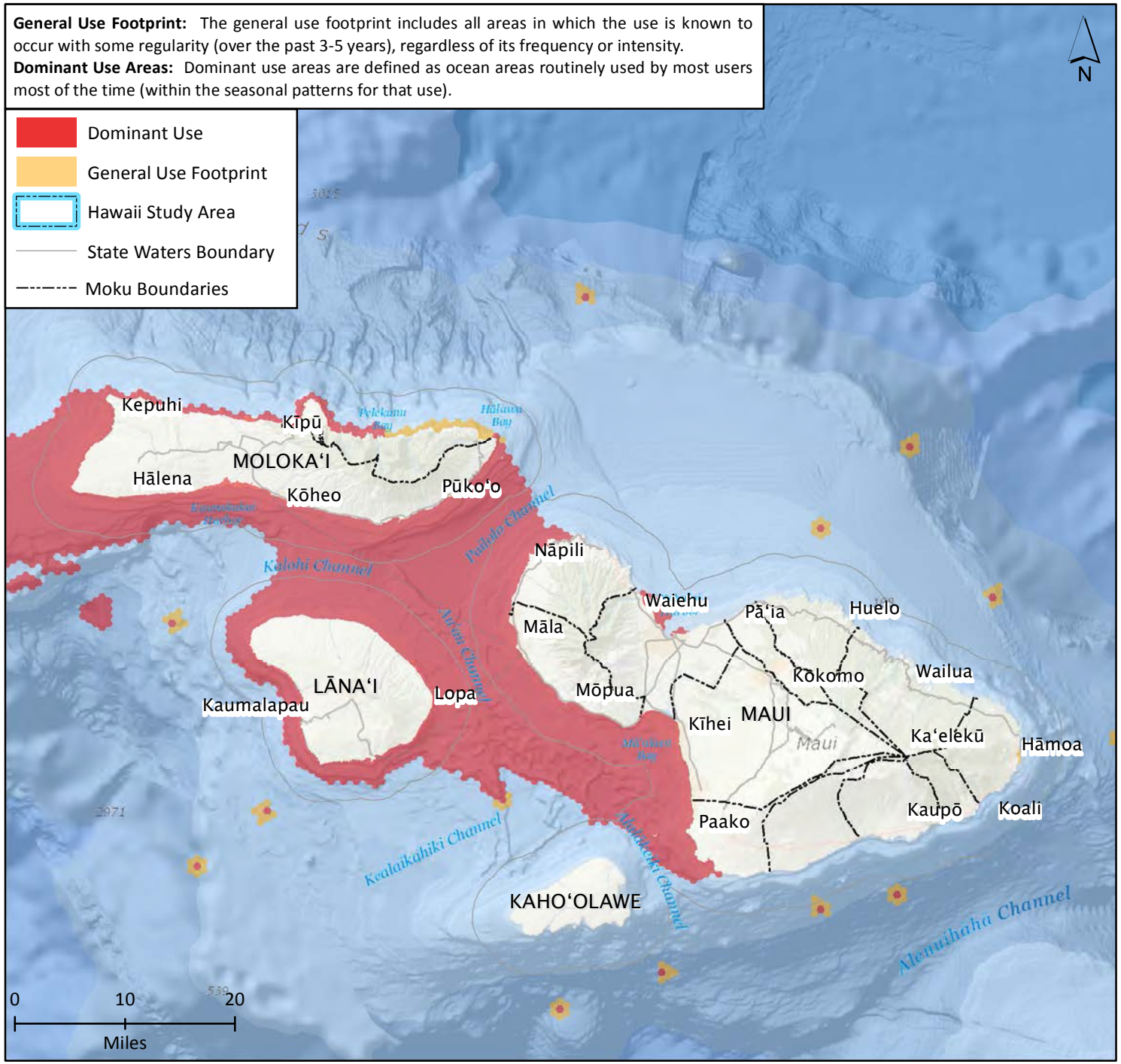

 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Permanent Research Areas

Includes:
Sites, transects, and specific areas monitored or studied for research or traditional and customary practices

Excludes:
Motorized Boating, Commercial Shipping

Island Use Notes:
Most permanent research areas on Oahu are monitoring sites for existing state marine protected areas, the Humpback Whale National Marine Sanctuary, or University funded research (e.g. Coconut Island in Kaneohe Bay). Oceanographic buoys are funded by PacIOOS (Pacific Integrated Ocean Observing System) and the HOT (Hawaii Oceanographic Time series). The Department of Health manages the CRAM (California Rapid Assessment Methods) sites and standard beach water quality sites around the island.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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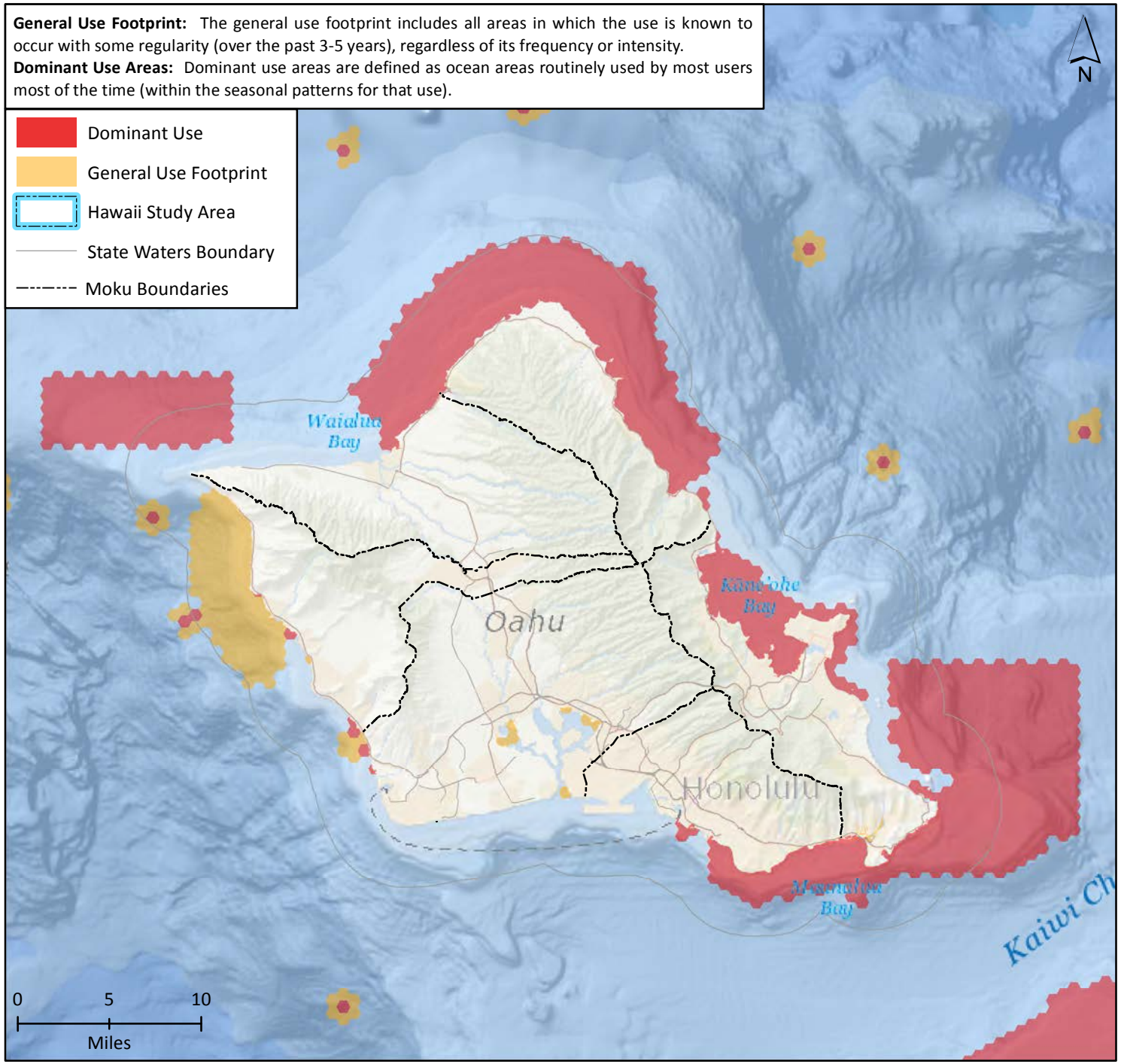

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THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

Permanent Research Areas

Includes:
Sites, transects, and specific areas monitored or studied for research or traditional and customary practices

Excludes:
Motorized Boating, Commercial Shipping

Island Use Notes:
There are a series of permanent research areas on Kauai, mainly on the east side of the island. Surfrider Foundation maintains a series of long term projects that involve monitoring of marine mammals, coastal sand movement, reef monitoring, water quality sampling and collection of traditional knowledge. Hanalei Bay has permanent coral monitoring sites that have been ongoing for over 15 years.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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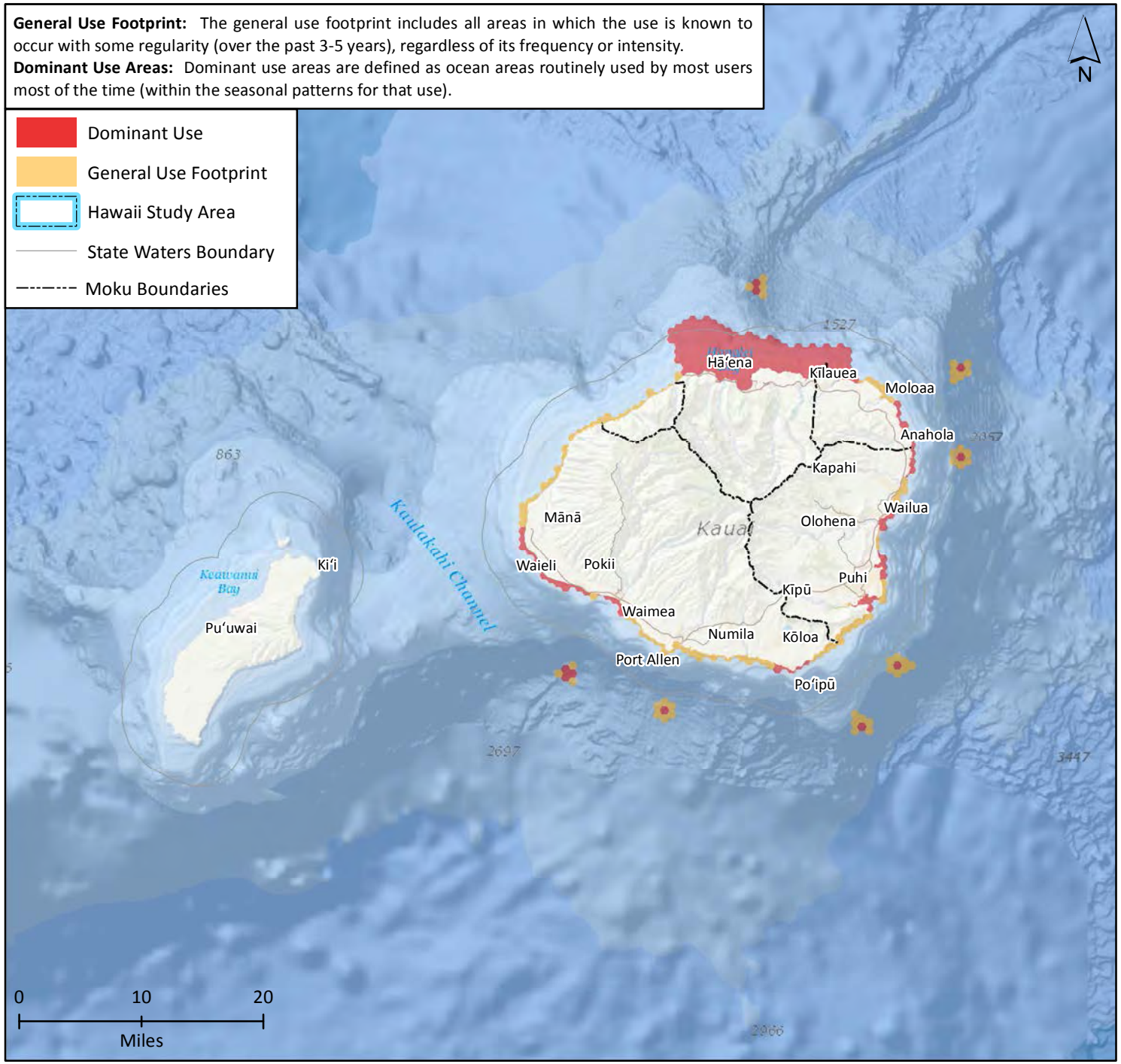

THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

SCUBA & Snorkeling

Includes:
SCUBA, snorkel and free-diving (shore-based and vessel-based) for recreation or traditional and customary practices. Includes recreational dive charters, swimming with dolphins/manta tours

Excludes:
Research, spearfishing, extractive activities

Statewide Use Notes:
SCUBA and snorkeling occurs throughout the Hawaiian Islands, as both a shore-based and boat-based activity. The use patterns are driven by coastal access, location of boat ramps and harbors, environmental conditions (e.g., protection from the seasonal trade winds) and proximity to population/tourism centers. Divers tend to stay within recreational depth limits (130 feet) and may dive during the day or at night. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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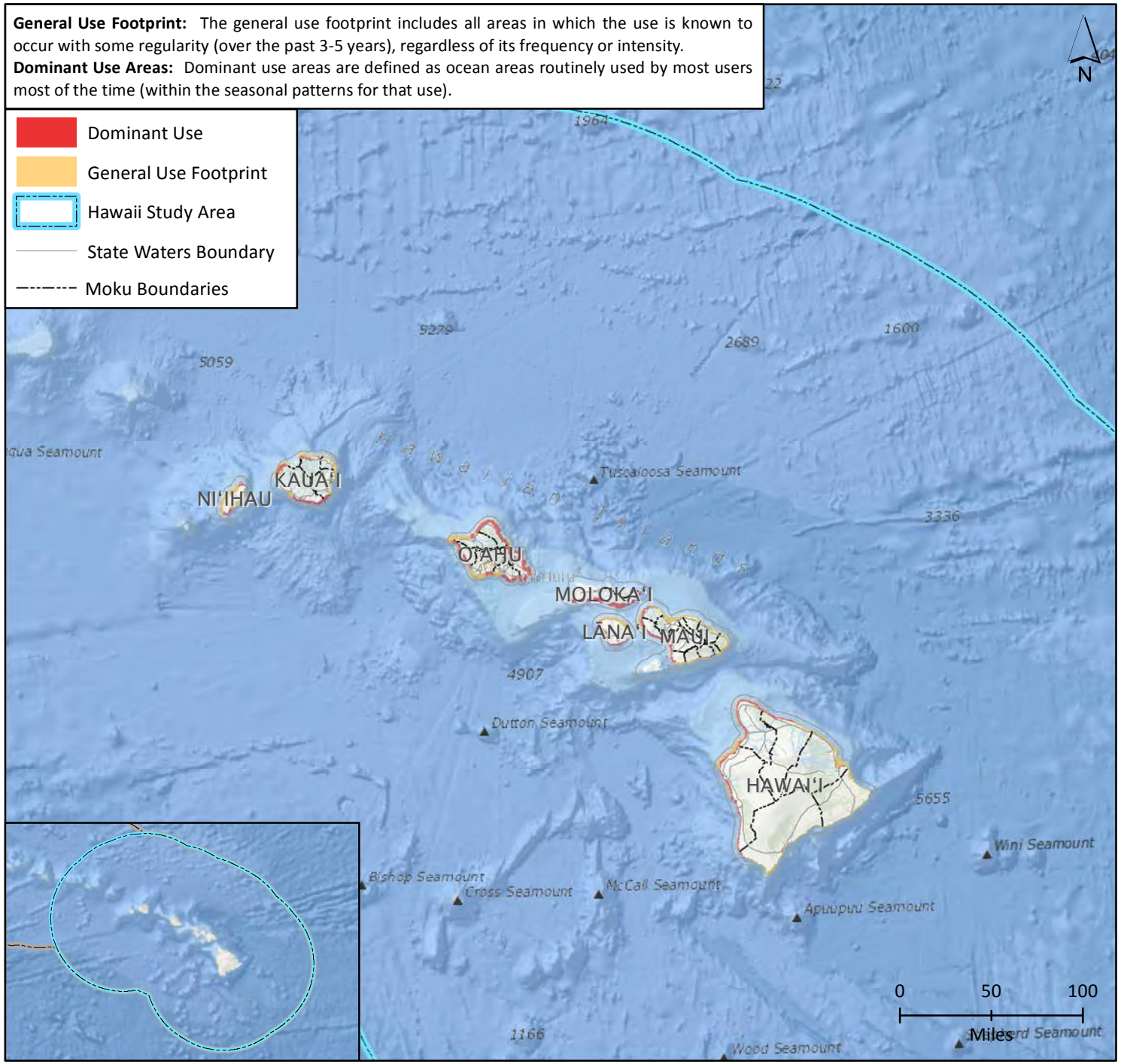

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

SCUBA & Snorkeling

Includes:
SCUBA, snorkel and free-diving (shore-based and vessel-based) for recreation or traditional and customary practices. Includes recreational dive charters, swimming with dolphins/manta tours

Excludes:
Research, spearfishing, extractive activities

Island Use Notes:
Non-consumptive SCUBA and snorkeling occurs island wide, both for tourism and competitive free diving. The leeward west side offers calmer seas and is generally more commonly used for these activities. Kona hosts both national and international competitions for competitive free divers, who can dive as deep as 300 feet. For SCUBA, divers will stay within recreational depth limits around the island, predominantly from the shore to a depth of 135 feet. Popular SCUBA/snorkeling areas include the Fish Aggregation Devices (FADs) and the fish farm off Keauhou Bay because the fish draw in pelagic predators . Other types of dives includenight dives out of Honokohau Bay to depths of 60 feet to observe large pelagics and regular research dives in Fish Replenishment Areas (FRAs) to study the effects of aquarium collecting.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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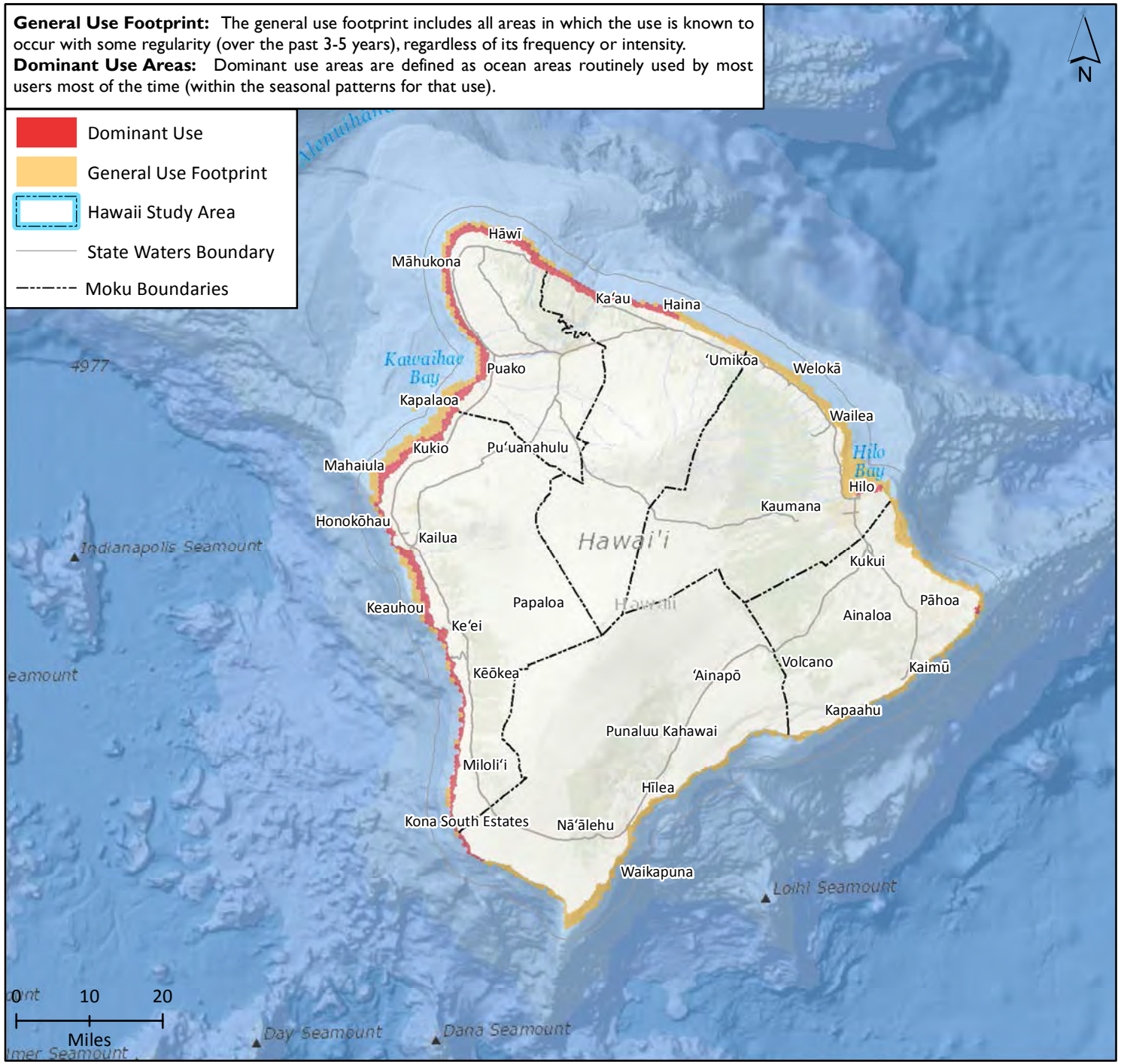


THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

SCUBA & Snorkeling

Includes:
SCUBA, snorkel and free-diving (shore-based and vessel-based) for recreation or traditional and customary practices. Includes recreational dive charters, swimming with dolphins/manta tours

Excludes:
Research, spearfishing, extractive activities

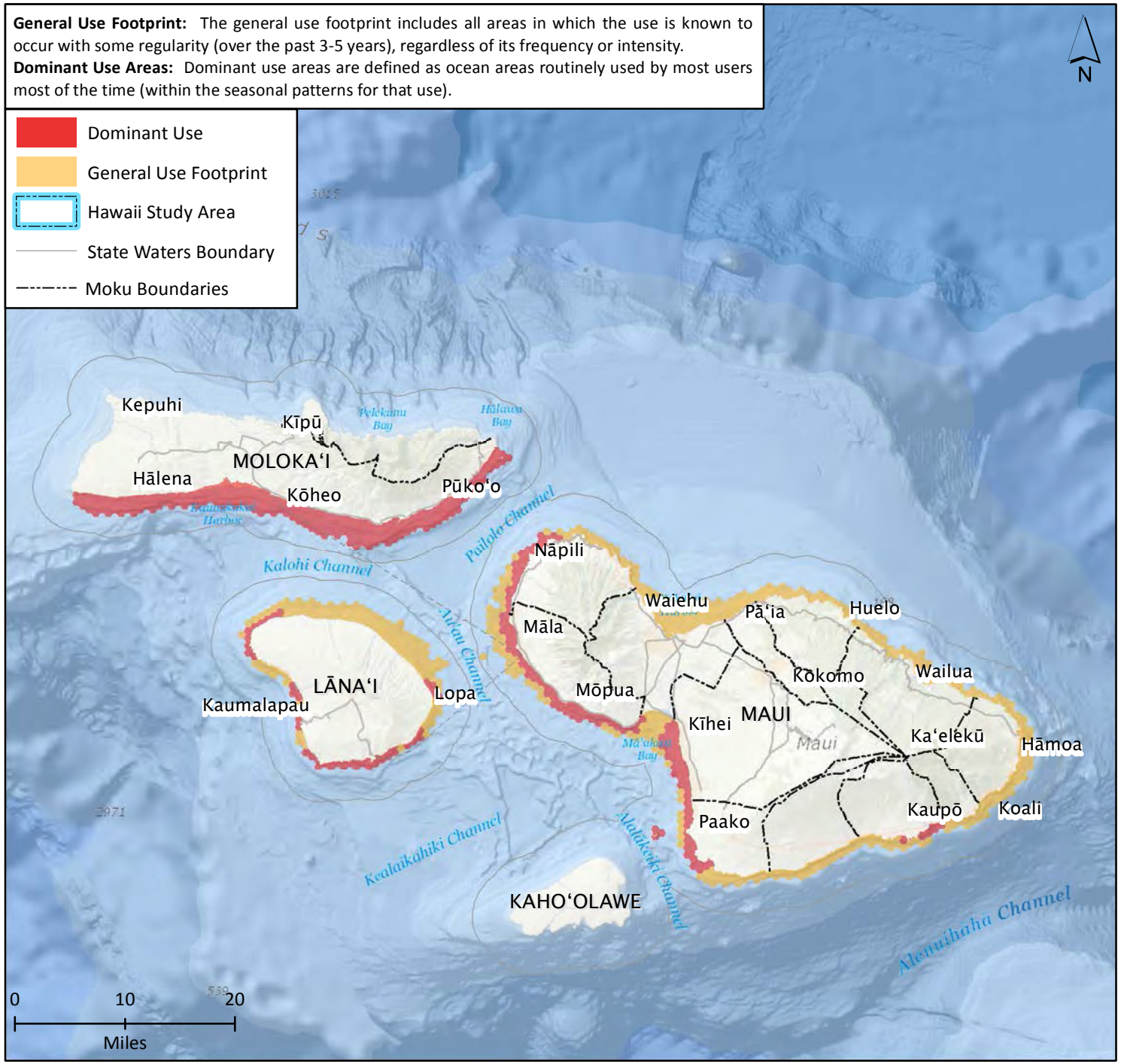
Island Use Notes:

Maui:
SCUBA and snorkeling occurs all around the islands, with the headlands and bays the most widely used areas. Oluwalu, which has multiple mooring sites, and the area around Molokini are both dominant use areas year round. SCUBA divers tend to stay within recreational depth limits, diving shallower than 130 feet. There is limited use on the north side of the island due to unfavorable environmental conditions.

Lanai:
SCUBA and snorkeling from shore occur most often in and around Manele Bay. Famous Lanai dive sites are at night off of Kaumalapau harbor to see tiger sharks and around the signature 12th hole of the Four Seasons hotel golf course. Most boat-based SCUBA and snorkeling operations are run by non-local charter organizations.

Molokai:
SCUBA and snorkeling occurs mainly along the south and east shore everywhere there is road access to the coast. Divers will usually stay within the recreational limits to the maximum depth of ~130 ft. There are few diving opportunities along the north coast because access is limited and the ocean conditions unfavorable most of the year.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

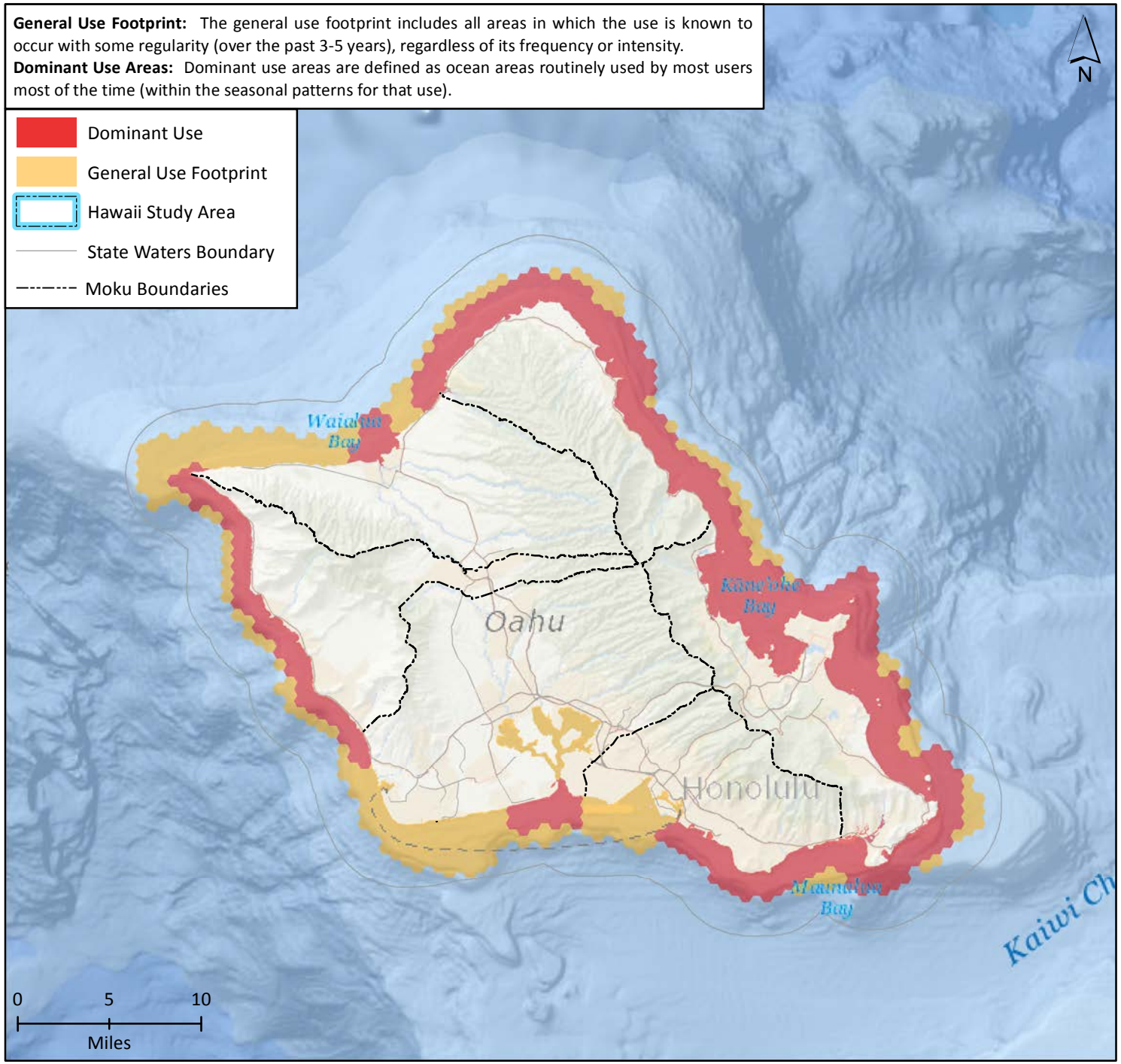
SCUBA & Snorkeling

Includes:
SCUBA, snorkel and free-diving (shore-based and vessel-based) for recreation or traditional and customary practices. Includes recreational dive charters, swimming with dolphins/manta tours

Excludes:
Research, spearfishing, extractive activities

Island Use Notes:
SCUBA and Snorkeling occurs all around the island where access allows, mainly between 0 – 200 feet in depth. The use is highly seasonal and dependent on oceanic conditions. Snorkeling can occur further from shore, but mainly occurs in shallow water out to 1 nautical mile from shore. Dominant use areas around the island include Sharks Cove, Three Tables, Laie, Kailua (out to Flat Island), Kaneohe Bay, Waimanalo, Hanauma Bay, Electric Beach (in front of the power plant), Makua Caverns, and Ewa Pinnacles, Maunalua Bay and Waikiki.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

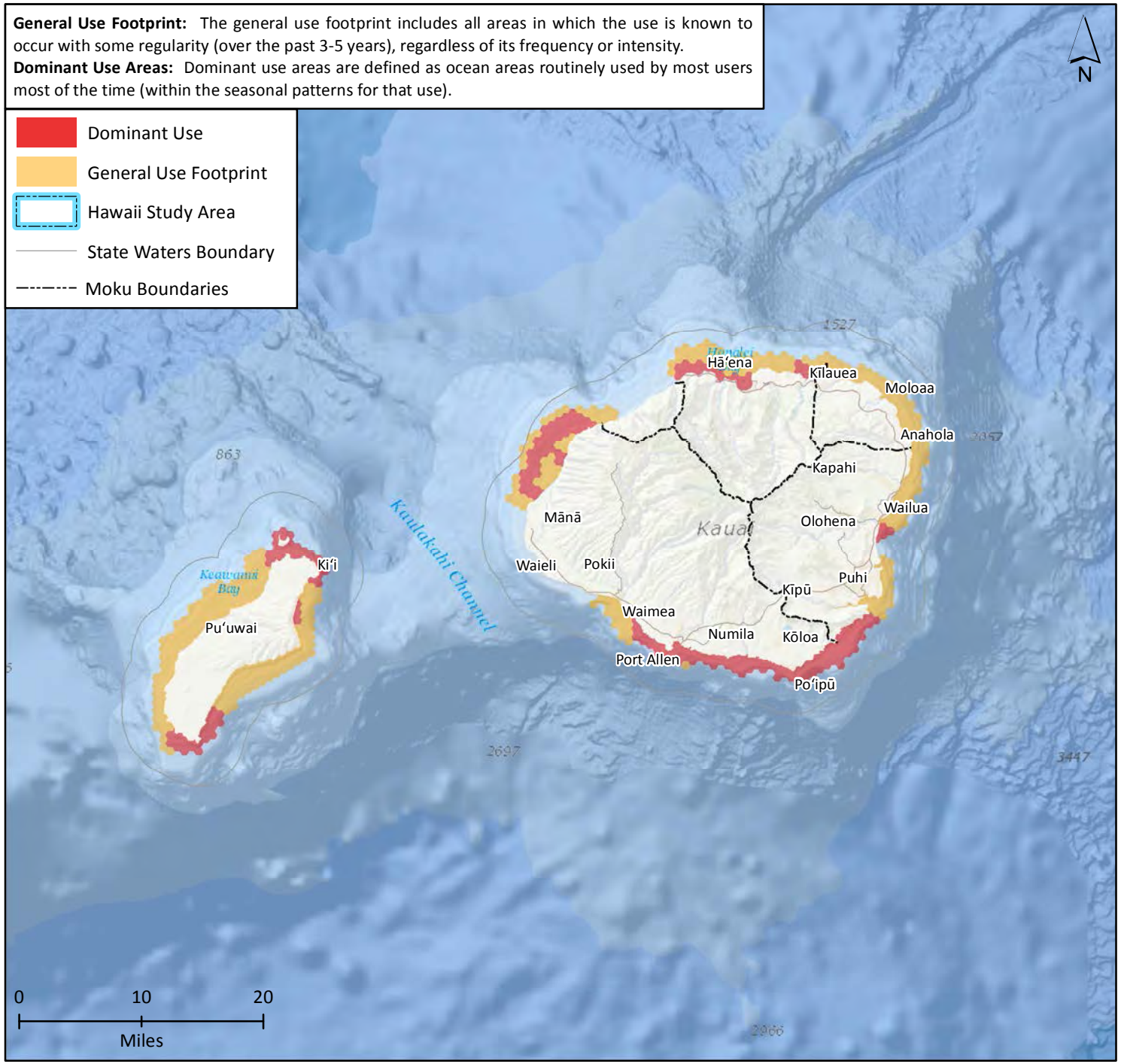
SCUBA & Snorkeling

Includes:
SCUBA, snorkel and free-diving (shore-based and vessel-based) for recreation or traditional and customary practices. Includes recreational dive charters, swimming with dolphins/manta tours

Excludes:
Research, spearfishing, extractive activities

Island Use Notes:
SCUBA and snorkeling activities are driven by weather conditions. Generally, these activities occur between depths of 0 - 130 feet around the island, with no known blue water diving around the island, Well-known use areas include Mana crack along the Na Pali coast and off of Niihau. There is no landing on Niihau island so operators anchor ~ 100 feet offshore to dive.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Surface Board Sports

Includes:
Tow-in, wind-surfing, kite surfing, sailboarding, surfing, surf-style stand up paddling and boogie boarding for recreation or traditional and customary practices

Excludes:
Paddling, SCUBA/Snorkeling, Swimming, flat-water stand up paddle boarding

Statewide Use Notes:
Surface board sports occur throughout the islands along the shoreline and the offshore barrier reefs. The use is most dominant along the accessible beaches and beach parks, near population centers and at sites with safe access and appropriate ocean conditions. Windsurfing and kite surfing are particularly popular around the Maui Nui region, occasionally crossing between the islands. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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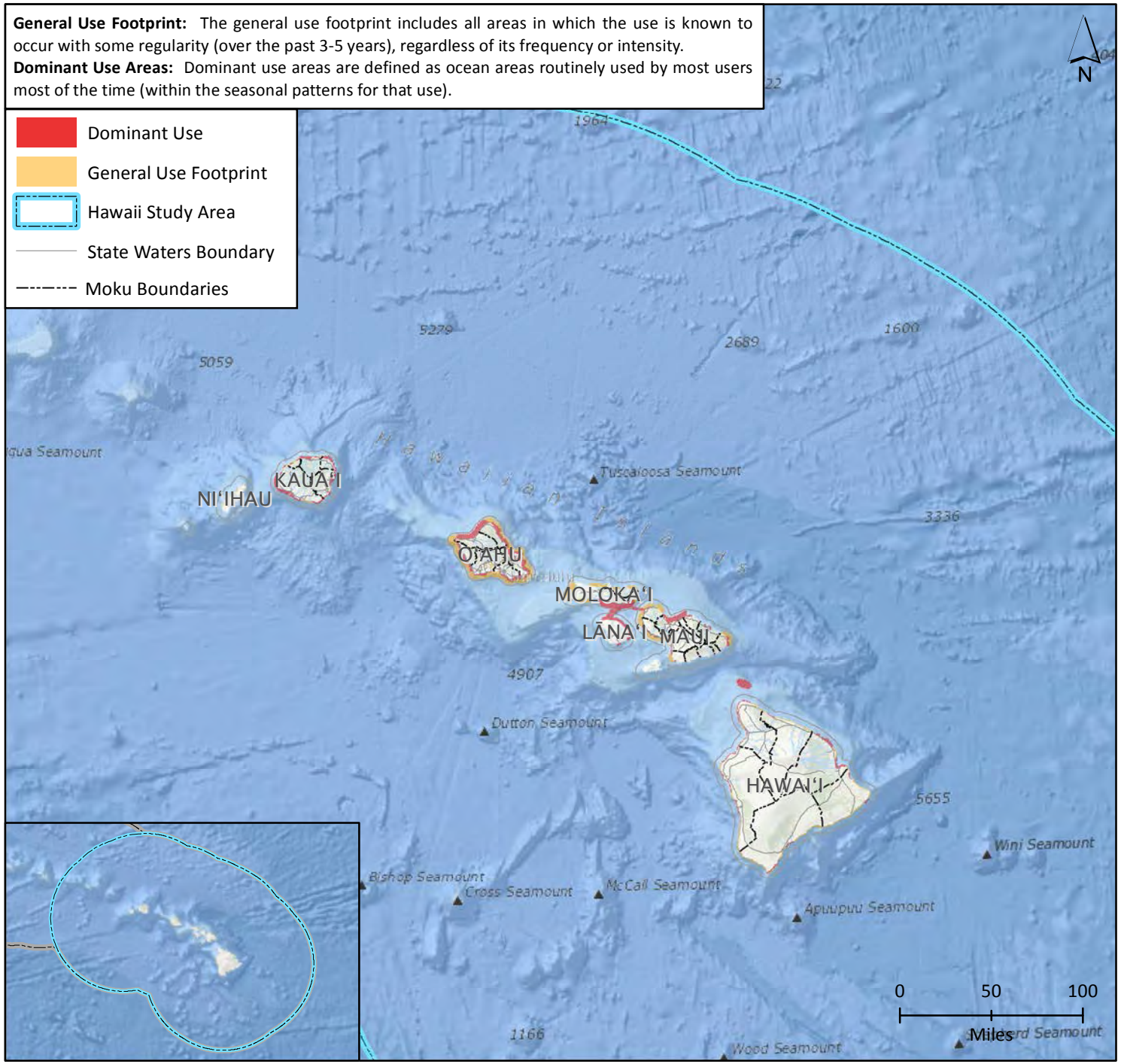


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

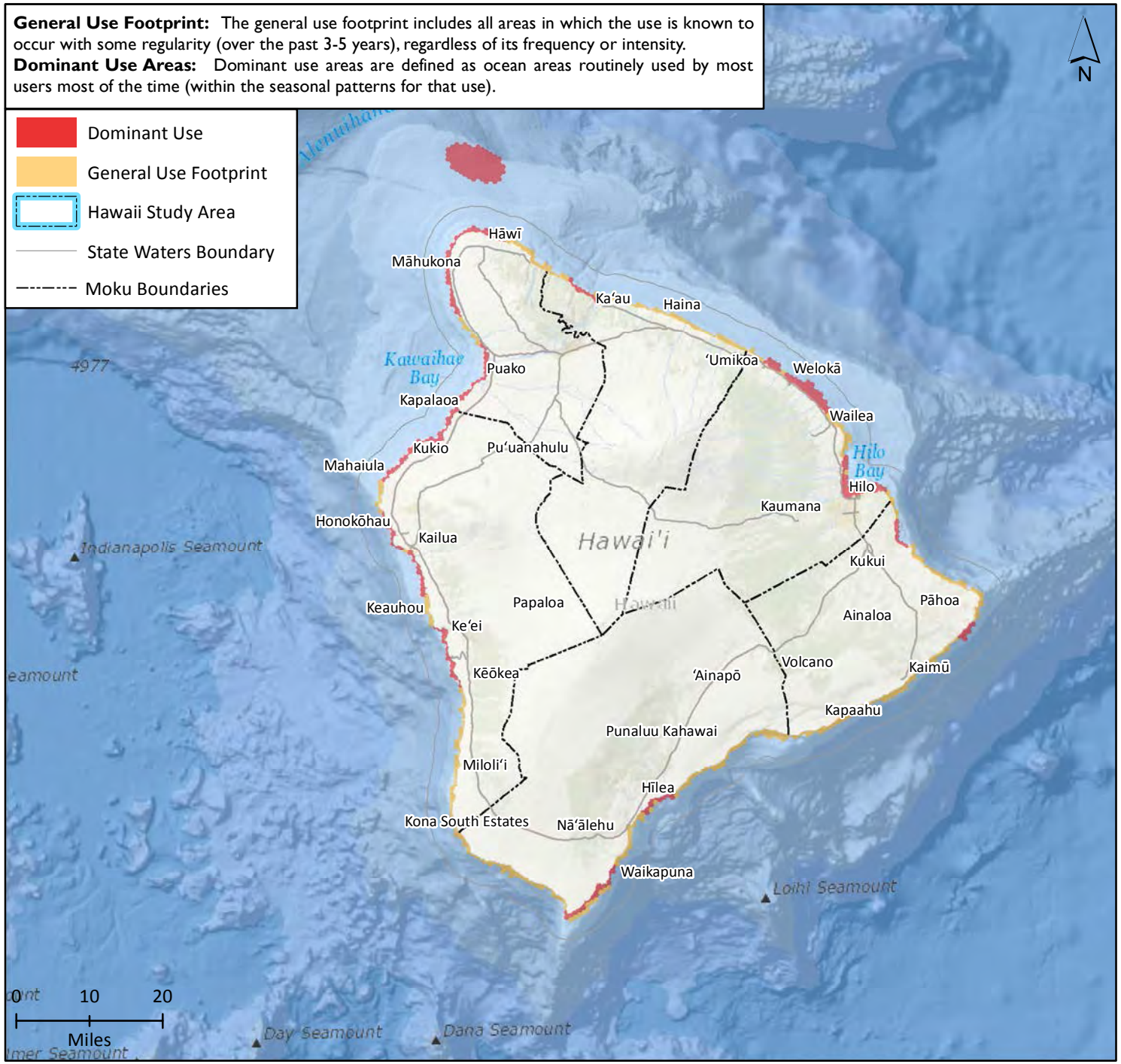
Surface Board Sports

Includes:
Tow-in, wind-surfing, kite surfing, sailboarding, surfing, surf-style stand up paddling and boogie boarding for recreation or traditional and customary practices

Excludes:
Paddling, SCUBA/Snorkeling, Swimming, flat-water stand up paddle boarding

Island Use Notes:
In general, surface board sports can be observed at all accessible beach areas. The majority of activities include windsurfing and kiteboarding offshore, and surfing and body boarding closer to shore. South Point is a well-known windsurfing and kiteboarding area from the shoreline out to nearly 2 miles offshore due to consistent winds. There are tow-in surf spots near North Point in the Kohala region (~8 miles offshore). On the windward side, kiteboarding occurs in and around Hilo Bay out to ~0.5 miles from shore. There are also annual surf contests held in various locations year-round.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Surface Board Sports

Includes:
Tow-in, wind-surfing, kite surfing, sailboarding, surfing, surf-style stand up paddling and boogie boarding for recreation or traditional and customary practices

Excludes:
Paddling, SCUBA/Snorkeling, Swimming, flat-water stand up paddle boarding

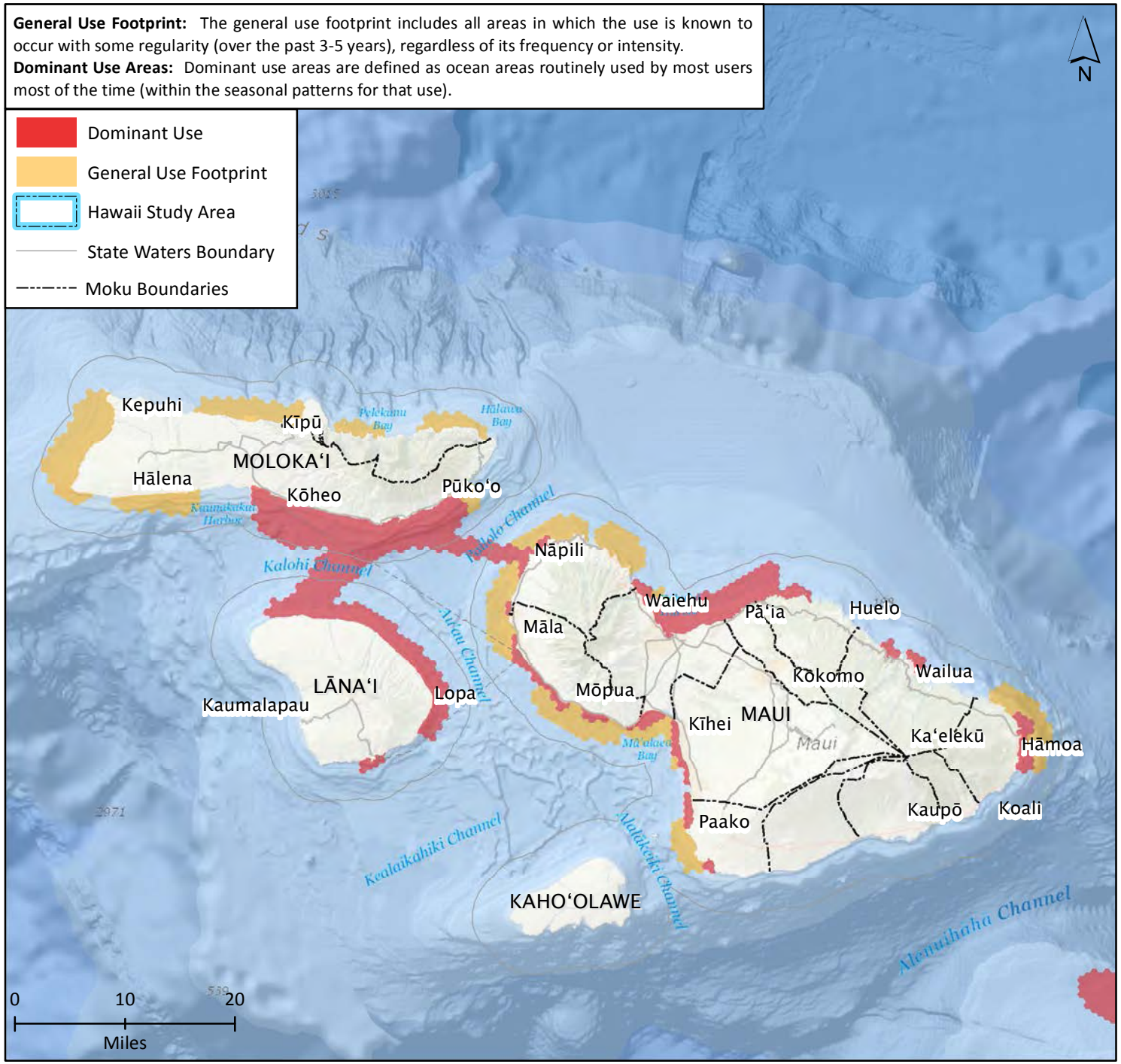
Island Use Notes:

Maui:
Surface board sports around Maui are most dominant in the North Maui Ocean Recreation Management Area that extends from Maliko Gulch to Waiehu and the Kihei shoreline. Generally, this use occurs throughout this area within 1 mile of the coastline except for the exclusion zone surrounding Kahului airport.

Lanai:
Surface board sport activity on Lanai is highly influenced by environmental conditions. The windy north side of the island is ideal for kite and wind surfing while the south and west sides are the preferred areas for surfing. Users will typically stay within 0.5 mile from shore, but kite and windsurfers may follow interisland routes to Maui and Molokai.

Molokai:
Surface board sports are most common on the north and east sides of the island. Kite surfers and windsurfers can cross to other islands but primarily stay close to shore.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

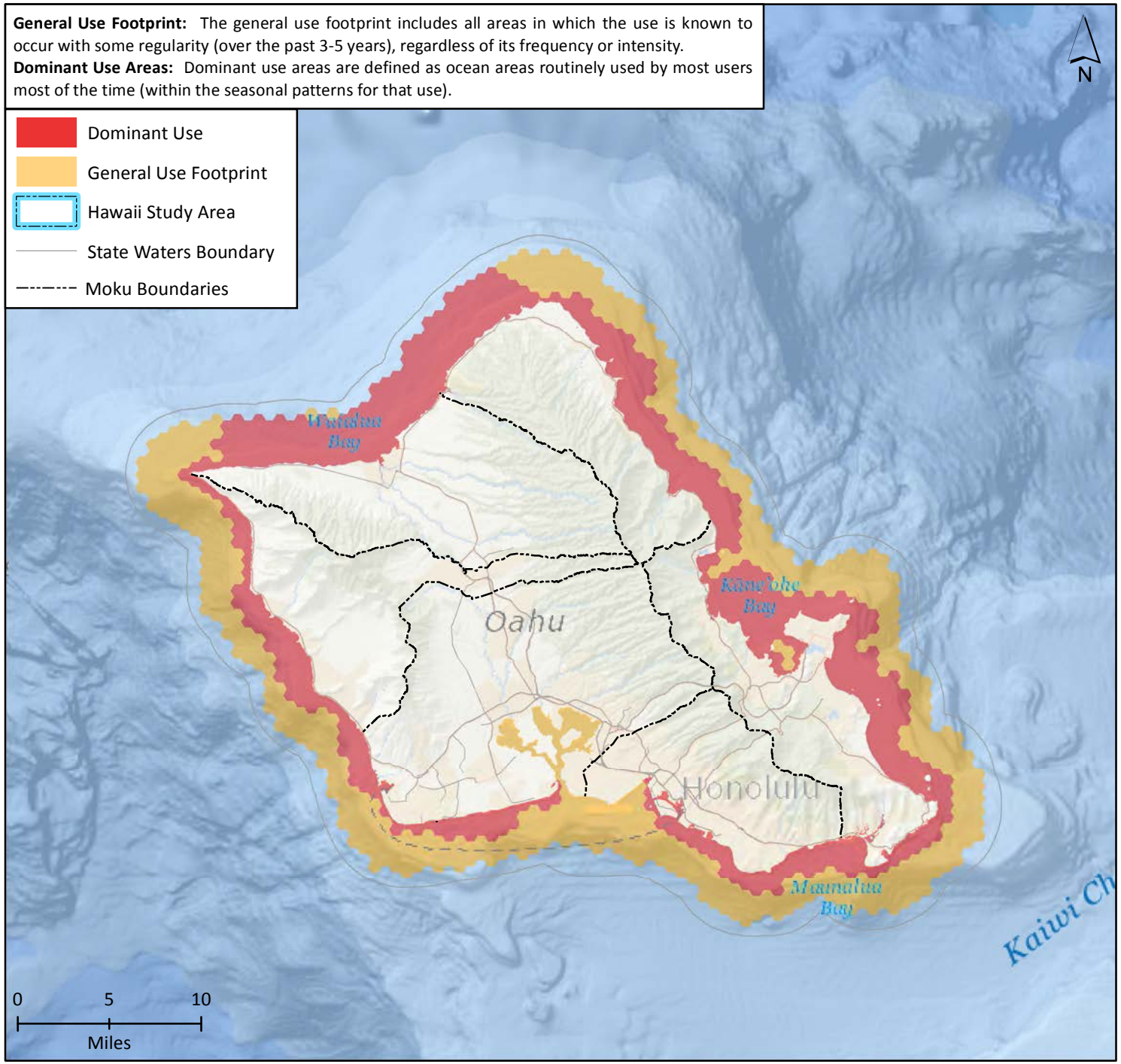
Surface Board Sports

Includes:
Tow-in, wind-surfing, kite surfing, sailboarding, surfing, surf-style stand up paddling and boogie boarding for recreation or traditional and customary practices

Excludes:
Paddling, SCUBA/Snorkeling, Swimming, flat-water stand up paddle boarding

Island Use Notes:
Surface board sports occur all around the island from 0 - 2 miles from shore. Dominant use areas are seasonal depending on ocean conditions (surfing more concentrated on the north shore in the winter, south shore in the summer). Many surf spots are highly publicized by the media (e.g. surfline.com). Dominant use areas for kitesurfing and windsurfing are Kaneohe, Waimanalo and Kailua bay.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

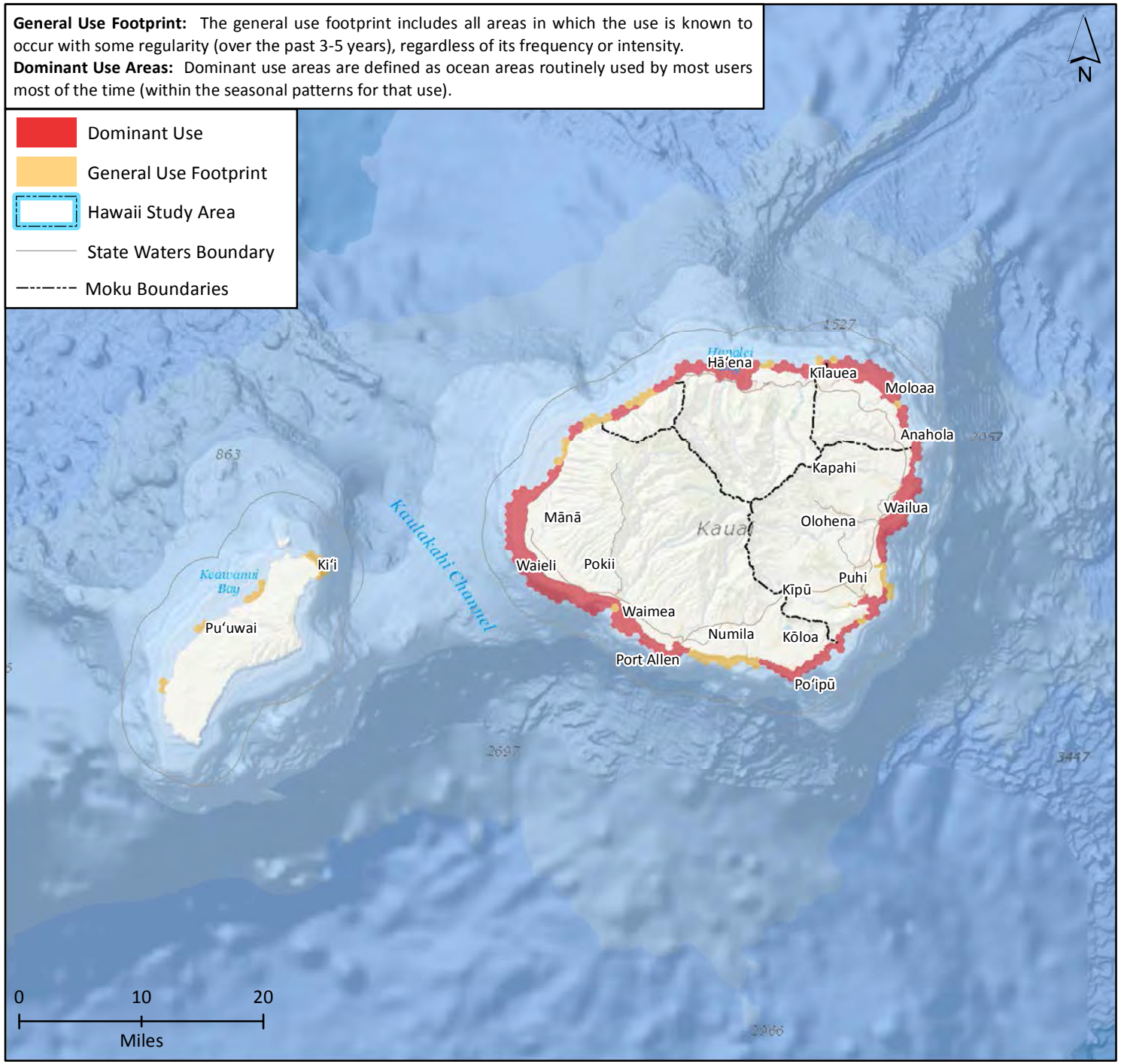
Surface Board Sports

Includes:
Tow-in, wind-surfing, kite surfing, sailboarding, surfing, surf-style stand up paddling and boogie boarding for recreation or traditional and customary practices

Excludes:
Paddling, SCUBA/Snorkeling, Swimming, flat-water stand up paddle boarding

Island Use Notes:
Surfing and other surface board sports occur around the entire island of Kauai depending on coastal access and swell conditions. Kauai hosts several annual surf competitions. The north shore is the dominant use area in winter, although there is surf all year around the island. Use areas extend to the barrier reef system to surf ~ 1.4 miles offshore. Kite and wind surfing extends out further from shore with dominant use areas around Wailua Bay and Kekaha.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Swimming

Includes:
Short- and long-distance surface swimming from shore, body surfing and race training/events for fitness, recreation or traditional and customary practices

Excludes:
Surface Board Sports, Beach Use/Shore Use, SCUBA/Snorkeling

Statewide Use Notes:
Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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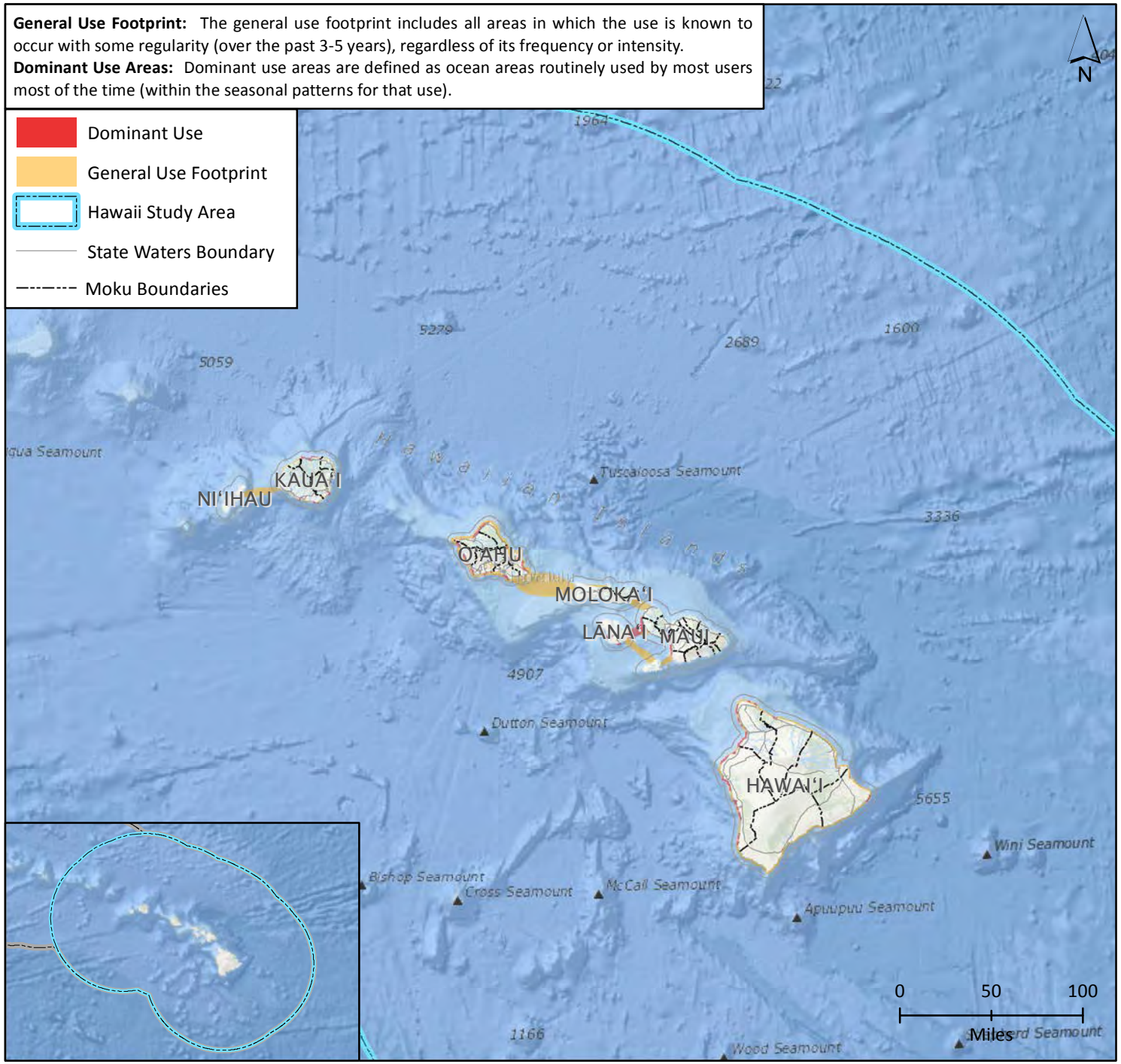

THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

Swimming

Includes:
Short- and long-distance surface swimming from shore, body surfing and race training/events for fitness, recreation or traditional and customary practices

Excludes:
Surface Board Sports, Beach Use/Shore Use, SCUBA/Snorkeling

Island Use Notes:
Swimming occurs around most accessible beaches out to 0.5 miles from shore. There are competitions for rough water swimming in Kukeo and Hapuna including international triathlon competitions that have swimming components. Some of the more common races occur from Kailua Bay to Keauhou, Mahaiula to Kukio, and around Kiholo Bay, Honokaope Bay, and Kealakekua Bay. Preceding the Ironman competitions in Kailua-Kona, there is increased swimming activity as racers train in Kailua Bay. On the windward side, swimming occurs less frequently, but is most common in Ha'ena and in the Kapoho Bay area.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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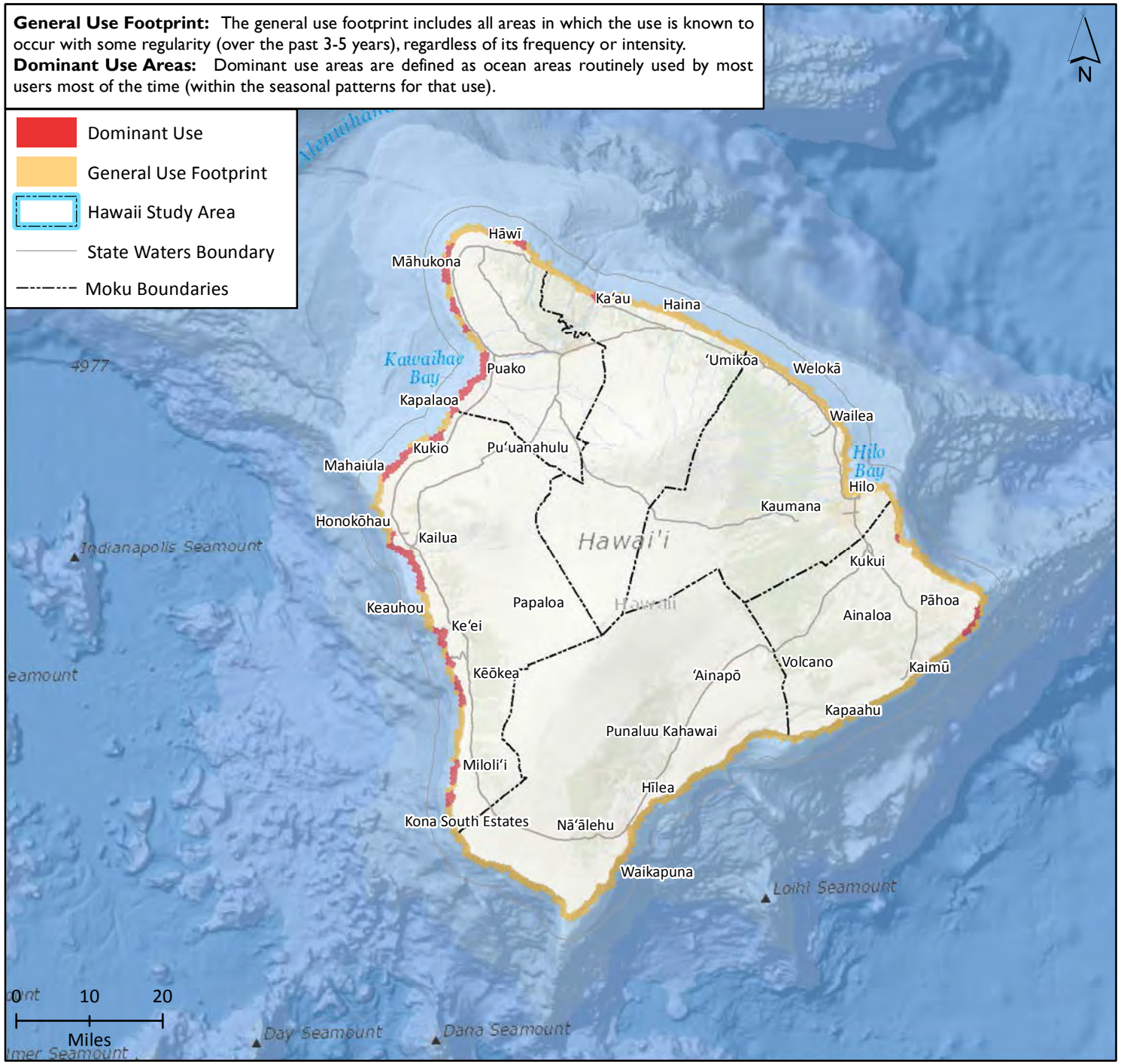

THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Swimming

Includes:
Short- and long-distance surface swimming from shore, body surfing and race training/events for fitness, recreation or traditional and customary practices

Excludes:
Surface Board Sports, Beach Use/Shore Use, SCUBA/Snorkeling

Island Use Notes:
Maui:
Swimming on the island occurs most frequently between Maalaea and Makena. Interisland swim routes exist between the islands of Maui Nui.
Lanai:
Swimming is most common in and around Manele Bay and Kaumalapau Harbor. Occasionally, long distance swimmers may attempt interisland swim routes, e.g. to Lahaina.
Molokai:
Swimming is limited on Molokai due to limited shoreline access. Swimming does occur around Kalaupapa and near Mo`omomi beach, with dominant use areas near the harbors and select hotel locations.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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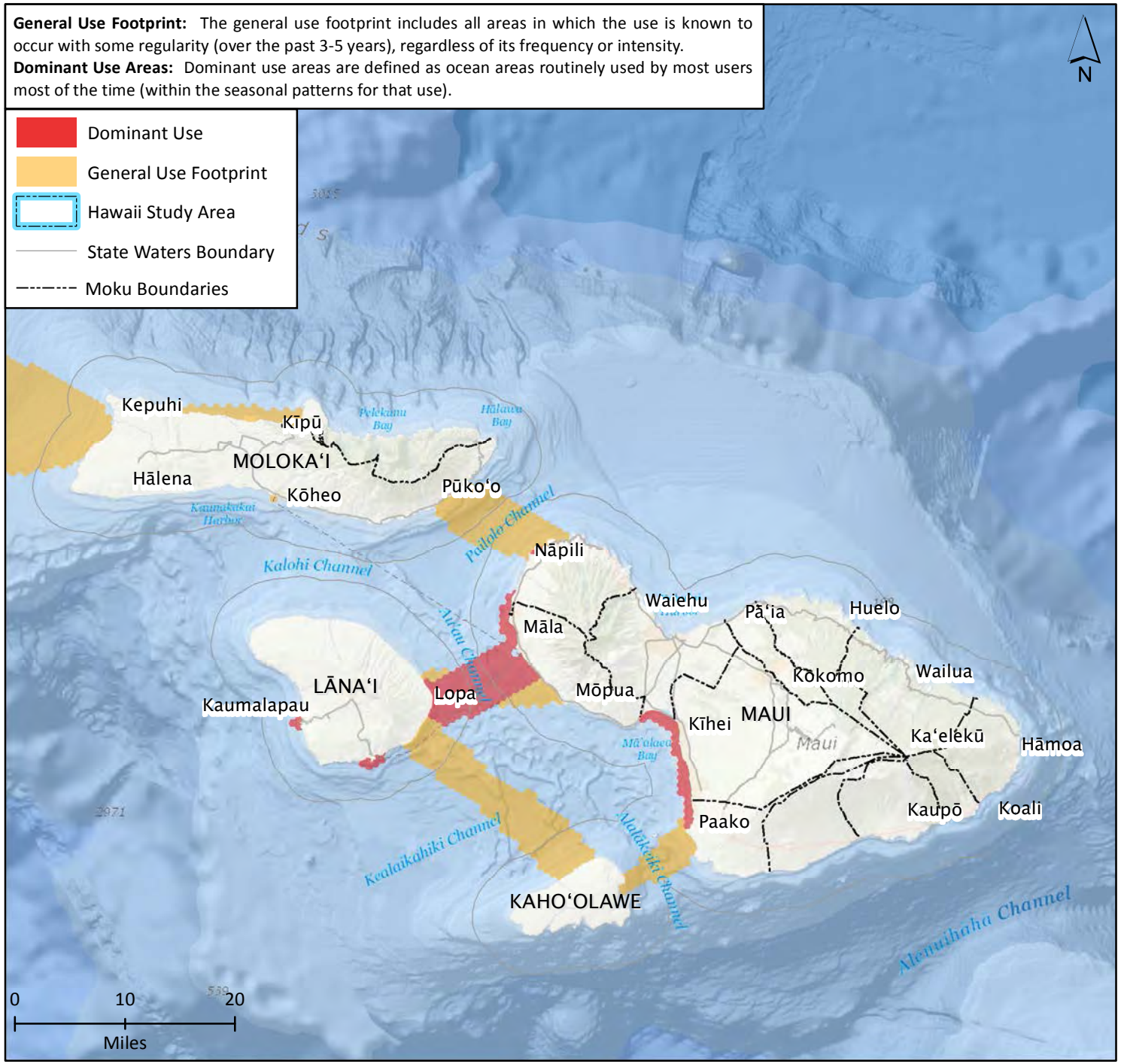

 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

Swimming

Includes:
Short- and long-distance surface swimming from shore, body surfing and race training/events for fitness, recreation or traditional and customary practices

Excludes:
Surface Board Sports, Beach Use/Shore Use, SCUBA/Snorkeling

Island Use Notes:
Swimming occurs all around the island with a concentration near beach parks and tourist centers, out to distance of ~ one mile from shore. Waikiki is likely the most dominantly used area, but others include Kapiolani Park area, Ala Moana Beach Park (Magic Island), Hanauma Bay, Bellows, Lanikai, Malekahana (Laie), and Waimea and Haleiwa (mostly in the summer). Swimming does not occur in the Ala Wai canal due to poor water quality. Local swimming races occur year-round on the north shore and south shore, including seasonal open water swim races from Sunset beach to Haleiwa (participants swim up to two miles offshore), the Waikiki rough water swim in September, and the annual Dukes Ocean Fest. There is also occasional interisland relay swimming from Molokai to Sandy's Beach, Lanai to Maui and Kauai to Oahu.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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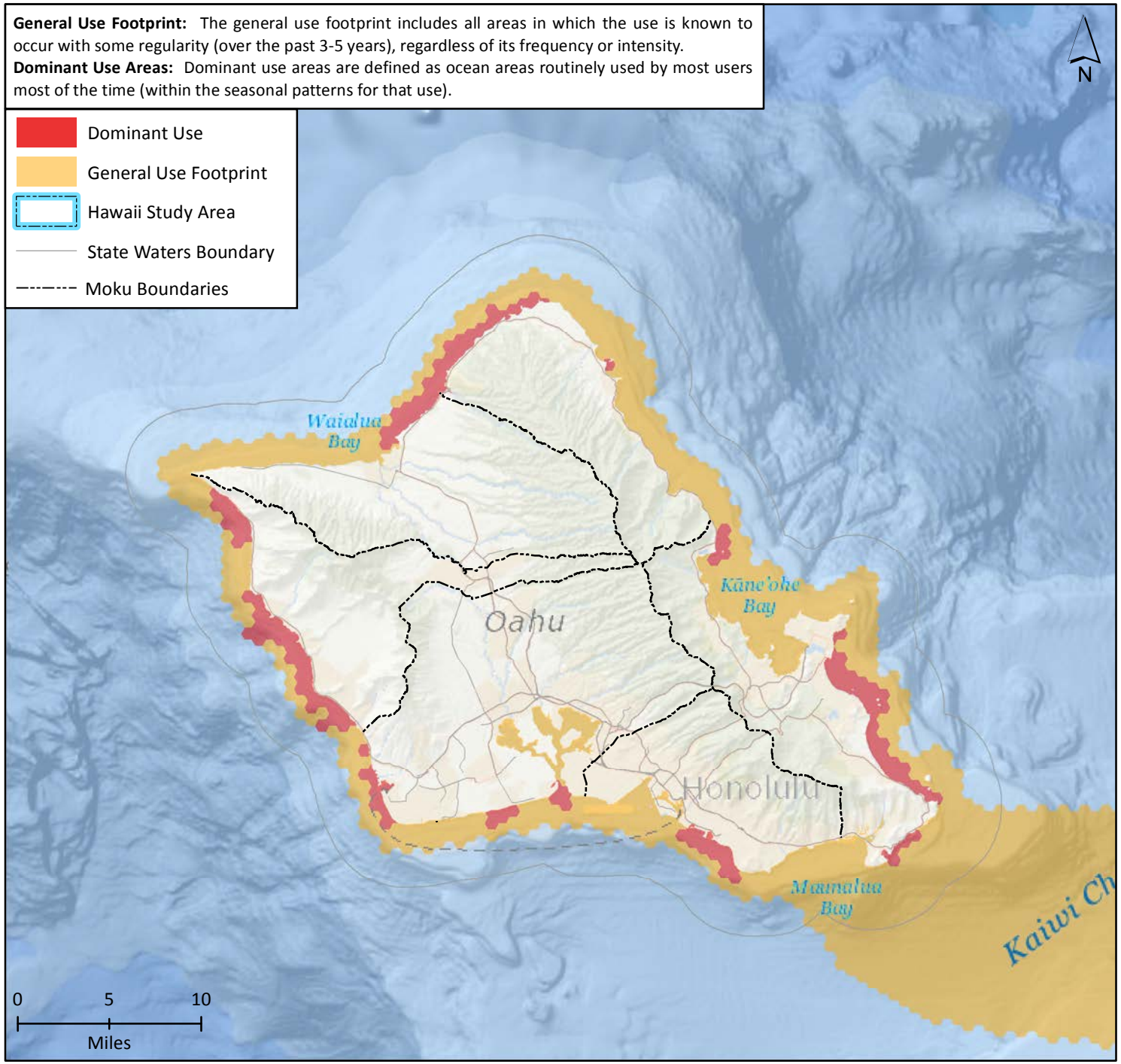


 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

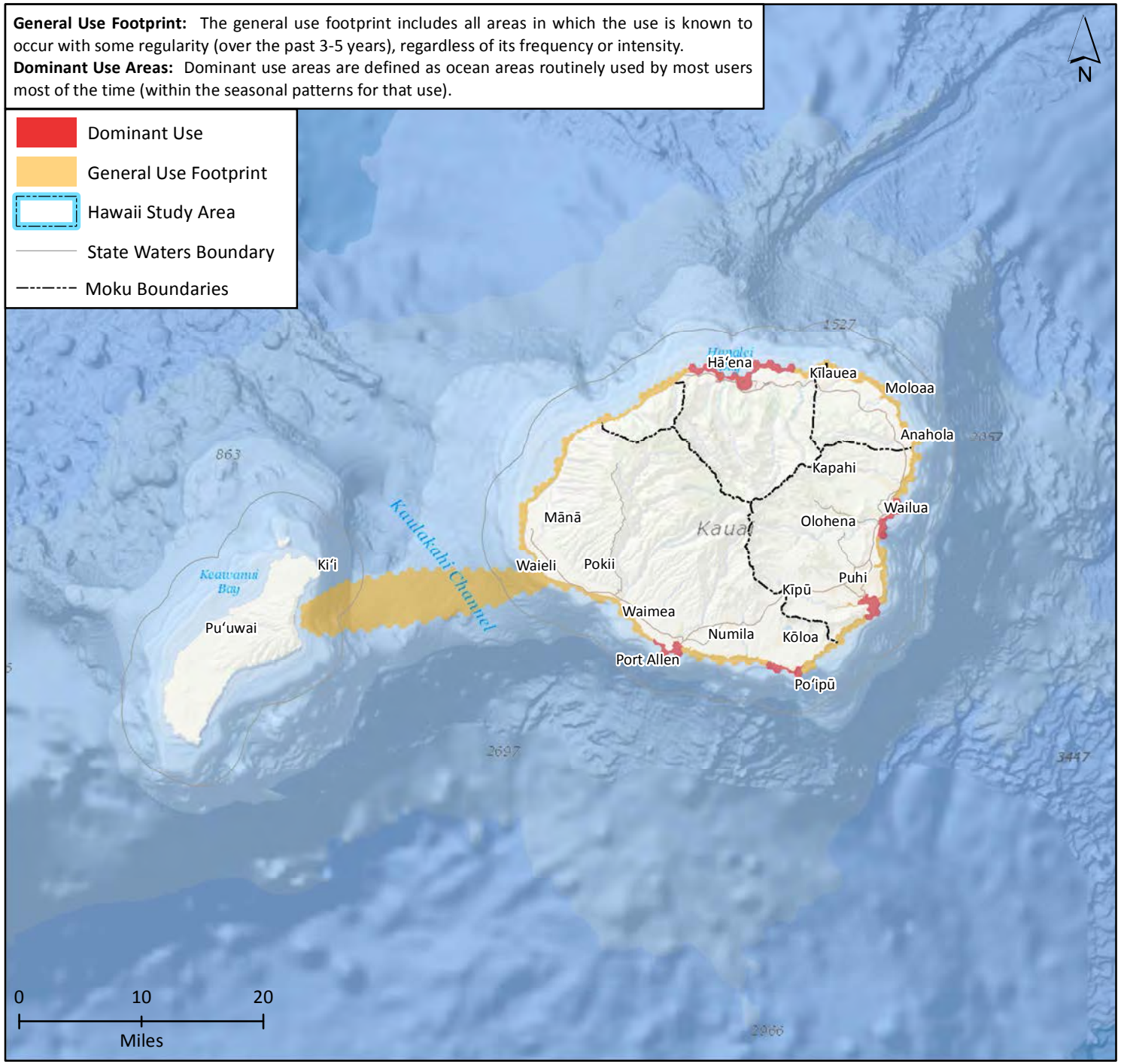
Swimming

Includes:
Short- and long-distance surface swimming from shore, body surfing and race training/events for fitness, recreation or traditional and customary practices

Excludes:
Surface Board Sports, Beach Use/Shore Use, SCUBA/Snorkeling

Island Use Notes:
All accessible beaches on Kauai have swimming typically out to 200 yards alongshore.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS

The Pacific Regional Ocean Uses Atlas

Wildlife Viewing At Sea

Includes:
Charter boating to observe wildlife, includes dolphin tours, whale-watching tours, scenic tours, sea bird tours from a boat for recreation or traditional and customary practices

Excludes:
Fishing Charters, Dive Charters, Boating, swim with dolphins/manta tours

Statewide Use Notes:
Wildlife viewing of turtles, whales, dolphins, monk seals, manta rays, sharks and pelagic seabirds occurs throughout the islands. Many of the charter businesses that operate wildlife tours run seasonally, with sunset cruises and fishing charters during the low seasons. Dominant use areas include the Humpback Whale National Marine Sanctuary and Maui Nui. Dominant use areas around each of the islands are driven mainly by access to ports and harbors, seasonal oceanic conditions and migration patterns for the target viewing species. Charters will often stay as close to shore as possible to limit fuel costs and can generally be found within 3 miles of shore. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
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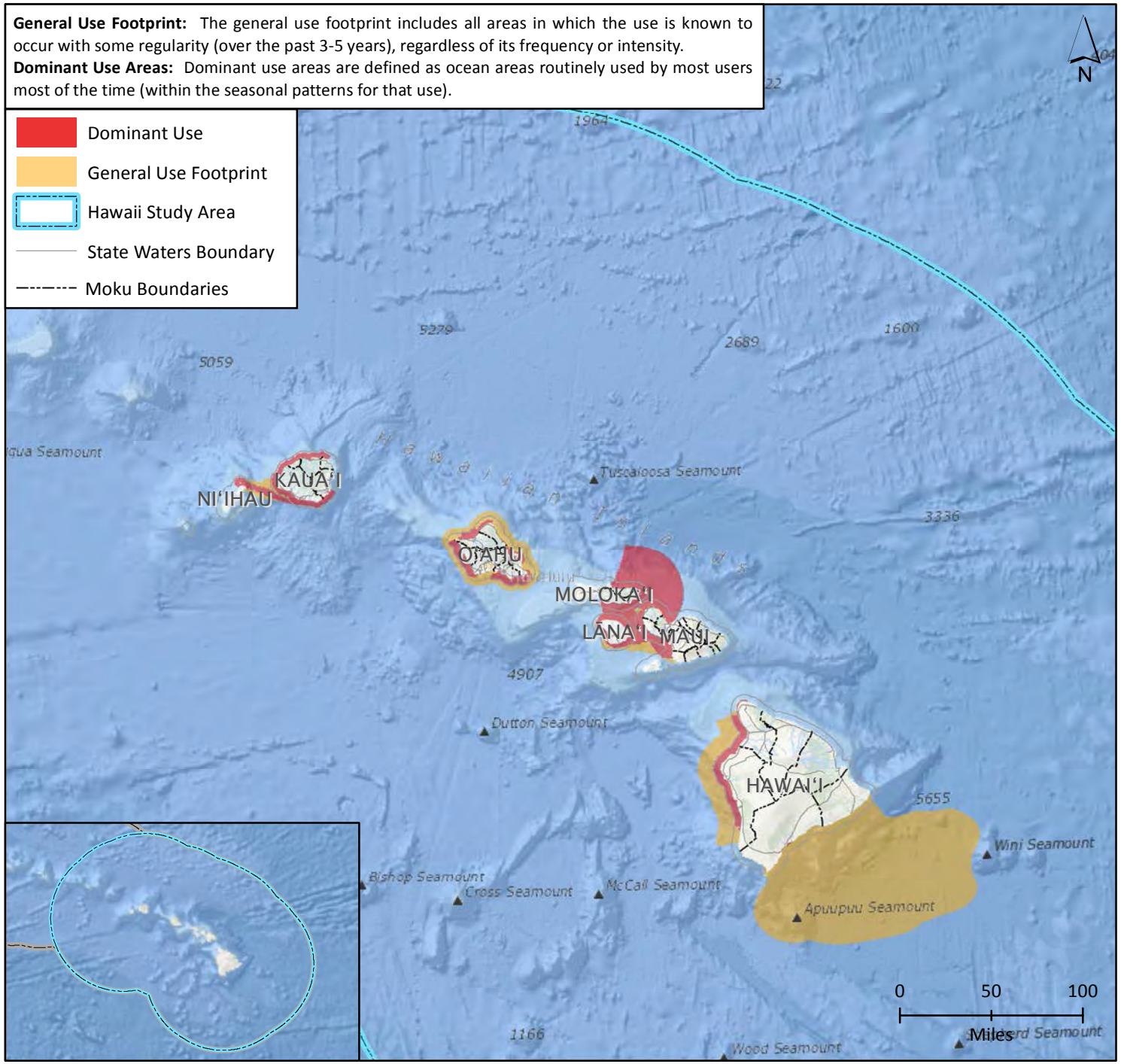


THE HAWAII OCEAN USES ATLAS: HAWAII ISLAND

The Pacific Regional Ocean Uses Atlas

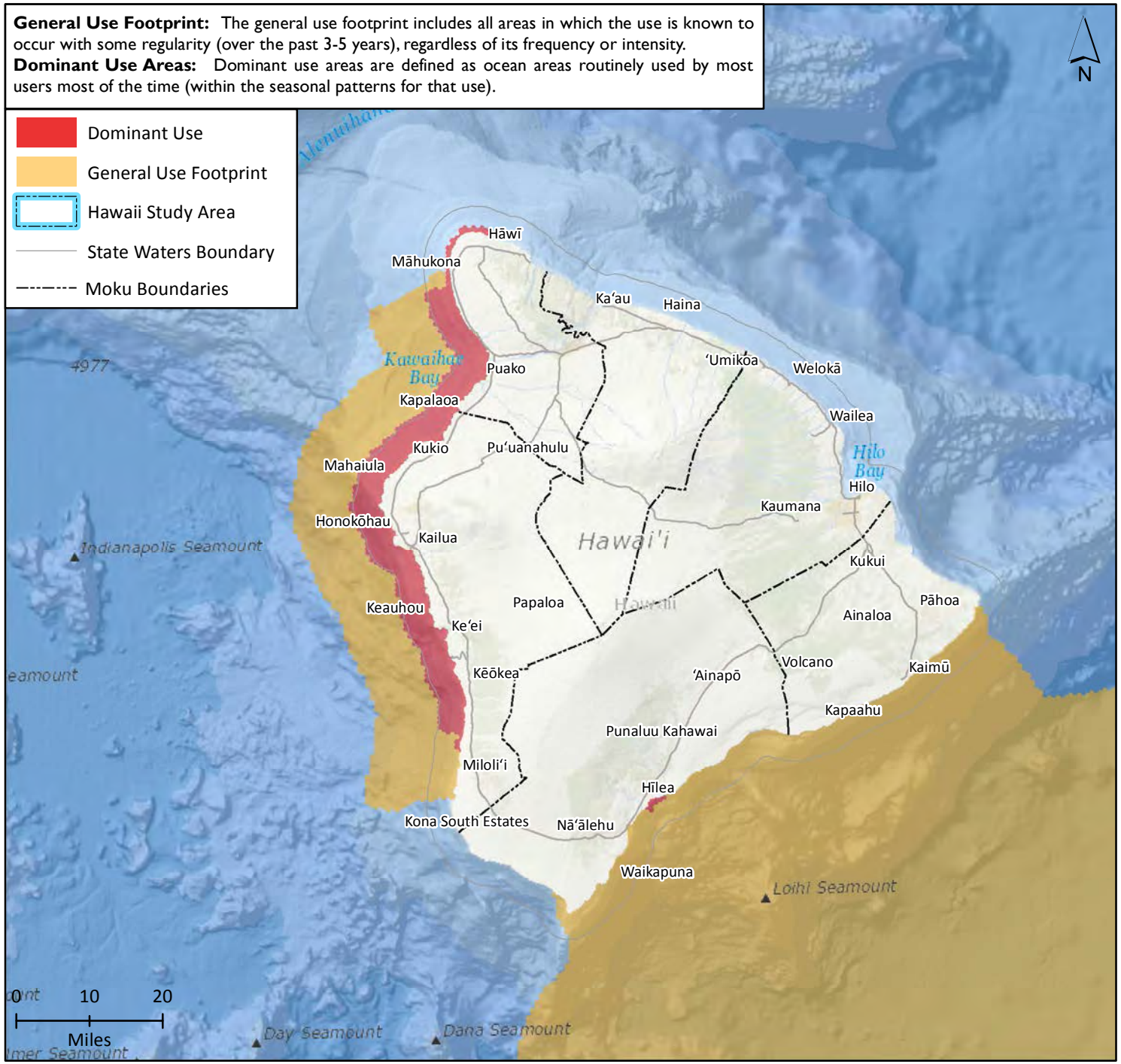
Wildlife Viewing At Sea

Includes:
Charter boating to observe wildlife, includes dolphin tours, whale-watching tours, scenic tours, sea bird tours from a boat for recreation or traditional and customary practices

Excludes:
Fishing Charters, Dive Charters, Boating, swim with dolphins/manta tours

Island Use Notes:
Wildlife viewing occurs around the entire island, typically within 3 miles from shore and consists mainly of commercial tourist charters for whale watching or dolphin watching. The whales arrive in late fall, but the commercial tours start up around mid-December/New Year's Day and run through May. Most tours run from the Kawaihae area down to Keauhou. Tours often find young calves around this area with adult male humpbacks singing in the deeper channels. Zodiac tour boats can be launched from anywhere there is access and are usually specifically looking for dolphins in and around sandy areas closer to shore. On the leeward side, the Kona Sheraton and Keauhou Bay are well known manta ray viewing areas with various tour boats that visit these sites. On the windward side, Pohoiki and Hilo are the primary ports where wildlife viewing boats are launched, although there are not many out of Hilo due to rough, deep water. The Pohoiki tours head several miles south to find manta rays, sharks and whales. There are also terrestrial tours around Punalu'u and Ha'ena to observe turtles and active lava flows.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: MAUI NUI

The Pacific Regional Ocean Uses Atlas

Wildlife Viewing At Sea

Includes:
Charter boating to observe wildlife, includes dolphin tours, whale-watching tours, scenic tours, sea bird tours from a boat for recreation or traditional and customary practices

Excludes:
Fishing Charters, Dive Charters, Boating, swim with dolphins/manta tours

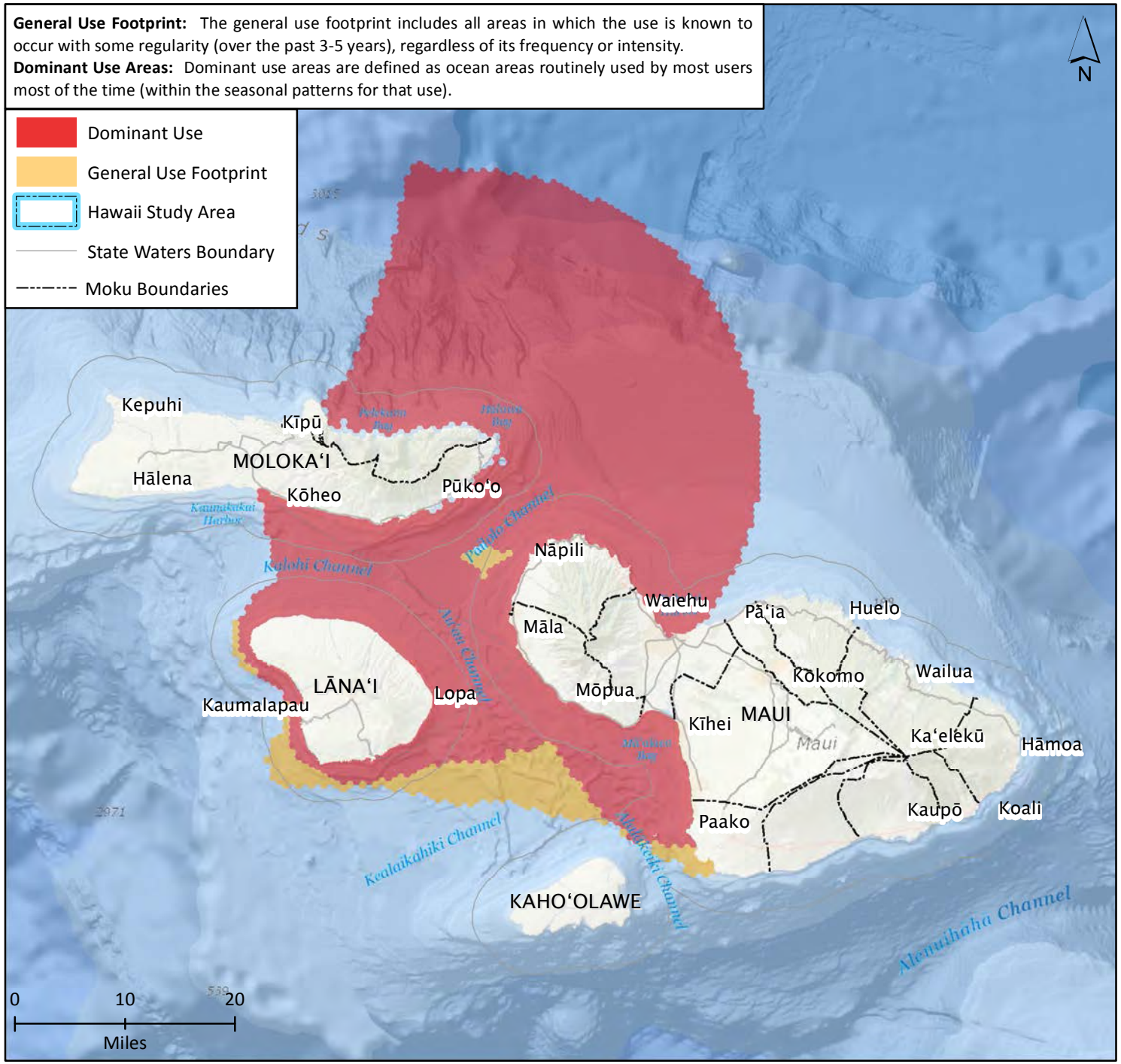
Island Use Notes:

Maui:
Dominant use areas for wildlife viewing are found within the Humpback Whale National Marine Sanctuary. Similar to SCUBA and Snorkeling the north side of the island sees limited use due to the extreme weather and ocean conditions.

Lanai:
Wildlife viewing occurs mainly via commercial charters to view false killer whales, humpback whales, dolphins, turtles, manta rays and sharks. Activity is increased during the humpback whale and monk seals birthing seasons.

Molokai:
Wildlife viewing is not a common use on Molokai. Tours in the waters surrounding Molokai are exclusively operated from neighboring islands. Most tours stay within 20 miles from shore with destinations following the locations of whale and dolphins year round. Dominant wildlife viewing areas are the humpback calving zone on the north side of Lanai and areas within the Humpback Whale National Marine Sanctuary.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



THE HAWAII OCEAN USES ATLAS: OAHU

The Pacific Regional Ocean Uses Atlas

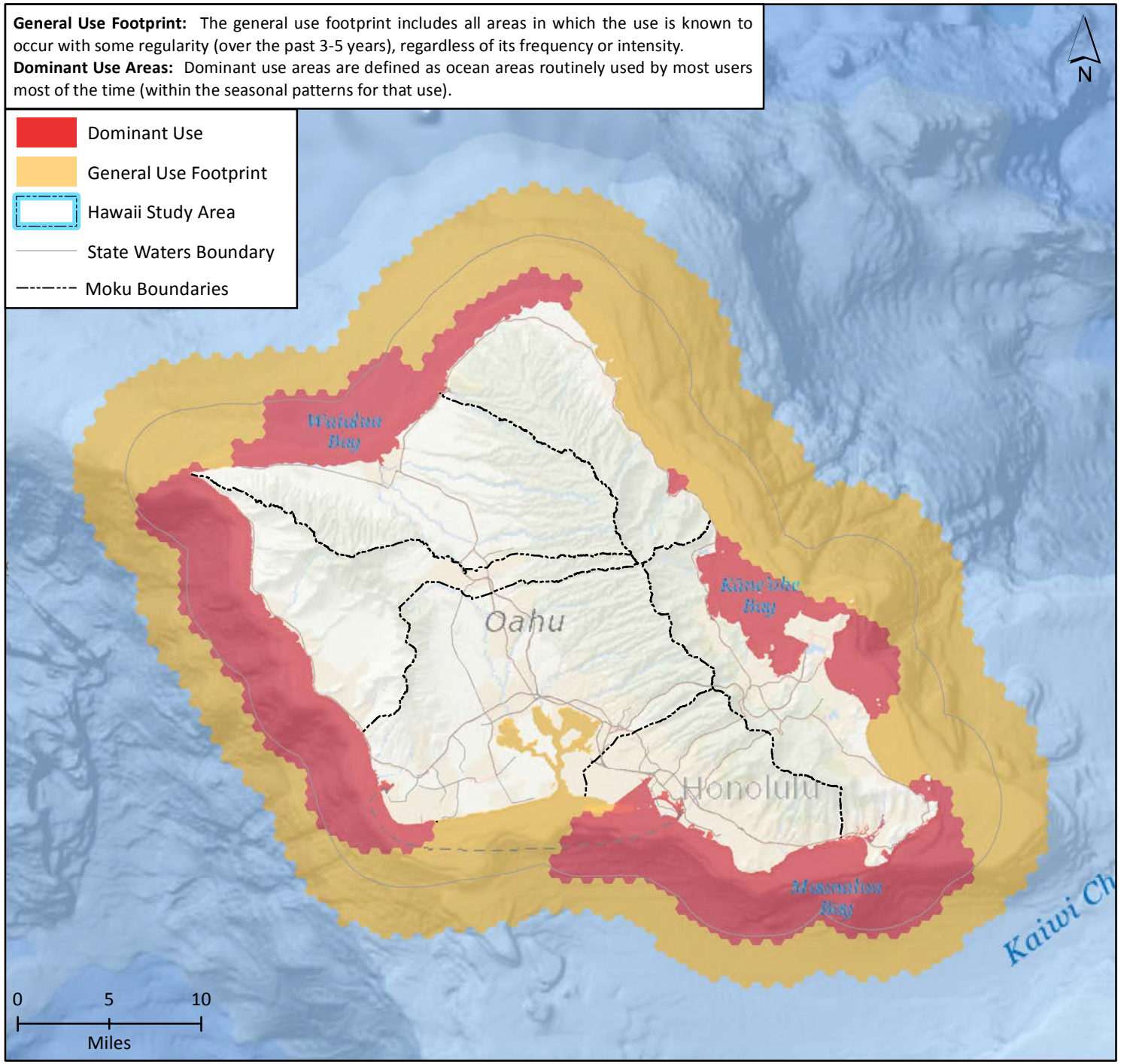
Wildlife Viewing At Sea

Includes:
Charter boating to observe wildlife, includes dolphin tours, whale-watching tours, scenic tours, sea bird tours from a boat for recreation or traditional and customary practices

Excludes:
Fishing Charters, Dive Charters, Boating, swim with dolphins/manta tours

Island Use Notes:
Wildlife viewing occurs most commonly as charters operating near the tourist population areas. Dolphin and whale watching tours operate mainly along the south and west shore, although some glass bottom boat tours do operate out of Honolulu (often focus is on submerged cultural artifacts). Most charters operate out of the the major harbors of Koolina, Waianae, Haleiwa, Kewalo Basin, and Honolulu. Along the west coast, charters target viewing of whales, dolphins and monk seals. On the east coast, there are also kayak-based birding trips out of Kailua, but these are less common. Along the north shore, there is also a shark cage snorkel tour that operates out of Haleiwa.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



 Date: 3/26/2015

THE HAWAII OCEAN USES ATLAS: KAUAI

The Pacific Regional Ocean Uses Atlas

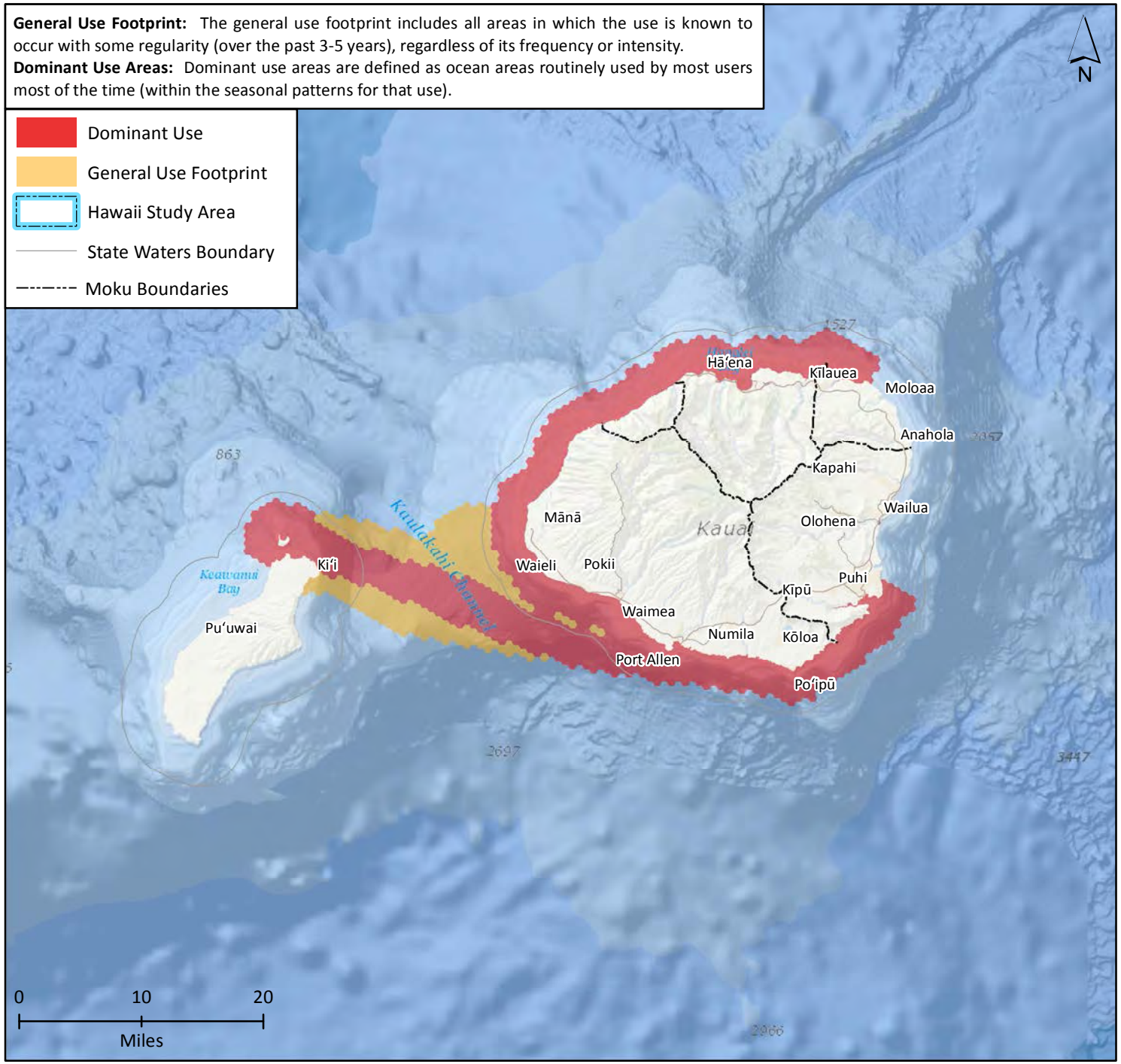
Wildlife Viewing At Sea

Includes:
Charter boating to observe wildlife, includes dolphin tours, whale-watching tours, scenic tours, sea bird tours from a boat for recreation or traditional and customary practices

Excludes:
Fishing Charters, Dive Charters, Boating, swim with dolphins/manta tours

Island Use Notes:
Wildlife viewing has distinctive seasons on Kauai with very few tour operators running year round. The winter is dominant for whale watching tours with tours running mainly along the south coast to shelter from the northerly swells. Some kayaking tours run throughout the year but tend to stay within the bays and close to shore. There are wetland and upland bird viewing areas along many of the coastal rivers, but only two permitted boat-based river tours. There are also wildlife charters that run tours out to Niihau and Lehua Island. Wildlife viewing charters tend to stay within 2-3 miles from shore depending on the season. Based on the seasonal demand, some tour operators will run sunset cruises and fishing trips. A majority of the charters are based in Port Allen with two known charters that launch from Anahola.

General Use Footprint: The general use footprint includes all areas in which the use is known to occur with some regularity (over the past 3-5 years), regardless of its frequency or intensity.
Dominant Use Areas: Dominant use areas are defined as ocean areas routinely used by most users most of the time (within the seasonal patterns for that use).



APPENDIX V

Ocean Use Notes by Geography

Washington Ocean Uses Atlas: Use Notes

Extractive Uses

Use Name	Use Definition	Notes
Commercial Fishing with Benthic Fixed Gear	**Includes:** Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types used to catch benthic fishes and invertebrates **Excludes:** All other forms of fishing	Commercial fishing with benthic fixed gear occurs throughout the study area with a focus on dungeness crab, black cod, halibut, spot prawn and hagfish. Longlines are used in the canyons at depths of 50 fathoms or more; crab pots are most commonly between 2-75 fathoms with most of the crabbing inside 100 fathoms. Crabbers hold over 200 permits in the state and account for over 100,000 crab pots. Protection of the crab fisher heritage and culture is very important to the local coastal communities. Recently the crab fishery has been shifting towards the southern coast near Klipsan Beach where 40-50% of the crab fleet is fishing in 9% of the 140 mile coast.
Commercial Fishing with Benthic Mobile Gear	**Includes:** The use of rod and reel, trolling, trawling and other mobile gear to catch benthic fishes and mobile invertebrates **Excludes:** All other forms of fishing	Commercial fishing with benthic mobile gear occurs mainly on the offshore portion of the continental shelf between 20-700 fathoms. This includes fishing for pink shrimp along the rocky edge of the shelf and around muddy, soft bottom areas; halibut trolling concentrated around 30-180 fathoms; black cod and groundfish between 60-700 fathoms; sole or flatfish between 20-700 fathoms.
Commercial Dive Fishing	**Includes:** The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for commercial purposes **Excludes:** All other forms of fishing, recreational SCUBA/Snorkeling	Commercial dive fishing is not a significant use in this area. Mainly a tribal use, it is most common along the eastern shore of the Strait within 50 feet of water. Geoduck, shellfish, urchin and sea cucumber are the most commonly targeted species.
Commercial Pelagic Fishing	**Includes:** Use of mid-water trawling, purse seine, pelagic longlines, handlines, harpoons, mid-water gillnets, rod and reel, trolling, and buoys to catch pelagic fishes and mobile invertebrates **Excludes:** All other forms of fishing	Commercial pelagic fishing is most common from March-September and targets a wide range of pelagic species including salmon, tuna, whitting, anchovy and sardines. There is some limited commercial pelagic fishing in estuaries for salmon and bait fish, but mainly it occurs outside of 3 miles. Use is concentrated around the channels within 30-40 miles from shore, but it is highly mobile, subject to the regulatory seasons, migration patterns, ocean temperatures and currents.
Commercial Intertidal Harvest	**Includes:** Commercial harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria **Excludes:** All other forms of intertidal or coastal harvesting	Commercial intertidal harvest occurs predominantly in Willapa and Grays Harbors. These two bays account for nearly 10 percent of oyster production in the US. Harvesting for clams is also a significant within the study area.

Use Name	Use Definition	Notes
Recreational Fishing from Boats for Benthic Species	**Includes:** Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates **Excludes:** Any other boat- or shore-based fishing	Recreational fishing from boats for benthic species occurs all throughout the area from the shoreline out to around 150 fathoms, including the bays. The use occurs mostly through recreational charters and is more common near to port due to fuel costs. Generally, the use targets halibut and rockfish.
Recreational Fishing from Boats for Pelagic Species	**Includes:** Recreational fishing from head boats, party boats, charters, or private boats targeting pelagic species **Excludes:** Any other boat- or shore-based fishing	Recreational fishing from boats for pelagic species is dominant along the edges of canyons. It is most common during the fishing openers (annual event to kick off fishing season), and decreases significantly in the winter months. The use mainly targets salmon and tuna, with some bait fishing. The use has decreased in recent years due to increased fuel costs.
Recreational Dive Fishing	**Includes:** The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for recreational purposes **Excludes:** Commercial fishing with SCUBA/snorkel, SCUBA/snorkel for viewing purposes	Recreational dive fishing occurs year-round and is concentrated around jetties, rocky pinnacles and shipwrecks, as well as in select bays. The use occurs mainly within 60 feet of water, but can go as deep as 120 feet. The target species include rockfish, lingcod, dungeness crab and occasionally octopus. The use is more dominant when salmon season is closed.
Kayak Fishing	**Includes:** The use of hook and line fishing from kayaks or any other similar vessel to catch fishes and mobile invertebrates **Excludes:** All other forms of fishing	Kayak fishing occurs along the shore throughout most of the study area, out to a distance of approximately 1.5 miles. The dominant use areas are closer to shore and are highly influenced by coastal access. In general, the use use has increased in the past decade.
Recreational Fishing From Shore	**Includes:** Rod and reel, surf-casting, fishing from piers, jetties, crab traps, cast nets for recreational purposes **Excludes:** All other forms of shore-based fishing	Recreational fishing from shore occurs throughout the study area. Use is focused along sandy beaches and the shores of the Strait. Use also occurs within bays and harbors and is more concentrated around the jetties, breakwaters and piers.
Recreational Intertidal Harvest	**Includes:** Recreational harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria **Excludes:** All other forms of intertidal harvesting	Recreational intertidal harvest occurs throughout the study area for a wide range of clam species (razor, butter, horse, and manila clams) and crabs. The use is most dominant in the summer months, but does occur year-round. Impacts from invasive seagrass have affected clam beds in Willapa Bay in recent years, as have harmful algal blooms.
Subsistence Fishing and Harvest	**Includes:** Shore and boat-based fishing or hunting for vertebrates, birds, mammals and reptiles, harvest of seaweed or algae for subsistence purposes **Excludes:** All other forms of fishing	Subsistence fishing, harvesting and hunting occurs to some degree throughout most of the study area, as a mixture of tribal and non-tribal use.

Industrial Uses

Use Name	Use Definition	Notes
Ocean Dumping	**Includes:** The deliberate legal dumping of dredged spoils and other materials into ocean waters **Excludes:** Sewage Discharge, Mining and Mineral Extraction	Ocean dumping that occurs in the study area is mainly associated with dredge spoils near ports, harbors and river mouths. It can also include the dumping of fish waste and ballast water throughout the study area. More questionable is the illegal dumping of plastics and nuclear waste. The majority of the use occurs as dredge spoils in the EPA Region 10 ocean dumping sites.
Mariculture	**Includes:** Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) **Excludes:** Aquaculture wholly pursued on land	Mariculture occurs in a number of the coastal bays for oysters, clams, salmon and baitfish. Shellfish research beds are present in Neah Bay (geoduck) and Makah Bay (shellfish); bait pens are present in Grays Harbor; net pens (salmon) in Port Angeles.
Marine Debris	**Includes:** The collection, monitoring and routine siting of marine debris, including targeted debris removal areas. **Excludes:** Any other form of ocean dumping	Marine debris siting has increased significantly in recent years. Routine monitoring and collection of debris occurs at various locations throughout the study area. The use is concentrated after large storms and in response to community sitings of debris on beaches and floating debris in nearshore waters.
Military Operations	**Includes:** Transit of military vessels related to training activities, ship and submarine maneuvers, war games, and ordnance disposal **Excludes:** Wartime military operations	Military operations occur throughout a majority of the study area. This includes areas for military training, rescue operations, exercises and ordnance disposal. Live fire testing is known to occur in the Quinault Underwater Test Range and throughout the Strait of Juan de Fuca. Military submarines and carriers transit through the area, staying mainly within the shipping lanes. Some military activities focus around Camp Rilea and the US Coast Guard bases at LaPush and Westport. Military research occurs around the Quileute canyon, basic training around Wade Island and rescue operations training in Sekiu and Clallam.
Mining and Mineral Extraction	**Includes:** Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment **Excludes:** Energy production	Mining and mineral extraction occurs as part of routine monitoring and maintenance of ports and harbors, through dredging activities. The use also includes some beach renourishment activities and gold mining along beaches for recreational purposes. Sand mining occurs around Ocean Park, and sand removal for cranberry bogs occurs in Grayland.
Underwater Pipelines	**Includes:** Any submerged pipe system used to transport oil, gas, sewage or other fluid **Excludes:** Underwater transmission cables	Pipelines are present in the study area for sewage outfall. There are no oil pipelines in the area and no pipelines through the Olympic Coast National Marine Sanctuary.

Use Name	Use Definition	Notes
Renewable Energy	**Includes:** Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms **Excludes:** Onshore power grids	Renewable energy has been considered and tested in a number of locations in the study area, but currently there are no permanent renewable energy developments in operation. Interest has been shown in Makah Bay for wave energy and Willapa Bay for tidal energy, but neither project has moved forward. The community is concerned with visual impacts and affects on local economies, jobs, seabird populations, and local fisheries.
Commercial Shipping	**Includes:** Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels **Excludes:** Cruise Ships, Military Vessels	Commercial shipping occurs throughout the study area. Deep draft vessels follow traffic lanes inside of Cape Flattery. Outside the Strait, it depends on the point of origin or destination - generally north from entrance for Alaska or Far East, south of entrance for coastal trade. Cargo vessels transit generally around 25 miles from shore, tanker vessels around 50 miles from shore. Low sulfur fuel requirements (1% in August 2012 to 0.1% in 2015) will likely push traffic further offshore to 200 miles or greater. Commercial transit occurs year-round with anchoring in Port Angeles harbor. Regular ferry runs occur between Port Angeles and Victoria year-round. Vessel traffic is dominant in the tug lanes and channels, with heavy traffic around the entrance to the Strait and pilot station in Port Angeles.
Underwater Transmission Cables	**Includes:** Cables installed on the seafloor to transmit data, communications, and electricity generated on land **Excludes:** Lost fishing gear, renewable electricity transmission cables	Underwater transmission cables are present throughout the study area. They include a Navy listening cable off Pacific Beach, research cables off Neah Bay (may no longer be active), two Pacific crossing cables, ocean observing NEPTUNE and VENUS cables, as well as military cables off the Quinault Underwater Test range. There is an electrical transmission line planned along the coast of Washington, Oregon and California with coast tie ins in South West Washington and North West Oregon.

Non-Extractive Uses

Use Name	Use Definition	Notes
Beach Use	**Includes:** Walking, running, digging, resting, collecting of shells, wildlife viewing, driving on the beach, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding **Excludes:** Tide Pooling, Mining and Mineral Extraction, Surface Board Sports, Swimming, Harvesting from Shore, Coastal Aquaculture	Beach use is a year-round activity that is most common on sandy beaches close to population centers. Use is more concentrated along the shoreline in the Olympic National Park and on public beaches for beachcombing after large storms. Day hiking and overnighting along the coastal trail contributes to this use year-round.
Motorized Boating	**Includes:** Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC) **Excludes:** Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing	Motorized boating is not a common activity for purely recreational purposes (mainly related to wildlife viewing, fishing or other commercial pursuits). The use mainly occurs along the Strait and within bays and harbors for transit purposes.
Cruise Ships	**Includes:** Transit, mooring or anchoring for extended overnight recreational travel on commercial ships **Excludes:** Motorized Boating, Commercial Shipping	Cruise ships are not a common use in this area and the activity is mainly for transit purpose. Approximately 20-30 ships per year come into Astoria and transit up or down the coast. Some stop in Grays Harbor, but most transit offshore north to Victoria. Cruise ships are observed most commonly in spring and fall and tend to stay at least 20 miles offshore and follow designated shipping lanes except when coming into port where they follow the traffic separation scheme. Some ships pass through the Strait of Juan de Fuca each year headed north to Alaska. They avoid passage through the Olympic Coast National Marine Sanctuary and the nearby Area To Be Avoided (ATBA). This use includes the ferry transit that runs five times daily between Port Angeles and Victoria across the Strait.
Cultural Use	**Includes:** Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance **Excludes:** All other uses and activities	Cultural use is found all throughout the study area. This use includes tribal Usual and Accustomed Areas, shipwrecks, lighthouses, forts, archaeological sites, memorials, cemeteries and the viewshed along all ocean beaches.
Paddling	**Includes:** Kayaking, canoeing, rowing, outrigger paddling, stand-up paddling **Excludes:** Motorized Boating, Surface Board Sports	Paddling is most common along the Strait de Juan de Fuca from Neah Bay to Port Angeles. The use can extend out to one mile from shore, but is more common within 0.5 miles. This use includes the tribal Canoe Journeys which occur along the coast every year.

Use Name	Use Definition	Notes
Permanent Research Areas	**Includes:** Sites, transects, and monitoring areas where routine research or monitoring is conducted **Excludes:** Motorized Boating, Commercial Shipping	Permanent research sites are common all along the coast throughout the study area. This includes research sites that focus on mammal and seabird counts, erosion monitoring, sediment accretion, harmful algal blooms, shellfish populations, and dead bird surveys. Research moorings, naval research areas, oceanographic monitoring buoys and fishery survey tracts are also present. In recent years, more research has focused on the monitoring and removal of marine debris. The Washington Dept. Fish and Wildlife have permanent transect areas on Long Beach peninsula and other coastal razor clam harvesting beaches.
Sailing	**Includes:** Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes **Excludes:** Motorized Boating, Paddling	Sailing is most common in the Strait during the annual Swiftsure Yacht Race in May. Mostly transit sailing occurs along the outer coast with anchoring and refueling common in Neah Bay. Along the outer coast, the use tends to occur between 4-25 miles from shore except for boats coming into port. Some day use sailing occurs within the Strait, in Willapa Bay and around Port Angeles. There is an Annual regatta off Oysterville in Willapa bay, between the main channel and the high tide line.
SCUBA/Snorkeling	**Includes:** SCUBA diving, surface supply diving, snorkeling (free diving) **Excludes:** Swimming, Dive Fishing	SCUBA occurs most commonly in and around the kelp beds near Neah Bay and along the Strait of Juan de Fuca at depths of 100 feet or less. Dominant use occurs from late summer into winter and focuses on shallower areas less than 60 feet. This use is not common on the outer coast with the exception of research or salvage purposes.
Surface Board Sports	**Includes:** Tow-in and paddle-in surfing, wind-surfing, kite surfing, sailboarding **Excludes:** Paddling, SCUBA/Snorkeling, Swimming	Surface board sports have shown an increase in activity in recent years with the introduction of stand up paddling (which now occurs in some harbors and bays). Overall the use is highly dependent on weather and ocean conditions, but does occur year-round. The use is influenced by coastal access, proximity to parking and location of surf breaks. The use tends to stay within one mile of the shoreline and extends into the mouth of the Columbia River.
Swimming	**Includes:** Short- and long-distance surface swimming and wading any distance from shore, body surfing **Excludes:** SCUBA/Snorkeling, Surface Board Sports	Swimming occurs year-round throughout the study area, but is more common in summer. This use occurs predominantly along the sandy beaches, is generally confined to the nearshore (within approximately 100 yards of the tide line) and is highly dependent upon coastal access. The activity may be better defined as wading or playing in the surf zone, as it can be dangerous further from shore.
Tide Pooling	**Includes:** Use of the intertidal zone between high and low tides for recreational, scientific or educational purposes **Excludes:** Harvesting from Shore, Shore Use	Tide pooling is a year-round activity with increased use in the spring through the fall. Most dominant use occurs during minus tides. There is extensive public use of the tide pools in the Olympic National Park.

Use Name	Use Definition	Notes
Wildlife Viewing at Sea	**Includes:** Boat-based wildlife viewing at sea, usually on a commercial vessel **Excludes:** Incidental wildlife viewing from shore or while at sea pursuing other uses	Wildlife viewing at sea has shown some increase in recent years with increase in eco-tourism. Use tends to be seasonal, following seabird and whale migration patterns. Use is most dominant out of Westport and Neah Bay, but there are also wildlife boat tours out of Port Angeles, Ilwaco and LaPush.

Oregon Ocean Uses Atlas: Use Notes

Extractive Uses

Use Name	Use Definition	Notes
Commercial Fishing with Benthic Fixed Gear	**Includes (Gear Types)**: Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types **Includes (Fisheries):** Benthic fishes and invertebrates (Crab, Halibut, Sablefish, and Hagfish) **Excludes**: All other forms of Fishing	Commercial fishing with benthic fixed gear occurs seasonally. Crabbing occurs December – August. Other species such as Halibut are harvested from spring – fall. Sablefish and Hagfish (or Slime Eel) are harvested year-round. This includes use by fishermen from California and Washington venturing into Oregon waters. Most fishermen fish within a day's travel of their home port to limit fuel costs. Vessels are variable in size; smaller boats tend to stay close to their home ports and larger boats will range coast-wide. Crab boats catch Dungeness Crab (highest value fishery in Oregon) using pots around 1 – 150 fathoms. Most commercial Dungeness Crabbing occurs in the first 8-10 weeks of the season, but the remainder of the season is still very important for local crabbing boats. Occasionally, Box Crab are harvested in Oregon, but markets are extremely limited. Traps and pots are also used for a limited Spot Prawn fishery with just 5 permits issued in Oregon. Benthic long lines with hooks are used in the capture of Halibut and Sablefish. Sablefish are also harvested using long lines with pots and Hagfish are caught exclusively using long lines with fixed barrels.
Commercial Fishing with Benthic Mobile Gear	**Includes (Gear Types)**: The use of rod and reel, trolling, trawling, dredging, and other mobile gear **Includes (Fisheries):** Benthic fishes and mobile invertebrates (Groundfish, Pink Shrimp, Rockfish, Lingcod, Cabazon, Scallops and Squid) **Excludes**: All other forms of Fishing	Since 2006, bottom trawling has been prohibited seaward of 700 fathoms because of this area's designation as a Groundfish Essential Fish Habitat (EFH) Conservation Area. Additional closures such as the Rockfish Conservation Areas have been in place since 2002. The main benthic mobile gear types used are hook and line (Rockfish, Lingcod and Cabezon) and trawls (Groundfish). Most hook and line fishing occurs 1 – 3 NM offshore. Trawling is very intensive on the entire upper continental slope. Trawlers run up to 60 miles out to fish and are not limited by proximity to harbors. Groundfish and Pink Shrimp are the main benthic mobile gear fisheries. Groundfish are fished commercially and recreationally May 1 – September 30, inside 30 fathoms. Almost all Pink Shrimp (90%) are caught at 30 – 160 fathoms on muddy bottoms. There is a dinglebar gear fishery for Lingcod that yields up to 400 lbs at a depth of around 20 – 30 fathoms, although currently Lingcod are more often caught using a hook and line. The commercial Lingcod fishery is seasonally regulated. Other fisheries in the study region include Scallops (caught at 10 – 70 fathoms) and Squid (Humboldt at 70 – 700 fathoms and Market at 10 – 100 fathoms by trawling).

Use Name	Use Definition	Notes
Commercial Pelagic Fishing	**Includes (Gear Types)**: Use of mid-water trawling, purse seine, handlines, rod and reel, trolling, and buoys **Includes (Fisheries):**Pelagic fishes and mobile invertebrates (Whiting, Sardine, Anchovy, Salmon, Tuna, and Squid) **Excludes**: All other forms of Fishing	Much of the fishing in the study region is seasonal. Pelagic species are caught using a variety of gear such as mid-water trawl nets (Whiting), round haul, or seine, gear (Sardine, Anchovy) and hook and line trolling (Salmon, Tuna). Whiting are targeted by both local fishermen and boats coming from Alaska that fish 20 – 50 miles out during the summer. Trawling for Whiting takes place in narrow (< 1 mile) swaths. Divergence in fishing tack can be detrimental to catch. The Port of Garibaldi delivers captains and parts to the Whiting processor ships 20 miles offshore. Salmon and Tuna fleets are distributed statewide. The Columbia River is the biggest producing system for Chinook and Coho salmon; Chinook from California rivers are also harvested offshore Oregon. Salmon distribution is driven by sea surface temperature. The Tuna fishery is the widest ranging. The commercial Tuna fleet consists of up to 350 boats. Larger Tuna boats range beyond 200 NM offshore. The movements of migratory fish, like Tuna, depend on water temperature, current strength and baitfish distribution. Tuna tend to move to temperature breaks. Squid are also caught using mid-water seine nets. Rockfish such as Yellowtail and Widow can be found around rocky bottom habitat during the summer months but can be highly variable year to year based on seasonal ocean changes.
Recreational Fishing from Boats for Benthic Species	**Includes (Gear Types)**: Recreational fishing from head boats, , charters, or private boats **Includes (Fisheries):**Benthic species including mobile invertebrates (Rockfish, Halibut, and Crab) **Excludes**: Any other boat- or shore-based fishing	Most recreational benthic fishermen catch Rockfish, Halibut or Crab during the spring and summer seasons. These boats use hook and line for Rockfish or Halibut and traps or pots for Crab. Charter boats targeting Rockfish and Crab will fish in state waters hosting up to 18 people on board. Crab boats will fish up to the breakers. The larger boats are concentrated around Depoe Bay (200 sport boats per day is not unusual), Newport (20 boats) and Garibaldi. Halibut is one of the main species recreationally fished outside 3 NM. When fishing for Halibut and Lingcod, fishermen typically stay within a day's sail of port (around 30 miles). There are some specific areas that Halibut fishers will target such as 'Halibut Hill' off of Garibaldi, 'Bandon High Spot', and 'Chicken Ranch' by Perpetua Bank. Groundfish are fished commercially and recreationally May 1 – September 30, inside 30 fathoms.

Use Name	Use Definition	Notes
Recreational Fishing from Boats for Pelagic Species	**Includes (Gear Types):** Recreational fishing from head boats, , charters, or private boats **Includes (Fisheries):**Pelagic species Excludes: Any other boat- or shore-based fishing	Recreational pelagic fishing from boats generally occurs within 70 NM out and 15 – 20 NM north and south of major ports. Major ports are: Astoria, Nehalem, Garibaldi, Pacific City, Depoe Bay, Newport, Florence, Reedsport, Charleston, Bandon, Gold Beach, Brookings and Port Orford. Target species include Salmon, Tuna and occasionally Mahi Mahi, Wahoo and Marlin. Salmon season is April – September, with the best fishing in June – September from shore to 100 fathoms. Tuna can be caught year-round but mostly starts with the onset of warm weather out to 100 miles. Every year the ports in Ilwaco and Garibaldi host the 'Oregon Tuna Classic' tournament series in which participants donate their catch to the Oregon Food Bank. The main fishing areas for Salmon and Tuna can vary drastically from year to year and the fishing is largely concentrated by how far fishermen are willing to go from ports. Sport fishermen in small boats fish close to the mouth of Tillamook Bay and north up to Nehalem out to 30 – 40 fathoms; the weather in that area can change quickly, and the boats can run back to the bay with the ocean and not against it in foul weather. The dory fleet catches Salmon and Tuna coast-wide and is not limited to larger ports.
Subsistence Fishing and Harvest	**Includes:** Shore and boat-based fishing or hunting for vertebrates, birds, mammals and reptiles, harvest of seaweed or algae for subsistence purposes **Excludes**: All other forms of Fishing	This use does not occur in the study area.
Commercial Seaweed Harvest	**Includes**: Large-scale commercial harvesting of macroalgae by machine, or limited-scale individual harvesting by hand from a small boat **Excludes**: Excludes: Aquaculture, Tide Pooling, other harvest	This use does not occur in the study area.

Industrial Uses

Use Name	Use Definition	Notes
Ocean Dumping	**Includes**: The deliberate legal dumping of dredged spoils and other materials into ocean waters **Excludes**: Sewage Discharge, Mining and Mineral Extraction	There is limited traditional ocean dumping such as dredge spoils disposal outside 3 NM. Environmental legislation prohibits dumping of most sinking materials inside 25 miles. Commercial shipping mid-ocean ballast water exchange has to occur outside of 50 miles and 200 meters in depth. There is a Whiting waste disposal area regularly used off of Newport.
Military Operations	**Includes**: Transit of military vessels related to training activities, ship and submarine maneuvers, war games, and ordnance disposal **Excludes**: Wartime military operations	Most Coast Guard and Navy activities in the study region are related to maneuvering activities on the continental slope near Washington. These activities include submarine traffic seaward of 100 fathoms, Coast Guard helicopter patterns and the Camp Rilea Danger Zone. The Coast Guard conducts much of its work inside 50 NM for rescue training and is most often called upon to pick up boats during the highly used summer season. Since the Coast Guard responds to distress calls from local fishing vessels and recreational boaters, its area of operations migrates with the fleet's seasonal movement.
Renewable Energy	**Includes**: Systems designed to generate electricity from wind, wave, currents or tidal power using turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms **Excludes**: Onshore power grids	Oregon has one of the most well developed offshore renewable energy programs on the West Coast of the U.S. The WindFloat Pacific Demonstration Project is a proposed pilot-scale floating wind energy project offshore Coos Bay. The WindFloat commercial lease request was received by BOEM in May of 2013. Energy testing sites in the study region include the proposed Pacific Marine Energy Center (PMEC) South Energy Testing Site (SETS) offshore Newport. The PMEC SETS research lease request was received by BOEM in June of 2013. The Oregon Military Department commissioned a feasibility study and concept design study for ocean renewable energy offshore Camp Rilea. The unique Gorda Ridge system offshore southern Oregon is a potential source of geothermal energy, though no project proposals or lease requests for the Gorda Ridge system have been received to date. Regarding offshore renewable energy development, communities have concerns with visual impacts and effects on seabird populations, local fisheries, and local economies from unproven wave energy technologies and out-of-state jobs.

Use Name	Use Definition	Notes
Commercial Shipping	**Includes**: Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels **Excludes**: Cruise Ships, Military Vessels	Heavy shipping use occurs throughout the study region. Ships in the region are either crossing the Pacific or transiting north and south 20 – 50 miles offshore. This traffic is concentrated closer to shore around the primary ports of Astoria, Newport and Coos Bay. Within most state waters, tow lanes exist (no major tow lanes in Garibaldi, Florence and Reedsport) for tugboats and barges but not deep draft shipping lanes. The tow lanes exist largely to prevent ships from picking up set crab gear. Most tow lane traffic is from ports such as Bandon, Florence and Coos Bay. An unlegislated agreement exists whereby the tow lanes are eligible to be crabbed during the crab season (winter months) but not at other times of the year. Changes in shipping goods such as timber logs and Liquified Natural Gas (LNG) development could alter shipping activities in the state dramatically.
Underwater Transmission Cables	**Includes**: Cables installed on the seafloor to transmit data, communications, and electricity generated on land **Excludes**: Lost fishing gear, renewable electricity transmission cables	Underwater transmission cables are present throughout the study region. Out to 700 fathoms, cables are buried to 1 meter to protect against trawling (burial does not protect against potential anchoring damage). Beyond this depth, the cables are simply laid on the seafloor. Existing cables are used predominantly for telecommunication and vary in length from north-south cables that span the west coast to transpacific cables. There are research cables around Coos Bay that include research arrays for the Ocean Observing Initiative (OOI).
Mariculture	**Includes**: Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages) **Excludes**: Aquaculture wholly pursued on land	This use does not occur in the study area.
Mining and Mineral Extraction	**Includes**: Sand and gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment **Excludes**: Energy production	This use does not occur in the study area.
Underwater Pipelines	**Includes**: Any submerged pipe system used to transport oil, gas, sewage or other fluid **Excludes**: Underwater transmission cables	This use does not occur in the study area.

Non-Extractive Uses

Use Name	Use Definition	Notes
Motorized Boating	**Includes**: Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, personal watercraft (PWC) **Excludes**: Fishing, Wildlife Viewing at Sea, Cruise Ships, Shipping, Sailing	Motorized boating is not common in the study region. The highest use areas are around ports, where boats typically motor as far as 10 NM offshore. There is a limited transitory corridor 50 NM offshore that boaters use to move up and down the coast.
Cruise Ships	**Includes**: Transit, mooring or anchoring for extended overnight recreational travel on commercial ships **Excludes**: Motorized Boating, Commercial Shipping	Cruise ships are not common in the study region. Approximately 20 ships transit north to Alaska using existing shipping lanes. Cruise ships will stop in Astoria periodically, although their activity is limited to the summer months.
Cultural Use	**Includes**: Traditional use of specific ocean, coastal, and shoreline areas based on inherent cultural, spiritual, or aesthetic values and significance **Excludes**: All other uses and activities	Much of the cultural value in the study region is perceived from coastal platforms such as tribal areas, lighthouses, forts, archaeological sites, memorials and cemeteries. Within the study region, the dominant use is the viewshed that can extend as far as 50 NM offshore the Oregon coast and beaches. Tribal cultural use is not explicitly depicted here.
Permanent Research Areas	**Includes**: Sites, transects, and monitoring areas where routine research or monitoring is conducted **Excludes**: Motorized Boating, Commercial Shipping	Permanent Research Areas are limited in the study region to areas with direct proximity to higher education facilities in Coos Bay and Newport. The use includes research moorings, oceanographic monitoring buoys and fishery survey tracts. Most data collected are by autonomous underwater vehicle (AUV) or remotely operated vehicle (ROV), and support oceanographic science such as ocean hypoxia. Areas of biological sampling include Heceta and Nehalem banks, although sampling is limited to areas with rocky substrate.
Sailing	**Includes**: Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes **Excludes**: Motorized Boating, Paddling	Sailing in the study region is a seasonal use with limited activity in the winter due to extreme weather conditions. Much of the activity includes transiting through Oregon waters out to 50 NM offshore. Recreational sailors tend to congregate locally around major harbors such as Astoria, Newport and Coos Bay; there is an annual race (10 – 20 boats) from Astoria to Newport. Charter sailboats run seasonally from Garibaldi north to the San Juan Islands and south to Newport around 10 miles offshore.
Wildlife Viewing at Sea	**Includes**: Boat-based wildlife viewing at sea, usually on a commercial vessel **Excludes**: Incidental wildlife viewing from shore or while at sea pursuing other uses	Wildlife viewing is dominated by whale watching and pelagic birding trips. These charter boats double as fishing boats depending on the season, so the use depends on where boat owners gain the maximum profit, whether from fishing or ecotours. Most charters are run out of Garibaldi and Newport heading to areas such as Cape Lookout and Three Arch Rocks. Other ports such as Yachats, Coos Bay, Astoria and Depoe Bay also have charter operators.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Commercial Dive Fishing/Harvest	Dive fishers are primarily subsistence and non-commercial fishers. The few commercial divers target live fish for the aquarium trade, a contentious activity in the islands that predominantly occurs off the Kona coast. Dominant use areas for dive fishing are around coastal access points in proximity to population zones and surrounding the state-maintained Fish Aggregation Devices (FADs). Free diving is increasing in popularity both as a recreational activity and for spearfishing. Dive fishing is dependent upon environmental conditions; SCUBA divers reach depths of ~130 feet, while free divers can reach a maximum depth of ~100 feet. Lack of spatial data may indicate either, *use was specifically not mapped during the HOUA process* OR *use does not occur*. Please consult Island Use Notes to confirm.	Maui: Information on commercial dive fishing and harvest was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: Workshop participants did not provide additional contextual information for this use. Molokai: Information on commercial dive fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Commercial dive fishing is a weather dependent activity that occurs around Kauai and Niihau (mainly off the west coast of Niihau). Divers typically catch reef fish and sell to families and local markets. On Kauai, commercial divers will collect corals down to 180 feet deep; there is one dive boat licensed for this activity. Free diving is growing in popularity, and occurs to depths of 100 feet around Kauai. Blue water diving occurs less frequently offshore within 0.25 miles of Fish Aggregation Devices.	Commercial dive fishing occurs throughout all marine waters around Hawaii Island, typically down to 150 feet. On the leeward side, the use is more common due to preferred marine conditions and increased access to the shoreline. Spearfishing using SCUBA gear is prohibited within 3 miles from shore on the leeward side, but free diving is allowed with restrictions on lobster collection. Divers can collect fish for the aquarium trade using SCUBA but this activity is prohibited within Fish Replenishment Areas (FRAs). Aquarium collection is a contentious use and often occurs covertly at sites farther from shore with limited access. Blue water diving occurs less frequently around the Fish Aggregation Devices (FADs) within 100 feet of the buoy. On the windward side, Kings Landing to Hilo Bay is a dominant use area. Private FADs have been placed offshore in a few select locations, but these are not as highly used as the state-maintained FADs.	Commercial dive fishing occurs all around the island, generally free diving from shore to 90 feet depth and SCUBA to 150 feet depth. The dominant areas are along the shallow reef flat (in areas like Kahana Bay) and areas along the reef break. SCUBA is more prevalent, but free diving is increasing in popularity. A controversial component of this activity focuses on the capture of live fish for the aquarium trade.
Commercial Fishing with Benthic Fixed Gear	As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity . Fishers are typically non-commercial but will occasionally sell the best of their catch. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Commercial benthic fishers primarily target Kona crab due to regulatory restrictions on the use of other gear types, (e.g., gill nets and lay nets). This activity is dominant throughout Maui Nui and along Penguin Bank (predominantly Oahu fishermen), but fuel costs often limit the distance that fishers will go from their home port. This use was discussed but use areas were not mapped during the workshop. Lanai: Information on commercial fishing with benthic mobile and fixed gear was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Commercial fishing occurs from the shoreline out to beyond 200 nautical miles. Dominant use areas are around Maui Nui with bottom fishing typically from Kaunakakai to Kamalo harbor. This use was discussed but use areas were not mapped during the workshop.	Commercial fishing with benthic gear occurs all around Kauai, mainly within the 20 – 500 fathom depth range. The typical species caught are the deep seven species. Using fixed gear, the most targeted species are the Kona crab and Samoan crab which are found mainly around Hanalei Bay and the mouth of the Wailua river. Kona crab fishing targets sandy bottom areas, between 20 – 60 fathoms. Fishers will also trap Oopu, an anadromous fish that breeds in the local rivers. These fish spawn from August to September and need heavy rains to trigger their cycles. In recent years, more non-resident/off-island boats have been seen fishing in Kauai waters. Alaskan fishermen come to fish for shrimp off Kauai using traps between 300 – 500 fathoms.	Commercial fishing with benthic mobile & fixed gear is mainly referred to as bottom fishing. The use is strongly tied to seafloor depth, seafloor morphology and distance from shore. The Cross, Loihi, and Daly seamounts, as well as other shallow seamounts (< 200 fathoms) and ledges off Maui and between Maui and Hawaii are well-known bottom fishing grounds. Users that target Kona crabs typically seek sandy bottom areas at depths of 20 - 50 fathoms with fixed nets commonly used at night for catching lobster. The predominant bottom fish species caught are snapper, grouper and jacks. Bottom fishing is prohibited in Mahaiula, and in the South Point bottom fish restricted areas (BRFA), but mainly occurs all around the island at 40 - 250 fathoms.	Commercial bottom fishing occurs all throughout the islands, depending on the season and the target species anywhere from the shoreline out to 350 fathoms. Bottom fishing for deep-water shrimp is most common between 200 – 350 fathoms and for Kona crab between 20-40 fathoms. Dominant use areas exist around Penguin Bank. Regulations and ocean conditions limit the locations and seasons for commercial bottom fishing.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Commercial Fishing with Benthic Mobile Gear	As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity . Fishers are typically non-commercial but will occasionally sell the best of their catch. Across the state there is no benthic trawling or trolling except to target Monchong near Hawaii island on the Cross seamount. Lack of spatial data may indicate either, *use was specifically not mapped during the HOUA process* OR *use does not occur*. Please consult Island Use Notes to confirm.	Maui: Commercial benthic fishers primarily target Kona crab due to regulatory restrictions on the use of other gear types, (e.g., gill nets and lay nets). This activity is dominant throughout Maui Nui and along Penguin Bank (predominantly Oahu fishermen), but fuel costs often limit the distance that fishers will go from their home port. This use was discussed but use areas were not mapped during the workshop. Lanai: Information on commercial fishing with benthic mobile and fixed gear was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Commercial fishing occurs from the shoreline out to beyond 200 nautical miles. Dominant use areas are around Maui Nui with bottom fishing typically from Kaunakakai to Kamalo harbor. This use was discussed but use areas were not mapped during the workshop.	Commercial fishing with benthic gear occurs all around Kauai, mainly within the 20 – 500 fathom depth range. The typical species caught are the deep seven species. Using fixed gear, the most targeted species are the Kona crab and Samoan crab which are found mainly around Hanalei Bay and the mouth of the Wailua river. Kona crab fishing targets sandy bottom areas, between 20 – 60 fathoms. Fishers will also trap Oopu, an anadromous fish that breeds in the local rivers. These fish spawn from August to September and need heavy rains to trigger their cycles. In recent years, more non-resident/off-island boats have been seen fishing in Kauai waters. Alaskan fishermen come to fish for shrimp off Kauai using traps between 300 – 500 fathoms.	Commercial fishing with benthic mobile & fixed gear is mainly referred to as bottom fishing. The use is strongly tied to seafloor depth, seafloor morphology and distance from shore. The Cross, Loihi, and Daly seamounts, as well as other shallow seamounts (< 200 fathoms) and ledges off Maui and between Maui and Hawaii are well-known bottom fishing grounds. Users that target Kona crabs typically seek sandy bottom areas at depths of 20 - 50 fathoms with fixed nets commonly used at night for catching lobster. The predominant bottom fish species caught are snapper, grouper and jacks. Bottom fishing is prohibited in Mahaiula, and in the South Point bottom fish restricted areas (BRFA), but mainly occurs all around the island at 40 - 250 fathoms. Across the state there is no benthic trawling or trolling except to target Monchong near Hawaii island on the Cross seamount.	Commercial bottom fishing occurs all throughout the islands, depending on the season and the target species anywhere from the shoreline out to 350 fathoms. Bottom fishing for deep-water shrimp is most common between 200 – 350 fathoms and for Kona crab between 20-40 fathoms. Dominant use areas exist around Penguin Bank. Regulations and ocean conditions limit the locations and seasons for commercial bottom fishing.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Commercial Pelagic/Midwater Fishing	Pelagic fishers use the all marine waters around the islands and venture beyond 200 nautical miles from shore. Dominant use areas are near submerged ledges and drop offs and surrounding seamounts and the state-maintained Fish Aggregation Devices (FADs). Prime fishing spots vary from island to island. Typical gear used are rod and reel (trolling) or kaka (hand) line from a boat. Kaka line fishing often occurs in smaller boats closer to shore. There are 110 long liners in the state and 11 short liners (<1 nautical mile length line). Most long liners are based from Honolulu including selling their catch and resupplying there. Some short line boats are based on Hawaii island, but sell primarily in Honolulu and to a lesser amount in Kona/Hilo. Long liners using gear longer than 1 nautical mile are restricted by the MHI longline fishing prohibited area. Longlining is the primary method of fishing, if measured by pounds of landed fish. The primary use, when measured by effort, is trolling for pelagics (marlin, mahi mahi, ono, and ahi). Commercial long liners follow seasonal and year-round regulatory closures. The primary target species are large pelagic fish including hebi (swordfish), ahi (tuna), akule (scad), and mahi (dolphin fish). Pelagic species' distributions vary seasonally. Non-commercial fishers use the same areas as the commercial pelagic fishers, the primary difference is non-commercial fishers will stay closer to shore to limit fuel costs (<15-20 miles). Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Maui fishermen request no development beyond the 20 fathom line. Lanai: Information on commercial pelagic fishing was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Information on commercial pelagic/midwater fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Commercial pelagic fishermen are predominantly targeting akule, ono, mahi and ahi, all around the main eight Hawaiian islands at depths ranging from 20 – 1500 fathoms. The dominant use areas are found around the Fish Aggregation Devices and within a two mile buffer around Niihau. Generally, the fishers follow the fish and their migrations and spawning seasons.	Commercial pelagic fishing occurs throughout the main eight Hawaiian Islands out to 200 nm and beyond. On the leeward side of Hawaii Island, dominant use is mainly within 10 miles from shore due to optimal marine conditions, fuel costs and good fishing. The waters surrounding Kailua-Kona hold regular fishing competitions, with dominant contest areas from Keauhou to Milolii. There are also many koas near Kawaihae. Fishers who use these koas have terrestrial landmarks that help to locate the koas at sea. The traditional 'drop stone' technique is commonly used, whereby a fish is tied to a stone and dropped into the water as bait to attract larger fish. Long lining is the primary method of fishing for pelagics, as trawling and purse seining are illegal in Hawaii's waters. There are specific quotas set for long lining, but these are not often met. Long line and short line fishermen tend to fish by exclusion zones rather than depth. The main pelagic species targeted are marlin, ono (usually within 40 – 60 fathoms), ahi using opelu as bait. The seamounts are popular for ahi fishing and are believed to be larval retention zones. Ahi migration patterns vary seasonally, routing north of the island in the fall and winter and south through the spring and summer. Smaller tuna are caught on the cross seamount using short lines (<1 nautical mile length) and around NOAA weather buoys. Private FADs have been placed offshore in a few select locations, but these are not as highly used as the state-maintained FADs.	Commercial pelagic fishing occurs throughout Hawaii's waters, from the shoreline to outside the 200 nautical mile extent of the US Exclusive Economic Zone, with the exception of the 50 nautical mile exclusion zone around the islands for pelagic long lining. Throughout the year, the targeted species change, but the activity occurs year round, most commonly with deep-sea hand lines or kaka lines. Trolling is not common, but does occur between 20-1500 fathoms. Dominant use areas are influenced by distance from port (driven by fuel costs and distance that can be covered in a day trip) and mostly include area from the shore out to 35 miles offshore. Non-commercial and subsistence fishers fish the same area. The depth zones typically fished vary depending on target species (e.g. akule, opelo and ono between 50-200 fathoms).

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Commercial Intertidal Harvest	Intertidal gathering occurs everywhere there is coastal access in the Hawaiian Islands as a non-commercial or subsistence activity. Dominant use areas are public access zones close to population centers that have unique conditions for the target species, such as access to brackish water, rocky headlands or sandy beach. Areas that prohibit access or harvest may still be used, but to a lesser extent. The collection zones are between high and low tide, although users will wade depending on depth . Gathering zones are seasonal based on species availability and ocean conditions for safe access. Gathering seasons can often be indicated by terrestrial environmental cues (e.g., blossoms on specific tree species) that vary from island to island. Primary target species are limu (seaweed), opihi (limpets) and he'e/ tako (octopus). These species taste different depending on whether they are collected from exposed or calm areas. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Information on commercial intertidal harvest was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: Information on commercial intertidal harvest was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Information on commercial intertidal harvest was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Commercial intertidal harvest occurs all throughout the islands, and often illegally. Opihi and limu are the main species gathered, and harvest is based on the seasonality and availability of these species, which in some areas has been heavily over-harvested. Traditionally, salt is gathered and sold at Hanapepe. (Limited knowledge at the workshop)	Commercial intertidal harvest occurs on all shorelines that offer safe access both from the land and sea. Harvest primarily targets opihi, limu and small shrimp that are used as bait. Intertidal aquarium harvesting also occurs along the Kona coast and near Honaunau. The dominant use areas are based on ease of access. Commercial intertidal harvest is less important to the community than non-commercial intertidal harvest in terms of subsistence and food supply. Main collection zones are ~15 – 20 feet from shore and between lowest low to highest high tide (~10 – 15 feet deep).	There is little strictly commercial intertidal harvest on Oahu. Dominant use areas are Kaena Point, Ewa and Mamala Bay. Primary species targeted are limu (seaweed) harvesting and opihi (limpets). Opihi sales are largely non-disclosed sales to local vendors.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commerical Dive Fishing/Harvest	Dive fishers are primarily subsistence and non-commercial fishers. The few commercial divers target live fish for the aquarium trade, a contentious activity in the islands that predominantly occurs off the Kona coast. Dominant use areas for dive fishing are around coastal access points in proximity to population zones and surrounding the state-maintained Fish Aggregation Devices (FADs). Free diving is increasing in popularity both as a recreational activity and for spearfishing. Dive fishing is dependent upon environmental conditions; SCUBA divers reach depths of ~130 feet, while free divers can reach a maximum depth of ~100 feet. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Non-commercial dive fishing occurs around the island generally to a depth of 90-100 feet. Dominant use areas are around the Fish Aggregation Devices and along the reef flat. Lanai: Lanai can be thought of as the 'biggest fish aggregation device in Hawaii'. Dominant use areas exist on the leeward side of the island for reef fish and opihi. The north side of the island has a shallow reef that is often accessed by spear fishers. Local dive fishing is mainly for subsistence and is highly dependent on ocean conditions. Lanai residents feel that they must compete for Lanai resources with fishermen from Maui, so local dive fishing sites are closely guarded secrets. Molokai: Information on non-commercial dive fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Commercial dive fishing is a weather dependent activity that occurs around Kauai and Niihau (mainly off the west coast of Niihau). Divers typically catch reef fish and sell to families and local markets. On Kauai, commercial divers will collect corals down to 180 feet deep; there is one dive boat licensed for this activity. Free diving is growing in popularity, and occurs to depths of 100 feet around Kauai. Blue water diving occurs less frequently offshore within 0.25 miles of Fish Aggregation Devices.	Dive fishing is more heavily practiced on the leeward side due to more optimal ocean conditions and focuses on primarily on reef fish and some pelagic species such as mahi (dorado) and tuna (ahi). Non-commercial and commercial dive fishing occur mainly in the same areas, but the non-commercial activity is much greater overall in all areas. There has been discussion about a 10 year spearfishing ban around Kaupulehu, but there has been community opposition to such a ban to date.	Non-commercial dive fishing occurs all around the island, generally free diving from shore to 90 feet depth and SCUBA to 150 feet depth. The dominant areas are along the shallow reef flat (in areas like Kahana Bay) and areas along the reef break. SCUBA is more prevalent, but free diving is increasing in popularity. Non-commercial fishermen will also blue water dive on the Fish Aggregation Devices down to ~100 feet depth. A controversial component of this activity is the targeted capture of live fish for the aquarium trade.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commercial Fishing (Benthic Fixed Gear)	As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity. Fishers are typically non-commercial but will occasionally sell the best of their catch. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Non-commercial bottom fishing occurs predominantly around ledges and drop offs down to 275 fathoms excluding regulatory closures and protected areas. Lanai: During the lobster season, local residents commonly set traps in the nearshore area around Keomuku. Users are mainly non-commercial or subsistence fishers. Lanai fishers feel that they must compete for resources with fishermen from Maui. This use was discussed but use areas were not mapped during the workshop. Molokai: Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers. This use was discussed but use areas were not mapped during the workshop.	Non-Commercial fishing with benthic mobile and fixed gear occurs mostly between 20-200 fathoms around the main islands of Kauai and Niihau. The limiting factor is often fuel costs. Near Haena, Wailua and Hanalei, there is a Samoan crab fishery in the brackish water at the river mouths. The dominant offshore areas are Kaula Rock and Lehua Seamount. (Limited use knowledge in workshop.)	Non-commercial fishing with benthic mobile & fixed gear occurs generally at depths of 20 - 220 fathoms along the whole coast of Hawaii Island. There are deep-water shrimp grounds from Kiholo to Kawaihae down to 200 fathoms but they are used by only a few fishers. Most of the use targets Kona crabs at 20 - 40 fathoms from Keauhou Bay to Kealakekua Bay and around Kailua Bay and Mahaiula.	Non-commercial fishing with benthic mobile and fixed gear is conducted mainly for subsistence, but occasionally for non-disclosed local sale. Traditional fishermen tend to fish close to shore and in shallow water, using lines made from plant material. One technique is dragging shell, whereby a lure (e.g. cowrie shell) gets dragged to tease out octopus or other benthic creatures. In recent years, some schools (e.g. PaePae o'Heia on the leeward side) have begun teaching traditional fishing techniques to educate youth on the historic practices and ways. Traditional fishermen follow the moku boundaries to maintain community kuleana to prevent overfishing.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commercial Fishing (Benthic Mobile Gear)	As the Hawaiian Islands are oceanic islands with steep drop-offs close to shore, bottom fishing is highly limited to the shelves, fringing reefs and shallow seamounts (<500 fathoms). Dominant use areas around the islands are the Maui Nui area and Penguin Bank (Kaiwi Channel). Primary species caught are Kona crab, deepwater shrimp and the 'Deep 7' bottom fish—a mix of high-value snapper and groupers. Crab can be found in areas with sandy bottoms; fish are found in areas with higher rugosity. Fishers are typically non-commercial but will occasionally sell the best of their catch. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Non-commercial bottom fishing occurs predominantly around ledges and drop offs down to 275 fathoms excluding regulatory closures and protected areas. Lanai: During the lobster season, local residents commonly set traps in the nearshore area around Keomuku. Users are mainly non-commercial or subsistence fishers. Lanai fishers feel that they must compete for resources with fishermen from Maui. Molokai: Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers.	Non-Commercial fishing with benthic mobile and fixed gear occurs mostly between 20-200 fathoms around the main islands of Kauai and Niihau. The limiting factor is often fuel costs. Near Haena, Wailua and Hanalei, there is a Samoan crab fishery in the brackish water at the river mouths. The dominant offshore areas are Kaula Rock and Lehua Seamount. (Limited use knowledge in workshop.)	Non-commercial fishing with benthic mobile & fixed gear occurs generally at depths of 20 - 220 fathoms along the whole coast of Hawaii Island. There are deep-water shrimp grounds from Kiholo to Kawaihae down to 200 fathoms but they are used by only a few fishers. Most of the use targets Kona crabs at 20 - 40 fathoms from Keauhou Bay to Kealakekua Bay and around Kailua Bay and Mahaiula.	Non-commercial fishing with benthic mobile and fixed gear is conducted mainly for subsistence, but occasionally for non-disclosed local sale. Traditional fishermen tend to fish close to shore and in shallow water, using lines made from plant material. One technique is dragging shell, whereby a lure (e.g. cowrie shell) gets dragged to tease out octopus or other benthic creatures. In recent years, some schools (e.g. PaePae o'Heia on the leeward side) have begun teaching traditional fishing techniques to educate youth on the historic practices and ways. Traditional fishermen follow the moku boundaries to maintain community kuleana to prevent overfishing.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commercial Pelagic/Midwater Fishing	Pelagic fishers use the all marine waters around the islands and venture beyond 200 nautical miles from shore. Dominant use areas are near submerged ledges and drop offs and surrounding seamounts and the state-maintained Fish Aggregation Devices (FADs). Prime fishing spots vary from island to island. Typical gear used are rod and reel (trolling) or kaka (hand) line from a boat. Kaka line fishing often occurs in smaller boats closer to shore. Commercial long liners follow seasonal and year-round regulatory closures. The primary target species are large pelagic fish including hebi (swordfish), ahi (tuna), akule (scad), and mahi (dolphin fish). Pelagic species' distributions vary seasonally. Non-commercial fishers use the same areas as the commercial pelagic fishers, the primary difference is non-commercial fishers will stay closer to shore to limit fuel costs (<15-20 miles). Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Non-commercial bottom fishing occurs predominantly around ledges and drop offs down to 275 fathoms excluding regulatory closures and protected areas. Lanai: During the lobster season, local residents commonly set traps in the nearshore area around Keomuku. Users are mainly non-commercial or subsistence fishers. Lanai fishers feel that they must compete for resources with fishermen from Maui. Molokai: Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers.	Non-commercial pelagic fishing occurs all around the island out to ~ 1000 fathoms. Dominant use areas are influenced by seafloor morphology (seamounts, ledges), distance from shore and fuel costs.	The general areas are the same for non-commercial pelagic fishing as for commercial pelagic fishing, the only difference is the non-commercial fishers will stay closer to shore, not more than 15-20 miles offshore. There are ~50 – 70 private (illegal) FADs around the island that are ~75 miles offshore. Users also kayak fish for pelagic species on special sailing kayaks, up to 10 miles offshore. Access is dictated by launch areas. The Cross seamount is an important area for non-commercial fishers.	Non-commercial pelagic fishers fish the same areas as the commercial fishers but tend to have smaller vessels and stay closer to shore (due to fuel costs).

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commercial Shore Fishing	Non-commercial fishing from shore occurs throughout the islands wherever there is shore access. In general, if people are using the shore they are likely fishing there as well. However, coastal access is not as limiting for fishing as it can be for beach/shore use, as even inaccessible areas can be fished using appropriate gear. Many types of gear are used, including the lay net (net laid over the reef at low tide and hauled in), cast net (actively casting a smaller net), pole and line, slide bait (casting a line with a lead weight and sliding bait down the line), paddle line (a line is paddled out from shore), bag line (using trash bags to blow bait out ~300 yards), and bowline (using a longbow to shoot fish from cliff tops). There are multiple target species for shore fishing, ranging from large pelagic fish (using bag/ paddle lines) to octopus. Every community has different environmental challenges (e.g., sandy bottom, rocky cliffs) so unique fishing techniques such as bowline fishing or bag line fishing have developed within each community. Peak fishing times are dictated by weather, moon phase and season. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Non-commercial fishing from shore on Maui is exclusively a subsistence-based use. The entire shoreline is used for shore fishing, but degree of use is influenced by ease of coastal access. However, some there are inaccessible areas that are still used by a select number of daring fishers. Lanai: Non-commercial fishing from shore is conducted mainly for subsistence and occurs on all accessible coastal areas along the shoreline on Lanai. Molokai: Information on non-commercial shore fishing was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Non-commercial shore fishing occurs all around the island with shoreline access and where the use is not prohibited (i.e. wildlife refuges). Dominant use areas include the piers at Waimea and Hanamaulu, but degradation to shoreline access in recent years has reduced use in areas like Papaa Bay. Fishers cast lines out to 150-200 yards from shore and are mostly fishing for moi and oopu. Moi fishing uses a throw net and fishing pole and occurs in Haena from June to September. Oopu spawn in the river from August to September and are dependent on heavy rains to trigger their migration. Local communities fear that degrading water quality caused by the tourist industry will influence the quality of the near shore fisheries.	Non-commercial fishing from shore occurs everywhere along the coast with a variety of methods and gear depending on the location. Use areas can change over time (e.g., Hosaka was a famous historical fishing spot but not regularly used now) and with changes in coastal access (e.g., Haumakoa coast plantation landings). Fishing techniques are unique to each community, but the primary methods include cast net, pole and line, coastline to slide bait (cast lead weight and slide bait down the line), bag line fishing (using trash bags to blow bait offshore). The bag line fishing occurs mainly around South Point and requires the trade winds to blow the bag out. The use is mainly non-commercial, but there may be some limited commercial use.	Shore fishing occurs around the entire island depending on regulatory seasons and access. The weather, moon phase and season dictate the peak times to fish. Lines cast from the shore can reach 100 yards, although people will paddle a line out to 0.5 miles offshore with their pole on land. Dominant use areas include Kaena Point, Barbers Point, Kaneohe Bay, Turtle Bay, Kailua Bay, Sandy's Beach to Makapuu. There is no kite/trash bag fishing on Oahu.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commercial Intertidal Harvest	Intertidal gathering occurs everywhere there is coastal access in the Hawaiian Islands as a non-commercial or subsistence activity. Dominant use areas are public access zones close to population centers that have unique conditions for the target species, such as access to brackish water, rocky headlands or sandy beach. Areas that prohibit access or harvest may still be used, but to a lesser extent. The collection zones are between high and low tide, although users will wade depending on depth . Gathering zones are seasonal based on species availability and ocean conditions for safe access. Gathering seasons can often be indicated by terrestrial environmental cues (e.g., blossoms on specific tree species) that vary from island to island. Primary target species are limu (seaweed), opihi (limpets) and he'e/ tako (octopus). These species taste different depending on whether they are collected from exposed or calm areas. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Non-commercial intertidal harvest occurs around the island wherever there is safe shoreline access. Locals have observed a significant decrease of resources (e.g. opihi) in recent years, attributed to non-traditional management of coastal resources on Maui. Lanai: Information on non-commercial intertidal harvest was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Information on non-commercial intertidal harvest was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Non-commercial intertidal harvest is highly seasonal and occurs around rocky points and shallow coral platforms all around the island where there is access. Dominant areas are Makahoa Point and Polihale Beach. The use is prohibited in the wildlife refuges.	Non-commercial intertidal harvest is an important activity for subsistence and cultural practice. Use occurs throughout the island and is most dominant around public access sites with a few less-used areas accessible only by boat.	Non-commercial intertidal gathering occurs all along the shoreline on Oahu. Species availability dictates the dominant use areas e.g. rocky areas for opihi, sandy areas for limu, and reef areas for tako (octopus). Quality of the harvest also varies with collection site, e.g. opihi collected from an exposed rock will taste different to those collected in calm water. Local residents observe environmental cues on the land that guide what can be harvested at the shore. These cues vary from island to island and with the season. Intertidal gathering is difficult to regulate due to seasonal flexibility.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Non-Commercial Kayak Fishing	Kayak fishing can generally occur anywhere in the Hawaiian Islands with safe coastal access and favorable ocean conditions. The dominant use area is within one nautical mile from shore, although this is highly dependent on season, access, weather and ocean conditions. Kayak can be a generic term in Hawaii that refers to both paddle craft and the larger sailing vessels that travel farther and catch larger fish. Target species range from large pelagic fish like au (marlin) to the smaller reef fish and octopus. Gear types can be modern rod and monofilament line or traditional hand woven line and dragging shells for benthic species. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Information on non-commercial kayak fishing was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: Information on non-commercial kayak fishing was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Charter boats stay close to shore due to fuel costs, but may venture up to 50 nautical miles offshore. Most charters focus on benthic fishing along fringing reefs close to shore. There are seasonal pelagic fisheries targeting ledges and drop offs for ahi (tuna), au (marlin), and ono (wahoo). Non-charter fishers have a subsistence focus and few have commercial licenses. Seasonal patterns exist depending on ocean conditions and fish availability. Dominant use areas are dictated by the availability of boat launches, e.g. limited fishing along the south coast due to absence of boat launches. In addition, dangerous weather and military activity prevent fishers from accessing these waters regularly. Fishing activity around Molokai can be from off-island fishers. This use was discussed but use areas were not mapped during the workshop.	Kayak fishing occurs mainly in the protected bays and coves with safe shoreline access. Activity occurs mainly within one mile from shore and is highly driven by weather and ocean conditions.	Non-commercial kayak fishing occurs all along the coast wherever there is safe coastal access, but the degree of use is highly dependent on ocean and weather conditions. Hilo Bay is a prime location for kayak fishing with an east side kayak club that runs annual fishing competitions. Typically users stay closer to shore within waters less than 100 fathoms.	Non-commercial kayak fishing occurs around the island from shore out to one mile offshore depending on the presence of a fringing reef. Dominant use areas are more commonly found on the leeward side where conditions are more favorable. Weather and ocean conditions influence fishing zones. Kayak fishers will drift with the local currents, launching at one location and drifting to the target location. Techniques can include shell dragging from 60-120 feet deep for octopus. Or in places like Kaneohe Bay, octopus can be caught tidally by placing bait at low tide and reeling in the catch at high tide.
Industrial Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Ocean Dumping	Ocean dumping in Hawaii consists mainly of ballast water release from large vessels. Legislation restricts this activity within 3 nautical miles from shore. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Ocean dumping is not a common use on Maui. There are federal regulations regarding waste dumping in the Humpback Whale National Marine Sanctuary. Lanai: Ocean dumping is not a common activity around Lanai, but commercial ships may dump ballast and waste water in the AuAu channel. There is growing community concern about non-point source pollution caused by run off from local golf course leading to overgrowth of algae and increased turbidity in nearshore waters. Molokai: There are no active ocean dumping zones surrounding Molokai. Although no longer in use, areas have historically been used by the military.	Ocean dumping around Kauai is limited to dumping of ballast water near the entry of Port Allen. But with limited port facilities for large vessels, this is not a common activity. Sewage dumping may also occur, but most local vessels dump outside of state waters.	Workshop participants did not provide additional contextual information for this use.	There are few ocean dumping sites around Oahu. A dredge spoil dump area exists offshore of Mamala Bay. Occasionally, the US Coast Guard will allow 'sinkboat' operations and the US Environmental Protection Agency (EPA) has a number of designated dredge disposal sites. On the leeward side, there are known areas where chemical munitions have been dumped (at depths of ~6000 fathoms), but these areas are not depicted on official maps.
Mariculture & Fishponds	Mariculture in the Hawaiian Islands is of commercial interest with existing offshore aquaculture test sites off Hawaii and Oahu. In general, mariculture faces community resistance due to fears of environmental degradation. Native Hawaiian fishponds exist throughout the islands, although few are actively used. Fishpond restoration is underway in select locations to preserve the local cultural heritage and educate youth on traditional fishing practices. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Mariculture is not a common use on Maui. Locations of native Hawaiian fishponds throughout the state have been mapped by Hui Malama Loko Ia. Hawaiian Oceanic Technology (HOT) has a permit near Kawaihae to farm ahi tuna. Lanai: Mariculture operations have been proposed for an area off of Kaumalapau. Fishpond restoration efforts have been proposed and funded, but are not yet operational. Molokai: Traditional fish ponds are predominantly situated along the southern shore of Molokai. Although not commercially harvested, these ponds are ecologically active because they were built to work in harmony with the ecosystem. Fishponds are vital to the subsistence harvest community as evidenced in the Governors Molokai Subsistence Task Force Final Report (pg. 20).	The Kauai community is not interested in developing commercial mariculture or aquaculture. There are traditional Hawaiian fishponds on the island, however most are non-operational. Those that have been restored are challenging to operate effectively due to external fouling caused by degraded habitat upstream and local theft of fish.	There are a number of experimental mariculture systems (both anchored and free floating) around Hawaii Island. Some new technologies are being tested to farm tuna at an offshore site located ~6 miles off Keauhou Bay and at a coastal site near Kawaihae. Local communities between Keawaiki Bay and Kohala fear that future mariculture technologies will affect current ocean conditions, migration patterns and animal behavior, and impact terrestrial fishponds and coastal resources. Traditionally, terrestrial fishponds and anchialine pools were used as holding pens for fish and turtles. Examples of these can be found around Kiholo Bay, Anaeho'omalu and Kukio Bay, Kahalou Bay and Kapoho.	Commercial mariculture is fairly limited, but a few test sites can be found on the south shore of Oahu. There is community concern relating to abandoned equipment and sea anchors after the testing periods are complete. A number of traditional Hawaiian fishponds are present around the island in varying states of restoration. The fishponds in Heia and around Kaneohe are under active restoration and restoration by the Navy is also occurring in the Mahia'au fishpond, adjacent to Maku Point and Kalau'ao fishponds. Although these efforts mainly have community support, there are concerns about the Kalau'ao project diverting the Kalau'ao river water away from residential properties to maintain the fishponds.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Military Operations	Military operations occur throughout the Hawaiian Islands. The US Coast Guard is involved in regular military operations and provides rescue services all throughout Hawaiian waters year round. The biennial Rim of the Pacific Exercise (RIMPAC) (the world's largest international maritime warfare exercise) brings military ships from around the world to Hawaii; foreign Naval forces routinely train in Hawaii. On Oahu, there are regular military exercises primarily at Pearl Harbor and Kaneohe Bay and public access is limited throughout the year. Across the other islands,military use is less visible to the communities onshore,but there are areas designated for operations in the federal register and Hawaii Range Complex Final EIS/OEIS, and noted on nautical charts. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Maui is a transit area for the military, there are no permanent military bases on the island but there are National Guard facilities. The area around Kahoolawe was used for target practice and training until 1990 and unexploded ordnance has been found in surrounding waters. Lanai: Military operations are limited in and around Lanai, with no official military areas on the island. Submarines are observed operating in the waters surrounding Hawaii. There are also two wrecks, call symbols YOG-18 and YOG-141 in the surrounding waters of Lanai. Molokai: Military use areas surrounding Molokai include the Kalohi channel and Turtle Island, areas used historically as training areas although they are no longer used for that purpose. The Marine Corps maintains 11 acres adjacent to the Molokai Airport (topside). Kalaupapa Airport is routinely used for helicopter training.	There are a number of documented military areas around Kauai, these are displayed in the federal register and nautical charts. These areas are used by the Navy for training and exercises, including torpedo recoveries. One such area is in the channel between Kauai and Niihau. While operational safety zones are broadcast publicly, the nature of the activities conducted within the zones is often unknown to other ocean users.There is also an acoustic listening array off of Niihau below 200 fathoms depth.	There are a number of documented military installation and training areas on and around Hawaii Island used for exercises, training and specifically for helicopters and other aviation transiting to Pohakuloa Training area and C-17 transporters practicing touch-and-go. The biennial RIMPAC Exercise is a particularly visible military activity to other ocean users.	The Navy trains regularly off south and east Pearl Harbor and all waters surrounding Oahu. Within Kaneohe Bay, there is a naval defensive sea area that serves as a buffer to Marine Corps Base Hawaii on the Mokapu Peninsula. Amphibious landing trainings take place on the peninsula and on Marine Corps Training Area Bellows (MCTAB) in Waimanalo. Marine aviation assets routinely transit from Mokapu Peninsula along the east coast of Oahu to the Whiskey 189 (W189) warning area on the northeast corner of Oahu and the Pacific Missile Range Facility as well as south to MCTAB, Molokai and Hawaii Island. MCTAB is opened to the public on most weekends and holidays.
Mining & Mineral Extraction	Mining and mineral extraction is limited throughout the islands and mainly consists of dredging of harbor channels and river mouths, or beach renourishment projects. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Information on mining and mineral extraction was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: There is no known mining or mineral extraction around Lanai with the exception of regular dredging in Manele Bay to keep the channels clear for boat traffic. Molokai: Mining and mineral extraction is not a common use on Molokai. In the 1950's, sand from Papohaku beach was mined for beach renourishment on Oahu.	The only known mining and mineral extraction on Kauai involved sand dredging and beach nourishment. Active dredging occurs in Kikiaola, Waiakea and Nawiliwili harbors. The mouth of the Wailua River is dredged to prevent flooding, but other river mouths are not dredged to protect the Oopu, an anadromous fish that lays eggs in the sand. Dredging is a contentious activity on Kauai, as some dredging efforts have had adverse impacts on reef resources (e.g., reef at Kuaehu Point covered by sand from nearby beach nourishment project).	The primary mining and mineral extraction around the island is associated with manganese nodule mining around the offshore seamounts. This resource was investigated by the GLOMAR Explorer over 20 years ago, but extraction was not considered cost-effective given the technology available at that time. There are community fears that this type of mining, if pursued, would adversely impact fish habitat. There are rumored cobalt resources off the southeast side of Hawaii Island but this has not yet been mined or thoroughly explored.	Mining and mineral extraction is prohibited within Hawaii state waters. There are beach nourishment projects at Waikiki, Kailua, Kapiolani, Pupukea, Hawaii Kai (Koko bay), and Kaula Bay, as well as dredging sites at Barbers Point, Honolulu Harbor and Hawaii Kai.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Underwater Pipelines	Information on underwater pipelines is specific to each island. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Workshop participants did not provide additional contextual information for this use. Lanai: Sewage discharge is treated by terrestrial plants so there are no existing sea bound pipelines. Molokai: Underwater pipelines on Molokai include the seawater intake pipe that feeds shrimp farms near Kaunakakai, and the sewage pipe from Hotel Molokai.	Information on underwater pipelines was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.	For information on underwater pipelines, workshop participants suggested referring to existing data layers hosted by the State of Hawaii.	Underwater pipelines on Oahu are predominantly sewer pipes. Commonly, these pipes have leaks and contribute to non-point source pollution. Several pipelines run out of the Waikiki area, (e.g., at Kaimana Beach and the Waikiki Aquarium). Kaneohe Bay has a large pipeline that extends offshore for ~ 6 miles. Fuel dolphins (containers with associated pumping lines) are present near Mamala Bay and pipelines are present off Coconut Island and Sand Island. Pipelines for seawater air conditioning run from Honolulu Harbor offshore to the shelf break.
Renewable Energy	Renewable energy on Hawaii consists mainly of terrestrial projects and some marine testing sites. Test sites for ocean thermal energy conversion (Hawaii island) and wave generation (Oahu) indicate interest in the Hawaiian Islands for ocean energy development. There are community concerns about development of ocean energy and its potential impacts on viewsheds, coastal and marine environment, fishing communities and traditional cultural practices. All planning for ocean renewable energy development must involve local communities. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Information on renewable energy was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: Workshop participants did not provide additional contextual information for this use. Molokai: Renewable energy on Molokai consists of ~8 terrestrially-based projects, most of which were completed without community input.	Renewable energy development is a contentious topic in Kauai and all around the Hawaiian islands. Local communities feel that they should have more control over management of existing resources, as well as the development of future renewable energy options. Communities feel that regulatory agencies should require more research and consideration of traditional knowledge and the tradeoffs between benefits such as energy independence and impacts to the local communities and the environment. Proposals for future project should also clearly define the benefits of proposed development to the local economy. There has been discussion on Niihau about investigating clean energy strategies.	Renewable energy activities around Hawaii Island are mainly for research and development and temporary instrument testing. There is an existing ocean thermal energy conversion (OTEC) test site off of Keahole Bay that is currently in a research and development phase. There is a proposed desalination plant in South Kohala, but there are strong community reservations regarding environmental effects of hyper-saline or heated water on coral reef environments. There is also an ocean water cooling device being test at Kaiwi point. With various emerging forms of renewable energy, there are community concerns that these efforts will impact the local ecology (e.g., breeding grounds, reef structures) and not give back to the local community. Communities also worry that planning for renewable energy will proceed without appropriate stakeholder involvement.	The Hawaiian Islands have great renewable energy potential, most of which has been harnessed on land. In the ocean, there are a limited number of test sites for Ocean Thermal Energy Conversion (OTEC) and wave energy (e.g., wave buoys near Pearl Harbor). A number of community concerns exist regarding renewable energy on and around Oahu. These include the potential for impact on the view shed, the coral reef ecosystem and traditional fishing practices. Mooring systems and marine cables will likely cross many ecological zones, so the cumulative impact of all aspects of renewable energy need to be considered.
Commercial Shipping	Commercial shipping in Hawaii centers on Oahu, which receives Pacific Basin traffic from the west and east. Within the islands, there are major commercial shipping routes to each island and ferry routes exist around Maui Nui. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Information on commercial shipping was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: Commercial shipping is not a regular use around Lanai. Interisland ferries run from Lahaina to Kaunakakai, and Young Brothers operate a regular barge service between Oahu and Molokai. Molokai: Commercial shipping is not an active use on Molokai. Regular ferries operate between from Kaunakakai to Lahaina.	Information on commercial shipping was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.	Commercial shipping routes around Hawaii Island extend from Kawaihae harbor to China, the US mainland and beyond. There are daily inter-island barges that run from Kawaihae to Oahu.	Commercial shipping around the islands is likely best mapped using Automated Identification System (AIS) data for routes that traverse the Pacific. There is some interisland shipping activity operated by Young Brothers and Matson which use the two commercial harbors on the south shore of Oahu in Kapolei and Honolulu.

Extractive Uses Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Underwater Cables	Information on underwater cables is specific to each island. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Information on underwater cables was not collected during the workshops on Maui due to lack of expertise or participant knowledge on this topic. Lanai: Information on underwater cables was not collected during the workshops on Lanai due to lack of expertise or participant knowledge on this topic. Molokai: Information on underwater cables was not collected during the workshops on Molokai due to lack of expertise or participant knowledge on this topic.	Information on underwater cables was not collected during the workshops on Kauai due to lack of expertise or participant knowledge on this topic.	Information on underwater cables was not collected during the workshops on Hawaii Island due to lack of expertise or participant knowledge on this topic.	Underwater cables are well represented in the existing spatial data. Other cables which may not be mapped include ones in and around Waikiki near Kapiolani Beach, and between Sand Island to Mokauea and Heia to Coconut Island.

Non-Extractive Use Sector					
Use Name	**Statewide Use Notes**	**Maui Nui Use Notes**	**Kauai Use Notes**	**Hawaii Island Use Notes**	**Oahu Use Notes**
Beach Use	Beach use is active around the Hawaiian Islands wherever there are beach parks, access roads or trails. The primary limiting factors on use are legal restrictions prohibiting access, and physical barriers preventing access. Overall, dominant areas tend to be found near population centers and tourist hotspots like hotels or resorts. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Beach use occurs all around the island of Maui and is most concentrated around the coastal beach parks. Availability of fresh water, free parking, and restrooms also influence use patterns. Dominant use areas include Keawakapu, Maalaea Bay, Manuwainui to La Perouse, Hawea Point, and Makalua-puna Point. However, large portions of the coast are private lands leased to ranchers and are inaccessible to the public. The resorts and black sand beaches on the west and south sides of the island are heavily used for camping, tidepooling and birding. Lanai: Beach use occurs on all accessible coastal areas along the shoreline on Lanai. Local residents mainly use the west side of the island, while tourists commonly use the coastal areas around the resorts in Manele bay. Some areas that are not easily accessed by land are used by boaters. Beach/shore use can cause disputes with neighboring islanders over littering and fouling of coastal areas. Molokai: Beach use occurs on all accessible coastal areas along the shoreline. Dominant use areas are those with safe and easy access to the shore.	Beach use occurs on all accessible coastal areas along the shoreline. The most commonly used areas include Kekaha, Nohili, Waimea, and Hanamaulu, as well as the beach parks, piers and Kilauea lighthouse area. Areas limited by land-based access are often used by boaters. These include Secret beach to Kalihaiwai and beaches and coves along the Na Pali coast. The only restricted beach area on Kauai is Larsen's beach which is a military restricted zone.	Beach use is common around Hawaii Island wherever there are access roads or trails. Beaches are used for a variety of activities ranging from flower picking for Lei's (Poihoiki) to camping and marine debris beach clean ups. Most of the beaches on the Kona side are used heavily, although it is difficult to differentiate specific beach use from terrestrial use (e.g., hiking). For example, the Ala Kahakai National Historic Trail, which connects all state parks, begins and ends in a beach area. The Na Ala Hele trails are also part of this trail system and are well used. The shore along the south coast to South Point is commonly used for overnight camping, specifically at Kohala beach, Pololu beach, Waipio beach, Mahukona beach, Keokea beach, Black Point (before Mahukona), and Lapakahi State Park. Beach parks on the windward side are often collection areas for marine debris and organized clean-ups occur regularly at a number of beaches, including Kaupulehu, Kamilo, Koloko, Keauhou Bay, Honuapo, Pohue, Ka`ilikii, Ho`okena and Upolu.	Beach use occurs on all accessible coastal areas along the shoreline and is concentrated near the beach parks and tourist centers. Oahu is one of the major tourist destinations in the Hawaiian Islands and their beaches receive ~25 million users a year. Beach use is restricted or prohibited in a few select locations, namely military closures (e.g. Pearl Harbor) and ecological reserves (e.g. Rabbit island). More remote coastline areas (e.g. Waimanalo Point, Yokohama and area north of Laie) experience less activity, but are still used to some degree mainly by locals. Dominant use areas tend to be those places with easy access, safe ocean conditions and close proximity to tourist centers, for example Waikiki, Kailua, Koolina, and Hanauma Bay.
Boating	In the Hawaiian Islands, recreational boating areas are	Maui: Boating occurs in and around the	Boating activity is heavily regulated by the state of Hawaii. It occurs mainly in and around the	Around Hawaii Island, recreational boating occurs mainly near the harbors of Hilo Bay, Kawaihae,	Recreational boating around Oahu occurs mostly within the Ala Wai canal and around Sand Island,

	adjacent to tourist hot spots. Boating is rarely a recreational activity for local Hawaiians, with the exception perhaps of inter-island sailing canoe races. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	interisland channels in the Maui Nui region. Dominant areas are from Maui to Molokai and Molokini, with regular sunset cruises and tourist charters from Maalaea to Molokini among other destinations. The south side of the island is used more by locals than tourists. High speed boating activities with personal watercraft and thrill craft are restricted during whale season. Lanai: Recreational boating around Lanai is mainly conducted by tourists and is highly limited by fuel costs. Most of the boating activity occurs in Manele Bay and around Kaumalapau Harbor. Molokai: Boating on Molokai is not a recreational activity on Molokai. All boating activity is conducted for transportation or some type of commercial or subsistence-based activity.	harbors on Kauai, but is not generally a recreational activity. Most boaters are on the water for other purposes, .e.g. to fish or run a tour or charter. There are a number of charter boats that operate sunset tours and trips around Niihau.	Honokohau, Kailua-Kona, Keauhou and Kealakekua. Activities often include sailing (occasional races) and seasonal trips for fishing and wildlife viewing.	Haleiwa and Kaneohe Bay. Parasailing, cultural tours (e.g. Pearl Harbor) and sunset cruises operate out of the Honolulu Harbor and Waikiki area and run along the south shore around Diamond Head to Waialua bay. Recreational boating usually occurs within 20 nautical miles from shore, with the exception of sailing. Sailing occurs all around the island, launching mostly from Koolina and Ala Moana Harbors. There are annual inter-island races for traditional sailing canoes and yachts that follow specific routes and are accompanied by safety boats. Some boating conflicts have emerged in recent years (e.g. Kahana Bay) resulting in the designation of management areas to restrict the use of thrill craft motorized vehicles to specific areas.
Paddling	Paddling in general is a dominant use across all Hawaiian Islands. The use area is limited by ocean conditions and coastal access. Dominant canoe paddling areas are adjacent to the paddling clubs, while dominant areas for standup and kayak paddling are often near population or tourist centers. Paddlers will generally travel a maximum of 3 nautical miles offshore unless paddling inter-island. Inter-island paddlers will have an accompanying support boat. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Generally, paddling occurs all around Maui out to 5 miles offshore. Dominant paddling areas are found around Kihei and Wailea, Maliko Bay to Kahului Bay, and Maalaea to Makena. There are canoe clubs in Lahaina, Napili and Kahana, Na Kai Ewalu, and Lae Ula O Kai. Practice routes for paddlers can be found around the island with one of the more common routes out to and around Kahoolawe. There are also numerous inter-island paddle races. Lanai: Traditional paddling occurs mainly near Manele Bay and along the beaches at Kaiolohia and Lopa. Kayaking and stand-up paddleboarding are also very common in Manele Bay. Paddling is more common on the south side of the island due to more favorable conditions. Molokai: Paddling occurs mainly along the south coast. The dominant use area extends ~ 2-3 miles offshore between Kamalo and Haleolono Harbor. Paddle regattas occur inside the Kaunakakai Harbor and the Pailolo Channel with regular inter-island races from Molokai to Oahu and Maui to Molokai. Stand-up and prone paddleboards and one-man canoes tend to stay closer to shore (within 2 miles) while outrigger canoes venture significantly further. Guided and self-	Paddling and paddleboarding occurs all around the island and in the coastal river areas with access being the primary limiting factor. The area surrounding the canoe clubs are most widely used from the shoreline out to a distance of one mile. Hanalei Bay, Wailua River, Anahola Bay, Niumalu, Koloa, Hanapepe, and Waimea are commonly used areas for this activity. There are a number of paddling races on Kauai (e.g. annual Na Pali coast standup paddleboard race) but these rarely cross the Kauai channel with the exception of sailing canoe races. There are a number of restrictions that prohibit the landing of paddle boats and canoes in the wildlife refuge and restrict use in specific areas along the Huleia and Hanepepe river to protect cultural resources.	Paddling is a very popular activity throughout the island. On the windward side, Hilo Bay is the most commonly used area for both outrigger canoe paddling and stand-up paddle boarding, with use concentrated mainly on the west side of the bay away from boat launches and jet skis. Within Hilo Bay, one-man canoe paddling has increased in popularity in recent years; ~40 canoes can be observed on any given day, paddling out to ~1 nautical mile from shore. The one-man race season runs from December through March (although it is a year-round activity). Similarly, there are seasonal stand-up paddle races at Keokea, Kawaihae and Kiholo run by the Live Strong foundation. Ka'alu'alu Bay is a very popular place for stand-up paddle boarding and surfing. On the leeward side, canoe paddling occurs within 2 miles from shore from Ho'okena to Laupahoehoe. There are interisland paddle races and Pacific voyaging sailing canoes run by the Makali'i Voyage Canoe Club (Na Kalai Wa'a non-profit organization).	Paddling occurs all around the island out to a distance of ~ 6 nautical miles from shore, but the use is highly seasonal. November to February is the training season; March to May is one-man season; and June to August the racing season. Paddle clubs tend to have designated practice areas, while the interisland channels are used for both paddling practice and races. The Kaiwi channel is widely used for several annual inter-island races (e.g., Hawaii Island to Molokai). In addition to outrigger teams, these races can be run by standup paddlers and one man canoes. Some farther race routes e.g. Kauai or Niihau to Oahu are completed by sailing canoes. Weather and ocean conditions will influence these races and boats on long races will be escorted by fishing boats.

		guided kayak tours are available on the northeast of the island.			
Permanent Research Areas	Permanent research is being conducted throughout the islands by a wide range of universities, government agencies and NGOs. Much of the ocean research is focused on water quality, reef health and climate change impacts. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Permanent research areas exist throughout Maui. The dominant areas include La Perouse Bay to Honolua Bay (Humpback Whale National Marine Sanctuary monitoring of whales, monk seal, and turtles); South and West Maui uplands (water quality studies); Kahana wetland (bird monitoring); Waiehu (limu study and restoration); and Aha Moku (changes in opelu run). Lanai: Permanent research areas exist throughout the island, with some of the more well-known areas used for monk seal tagging, traditional fishpond restoration, water quality studies (to assess the impacts of terrestrial manmade features such as golf courses and their effects on local reefs and bays) and whale counts (part of the Humpback Whale National Marine Sanctuary monitoring program). Molokai: Permanent research sites operated by the US Geological Survey and The Nature Conservancy (and others) on Molokai are designed to monitor land use watershed, water quality, stream runoff, and coral reef health on the south side of the island. The north side of Kamalo Bay is also a monitoring site with turtle and shearwater nesting areas and bird sanctuary.	There are a series of permanent research areas on Kauai, mainly on the east side of the island. Surfrider Foundation maintains a series of long term projects that involve monitoring of marine mammals, coastal sand movement, reef monitoring, water quality sampling and collection of traditional knowledge. Hanalei Bay has permanent coral monitoring sites that have been ongoing for over 15 years.	The primary permanent research areas surrounding Hawaii island are fishing related and include the state-managed Fish Aggregation Devices (FADs), Fish Replenishment Areas (FRA), and Fishery Management Areas (FMA) (see Hawaii fishing regulations booklets for more details). In addition, there is a network of PacIOOS, NOAA weather and tsunami warning buoys whose locations can be found on their respective websites. On the Kona side of the island, two organizations run regular scientific monitoring, Liquid Robotics (Kawaihae) running drones and Jupiter Research foundation (Puako), both of which use the area 3 - 5 miles offshore around their launch points. More localized projects include fishpond monitoring and restoration and phytoplankton counts for algal bloom monitoring in Hilo Bay.	Most permanent research areas on Oahu are monitoring sites for existing state marine protected areas, the Humpback Whale National Marine Sanctuary, or University funded research (e.g. Coconut Island in Kaneohe Bay). Oceanographic buoys are funded by PacIOOS (Pacific Integrated Ocean Observing System) and the HOT (Hawaii Oceanographic Time series). The Department of Health manages the CRAM (California Rapid Assessment Methods) sites and standard beach water quality sites around the island.
SCUBA & Snorkeling	SCUBA and snorkeling occurs throughout the Hawaiian Islands, as both a shore-based and boat-based activity. The use patterns are driven by coastal access, location of boat ramps and harbors, environmental conditions (e.g., protection from the seasonal trade winds) and proximity to population/tourism centers. Divers tend to stay within recreational depth limits (130 feet) and may dive during the day or at night. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: SCUBA and snorkeling occurs all around the islands, with the headlands and bays the most widely used areas. Oluwalu, which has multiple mooring sites, and the area around Molokini are both dominant use areas year round. SCUBA divers tend to stay within recreational depth limits, diving shallower than 130 feet. There is limited use on the north side of the island due to unfavorable environmental conditions. Lanai: SCUBA and snorkeling from shore occur most often in and around Manele Bay. Famous Lanai dive sites are at night off of Kaumalapau harbor to see tiger sharks and around the signature 12th hole of the Four Seasons hotel golf course. Most boat-based SCUBA and snorkeling operations are run by non-local charter	SCUBA and snorkeling activities are driven by weather conditions. Generally, these activities occur between depths of 0 - 130 feet around the island, with no known blue water diving around the island, Well-known use areas include Mana crack along the Na Pali coast and off of Niihau. There is no landing on Niihau island so operators anchor ~ 100 feet offshore to dive.	Non-consumptive SCUBA and snorkeling occurs island wide, both for tourism and competitive free diving. The leeward west side offers calmer seas and is generally more commonly used for these activities. Kona hosts both national and international competitions for competitive free divers, who can dive as deep as 300 feet. For SCUBA, divers will stay within recreational depth limits around the island, predominantly from the shore to a depth of 135 feet. Popular SCUBA/snorkeling areas include the Fish Aggregation Devices (FADs) and the fish farm off Keauhou Bay because the fish draw in pelagic predators . Other types of dives includenight dives out of Honokohau Bay to depths of 60 feet to observe large pelagics and regular research dives in Fish Replenishment Areas (FRAs) to study the effects of aquarium collecting.	SCUBA and Snorkeling occurs all around the island where access allows, mainly between 0 – 200 feet in depth. The use is highly seasonal and dependent on oceanic conditions. Snorkeling can occur further from shore, but mainly occurs in shallow water out to 1 nautical mile from shore. Dominant use areas around the island include Sharks Cove, Three Tables, Laie, Kailua (out to Flat Island), Kaneohe Bay, Waimanalo, Hanauma Bay, Electric Beach (in front of the power plant), Makua Caverns, and Ewa Pinnacles, Maunalua Bay and Waikiki.

		organizations. Molokai: SCUBA and snorkeling occurs mainly along the south and east shore everywhere there is road access to the coast. Divers will usually stay within the recreational limits to the maximum depth of ~130 ft. There are few diving opportunities along the north coast because access is limited and the ocean conditions unfavorable most of the year.			
Surface Board Sports	Surface board sports occur throughout the islands along the shoreline and the offshore barrier reefs. The use is most dominant along the accessible beaches and beach parks, near population centers and at sites with safe access and appropriate ocean conditions. Windsurfing and kite surfing are particularly popular around the Maui Nui region, occasionally crossing between the islands. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Surface board sports around Maui are most dominant in the North Maui Ocean Recreation Management Area that extends from Maliko Gulch to Waiehu and the Kihei shoreline. Generally, this use occurs throughout this area within 1 mile of the coastline except for the exclusion zone surrounding Kahului airport. Lanai: Surface board sport activity on Lanai is highly influenced by environmental conditions. The windy north side of the island is ideal for kite and wind surfing while the south and west sides are the preferred areas for surfing. Users will typically stay within 0.5 mile from shore, but kite and windsurfers may follow interisland routes to Maui and Molokai. Molokai: Surface board sports are most common on the north and east sides of the island. Kite surfers and windsurfers can cross to other islands but primarily stay close to shore.	Surfing and other surface board sports occur around the entire island of Kauai depending on coastal access and swell conditions. Kauai hosts several annual surf competitions. The north shore is the dominant use area in winter, although there is surf all year around the island. Use areas extend to the barrier reef system to surf ~ 1.4 miles offshore. Kite and wind surfing extends out further from shore with dominant use areas around Wailua Bay and Kekaha.	In general, surface board sports can be observed at all accessible beach areas. The majority of activities include windsurfing and kiteboarding offshore, and surfing and body boarding closer to shore. South Point is a well-known windsurfing and kiteboarding area from the shoreline out to nearly 2 miles offshore due to consistent winds. There are tow-in surf spots near North Point in the Kohala region (~8 miles offshore). On the windward side, kiteboarding occurs in and around Hilo Bay out to ~0.5 miles from shore. There are also annual surf contests held in various locations year-round.	Surface board sports occur all around the island from 0 - 2 miles from shore. Dominant use areas are seasonal depending on ocean conditions (surfing more concentrated on the north shore in the winter, south shore in the summer). Many surf spots are highly publicized by the media (e.g. surfline.com). Dominant use areas for kitesurfing and windsurfing are Kaneohe, Waimanalo and Kailua bay.
Swimming	Swimming occurs throughout the islands and is most common along sandy beaches, near coastal beach parks and easily accessed coastal areas near population centers. Generally, swimmers stay within 0.5 miles from the coast, but occasionally venture farther from shore for training and races. Across the islands, there are various competitive open water swimming events, including the international Ironman held annually in Kona. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Swimming on the island occurs most frequently between Maalaea and Makena. Interisland swim routes exist between the islands of Maui Nui. Lanai: Swimming is most common in and around Manele Bay and Kaumalapau Harbor. Occasionally, long distance swimmers may attempt interisland swim routes, e.g. to Lahaina. Molokai: Swimming is limited on Molokai due to limited shoreline access. Swimming does occur around Kalaupapa and near Mo`omomi beach, with dominant use areas near the harbors and select hotel locations.	All accessible beaches on Kauai have swimming typically out to 200 yards alongshore.	Swimming occurs around most accessible beaches out to 0.5 miles from shore. There are competitions for rough water swimming in Kukeo and Hapuna including international triathlon competitions that have swimming components. Some of the more common races occur from Kailua Bay to Keauhou, Mahaiula to Kukio, and around Kiholo Bay, Honokaope Bay, and Kealakekua Bay. Preceding the Ironman competitions in Kailua-Kona, there is increased swimming activity as racers train in Kailua Bay. On the windward side, swimming occurs less frequently, but is most common in Ha'ena and in the Kapoho Bay area.	Swimming occurs all around the island with a concentration near beach parks and tourist centers, out to distance of ~ one mile from shore. Waikiki is likely the most dominantly used area, but others include Kapiolani Park area, Ala Moana Beach Park (Magic Island), Hanauma Bay, Bellows, Lanikai, Malekahana (Laie), and Waimea and Haleiwa (mostly in the summer). Swimming does not occur in the Ala Wai canal due to poor water quality. Local swimming races occur year-round on the north shore and south shore, including seasonal open water swim races from Sunset beach to Haleiwa (participants swim up to two miles offshore), the Waikiki rough water swim in September, and the annual Dukes Ocean Fest. There is also occasional interisland relay swimming from Molokai to Sandy's Beach, Lanai to Maui and Kauai to Oahu.

Wildlife Viewing At Sea	Wildlife viewing of turtles, whales, dolphins, monk seals, manta rays, sharks and pelagic seabirds occurs throughout the islands. Many of the charter businesses that operate wildlife tours run seasonally, with sunset cruises and fishing charters during the low seasons. Dominant use areas include the Humpback Whale National Marine Sanctuary and Maui Nui. Dominant use areas around each of the islands are driven mainly by access to ports and harbors, seasonal oceanic conditions and migration patterns for the target viewing species. Charters will often stay as close to shore as possible to limit fuel costs and can generally be found within 3 miles of shore. Lack of spatial data may indicate either, use was specifically not mapped during the HOUA process OR use does not occur. Please consult Island Use Notes to confirm.	Maui: Dominant use areas for wildlife viewing are found within the Humpback Whale National Marine Sanctuary. Similar to SCUBA and Snorkeling the north side of the island sees limited use due to the extreme weather and ocean conditions. Lanai: Wildlife viewing occurs mainly via commercial charters to view false killer whales, humpback whales, dolphins, turtles, manta rays and sharks. Activity is increased during the humpback whale and monk seals birthing seasons. Molokai: Wildlife viewing is not a common use on Molokai. Tours in the waters surrounding Molokai are exclusively operated from neighboring islands. Most tours stay within 20 miles from shore with destinations following the locations of whale and dolphins year round. Dominant wildlife viewing areas are the humpback calving zone on the north side of Lanai and areas within the Humpback Whale National Marine Sanctuary.	Wildlife viewing has distinctive seasons on Kauai with very few tour operators running year round. The winter is dominant for whale watching tours with tours running mainly along the south coast to shelter from the northerly swells. Some kayaking tours run throughout the year but tend to stay within the bays and close to shore. There are wetland and upland bird viewing areas along many of the coastal rivers, but only two permitted boat-based river tours. There are also wildlife charters that run tours out to Niihau and Lehua Island. Wildlife viewing charters tend to stay within 2-3 miles from shore depending on the season. Based on the seasonal demand, some tour operators will run sunset cruises and fishing trips. A majority of the charters are based in Port Allen with two known charters that launch from Anahola.	Wildlife viewing occurs around the entire island, typically within 3 miles from shore and consists mainly of commercial tourist charters for whale watching or dolphin watching. The whales arrive in late fall, but the commercial tours start up around mid-December/New Year's Day and run through May. Most tours run from the Kawaihae area down to Keauhou. Tours often find young calves around this area with adult male humpbacks singing in the deeper channels. Zodiac tour boats can be launched from anywhere there is access and are usually specifically looking for dolphins in and around sandy areas closer to shore. On the leeward side, the Kona Sheraton and Keauhou Bay are well known manta ray viewing areas with various tour boats that visit these sites. On the windward side, Pohoiki and Hilo are the primary ports where wildlife viewing boats are launched, although there are not many out of Hilo due to rough, deep water. The Pohoiki tours head several miles south to find manta rays, sharks and whales. There are also terrestrial tours around Punalu'u and Ha'ena to observe turtles and active lava flows.	Wildlife viewing occurs most commonly as charters operating near the tourist population areas. Dolphin and whale watching tours operate mainly along the south and west shore, although some glass bottom boat tours do operate out of Honolulu (often focus is on submerged cultural artifacts). Most charters operate out of the the major harbors of Koolina, Waianae, Haleiwa, Kewalo Basin, and Honolulu. Along the west coast, charters target viewing of whales, dolphins and monk seals. On the east coast, there are also kayak-based birding trips out of Kailua, but these are less common. Along the north shore, there is also a shark cage snorkel tour that operates out of Haleiwa.

APPENDIX VI

Space Use Profiles

Use Profile: Beach Use

Section 1. Use Description

Use Includes:

Walking, running, digging, resting, collecting of shells, wildlife viewing, driving on the beach, camping, kite flying, bonfires, picnicking, dog walking, horseback riding, and skim boarding.

Use Excludes:

Tide Pooling, Mining and Mineral Extraction, Surface Board Sports, Swimming, Harvesting from Shore, Coastal Aquaculture.

Use Footprint

The beach areas where the uses take place, plus access and transit routes to and from land or, at times, the ocean.

Core Activity Area

Beach areas in the upper (i.e. supra-tidal) marine zone between the Intertidal Zone and predominantly terrestrial landforms.

Functional Components

People, gear, tents, vehicles, fires, pets or other animals integral to the use.

Notes and Assumptions

While some beach uses may be supported or organized by commercial entities, most are typically pursued by individuals for recreational (i.e. non-commerical) purposes. With the exception of small-scale shell collecting, Beach Use is typically non-extractive.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Sometimes	Rarely	Never	Never	Access to beaches may, in some instances, be from the ocean by vessels.
Core Activity	Always	Sometimes	Never	Never	Never	Beach use may occur in the Intertidal Zone during low tide in areas with large tidal ranges.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Rarely	Never	Always	Sometimes	Kite flying and other kite-driven activities may extend into the Air Zone. Seafloor and Seabed equate to the beach sediments.
Core Activity	Sometimes	Never	Never	Always	Sometimes	Beaches may be accessed (rarely) by vessels from the Nearshore Zone.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Not Applicable	Not Applicable	Assumes that access by vessel never extends beyond the Nearshore Zone.
Vessels	Rarely	Rarely	Always	Not Applicable	Not Applicable	Assumes that access by vessel is rare and always involves the Nearshore Zone.
Anchors	Rarely	Rarely	Sometimes	Not Applicable	Not Applicable	When beaches are accessed by vessel, they may use anchors temporarily.
Moving Gear	Often	Often	Never	Not Applicable	Not Applicable	Mobile gear is often an integral part of many Beach Uses (while on land).
Infrastructure	Sometimes	Rarely	Rarely	Not Applicable	Not Applicable	Fixed equipment is typically located on the beach above the high tide line.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Rarely	Never	Always	Sometimes	People may be on the Sea Surface when accessing beaches by vessel.
Vessels	Never	Always	Rarely	Sometimes	Rarely	Vessels used to access beaches are typically small, low to the water and w/ shallow draft.
Anchors	Never	Rarely	Never	Always	Often	Anchors may be used to secure vessels used to

Use Profile: Beach Use

	Never	Rarely	Never	Always	Often	access beaches from the ocean.
Moving Gear	Sometimes	Sometimes	Never	Often	Sometimes	Mobile gear sometimes extends upward to the Air Zone (e.g. thrown or flying objects), or on the beach surface.
Infrastructure	Rarely	Never	Never	Always	Often	When used, Infrastructure is typically installed on the beach.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People are always involved in Beach Use.
Vessels	Not Applicable	In rare cases, beaches are accessed by vessels.
Anchors	Not Applicable	In rare cases, boats beached on land may employ anchors temporarily.
Moving Gear	Secondary	Some Beach Uses involve recreational gear that is thrown, flown, ridden, or otherwise mobile.
Infrastructure	Secondary	Some Beach Uses may involve fixed structures (e.g. jetties) or equipment (e.g. fire pits) on land.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	High	Beach Users can often choose where to go and whether to change locations in response to changing situations.
Moving Gear:	Medium	Beach Use may involve moving people or mobile gear (e.g. recreational equipment).
Exclusion		
Permanence:	Low	Any individual Beach Use, as defined above, is inherently temporary and mobile.
Buffer Zones:	Low	Beach use does not typically involve official buffer zones.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Beach access is sometimes controlled directly or influenced indirectly by the presence of relevant infrastructure (e.g. parking, restrooms, etc.).
Site Dependence:	Medium	Successful Beach Use is influenced by many place-based factors but can often be pursued in a variety of settings.

Use Profile: Commercial Dive Fishing

Section 1. Use Description

Use Includes:

The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for commercial purposes.

Use Excludes:

All other forms of fishing, recreational SCUBA/Snorkeling.

Use Footprint

Typically encompasses dive sites and relatively narrow tracks followed by fishing vessels to reach and return from dive sites.

Core Activity Area

Dive site(s), including areas traversed on drift ro tow dives, typically occurring in relatively shallow near-shore or coastal waters reachable by swimming or vessels, and extending from the sea surface to the seafloor.

Functional Components

People (divers, boat operators, observers), vessels, anchors, dive gear, mobile gear (e.g. fishing, marker bouys), infrastructure (e.g. mooring bouys).

Notes and Assumptions

Commercial Dive Fishing may involve a variety of gear types and methods, including: spears, hooks, nets, and traps. Methods and gear vary among regions and target species.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Sometimes	Sometimes	Often	Sometimes	Never	Footprint may include entry/exit from Shoreline (beach dives).
Core Activity	Never	Rarely	Often	Sometimes	Never	Excludes habitat-based saturation diving, technical diving to extreme depths, and cave diving.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Often	Often	Sometimes	Large vessels may extend into Air Zone; some fishing activities (e.g. shellfish) and gear (e.g. anchors) may extend into Seabed.
Core Activity	Never	Always	Often	Often	Sometimes	All forms of dive fishing begin at the Sea Surface; some (e.g. spear fishing) occur at or near the surface and do not extend into the WC; many occupy the Sea Floor.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Always	Always	Always	Not Applicable	By definition, if the Use is occurring, it involves People (i.e. divers).
Vessels	Not Applicable	Rarely	Often	Always	Not Applicable	Diving from boats becomes necessary as distance from shore increases.
Anchors	Not Applicable	Rarely	Often	Often	Not Applicable	Anchors for dive vessels, flags and floats are often used in relatively shallow water but not extreme depths.
Moving Gear	Not Applicable	Rarely	Sometimes	Sometimes	Not Applicable	Spear guns, nets and towed diver sleds are sometimes used to dive fish, depending on the target species. Dive fishing in the Intertidal is typically rare and assumed to occur at high tide when submerged.
Infrastructure	Not Applicable	Rarely	Sometimes	Sometimes	Not Applicable	Mooring buoys and site markers may be used in moderate depths.

Use Profile: Commercial Dive Fishing

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Not Applicable	Always	Often	Often	Rarely	Always involved in the use, divers begin and end at the surface, often contacting the Seafloor but rarely excavating to the Seabed.
Vessels	Not Applicable	Always	Sometimes	Never	Never	When used, dive boats always occupy the Sea Surface, sometimes extend downward to the Water Column Zone, and are not intended to contact the Seafloor or Seabed.
Anchors	Not Applicable	Always	Always	Always	Often	When used, anchors typically extend from the Sea Surface to the Seabed.
Moving Gear	Not Applicable	Always	Often	Sometimes	Never	When used, mobile gear (e.g. spears) is most often employed in the upper layers of the WC.
Infrastructure	Not Applicable	Always	Always	Always	Often	When used, fixed mooring buoys or navigation marks extend from Sea Surface to the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Dive fishing always involves people as diver(s) or boat crew.
Vessels	Primary	Boats are typically used to in commercial dive fishing to transport divers to and from dive sites, except for shore dives.
Anchors	Primary	Anchors are often used to secure boats to the seafloor during the dives.
Moving Gear	Secondary	Mobile gear is sometimes used in to capture animals (e.g. spears, nets, baskets), mark dive sites (e.g. flags), or to secure boats (e.g. sea anchors and drogues).
Infrastructure	Secondary	Fixed mooring or navigation buoys are sometimes used by vessels.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Dive fishing is most flexible when transiting to/from and selecting dive sites; it is considerably less maneuverable when the boat is tethered and the diver is underwater.
Moving Gear:	Medium	Dive fishing may involve spears, nets or other devices hanging in or pulled through the water column.
Exclusion		
Permanence:	Low	Other than saturation diving, typical dives are short-term and mobile.
Buffer Zones:	Low	Dive fishing is not typically accompanied by official buffer zones around divers.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Dive fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence:	High	Successful dive fishing requires certain environmental conditions, including safe sea states, abundant prey and low crowding.

Use Profile: Commercial Fishing with Benthic Fixed Gear

Section 1. Use Description

Use Includes:

Use of traps, pots, bottom longlines, bottom or anchored gillnets, pound nets, weirs, and other bottom tending gear types used to catch benthic fishes and invertebrates.

Use Excludes:

All other forms of fishing.

Use Footprint

Use Footprint includes the active fishing areas as well as vessel transit to and from the fishing site(s).

Core Activity Area

Commercial benthic fishing with fixed gear occurs throughout the Near-Shore, Coastal and Oceanic zones in many depths.

Functional Components

Vessel(s), people onboard, mobile gear (lines, tethers and fishing gear in the water), anchors, infrastructure (moorings, nav aids).

Notes and Assumptions

Focused solely on the primary fishing vessel and associated support boats, and not factory ships collecting catch from multiple vessels.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Never	Always	Often	Sometimes	Transit areas, and thus the Overall Footprint, always include Near-Shore Zone.
Core Activity	Never	Never	Often	Often	Sometimes	Location of fishing varies widely w/ bathymetry and target stocks. Excludes by definition rare cases of fishing in submerged intertidal zones.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Always	Always	Often	Mirrors space occupancy of Core Activity Area.
Core Activity	Sometimes	Always	Always	Always	Often	Many types of bottom gear can disturb sub-surface sediments and assemblages in the Seabed. Some vessels raise and lower benthic gear from large davits that extend upward into the Air Zone.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	Use of different Components is fairly constant throughout the Zones in which fishing occurs. People and Vessels are always involved; Anchors and Installed Infrastructure are more common in shallower water.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	Use of different Components is fairly constant throughout the Zones in which fishing occurs. People and Vessels are always involved; Anchors and Installed Infrastructure are more common in shallower water.
Anchors	Not Applicable	Not Applicable	Rarely	Rarely	Never	Use of different Components is fairly constant throughout the Zones in which fishing occurs. People and Vessels are always involved; Anchors and Installed Infrastructure are more common in shallower water.
Moving Gear	Not Applicable	Not Applicable	Always	Always	Always	All fishing gear is, by definition, Mobile.
Infrastructure	Not Applicable	Not Applicable	Sometimes	Rarely	Never	Installed infrastructure can be used to secure vessels or as navigation aids, or as catching structures such as weirs or pound nets.

Use Profile: Commercial Fishing with Benthic Fixed Gear

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Rarely	Never	Always involved, People occur exclusively at the Sea Surface, except when standing on the shallow Seafloor tending to weirs or pound nets.
Vessels	Rarely	Always	Sometimes	Never	Never	Always involved, some large vessels extend up into "Air" zone; some down into the "Water Column".
Anchors	Never	Always	Always	Always	Always	When used, anchors run from Surface to the Seabed.
Moving Gear	Sometimes	Always	Always	Always	Often	Mobile benthic gear is suspended from the Surface to the Seabed and occasionally extends into the Air Zone on davits or other devices..
Infrastructure	Sometimes	Always	Always	Always	Often	When used, Infrastructure extends from Sea Surface to Seabed, and sometimes into the Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in this activity.
Vessels	Primary	Fishing vessels are always involved in this activity, including to install, maintain and remove fixed devices used to trap fish.
Anchors	Secondary	Fishing vessels are mainly mobile but may use anchors to secure to the seabed.
Moving Gear	Primary	The gear used in this type of fishing is usually mobile, as it is routinely lowered and raised through the water column, except in the relative rare cases of weirs, pound nets and similar structures.
Infrastructure	Secondary	Fishing vessels may use mooring buoys or navigation markers. Some relatively rare fixed gear types (e.g. weirs, pound nets) are installed on the Seafloor for long periods.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Benthic mobile fishing operations are relatively maneuverable before Mobile Gear has been deployed. During deployment or retrieval, however, their mobility and flexibility may be highly limited in real-time.
Moving Gear:	Medium	This activity often involves periods of lowering, pulling, raising or removing fixed gear (e.g. lines, nets, traps, dredges, etc.) through the Water Column, but sometimes involves fixed, stationary gear (e.g. weirs).
Exclusion		
Permanence:	Medium	Although relatively stationary when deployed, fixed benthic fishing gear is generally transitory (e.g. crab pots) and removed quickly. Some fisheries, on the other hand, may employ more permanent gear for longer but finite periods (e.g. weirs and pound nets).
Buffer Zones:	Medium	Benthic fishing operations may involve official safety zones around installed gear.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Benthic fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence:	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Profile: Commercial Fishing with Benthic Mobile Gear

Section 1. Use Description

Use Includes:	Use Excludes:
The use of rod and reel, trolling, trawling and other mobile gear to catch benthic fishes and mobile invertebrates for commercial purposes.	All other forms of fishing.

Use Footprint	Core Activity Area
Use Footprint includes the active fishing areas and transit from and back to port.	Benthic mobile fishing occurs throughout the Nearshore, Coastal and Oceanic zones in all depths.

Functional Components

Vessel(s), people onboard, mobile gear (e.g. lines, nets, dredges, trawls, tethers) in the water, anchors, infrastructure (moorings, nav aids).

Notes and Assumptions

Focused solely on the fishing vessel and support boats, and not on factory ships collecting catch from multiple vessels.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Never	Always	Often	Sometimes	Includes transit tracks to fishing grounds
Core Activity	Never	Never	Often	Often	Sometimes	Location of fishing varies widely w/ bathymetry and target stocks. Excludes rare cases of fishing in submerged intertidal zones.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Always	Always	Often	Presence on the Seafloor and Seabed occur only when actively fishing.
Core Activity	Rarely	Always	Always	Always	Often	Assumes trawls can disturb sub-surface sediments and assemblages in the Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	Use of different Components is fairly constant throughout the Zones in which fishing occurs. People and Vessels are always involved; Anchors and Installed Infrastructure are more common in shallower water.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	Use of different Components is fairly constant throughout the Zones in which fishing occurs. People and Vessels are always involved; Anchors and Installed Infrastructure are more common in shallower water.
Anchors	Not Applicable	Not Applicable	Rarely	Rarely	Never	Use of different Components is fairly constant throughout the Zones in which fishing occurs. People and Vessels are always involved; Anchors and Installed Infrastructure are more common in shallower water. Typically, anchors are used for short periods, overnight or to ride out bad weather.
Moving Gear	Not Applicable	Not Applicable	Always	Always	Always	All fishing gear is, by definition, Mobile.
Infrastructure	Not Applicable	Not Applicable	Rarely	Rarely	Never	Installed infrastructure can be used to secure vessels or as navigation aids.

Use Profile: Commercial Fishing with Benthic Mobile Gear

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Never	Never	Always involved, People occur exclusively at the Sea Surface.
Vessels	Rarely	Always	Rarely	Never	Never	Always involved, some large vessels extend up into "Air" zone; some down into the "Water Column".
Anchors	Never	Always	Always	Always	Always	When used, anchors run from Surface to the Seabed.
Moving Gear	Never	Always	Always	Always	Often	Mobile benthic gear is suspended from the Surface to the Seabed and occasionally extends into the Air Zone on davits or other devices..
Infrastructure	Rarely	Always	Always	Always	Often	When used, Infrastructure extends from Sea Surface to Seabed, and sometimes into the Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in this activity.
Vessels	Primary	Fishing vessels are always involved in this activity.
Anchors	Secondary	Fishing vessels may use anchors to secure to the seabed.
Moving Gear	Primary	The gear used in this type of fishing is always, by definition, mobile.
Infrastructure	Secondary	Fishing vessels may use mooring buoys or navigation aids and markers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Benthic mobile fishing operations are relatively maneuverable before Mobile Gear has been deployed. Afterward, their flexibility may be highly limited in real-time.
Moving Gear:	High	This activity involves routine lowering, pulling or raising of fishing gear (e.g. lines, nets, traps, dredges, etc.) through the Water Column and along the Seafloor.
Exclusion		
Permanence:	Low	Benthic fishing w/ mobile gear is inherently transitory and only temporarily occupies ocean spaces.
Buffer Zones:	Medium	Fishing operations may involve official safety zones when underway.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence:	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Profile: Commercial Intertidal Harvest

Section 1. Use Description

Use Includes:	Use Excludes:
Commercial harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria.	All other forms of intertidal or coastal harvesting.
Use Footprint	**Core Activity Area**
The harvest area plus areas covered during transit (typically by foot) to, from and among them.	The localized areas of the intertidal zone where the harvesting occurs.

Functional Components

People, mobile gear (harvest tools, baskets, bags), and vessels when used during high tide to reach harvest areas exposed at low tide.

Notes and Assumptions

This commercial use may involve vesssels to access, transport animals or plants, or to move among intertidal harvest areas.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Always	Never	Never	Never	Assumes that users typically access harvest areas from land, and sometimes from vessels, and that any vessels used do not travel far offshore.
Core Activity	Rarely	Always	Never	Never	Never	Assumes that users often access harvest areas from land, not vessels, and that harvest on the Shoreline is rare and incidental to Intertidal collecting.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Never	Always	Never	Always	Sometimes	Assumes harvesting does not reach the Water Column, and that the substrate = Seafloor and/or Seabed. Also assumes vessels do not extend into the Water Column and that their anchors encounter the Seafloor and Seabed.
Core Activity	Never	Always	Never	Always	Sometimes	Assumes harvesting does not reach the Water Column, and that the substrate = Seafloor and/or Seabed. Also assumes vessels do not extend into the Water Column and that their anchors encounter the Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Not Applicable	Not Applicable	People are always involved as the Users.
Vessels	Rarely	Sometimes	Always	Not Applicable	Not Applicable	Vessels may be used to access harvest areas, mainly w/in or just outside of the Intertidal Zone.
Anchors	Never	Sometimes	Rarely	Not Applicable	Not Applicable	When vessels are used, anchors may be set to secure them.
Moving Gear	Never	Sometimes	Not Applicable	Not Applicable	Not Applicable	When used, mobile gear (e.g. dredges) are used solely in the Intertidal harvest areas.
Infrastructure	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not relevant to this use.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes

Use Profile: Commercial Intertidal Harvest

People	Never	Rarely	Never	Always	Sometimes	People harvesting in the Intertidal occur typically at the sediment surface, or on the surface in boats.
Vessels	Rarely	Always	Never	Often	Never	Vessels used to transit to, from and among harvest areas travel on the sea surface at high tide, and are typically beached in place during harvest at low tide.
Anchors	Never	Always	Sometimes	Always	Often	Anchors may be used in conjunction w/ larger commercial vessels to secure boats in harvest areas or in offshore areas during transit.
Moving Gear	Never	Never	Never	Always	Often	Mobile gear for harvesting occurs only at nor near the sediment interface.
Infrastructure	Not Applicabl	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not relevant to this use.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (the harvesters) are always involved in this use.
Vessels	Secondary	Vessels may be used to access harvest areas from the ocean.
Anchors	Secondary	When vessels are used, anchors may be set to secure them.
Moving Gear	Secondary	Although intertidal harvesting often uses equipment, it is always attached to People and remains under their active control, even when moving.
Infrastructure	Not Applicable	Not Applicable

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Harvesters have some ability to choose operating areas, but may have limited ability to change locations quickly in response to changing conditions.
Moving Gear:	Low	Dredges and other moving gear are sometimes used to collect animals, but are always under active control by People.
Exclusion		
Permanence:	Low	Intertidal harvesting is an inherently mobile and transitory activity.
Buffer Zones:	Low	Harvesting is not typically protected by exclusion zones.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Intertidal commercial harvesting is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence:	High	Successful harvest depends upon adequate population numbers of target species, and safe operating conditions and access.

Use Profile: Commercial Pelagic Fishing

Section 1. Use Description

Use Includes:

Use of mid-water trawling, purse seine, pelagic longlines, handlines, harpoons, mid-water gillnets, rod and reel, trolling, and buoys to catch pelagic fishes and mobile invertebrates.

Use Excludes:

All other forms of fishing.

Use Footprint

The total area covered by the vessel on a fishing trip, which may include transit from the harbor or some other area, among fishing sites, and back to the harbor, as well as the Core Activity Area(s) where fishing is actually conducted.

Core Activity Area

The primary area where fishing is conducted, as opposed to transit to, from and between those areas.

Functional Components

Fishermen (people), vessels, mobile in-water gear (e.g. nets, lines, etc.), anchors, infrastructure (nav aids, moorings).

Notes and Assumptions

Assumes that the use does not involve intentional gear contact with the Seafloor or capture of animals that live exclusively on, under or very close to the Seafloor (e.g. scallops, lobsters, urchins).

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Sometimes	Often	Often	Sometimes	Transit to/from fishing areas may cross Intertidal Zone in some geographies w/ high tide ranges.
Core Activity	Never	Never	Often	Often	Sometimes	Frequencies of occurrence vary widely with different target species and fisheries.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Often	Sometimes	Sometimes	Large vessels may extend into Air Zone; some trolling and long-line gear may only skim the Surface; Anchors may contact Seafloor and Seabed.
Core Activity	Sometimes	Always	Often	Sometimes	Sometimes	Large vessels may extend into Air Zone; some trolling and long-line gear may only skim the Surface; Anchors may contact Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	Target species begin in the subtidal zone and exclude intertidal organisms.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	
Anchors	Not Applicable	Not Applicable	Sometimes	Rarely	Never	Anchors are limited by depth.
Moving Gear	Not Applicable	Not Applicable	Always	Always	Always	All gear is Mobile by definition.
Infrastructure	Not Applicable	Not Applicable	Sometimes	Rarely	Rarely	Some activities may involve mooring, marker, navigation buoys in shallower water.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Never	Never	Never	People may act as 'spotters' on tall vessels extending into Air Zone. People are not intentionally in water.

Use Profile: Commercial Pelagic Fishing

Vessels	Sometimes	Always	Sometimes	Never	Never	Deep draft vessels may extend into Water Column and do not intentionally contact the Seafloor or Seabed..
Anchors	Never	Always	Always	Always	Often	When used, Anchors extend from Sea Surface to Seabed.
Moving Gear	Sometimes	Always	Always	Never	Never	Always used, mobile gear (e.g. nets) extends into the Water Column, avoids the Seafloor and may be held on davits extending up into the Air Zone.
Infrastructure	Sometimes	Always	Always	Always	Often	Activity may involve installed buoys, markers or lights, all of which extend from Sea Surface to Seabed, and some of which may extend into Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in all aspects of this Use.
Vessels	Primary	The use requires a Vessel for access to and from fishing areas.
Anchors	Secondary	Anchors may be used periodically to secure the boat.
Moving Gear	Primary	Pelagic fishing always involves moving gear through the water to catch fish and invertebrates.
Infrastructure	Secondary	Pelagic fishing may use fixed mooring buoys or navigation aids during the course of the activity.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Pelagic fishing operations are relatively maneuverable before Mobile Gear has been deployed. Afterward, their flexibility may be highly limited in real-time.
Moving Gear:	High	Pelagic fishing always involves lowering and/or pulling moving fishing gear through the water above the Seafloor.
Exclusion		
Permanence:	Low	Pelagic fishing is a highly mobile activity with temporary space occupancy.
Buffer Zones:	Medium	Some pelagic fishing activities may have minimum approach distances for safety reasons.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Pelagic fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence:	High	Successful Pelagic Fishing depends upon the presence of target species, and safe operating conditions.

Use Profile: Commercial Shipping

Section 1. Use Description

Use Includes:	Use Excludes:
Transit, mooring, towing, barging or anchoring by ships, tankers, ferries and other large commercial vessels.	Cruise Ships, Military Vessels.
Use Footprint	**Core Activity Area**
The Core Activity Area(s) plus transit areas between ports/harbors and established shipping lanes.	The primary vessel traffic route(s) followed during the typical use.

Functional Components

People (passengers and crew); primary and towed vessels; anchors; infrastructure (nav aids, moorings).

Notes and Assumptions

Excludes aircraft or submersibles associated w/ commercial vessels, and any equipment dragged by dredges.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Never	Sometimes	Often	Often	Assumes occurrence in Nearshore waters is typically during transit to/from vessel traffic lanes.
Core Activity	Never	Never	Rarely	Often	Often	Assumes occurrence in Nearshore waters is typically during transit to/from vessel traffic lanes.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Always	Often	Sometimes	Sometimes	Anchoring becomes more common in transit routes to and from the main shipping lanes.
Core Activity	Often	Always	Often	Rarely	Rarely	Large vessels extend into the Air Zone and Water Column but not the Seafloor (normally) bottom contact is typically thru anchoring.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	People are always involved as crew or passengers.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	Vessels are inherent to the use.
Anchors	Not Applicable	Not Applicable	Sometimes	Rarely	Never	Anchors may be used, especially near the coast in transit areas between land and shipping lanes.
Moving Gear	Not Applicable	Not Applicable	Never	Never	Never	Mobile gear is not typically associated with Commercial Shipping.
Infrastructure	Not Applicable	Not Applicable	Sometimes	Sometimes	Sometimes	Commercial ships may use, but do not install, fixed infrastructure for navigation and mooring.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Never	Never	Never	People ride on the surface, occasionally on upper decks extending into the Air Zone.
Vessels	Often	Always	Often	Never	Never	Vessels typically extend from the Air to the Water Column.
Anchors	Never	Always	Always	Always	Always	When used, Anchors typically extend from Sea Surface to Seabed

Use Profile: Commercial Shipping

Moving Gear	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Commercial shipping does not typically involve Mobile Gear.
Infrastructure	Sometimes	Always	Always	Always	Always	When ships use Infrastructure, it is typically installed in the Seabed and extends to the Sea Surface and sometimes the Air Zone (e.g. large buoys or markers).

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People are always involved as crew or passengers.
Vessels	Primary	Vessels are inherent to and always employed by the use.
Anchors	Secondary	Anchors may be used in some situations, especially near the coast.
Moving Gear	Not Applicable	Mobile gear, as defined here, is not typically associated with Commercial Shipping.
Infrastructure	Secondary	Commercial ships may use, but do not typically install or maintain, fixed infrastructure for navigation and mooring.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Large commercial ships have some ability to change course with sufficient notice, but has very little ability to react to rapidly changing local conditions.
Moving Gear:	Low	Shipping does not typically involve separate gear moving through the water, other than Anchors.
Exclusion		
Permanence:	Low	Shipping is inherently mobile and transitory.
Buffer Zones:	Medium	Commercial ships may have buffer zones when under-way or at anchor.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Outside of established shipping lanes near land, vessel traffic is not highly controlled on a local scale.
Site Dependence:	Medium	Shipping often follows established vessel traffic lanes for safety and efficiency, especially near land, as well as reasonable weather and sea states along its planned routes.

Use Profile: Cruise Ships

Section 1. Use Description

Use Includes:

Transit, mooring or anchoring for extended overnight recreational travel on commercial ships.

Use Excludes:

Motorized Boating, Commercial Shipping.

Use Footprint

The Core cruising area and destinations, plus any other transit areas between ports/harbors and established shipping lanes.

Core Activity Area

The primary vessel traffic route(s) followed during the typical cruise, often located in relatively deep coastal waters along a shoreline or between mainland and island destinations.

Functional Components

People (passengers and crew); vessels; anchors; moving gear (lines; support boats); infrastructure (nav aids, moorings).

Notes and Assumptions

Excludes private yachts, day-trip whale watching vessels, research vessels, and other vessels that might be used for individual recreational purposes (e.g. small sailboats). Because transit is integral to cruising, the Core Activity Area and Overall Footprint typically overlap.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Sometimes	Rarely	Sometimes	Often	Sometimes	Includes access to coastal beaches for recreation.
Core Activity	Sometimes	Rarely	Sometimes	Often	Sometimes	Assumes that core activities occur along transit routes and at destination, including beach use.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Always	Often	Sometimes	Sometimes	Large vessels extend into the Air Zone and Water Column; anchoring contacts the Seafloor and Seabed.
Core Activity	Often	Always	Often	Sometimes	Sometimes	Large vessels extend into the Air Zone and Water Column; anchoring contacts the Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	People are always involved as crew or passengers.
Vessels	Sometimes	Rarely	Always	Always	Always	Vessels are inherent to the use; small passenger movers may be beached on the Shoreline or in the exposed Intertidal.
Anchors	Rarely	Rarely	Often	Sometimes	Never	Anchors may be used, especially near the coast in destinations or transit areas between land and shipping lanes.
Moving Gear	Sometimes	Rarely	Sometimes	Rarely	Never	Mobile gear, when used, is typically integral to recreational activities by the passengers.
Infrastructure	Never	Never	Sometimes	Sometimes	Sometimes	Cruise ships may use, but do not install, fixed infrastructure for navigation and mooring.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Never	Never	Never	People are assumed to ride on the surface, occasionally on upper decks extending into the Air Zone.

Use Profile: Cruise Ships

Vessels	Often	Always	Often	Never	Never	Cruise ships are large and typically extend from the Air to the Water Column, but generally avoid the bottom.
Anchors	Never	Always	Always	Always	Always	When used, Anchors typically extend from Sea Surface to Seabed
Moving Gear	Never	Often	Sometimes	Rarely	Never	Mobile gear, when used, is typically integral to recreational activities at or near the Sea Surface.
Infrastructure	Sometimes	Always	Always	Always	Always	When ships use Infrastructure, it is typically installed in the Seabed and extends to the Sea Surface and sometimes the Air Zone (e.g. large buoys or markers).

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People are always involved as crew or passengers.
Vessels	Primary	Vessels are inherent to the use and are always employed.
Anchors	Primary	Anchors are often used at the destination.
Moving Gear	Secondary	Mobile gear, when used, is typically integral to recreational activities by the passengers and generally limited to the sea surface and/or air zones.
Infrastructure	Secondary	Cruise ships may use, but do not typically install or maintain, fixed infrastructure for navigation and mooring.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Large commercial ships have some limited and delayed ability to change course with sufficient notice, but have very little ability to react to rapidly changing local conditions.
Moving Gear:	Medium	Recreational activities by Cruise Ship passengers at anchor may involve specialized gear moving through the water and/or air.
Exclusion		
Permanence:	Low	Shipping is inherently mobile and transitory.
Buffer Zones:	High	Cruise Ships often have buffer/safety zones while underway as well as security zones at anchor to prevent terrorism.

Section 6. Spatial Management Considerations

Spatial Management:	High	Cruise ship transit lanes and destinations are often managed spatially by various federal, state and local authorities.
Site Dependence:	High	Transit depends on established vessel traffic lanes for safety and efficiency, and on reliable access to specific destinations (e.g. mooring, anchoring, docking).

Use Profile: Kayak Fishing

Section 1. Use Description

Use Includes:

The use of hook and line fishing from kayaks or any other similar vessel to catch fishes and mobile invertebrates.

Use Excludes:

All other forms of fishing.

Use Footprint

The total area covered by the kayak on a fishing trip, which may include transit from the harbor or some other area, among fishing sites, and back to the harbor, as well as the Core Activity Area(s) where fishing is actually conducted.

Core Activity Area

The primary area where fishing is conducted, as opposed to areas covered during transit to, from and between fishing areas.

Functional Components

Fishermen (people), vessels, mobile gear (paddles, in-water fishing gear), anchors, infrastructure (bouys, nav aids, markers).

Notes and Assumptions

Assumes that: (i) kayak fishing may be for either commercial or recreational purposes; (ii) the kayaks are manually powered; and, (iii) that the fishermen does not enter the water intentionally as part of the fishing activity.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Often	Often	Rarely	Never	Transit to and from kayak fishing areas typically involves entry and exit from shore and crossing the Intertidal Zone.
Core Activity	Never	Rarely	Often	Rarely	Never	Kayak fishing tends to occur relatively near shore in shallower water, including, rarely, in the Intertiday when submerged.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Never	Always	Often	Sometimes	Never	Kayaks and fishing gear always occupy the Sea Surface; often (i.e. gear) the Water Column; and, sometimes (i.e. the vessel) contact the Seafloor in shallow water.
Core Activity	Never	Always	Often	Sometimes	Never	Kayaks and fishing gear always occupy the Sea Surface; often (i.e. gear) the Water Column; and, sometimes (i.e. the vessel) contact the Seafloor in shallow water.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	People (fishermen) are always involved in all aspects of Kayak Fishing, regardless of location..
Vessels	Always	Always	Always	Always	Always	The use requires, by definition, a Vessel for access to and from fishing areas, regardless of where fishing occurs.
Anchors	Rarely	Rarely	Sometimes	Rarely	Never	The utility of anchors is limited by depth and is highest in the relatively shallow Near-Shore Zone.
Moving Gear	Never	Rarely	Always	Always	Always	Mobile gear is not typically involved in Kayak Fishing inside of open water.
Infrastructure	Never	Never	Sometimes	Rarely	Never	The prevalence of installed infrastructure relevant to pelagic fishing decreases with depth.

Use Profile: Kayak Fishing

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Sometimes	Never	People may act as 'spotters' on tall vessels extending into Air Zone. Other than walking on the bottom during entry and exit, people are not intentionally in water.
Vessels	Never	Always	Never	Sometimes	Never	Kayaks float at the Sea Surface and only occasionally contact the Seafloor during entry and exit.
Anchors	Never	Always	Always	Always	Rarely	When used, small-boat anchors typically used in kayak fishing tend to rest on the surface of the Seafloor and do not extend down to the Seabed.
Moving Gear	Never	Always	Often	Often	Never	Always used in kayak fishing, mobile gear (e.g. lines, hooks) typically extends into the Water Column; often contacts the Seafloor; but does not disturb the Seabed.
Infrastructure	Rarely	Always	Always	Always	Often	Kayak fishing may involve installed buoys, markers or lights, all of which extend from Sea Surface to Seabed, and some of which may extend into Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in all aspects of Kayak Fishing.
Vessels	Primary	The use requires, by definition, a Vessel (i.e. the kayak) for access to and from fishing areas.
Anchors	Secondary	Small anchors may be used periodically to secure the boat to a specific area in relatively shallow water.
Moving Gear	Primary	Kayak fishing always involves lowering, moving and raising fishing gear through the water to catch fish and invertebrates.
Infrastructure	Secondary	Kayak fishing may involve mooring buoys, navigation aids, or fish havens installed on the Seafloor.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Kayak fishing is relatively maneuverable, especially before the fishing gear has been deployed. Afterward, their flexibility may be more limited in real-time.
Moving Gear:	High	Kayak fishing always involves lowering and/or pulling moving fishing gear through the water above the Seafloor.
Exclusion		
Permanence:	Low	Kayak fishing is a highly mobile activity with temporary space occupancy.
Buffer Zones:	Low	Kayak fishing does not typically involve buffer zones around individual boats.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Kayak fishing is not typically managed spatially other than in local MPAs or through broader-scale fisheries management measures.
Site Dependence:	High	Successful Kayak Fishing depends upon the presence of target species, and safe operating conditions.

Use Profile: Mariculture

Section 1. Use Description

Use Includes:

Cultivating and harvesting marine organisms in the near-shore or offshore using man-made enclosures that can be fixed, floating or submerged (e.g. nets, pens and cages).

Use Excludes:

Aquaculture wholly pursued on land.

Use Footprint

The operational area plus transit corridors to, from and between them.

Core Activity Area

The immediate area where the operation occurs, which may range from the Intertidal out to the Ocean Zones, depending on the nature of the species being farmed and the methods used.

Functional Components

People; Vessels; Infrastructure (e.g. Fixed Enclosures, Cages and Racks (see Note below); Mobile Enclosures, fish food and tethers); Anchors.

Notes and Assumptions

This Use actually comprises two distinct forms of Mariculture: fixed and mobile enclosures. They have very different space use profiles, but are combined here, taking into account the nature of each activity. Assume that this Use also includes non-enclosed, and typically fixed, structures with suspended ropes for bivalve mariculture; these are important because they occur largely in the Intertidal and very Near Shore Zones.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Sometimes	Often	Often	Sometimes	Rarely	The footprint includes access to Mariculture sites, including by land. Otherwise, it matches the Core Activity Area because vessels transit the same areas to reach the operations.
Core Activity	Never	Often	Often	Sometimes	Rarely	Most activities occur between the Intertidal and Near-Shore Zones, w/ some occurring in deeper water, esp. the emerging use of mobile enclosures.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Often	Often	Often	Footprint matches the Core Activity Area.
Core Activity	Sometimes	Always	Often	Often	Often	Vessels and/or cages may extend up into the Air; cages typically float at or near the surface; and extend down into the WC; attached cages are typically anchored to the Seafloor or Seabed; mobile cages are not.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Often	Sometimes	Sometimes	Rarely	The Use does not occur onshore (by definition). People are present more frequently closer to shore and less often farther from shore.
Vessels	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	Activities and associated components peak in the Near-Shore and Coastal/Offshore Zones, and - other than mobile cages -- are Rare or non-existent in Oceanic waters.
Anchors	Not Applicable	Rarely	Sometimes	Sometimes	Never	Anchors follow the same spatial pattern as Vessels, except in Oceanic waters, where they are impractical to use.
Moving Gear	Not Applicable	Rarely	Sometimes	Sometimes	Always	In Oceanic waters, cages are typically mobile and not fixed; elsewhere, the associated Mobile Gear is associated with feeding, maintenance and collection.

Use Profile: Mariculture

Infrastructure	Not Applicable	Always	Always	Often	Never	In Oceanic waters, cages are not considered Installed Infrastructure; elsewhere, they are always or often fixed to the Seabed.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Rarely	Always	Sometimes	Rarely	Never	People ride in vessels typically at the Sea Surface. People may dive/snorkel in the Water Column or at the Seafloor depending on depth and operations.
Vessels	Sometimes	Always	Sometimes	Rarely	Never	Vessels may extend up to the Air, always occupy the Sea Surface; sometimes extend into the Water Column; and rarely contact the Seafloor.
Anchors	Never	Always	Always	Always	Always	When used, vessel anchors run from Sea Surface to the Seabed.
Moving Gear	Rarely	Always	Often	Rarely	Never	Mobile gear (e.g. ROVs, other equipment, or mobile cages themselves) can extend from Air to Water Column.
Infrastructure	Rarely	Always	Always	Always	Always	Fixed (installed) cages typically float at the Sea Surface and are attached to the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Secondary	People are involved mainly during installation, feeding, collecting and maintenance, but are not continuously onsite.
Vessels	Secondary	Vessels are involved mainly during installation, feeding, collecting and maintenance, but are typically not continuously onsite.
Anchors	Secondary	Vessel anchors are involved mainly during installation, feeding, collecting and maintenance, but are not used continuously onsite.
Moving Gear	Secondary	Mobile gear (e.g. ROVs) may be involved mainly during installation, feeding, collecting and maintenance, but are not used continuously onsite, w/ the exception of (relatively rare) mobile cages, which are always present and in motion.
Infrastructure	Primary	The mariculture cages/pens/racks constitute installed infrastructure, w/ the exception of mobile cages; all occur continuously onsite.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Mariculture operations are unable to move quickly in response to changing conditions.
Moving Gear:	Medium	Depends on the mode of operation: fixed cages do not move; mobile cages do, as does some associated equipment such as ROVs.
Exclusion		
Permanence:	Medium	Depends on the mode of operation: fixed cages are relatively permanent; mobile cages are not.
Buffer Zones:	Medium	Mariculture may involve buffer zones around operations.

Section 6. Spatial Management Considerations

Spatial Management:	High	Mariculture operations are typically allocated to specific areas by permitting agencies.

Site Dependence:	Medium	Successful mariculture requires certain environmental conditions (e.g. depth, water quality, water movement) that often vary spatially.

Use Profile: Marine Debris

Section 1. Use Description

Use Includes:

The collection, monitoring and routine siting of marine debris, including targeted debris removal areas.

Use Excludes:

Any other form of ocean dumping.

Use Footprint

The operating areas plus transit routes by land or sea to, from and between them.

Core Activity Area

The immediate areas in which marine debris are sought, observed, documented, and/or removed.

Functional Components

Vessels; Anchors; People (collectors/monitors); Mobile Gear (the debris, collecting equipment, sampling gear, markers); Infrastructure (nav aids, moorings).

Notes and Assumptions

This profile focuses on routine monitoring and removal of marine debris from relatively accessible areas. It excludes broad searches of large areas in the open ocean w/out known sitings of debris. Therefore, we assume that Oceanic Waters are not applicable to this Use. Moreover, the profile data reflect a combination of two related factors: (i) the general spatial occurrence of marine debris in a typical ocean zone; and (ii) the sometimes broader spatial footprint of management efforts to detect, document and remove it.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Often	Sometimes	Rarely	Never	Frequency of monitoring declines with distance from shore. Oceanic waters are excluded.
Core Activity	Often	Often	Sometimes	Rarely	Never	Frequency of monitoring declines with distance from shore. Oceanic waters are excluded.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Often	Rarely	Sometimes	Rarely	Transit to Core Activity Areas can include aircraft, vehicles and foot.
Core Activity	Rarely	Often	Rarely	Sometimes	Rarely	Monitoring and removal tend to focus on Sea Surface and Seafloor zones.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Not Applicable	People are integral to this Use.
Vessels	Never	Rarely	Always	Always	Not Applicable	Vessels are sometimes used to find or remove debris, especially in moderate depths.
Anchors	Never	Rarely	Often	Sometimes	Not Applicable	Vessel anchors are sometimes used to secure boats, especially in moderate depths.
Moving Gear	Never	Rarely	Sometimes	Sometimes	Not Applicable	Mobile gear (e.g. ROVs) may be employed in moderate depths.
Infrastructure	Never	Rarely	Sometimes	Sometimes	Not Applicable	Pre-existing Infrastructure can assist with navigation and mooring when needed.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Rarely	Sometimes	Sometimes	Sometimes	Never	People are typically in vessels, snorkeling or diving, sometimes to the Seafloor.
Vessels	Sometimes	Always	Sometimes	Rarely	Never	Larger vessels may extend into the Air and Water Column but are rarely beached.

Use Profile: Marine Debris

Anchors	Never	Always	Always	Always	Always	When used, anchors extend from Sea Surface to Seabed.
Moving Gear	Rarely	Often	Often	Sometimes	Never	Mobile gear (e.g. ROVs) may be employed in moderate depths or in the air (e.g. drones).
Infrastructure	Sometimes	Always	Always	Always	Always	When used, Infrastructure typically extends from Sea Surface to Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People are integral to this Use.
Vessels	Secondary	Vessels are sometimes used to find or remove debris.
Anchors	Secondary	Vessel anchors are sometimes used to secure boats, especially in moderate depths.
Moving Gear	Secondary	ROVs and other mobile observational gear may be used to detect or remove debris.
Infrastructure	Not Applicable	These activities may occasionally use fixed navigation markers or buoys.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Aspects of the Use (e.g. monitoring) may be flexible in selecting locations, but documentation and removal are focused on the site of the marine debris and thus are not able to shift locations permanently.
Moving Gear:	Medium	This Use may periodically employ mobile gear, such as ROVs or aerial surveillance drones.
Exclusion		
Permanence:	Low	This Use is inherently temporary and mobile.
Buffer Zones:	Low	This Use is not likely to involve formal buffer zones, except for very brief periods to allow removal of heavy or dangerous materials.

Section 6. Spatial Management Considerations

Spatial Management:	Low	This Use is not likely to be managed spatially.
Site Dependence:	Medium	This Use is targeted to areas that are considered likely to have marine debris by virtue of their location, exposure, topography, oceanography, etc.

Use Profile: Mining and Mineral Extraction

Section 1. Use Description

Use Includes:	Use Excludes:
Sand, gravel and sediment extraction, seabed mining for commercial minerals, dredging, and beach re-nourishment.	Energy production.

Use Footprint	Core Activity Area
The Core Activity Area plus vessel and equipment transit routes to, from and between operating areas.	The immediate area offshore where benthic material is being extracted and, where applicable, the target fill area here it will be deposited (typically renourished beaches or habitats).

Functional Components

People (crews); Vessels (Barges, Tow, Support Vessels); Mobile Gear (Dredges and Mineral Extractors, Sand Distributors).

Notes and Assumptions

This Use excludes many functionally similar activities (e.g. dredging) often associated with installing offshore infrastructure such as marker bouys, cables, pipelines, etc. It includes, for beach renourishment, the deposition of sediments on the target beaches. It also assumes that deep-sea mineral extraction remains relatively rare to date. Important Note - this use actually comprises two often distinct activities (offshore mineral extraction [ME} and nearshore beach renourishment [BR}). Their locations, general space occupancy, and effects on local habitats and users typically differ considerably. Consequently, the data below sometimes reflect a combination of responses for each of the two sub-activities (e.g. ME and BR). Thus combined, the data paint a somewhat confusing picture of space use.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Sometimes	Often	Often	Rarely	Includes vessel traffic patterns; BR focused from Shoreline to Nearshore; ME focused from Nearshore to Oceanic.
Core Activity	Often	Sometimes	Often	Sometimes	Rarely	BR focused from Shoreline to Nearshore; ME focused from Nearshore to Oceanic.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Always	Always	Always	Always	Includes vessel traffic patterns; BR focused from Shoreline to Nearshore; ME focused from Nearshore to Oceanic.
Core Activity	Often	Always	Always	Always	Always	Relatively large vessels and equipment extend upward to Air and downward to Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Often	Often	Always	Always	Always	People are always involved, mainly on vessels.
Vessels	Rarely	Rarely	Always	Always	Always	Vessels are integral to this use.
Anchors	Rarely	Rarely	Often	Sometimes	Never	Anchors are sometimes used to secure vessels in moderate depths.
Moving Gear	Often	Often	Always	Always	Always	Mobile Gear comprises all the equipment used in the water (e.g. dredges).
Infrastructure	Rarely	Rarely	Sometimes	Sometimes	Rarely	Vessels may use installed markers, buoys and other structures for navigation.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Never	Sometimes	Never	People may be present in the Air Zone and Sea Surface on tall vessels (ME/BR), and on the Seafloor during onshore operations (BN).

Use Profile: Mining and Mineral Extraction

Vessels	Often	Always	Sometimes	Rarely	Never	Vessels may be present in the Air, and upper waters, but rarely encounter the Seafloor or Seabed.
Anchors	Never	Always	Always	Always	Always	Vessel anchors may be used to secure vessels, mainly in moderate depths and extend from Surface to Seabed.
Moving Gear	Rarely	Always	Always	Always	Always	Mobile is assumed to contact the Seabed and be tethered to a vessel at the Sea Surface.
Infrastructure	Sometimes	Always	Always	Always	Always	The Use may employ markers, buoys or other structures for navigation or operations.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People are always involved, mainly on vessels.
Vessels	Primary	Vessels are integral to this use.
Anchors	Secondary	Anchors are sometimes used to secure vessels in moderate depths.
Moving Gear	Primary	Mobile Gear comprises all the equipment used in the water (e.g. dredges).
Infrastructure	Secondary	Vessels may use installed markers, buoys and other structures for navigation.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Once the site has been selected and operations begin, mobility of the vessels and mobile gear is very limited in response to local situations.
Moving Gear:	High	The use involves moving gear suspended from vessels and moving along the Seafloor.
Exclusion		
Permanence:	Low	Mineral extraction and beach renourishment are inherently mobile and temporary activities.
Buffer Zones:	Medium	During operation, dredging vessels may have temporary exclusion zones primarily for safety issues.

Section 6. Spatial Management Considerations

Spatial Management:	High	Both dredging/mining and renourishment are heavily regulated at multiple governmental levels.
Site Dependence:	High	The successful use requires proper environmental conditions (e.g. extracted resource) and governmental approvals.

Use Profile: Motorized Boating

Section 1. Use Description

Use Includes:	Use Excludes:
Transit, mooring or anchoring by motorized vessels for commercial or recreational purposes, including personal watercraft (PWC).	Other Uses conducted from a motorized vessel (e.g. Fishing, Wildlife Viewing at Sea); Cruise Ships; Shipping; Sailing.
Use Footprint	**Core Activity Area**
The Overall Footprint extends from home port to the furthest reaches of a trip; sometimes measuring 10's or even 100's of miles.	The Core Area comprises the zone generally covered by a typical users on a day trip within approx. 10 miles of home port.

Functional Components

Includes People (boaters), Vessels (boat, tender/dinghy), Anchors, Mobile Gear (lines), Infrastructure (mooring bouys, nav aids).

Notes and Assumptions

Most motorized boats are under 40' in length, with many less than 28'. Most engage in short trips, often returing to home port before night. Some may anchor or tie up to installed offshore mooring bouys during a trip. Anchors can disturb the Seabed.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Sometimes	Sometimes	Often	Often	Rarely	Smaller boats may be launched and retrieved on the Shoreline, crossing the Intertidal Zone along the way; some are beached temporarily as part of the activity.
Core Activity	Never	Sometimes	Often	Often	Rarely	Most motorized boats stay w/in the Near-Shore and Coastal/Offshore Zones, rarely venture into the Oceanic Zone, but may occasionally occupy Intertidal Zones when submerged.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Rarely	Sometimes	Sometimes	Some larger boats extend into Air Zone; hull/keels typically do not reach Water Column depths; boats are sometimes beached; and anchors dig into seabed.
Core Activity	Sometimes	Always	Rarely	Sometimes	Sometimes	Some larger boats extend into Air Zone; hull/keels typically do not reach Water Column depths; boats are sometimes beached; and anchors dig into seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	People are always involved in Motorized Boating.
Vessels	Always	Always	Always	Always	Always	Vessels are central to Motorized Boating.
Anchors	Sometimes	Rarely	Often	Rarely	Never	Anchors are used mainly in relatively shallow, Near-Shore waters.
Moving Gear	Never	Never	Sometimes	Rarely	Rarely	Mobile gear (markers, tow ropes, floats, etc.) are used mainly Near-Shore.
Infrastructure	Never	Never	Sometimes	Sometimes	Never	Installed infra = mooring and marker buoys and lights - are used routinely in relatively shallow waters.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes

Use Profile: Motorized Boating

People	Never	Always	Never	Rarely	Never	Assumes people/sailor's typical location is always aboard the vessel at the Sea Surface, except when the boat is intentionally beached in shallow water.
Vessels	Sometimes	Always	Rarely	Sometimes	Never	Vessels may extend into Air w/ masts and superstructure; into WC with deep keels; and onto Seafloor when intentionally beached.
Anchors	Never	Always	Always	Always	Always	When used, anchors always extend from Sea Surface to Seabed.
Moving Gear	Never	Always	Often	Sometimes	Never	When used, temporary markers and buoys w/ weighted lines may extend from Sea Surface to Seafloor.
Infrastructure	Sometimes	Always	Always	Always	Always	When used, installed Infrastructure may extend from Air to Seabed (e.g. markers, buoys, lights).

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Motorized boating always involves People (i.e. the boaters).
Vessels	Primary	The boats are always integral to this use.
Anchors	Secondary	Anchors are sometimes, but not always, used by motorized boats, depending on the location and nature of the activity.
Moving Gear	Secondary	Lines, markers, sea anchors are sometimes used by motorized boats.
Infrastructure	Secondary	Motorized boats may use fixed navigation aids or mooring buoys, especially long-distance cruisers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	High	Motorized Boating can typically select alternative courses and can manoeuver around obstacles, given enough notice.
Moving Gear:	Medium	Motorized Boating occasionally involves sea anchors, drogues, tow lines or other temporary gear in the water.
Exclusion		
Permanence:	Low	Motorized Boating is an inherently mobile activity; although some boats may be permanently moored when not in use.
Buffer Zones:	Low	Motorized Boats are sometimes afforded a small but temporary safety zone or right of way governed by state or federal rules, depending on how it is being conducting in the local setting.

Section 6. Spatial Management Considerations

Spatial Management:	Low	Motorized Boating is sometimes but relatively rarely zoned as part of spatial management schemes, particularly in zones MPAs.
Site Dependence:	Medium	Successful and safe Motorized Boating requires certain environmental conditions, including levels of crowding by other uses.

Use Profile: Non-Commercial Fishing (Benthic Fixed Gear)

Section 1. Use Description

Use Includes:	Use Excludes:
Fishing from private or charter boats using fixed bottom-tending gear types used to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices	All other forms of Fishing.

Use Footprint	Core Activity Area
Use Footprint includes the active fishing areas and areas transited from and back to port.	Benthic fishing with fixed gear can occur throughout the Near-Shore, Coastal and Oceanic zones in all depths, including the Intertidal when submerged at high tides.

Functional Components

Vessel(s) (e.g. motorized, sailing or paddled); People (crew_; Anchors; and Mobile Gear (e.g. traps, pots, cages, shelters, anchored lines with hooks) in the water.

Notes and Assumptions

Excludes illegal fishing methods such as explosives or poison. Assumes that other forms of fishing are not combined during the same activity.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Rarely	Sometimes	Often	Often	Rarely	Small boats may be launched and retrieved from shore; most benthic fixed gear is used in relatively shallow waters.
Core Activity	Never	Sometimes	Often	Often	Rarely	Fishing efforts typically peak in the Nearshore and Coastal/Offshore zones, and decrease in extreme depths.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Often	Often	Often	Larger fishing vessels may extend into the Air Zone; anchors or fishing gear may rest on Seafloor and Seabed in transit or layover areas.
Core Activity	Rarely	Always	Often	Often	Sometimes	All fixed gear is, by definition, on the Seafloor and thus extends from Sea Surface to the bottom.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Always	Always	Always	Always	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Elsewhere, People are always involved (by definition).
Vessels	Not Applicable	Always	Always	Always	Always	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Elsewhere, Vessels are always involved (by definition).
Anchors	Not Applicable	Often	Often	Sometimes	Rarely	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Typically, anchors are used for short periods, overnight or to ride out bad weather.
Moving Gear	Not Applicable	Never	Never	Never	Never	Fixed benthic fishing gear is considered to be not "mobile", except during brief periods of raising and lowering to and from the Seafloor.
Infrastructure	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	Installed infrastructure can be used to secure

Use Profile: Non-Commercial Fishing (Benthic Fixed Gear)

	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	vessels or as navigation aids. The main activity does not occur on the Shoreline, and only at high tide in the Intertidal.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Never	Rarely	Always involved, People occur exclusively at the Sea Surface, and by definition, in Vessels.
Vessels	Rarely	Always	Sometimes	Rarely	Never	Always involved, some large vessels extend up into "Air" zone; some down into the "Water Column" and some intentionally beached on the Seafloor as part of the fishing activity.
Anchors	Never	Always	Always	Always	Always	When used, anchors run from Surface to the Seabed.
Moving Gear	Never	Never	Never	Never	Never	Fixed benthic fishing gear is considered to be not "mobile", except during brief periods of raising and lowering to and from the Seafloor.
Infrastructure	Rarely	Always	Always	Always	Often	When used, Infrastructure extends from Sea Surface to Seabed, and sometimes into the Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in this activity.
Vessels	Primary	Fishing vessels are always involved in this activity.
Anchors	Secondary	Fishing vessels may use anchors to secure to the seabed either during fishing or transit.
Moving Gear	Not Applicable	Although fixed fishing gear can be considered "mobile" while being lowered and raised, it is otherwise stationary during most of its use.
Infrastructure	Secondary	Fishing vessels may use mooring buoys or navigation markers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Benthic fishing with fixed gear operations are relatively maneuverable before Mobile Gear has been deployed. Afterward, their flexibility may be more limited in real-time because, while the vessel may move, the gear does not.
Moving Gear:	Medium	This activity typically involves lowering, pulling or raising gear (e.g. traps, cages, pots, lines with hooks) through the Water Column and along the Seafloor. Therefore, in a functional sense, it does intermittently and briefly involve moving gear as part of the operation.
Exclusion		
Permanence:	Medium	Benthic fishing w/ fixed gear occupies areas of the Seafloor for various, and sometimes long, periods of time, often in repeated cycles of gear deployment and retrieval (e.g. crab traps).
Buffer Zones:	Medium	Fishing operations may involve official safety zones when underway, depending partly on the type of gear used.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.

Use Profile: Non-Commercial Fishing (Benthic Fixed Gear)

Site Dependence: High

Successful benthic fishing with fixed gear requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Profile: Non-Commercial Fishing (Benthic Mobile Gear)

Section 1. Use Description

Use Includes:

Fishing from private or charter boats using mobile gear to catch benthic fishes and invertebrates for non-commercial purposes or traditional and customary practices

Use Excludes:

All other forms of Fishing

Use Footprint

Use Footprint includes the active fishing areas and areas transited from and back to port.

Core Activity Area

Benthic mobile fishing can occur throughout the Near-Shore, Coastal and Oceanic zones in all depths, including the Intertidal when submerged at high tides.

Functional Components

Vessel(s) (e.g. motorized, sailing or paddled); crew (i.e. people); anchors; and fishing gear (e.g. lines, hooks, pulled nets, trawls, dip nets, spears, harpoons) in the water.

Notes and Assumptions

Harpoons and spears are used for benthic fishing only in very shallow water where bottom-dwelling fish are visible and reachable. Excludes illegal fishing methods such as explosives or poison. Assumes that other forms of fishing are not combined during the same activity.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Rarely	Sometimes	Often	Often	Sometimes	Small boats may be launched and retrieved from shore.
Core Activity	Never	Sometimes	Often	Often	Sometimes	Fishing efforts typically peak in the Neashore and Coastal/Offshore zones, and decrease in extreme depths.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Often	Often	Often	Large vessels may extend into the Air Zone; anchors or fishing gear may rest on Seafloor and Seabed.
Core Activity	Rarely	Always	Often	Often	Sometimes	Assumes trawls can disturb sub-surface sediments and assemblages in the Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Always	Always	Always	Always	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Elsewhere, People are always involved (by definition).
Vessels	Not Applicable	Always	Always	Always	Always	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Elsewhere, Vessels are always involved (by definition).
Anchors	Not Applicable	Sometimes	Sometimes	Rarely	Never	The main activity does not occur on the Shoreline, and only at high tide in the Intertidal. Typically, anchors are used for short periods, overnight or to ride out bad weather.
Moving Gear	Not Applicable	Always	Always	Always	Always	All fishing gear is, by definition, Mobile. The main activity does not occur on the Shoreline, and only at high tide in the Intertidal.
Infrastructure	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	Installed infrastructure can be used to secure vessels or as nav aids. The main activity does not

Use Profile: Non-Commercial Fishing (Benthic Mobile Gear)

	Not Applicable	Rarely	Sometimes	Sometimes	Rarely	occur on the Shoreline, and only at high tide in the Intertidal.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Never	Never	Always involved, People occur exclusively at the Sea Surface, and by definition, in Vessels.
Vessels	Rarely	Always	Sometimes	Rarely	Never	Always involved, some large vessels extend up into "Air" zone; some down into the "Water Column" and some intentionally beached on the Seafloor as part of the fishing activity.
Anchors	Never	Always	Always	Always	Always	When used, anchors run from Surface to the Seabed.
Moving Gear	Rarely	Always	Often	Often	Sometimes	Mobile benthic gear is suspended from the Sea Surface to the Seafloor and sometimes into the Seabed; it occasionally extends into the Air Zone on davits or other devices; and it often extends downward thru the Water Column (except in the Intertidal) to the Seafloor (except when fishing immediately above the bottom.
Infrastructure	Rarely	Always	Always	Always	Often	When used, Infrastructure extends from Sea Surface to Seabed, and sometimes into the Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in this activity.
Vessels	Primary	Fishing vessels are always involved in this activity.
Anchors	Secondary	Fishing vessels may use anchors to secure to the seabed.
Moving Gear	Primary	The gear used in this type of fishing is always mobile.
Infrastructure	Secondary	Fishing vessels may use mooring buoys or navigation markers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Benthic mobile fishing operations are relatively maneuverable before Mobile Gear has been deployed. Afterward, their flexibility may be considerably more limited in real-time.
Moving Gear:	High	This activity routinely involves lowering, pulling or raising gear (e.g. lines, nets, traps, dredges, etc.) through the Water Column and along the Seafloor.
Exclusion		
Permanence:	Low	Benthic fishing w/ mobile gear is inherently transitory and only temporarily occupies ocean spaces.
Buffer Zones:	Medium	Fishing operations may involve official safety zones when underway, depending partly on the type of vessel and gear used.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Benthic mobile fishing is Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.

Use Profile: Non-Commercial Fishing (Benthic Mobile Gear)

Site Dependence: High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Profile: Ocean Dumping

Section 1. Use Description

Use Includes:	Use Excludes:
The deliberate legal dumping of dredged spoils and other materials into ocean waters.	Sewage Discharge, Mining and Mineral Extraction.

Use Footprint	Core Activity Area
The dumping area plus any areas transited to, from and among dumping areas.	The immediate area(s) where the materials are dumped into the ocean.

Functional Components

Vessels (barges and support vessels); Anchors; People (crew and monitors); Mobile Gear (to dump materials); Dumped materials.

Notes and Assumptions

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Never	Rarely	Often	Sometimes	Footprint matches Core Activity Areas.
Core Activity	Never	Never	Rarely	Often	Sometimes	Dumping peaks in Coastal/Offshore waters that are both relatively deep and accessible.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Always	Always	Always	Never	Large vessels and equipment used in Dumping will extend into the Air Zone.
Core Activity	Not Applicable	Always	Always	Always	Never	Dumped materials typically enter the water at the Sea Surface and sink to the Sea Floor.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	People are always involved in this Use in all offshore zones.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	Vessels are always involved in this Use all offshore zones.
Anchors	Not Applicable	Not Applicable	Sometimes	Rarely	Never	Anchors may be used to secure Vessels, especially in moderate depths.
Moving Gear	Not Applicable	Not Applicable	Sometimes	Sometimes	Rarely	Mobile gear (e.g. dumping equipment and/or monitoring ROVs) may be used, especially in moderate depths.
Infrastructure	Not Applicable	Not Applicable	Sometimes	Sometimes	Rarely	Fixed structures and buoys may be used for navigation or mooring.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Rarely	Often	Never	Never	Never	Assumes that People may be present on upper structures of large vessels, but not in the water.
Vessels	Sometimes	Always	Often	Never	Never	Large vessels may extend into Air Zone and Water Column but avoid the Seafloor.
Anchors	Never	Always	Always	Always	Always	When used, Anchors extend from Sea Surface to Seabed.
Moving Gear	Never	Often	Often	Sometimes	Never	ROVs and other gear may be used to monitor dump operations and sites.

Use Profile: Ocean Dumping

Infrastructure	Sometimes	Always	Always	Always	Always	Dumping operations may use install infrastructure for navigation and mooring.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People are integral to this Use.
Vessels	Primary	Vessels are integral to this Use.
Anchors	Secondary	Vessel anchors may be used to secure barges and support boats.
Moving Gear	Secondary	ROVs and other gear may be used to guide and monitor dump operations and sites.
Infrastructure	Secondary	Fixed infrastructure may be used for navigation or mooring.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Dump sites and their contents are stationary; operational mobility is constrained by the site location and by navigational challenges once the operation has begun.
Moving Gear:	Medium	The act of dumping materials often involves mobile gear in the water; ROVs and other mobile gear may be used to monitor dumping. Once dumping is completed, the materials tend to be stationary.
Exclusion		
Permanence:	High	While individual dumping operations are temporary, most dump sites are permanent and their contents tend to preclude or interfere with other uses (e.g. munitions).
Buffer Zones:	High	Dumping may involve buffer zones during the operations and dump sites often limit access around their boundaries.

Section 6. Spatial Management Considerations

Spatial Management:	High	Approved dump sites are determined and regulated by governmental agencies.
Site Dependence:	High	Dumping is often only allowed in delineated areas with specific environmental features (e.g. substrate, currents), and the use depends on access to those sites.

Use Profile: Paddling

Section 1. Use Description

Use Includes:

Kayaking, canoeing, rowing, outrigger paddling, stand-up paddling.

Use Excludes:

Motorized Boating, Surface Board Sports.

Use Footprint

The Overall Footprint may range from Shore to Near-Shore waters, and in some cases such as outrigger canoe races and kayak voyages, to longer distances along shore or to other land masses.

Core Activity Area

Typically initiated from shore or dock and concentrated in the Near-Shore Zone, within a few miles of land.

Functional Components

Paddlers (people), Vessels (boat or paddle board); Mobile Gear (paddles, oars, lines); Anchors; Infrastructure (nav aids).

Notes and Assumptions

Assumes the majority of Paddlng is conducted close to shore.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Often	Always	Sometimes	Rarely	Allows for longer distance paddles.
Core Activity	Often	Often	Always	Rarely	Rarely	Assumes paddlers originate from shore vs. from vessels offshore.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Never	Always	Never	Sometimes	Rarely	Assumes some possible contact w/ seafloor nearshore and w/ seabed when anchoring.
Core Activity	Never	Always	Never	Sometimes	Rarely	Assumes some possible contact w/ seafloor nearshore and w/ seabed when anchoring.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	Paddling always involves people as paddlers in all Zones where it occurs.
Vessels	Always	Always	Always	Always	Always	Paddling always involves vessels in all Zones where it occurs.
Anchors	Rarely	Rarely	Sometimes	Rarely	Never	Anchors may occasionally be used, particularly in relatively shallow water to secure the vessel.
Moving Gear	Sometimes	Sometimes	Sometimes	Rarely	Rarely	Lines, markers, sea anchors/drogues, etc. are most likely to be used in relatively shallow water.
Infrastructure	Rarely	Rarely	Sometimes	Rarely	Rarely	Infrastructure, including navigation or mooring buoys, is most likely to be used in relatively shallow near-shore waters.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Sometimes	Never	Always present, paddlers are typically at the sea surface but may stand on Seafloor periodically.
Vessels	Never	Always	Never	Sometimes	Never	Always present, boats and boards at the surface may contact Seafloor periodically, but not penetrate to Seabed.
Anchors	Never	Always	Always	Always	Sometimes	When used, Anchors run from surface to seafloor and sometimes into Seabed.

Use Profile: Paddling

Moving Gear	Never	Always	Sometimes	Sometimes	Never	When used, lines, markers, sea anchors/drogues, etc. occupy Sea Surface to Seafloor Zones.
Infrastructure	Sometimes	Always	Always	Always	Often	When used, Infrastructure could include navigation or mooring buoys and markers extending into Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Paddling always involves people.
Vessels	Primary	Paddling always involves vessels (the boats or boards).
Anchors	Secondary	Small anchors are sometimes used to temporarily secure the vessel to the bottom or while onshore.
Moving Gear	Secondary	Lines may be deployed w/ floating sea anchors or to secure the vessel to the bottom or other structures.
Infrastructure	Secondary	Infrastructure may be used as navigation aids or mooring buoys.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	High	Paddled vessels are typically able to maneuver around obstacles or other uses, although their speed is relatively low compared to other uses (e.g. motorized boats).
Moving Gear:	Low	Paddling only occasionally involves deploying temporary anchors, drogues or other lines outside the vessel in the water.
Exclusion		
Permanence:	Low	Paddling always involves a mobile, temporary use of ocean space by the user (as opposed to paddling zones).
Buffer Zones:	Low	Paddled vessels may occasionally be protected by minimal approach distances or right of way rules.

Section 6. Spatial Management Considerations

Spatial Management:	Low	Paddling is not typically managed spatially except w/ relatively rare zoning schemes such as MPAs and other forms of spatial management.
Site Dependence:	Medium	Safe/enjoyable paddling requires a certain range of sea state and environmental conditions, including levels of crowding by other users.

Use Profile: Permanent Research Areas

Section 1. Use Description

Use Includes:

Sites, transects, and monitoring areas where routine research or monitoring is conducted.

Use Excludes:

Motorized Boating, Commercial Shipping.

Use Footprint

Includes the Core Activity Area plus areas used to transit to, from and among research sites, tyically from land across Shorline and Intertidal Zones, or by sea in the Nearshore or Coastal/Offshore Zones.

Core Activity Area

Areas where research and monitoring activities are routinely conducted, typically occuring mainly from Shoreline to Nearshore Zones.

Functional Components

People (scientists, crew); Vessels (e.g. Submersibles/ROVs/AOVs); Mobile Gear (measuring and collecting equipment and gear; site markers and bouys); Anchors; Infrastructure (e.g. mooring bouys and nav aids).

Notes and Assumptions

Although some monitoring and research occurs w/out the constant presence of people, these examples assume that the scientists are involved in the typical activity most of the time it is occurring in a place. Examples do not include similar activities conducted once or rarely in multiple places (e.g. a random, one-time survey of mid-water plankton), or atypical activities such as manned underwater habitats or access to areas by plane or helicopter.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Often	Often	Often	Rarely	Transit to, from and among research areas can involve vessels operating offshore and/or beached or launched from shore.
Core Activity	Sometimes	Often	Often	Sometimes	Rarely	Permanent research areas are less common and harder to access as depth and distance from shore increase.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Often	Often	Often	Sometimes	Research extending in the Air Zone may involve tall vessels or air sampling devices; some occur on or under the Seafloor and Seabed.
Core Activity	Rarely	Often	Often	Often	Sometimes	Research extending in the Air Zone may involve tall vessels or air sampling devices; some occur on or under the Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	By definition (above), people are always involved in this use.
Vessels	Sometimes	Rarely	Often	Always	Always	Vessels are typically involved in activities occurring beyond the Intertidal; some near-shore sites may be accessible by swimming.
Anchors	Never	Rarely	Sometimes	Sometimes	Rarely	Vessels sometimes uses anchors in relatively shallow water or while beached.
Moving Gear	Rarely	Sometimes	Often	Often	Often	Research and monitoring often employs towed, raised/lowered, or self-propelled sampling or observational gear.
Infrastructure	Sometimes	Sometimes	Sometimes	Sometimes	Sometimes	The use may rely on installed buoys, markers, etc., or my involve the installation of dedicated devices for monitoring and observation.

Use Profile: Permanent Research Areas

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Rarely	Often	Sometimes	Often	Sometimes	Researchers often conduct in situ studies in the water, entering at the Sea Surface, passing through the Water Column, and encountering the Seafloor and Seabed.
Vessels	Sometimes	Always	Sometimes	Rarely	Never	Tall vessels may extend into the Air Zone; some vessels extend down into the Water Column; some are intentionally beached on land for short periods.
Anchors	Never	Always	Always	Always	Often	When used, Anchors always extends from Sea Surface to Seafloor, and often into the Seabed.
Moving Gear	Rarely	Often	Often	Often	Rarely	A variety of towed, lowered, and self-propelled gear may be used throughout the vertical zones.
Infrastructure	Sometimes	Often	Often	Always	Often	Infrastructure is always connected to the Seafloor and Seabed, and often extends upward to the Sea Surface and Air Zones.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (i.e. scientists and crew) are always involved for some time, even though some equipment may be left alone for long periods between site visits.
Vessels	Primary	Vessels are typically involved when conducting research in zones beyond the Intertidal.
Anchors	Secondary	When Vessels are involved, anchors are sometimes used to secure them in place.
Moving Gear	Secondary	Mobile Gear is sometimes employed to conduct research for relatively short periods (e.g. towed gear or nets).
Infrastructure	Secondary	Fixed infrastructure may include sampling devices, site markers, navigation or mooring buoys, etc., depending on the specific activity.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Research and monitoring activities are fairly tied to specific areas and tend to lack flexibility once underway.
Moving Gear:	Medium	Research and monitoring sometimes involves moving gear, as described above.
Exclusion		
Permanence:	Medium	Permanent research and monitoring areas involve the long-term use of specific areas; some uses occupy the site for long periods, while others occur intermittently but in the same area.
Buffer Zones:	Medium	Some long-term research areas are protected by buffer zones, but the individual use/user is typically not.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Permanent study areas are occasionally delineated in spatial management schemes.
Site Dependence:	High	Permanent study areas are typically selected for their unique characteristics, and returning to the same reference area is often critical to the success of permanent research and monitoring stations.

Use Profile: Recreational Dive Fishing

Section 1. Use Description

Use Includes:

The use of SCUBA diving, surface supply diving or snorkeling (free diving) to catch fishes and invertebrates for recreational purposes.

Use Excludes:

Commercial fishing with SCUBA/snorkel, SCUBA/snorkel for viewing purposes.

Use Footprint

Typically encompasses dive sites and relatively narrow tracks followed by vessels to reach and return from dive sites.

Core Activity Area

Dive site(s), including areas traversed on drift dives, typically occurring in relatively shallow near-shore or coastal waters reachable by swimming or vessels, and extending from the sea surface to the seafloor.

Functional Components

People (divers, boat operators, observers), Vessels, Anchors, Mobile Gear (dive gear, fishing gear, towed sleds, marker bouys), Infrastructure (mooring bouys).

Notes and Assumptions

Recreational Dive Fishing may involve a variety of gear types and methods, including: spears, hooks, nets, and traps. Methods and gear vary among regions and target species.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Sometimes	Sometimes	Often	Sometimes	Rarely	
Core Activity	Never	Rarely	Often	Sometimes	Rarely	Excludes technical diving to extreme depths and cave diving.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Often	Often	Rarely	Notes
Core Activity	Never	Always	Often	Sometimes	Rarely	Notes

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Always	Always	Always	Always	By definition, if the Use is occurring, it involves People (i.e. divers).
Vessels	Not Applicable	Rarely	Often	Always	Always	Diving from boats is more common as depths and distance from shore increases.
Anchors	Not Applicable	Rarely	Often	Often	Never	Anchors for dive vessels, flags and floats are often used in relatively shallow water but not extreme depths.
Moving Gear	Not Applicable	Sometimes	Often	Often	Often	Spear guns, nets and towed diver sleds are often used to dive fish, depending on the target species. Diving in the Intertidal is assumed to occur at high tide when submerged.
Infrastructure	Not Applicable	Rarely	Often	Sometimes	Rarely	Mooring buoys and site markers may be used in moderate depths.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Not Applicable	Always	Often	Sometimes	Never	Always used, divers always begin and end at the surface, sometimes contacting the Seafloor but never extending to the Seabed.
Vessels	Not	Always	Rarely	Never	Never	When used, deep-draft vessels always occupy

	Not Applicable	Always	Rarely	Never	Never	the Sea Surface and may extend downward to the Water Column but are not intended to contact the Seafloor or Seabed.
Anchors	Not Applicable	Always	Always	Always	Sometimes	When used, anchors typically extend from the Sea Surface to the Seabed.
Moving Gear	Not Applicable	Always	Often	Sometimes	Never	When used, mobile gear is most often employed in the upper layers of the WC.
Infrastructure	Not Applicable	Always	Always	Always	Sometimes	When used, fixed mooring buoys or navigation marks extend from Sea Surface to the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Activity always involves people as diver(s) or boat crew.
Vessels	Secondary	Boats are sometimes used to transport divers to and from dive sites, depending on the area.
Anchors	Secondary	Anchors are sometimes used to secure boats to the seafloor.
Moving Gear	Secondary	Mobile gear is sometimes used in to capture animals (e.g. spears) or to secure boats (e.g. sea anchors).
Infrastructure	Secondary	Fixed mooring or navigation buoys are sometimes used by dive vessels.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Dive fishermen are typically able to manoeuver around obstacles at slow speeds and over small distances.
Moving Gear:	Medium	In addition to hand capture, dive fishing may also involve spears, nets or other devices hanging in, short or pulled through the water column.
Exclusion		
Permanence:	Low	Other than saturation diving in underwater habitats, typical dives are short-term and mobile.
Buffer Zones:	Low	Dive fishing is not typically accompanied by official buffer zones around divers.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Dive fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.
Site Dependence:	High	Successful dive fishing requires certain environmental conditions, including safe sea states, abundant prey and low crowding.

Use Profile: Recreational Fishing from Boats for Benthic Species

Section 1. Use Description

Use Includes:

Recreational fishing from head boats, party boats, charters, or private boats targeting benthic species including mobile invertebrates.

Use Excludes:

Any other boat- or shore-based fishing, including Dive Fishing from boats.

Use Footprint

Use Footprint includes the active fishing areas and areas of transit to and from the fishing site(s).

Core Activity Area

Sport fishing for benthic species typically occurs throughout the Near-Shore, Coastal and Oceanic zones in all depths.

Functional Components

Vessel(s), People (fishing or crew) onboard; Anchors; Mobile Gear (lines, hooks, tethers harpoons, nets, traps).

Notes and Assumptions

Focused solely on the relatively small or medium-sized sport fishing vessels and their occupants on short trips of 1-3 days. Assumes fishermen do not leave the vessel or enter the water.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Never	Always	Often	Sometimes	Sport fishing always occurs in, or transits thru, the Near-Shore Zone.
Core Activity	Never	Never	Often	Often	Sometimes	Location of fishing varies widely w/ bathymetry and target stocks. Excludes rare cases of fishing in submerged intertidal zones.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Always	Always	Often	Presence of gear on the Seafloor and Seabed occur only when actively fishing, not during transit.
Core Activity	Rarely	Always	Always	Always	Often	Assumes some large vessels extend into the Air Zone, and some gear (e.g. lines, traps) will contact the Seafloor.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	People (fishermen) are always involved in this activity in every Zone where it occurs.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	Vessels are always involved in this activity in every Zone where it occurs.
Anchors	Not Applicable	Not Applicable	Sometimes	Rarely	Never	Typically, anchors are used in relatively shallow, near-shore waters for short periods, overnight, or to ride out bad weather.
Moving Gear	Not Applicable	Not Applicable	Always	Always	Always	All sport fishing gear is, by definition, Mobile in every Zone where it occurs.
Infrastructure	Not Applicable	Not Applicable	Sometimes	Sometimes	Never	Installed infrastructure can be used to secure vessels or as nav aids, and is most common in relatively shallow waters.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Never	Never	Always involved, People occur exclusively at the Sea Surface.
Vessels	Rarely	Always	Rarely	Sometimes	Never	Always involved, some large vessels extend up

Use Profile: Recreational Fishing from Boats for Benthic Species

	Rarely	Always	Rarely	Sometimes	Never	into "Air" zone; some down into the "Water Column"; some are intentionally beached for short periods.
Anchors	Never	Always	Always	Always	Always	When used, anchors always run from Surface to the Seabed.
Moving Gear	Sometimes	Always	Always	Always	Often	By definition, benthic sport fishing gear is suspended from the Surface to the Seafloor.
Infrastructure	Sometimes	Always	Always	Always	Often	When used, Infrastructure always extends from Sea Surface to Seabed, and sometimes into the Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in this activity.
Vessels	Primary	Fishing vessels are always involved in this activity.
Anchors	Secondary	Fishing vessels may use anchors to secure to the seabed.
Moving Gear	Primary	Most sport fishing gear is mobile and actively pulled thru the water; some moves while being lowered or raised but also rests temporarily on the Seafloor (e.g. crab/lobster traps/pots) until retrieved.
Infrastructure	Secondary	Fishing vessels may use mooring buoys or navigation markers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Benthic sport fishing operations are relatively maneuverable and spatially flexible before the fishing site has been established and the fishing gear deployed. Afterward, their flexibility may be highly limited in real-time.
Moving Gear:	High	Benthic sport fishing involves throwing, lowering, pulling or raising gear (e.g. lines, nets, traps, harpoons, etc.) from the Sea Surface through the Water Column and along the Seafloor.
Exclusion		
Permanence:	Low	Benthic sport fishing from boats is inherently transitory and only temporarily occupies ocean spaces.
Buffer Zones:	Medium	Recreational fishing activities may involve limited safety zones while underway.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Benthic sport fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.
Site Dependence:	High	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Profile: Recreational Fishing from Boats for Pelagic Species

Section 1. Use Description

Use Includes:	Use Excludes:
Recreational fishing from head boats, party boats, charters, or private boats targeting pelagic species.	All other forms of fishing.

Use Footprint	Core Activity Area
The total area covered by the vessel on a fishing trip, which may include transit from the harbor or some other area, among fishing sites, and back to the harbor, as well as the Core Activity Area(s) where fishing is actually conducted.	The primary area where fishing is conducted, as opposed to transit to, from and between those areas.

Functional Components

Fishermen (people), Vessels, Mobile Gear (in-water gear including nets, lines, hooks, etc.); Anchors; Infrastructure (moorings, nav aids).

Notes and Assumptions

Assumes that the use does not involve intentional gear contact with the Seafloor, capture of animals that live exclusively on or very close to the Seafloor (e.g. scallops, lobsters, urchins), or capture for commercial sale.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Sometimes	Often	Often	Sometimes	Transit to/from fishing areas may cross Intertidal Zone in some geographies w/ high tide ranges.
Core Activity	Never	Never	Often	Often	Sometimes	Frequencies of fishing vary widely with different target species and fisheries but tend to avoid or be less common in Shore, Intertidal and Oceanic Zones.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Often	Sometimes	Sometimes	Large vessels may extend into Air Zone; some trolling and long-line gear may only skim the Surface; Anchors may contact Seafloor and Seabed.
Core Activity	Sometimes	Always	Often	Sometimes	Sometimes	Large vessels may extend into Air Zone; some trolling and long-line gear may only skim the Surface; Anchors may contact Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	Excludes recreational pelagic fishing from shore or for Intertidal species.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	The use requires, by definition, a Vessel for access to and from fishing areas, regardless of where fishing occurs.
Anchors	Not Applicable	Not Applicable	Sometimes	Rarely	Never	The utility of anchors is limited by depth and thus decreases with distance offshore.
Moving Gear	Not Applicable	Not Applicable	Always	Always	Always	All pelagic fishing gear is Mobile by definition, regardless of where the activity occurs.
Infrastructure	Not Applicable	Not Applicable	Often	Sometimes	Never	The prevalence of installed infrastructure relevant to pelagic fishing decreases with depth.

Use Profile: Recreational Fishing from Boats for Pelagic Species

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Never	Never	Never	People may act as 'spotters' on tall vessels extending into Air Zone. People are not intentionally in water.
Vessels	Sometimes	Always	Sometimes	Never	Never	Large deep draft vessels may extend into the Air and Water Column, but do not intentionally contact the Seafloor or Seabed..
Anchors	Never	Always	Always	Always	Often	When used, Anchors extend from Sea Surface to Seabed.
Moving Gear	Sometimes	Always	Always	Never	Never	Always used, mobile gear (e.g. nets) extends into the Water Column, avoids the Seafloor and may be held on davits extending up into the Air Zone. (Note - these values assume that pelagic fishing is strictly occurring in that Zone and catching species common to it.)
Infrastructure	Sometimes	Always	Always	Always	Often	When used, pelagic fishing may involve installed buoys, markers or lights, all of which extend from Sea Surface to Seabed, and some of which may extend into Air Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in all aspects of this Use.
Vessels	Primary	The use requires, by definition, a Vessel for access to and from fishing areas.
Anchors	Secondary	Anchors may be used periodically to secure the boat to a specific area.
Moving Gear	Primary	Pelagic fishing involves moving fishing gear through the water to catch fish and invertebrates.
Infrastructure	Secondary	Pelagic fishing may use fixed mooring buoys or navigation aids during the course of the activity, and may also preferentially target installed objects as fish havens (e.g. rigs, sunken debris).

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Pelagic fishing operations are relatively maneuverable before Mobile Gear has been deployed. Afterward, their flexibility may be highly limited in real-time.
Moving Gear:	High	Pelagic fishing always involves lowering and/or pulling moving fishing gear through the water above the Seafloor.
Exclusion		
Permanence:	Low	Pelagic fishing is a highly mobile activity with temporary space occupancy.
Buffer Zones:	Medium	Some pelagic fishing activities may have minimum approach distances for safety reasons.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Pelagic fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.
Site Dependence:	High	Successful Pelagic Fishing depends upon the presence of target species, and safe operating conditions.

Use Profile: Recreational Fishing From Shore

Section 1. Use Description

Use Includes:

Rod and reel, surf-casting, fishing from piers, jetties, crab traps, cast nets for recreational purposes.

Use Excludes:

All other forms of fishing, including from shore.

Use Footprint

The core fishing areas and any areas of the Shoreline used to access them.

Core Activity Area

Recreational Fishing from Shore typically involves the Shoreline and Intertidal Zones and the immediate Near-shore waters where fishing occurs.

Functional Components

People (fishermen), Mobile Gear (poles, lines, hooks, nets); other equipment (rod-holders, chairs, coolers, vehicles).

Notes and Assumptions

Assumes: no vessels are involved; no commercial sale of fish caught; no intertidal invertebrates such as bivalve are caughts; and, fishermen do not swim, snorkel or dive in the water in order to catch fish.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Always	Often	Never	Never	Recreational fishing from shore typically targets the Nearshore Zone, with lines and gear passing over or thru the Intertidal Zone. In some cases, fishing may target animals in the Intertidal Zone itself, when that area is submerged.
Core Activity	Always	Always	Often	Never	Never	Recreational fishing from shore typically targets the Nearshore Zone, with lines and gear passing over or thru the Intertidal Zone. In some cases, fishing may target animals in the Intertidal Zone itself, when that area is submerged.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Always	Often	Often	Never	Some recreational fishing from shore targets species in the upper layers and may not extend into the Water Column; most encounter the Seafloor but do not disturb the Seabed. Sometimes, lines and lures may enter the Air Zone during casting.
Core Activity	Rarely	Always	Often	Often	Never	Some recreational fishing from shore targets species in the upper layers and may not extend into the Water Column; most encounter the Seafloor but do not disturb the Seabed. Sometimes, lines and lures may enter the Air Zone during casting.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Never	Never	Never	By definition, the fishermen themselves do not occur beyond the Intertidal Zone.
Vessels	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	By definition, vessels are not involved in this use in any Zone.
Anchors	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Anchors are never involved in Recreational Fishing from Shore in any Zone.
Moving Gear	Always	Always	Always	Never	Never	Mobile fishing gear is always involved wherever Recreational Fishing from Shore occurs.

Use Profile: Recreational Fishing From Shore

Infrastructure	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Fixed infrastructure is never involved in any Zone.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Often	Never	Often	Never	Fishermen often stand in shallow water to cast and retrieve their lines.
Vessels	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	By definition, vessels are not involved in this use in any Zone.
Anchors	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Anchors are never involved in Recreational Fishing from Shore in any Zone.
Moving Gear	Rarely	Always	Often	Often	Never	Mobile fishing gear (e.g. lines, hooks) may: pass briefly thru Air Zone during casting; always occupy the Sea Surface; often occupy the Water Column and Seafloor; and do not disturb the Seabed.
Infrastructure	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Fixed infrastructure is never involved in any Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (fishermen) are always involved in Recreational Fishing from Shore.
Vessels	Not Applicable	Vessels are never, by definition, involved in Recreational Fishing from Shore.
Anchors	Not Applicable	Anchors are never involved in Recreational Fishing from Shore.
Moving Gear	Primary	Mobile fishing gear is always involved in Recreational Fishing from Shore.
Infrastructure	Not Applicable	Fixed infrastructure is never involved.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Fishing from shore has considerable flexibility in selecting a location, or timing a cast, but limited ability to avoid obstacles once the lines are in the water.
Moving Gear:	High	Fishing gear moving thru water and air is an integral component of this use.
Exclusion		
Permanence:	Low	Recreational fishing from shore is a temporary activity with shifting locations and durations.
Buffer Zones:	Low	Fishing from shore does not typically involve official buffer zones.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Fishing from shore is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.
Site Dependence:	High	Successful fishing depends upon the presence of the target species and favorable operating conditions such as waves, beach access, low crowding, and good weather.

Use Profile: Recreational Intertidal Harvest

Section 1. Use Description

Use Includes:	Use Excludes:
Recreational harvest in the intertidal zone of living marine plant or animal species for consumption or aquaria.	All other forms of intertidal harvesting.

Use Footprint	Core Activity Area
The harvest area plus areas covered during transit (typically by foot) to, from and among them.	The localized areas of the intertidal zone where the harvesting occurs.

Functional Components

People, other equipment (harvest tools, baskets, bags); Vessels and Anchors when used rarely during high tide to reach harvest areas exposed at low tide.

Notes and Assumptions

The typical use does not involve vesssels to access or move among intertidal harvest areas.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Always	Rarely	Never	Never	Assumes that users typically access harvest areas from land, not vessels, and that any vessels used do not travel far offshore.
Core Activity	Rarely	Always	Never	Never	Never	Assumes that users often access harvest areas from land, not vessels, and that harvest on the Shoreline is rare and incidental to Intertidal collecting.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Never	Always	Never	Always	Sometimes	Assumes harvesting does not reach the Water Column, and that the substrate = Seafloor and/or Seabed.
Core Activity	Never	Always	Never	Always	Sometimes	Assumes harvesting does not reach the Water Column, and that the substrate = Seafloor and/or Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Not Applicable	Not Applicable	People are always involved as the Users.
Vessels	Rarely	Rarely	Always	Not Applicable	Not Applicable	Vessels may, in rare cases, be used to access harvest areas, mainly w/in or just outside of the Intertidal Zone.
Anchors	Never	Rarely	Not Applicable	Not Applicable	Not Applicable	When vessels are used, anchors may be set to secure them.
Moving Gear	Never	Sometimes	Not Applicable	Not Applicable	Not Applicable	When used, mobile gear (e.g. dredges) are used solely in the Intertidal harvest areas.
Infrastructure	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not relevant to this use.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Rarely	Never	Always	Sometimes	People harvesting in the Intertidal occur typically at the sediment surface, or on the surface in boats.

Use Profile: Recreational Intertidal Harvest

Vessels	Never	Always	Never	Often	Never	Vessels used to transit to, from and among harvest areas travel on the sea surface at high tide, and are typically beached in place during harvest at low tide.
Anchors	Never	Always	Never	Always	Often	Anchors may be used in conjunction w/ vessels to secure boats in harvest areas.
Moving Gear	Never	Never	Never	Always	Often	Mobile gear for harvesting occurs only at nor near the sediment interface.
Infrastructure	Not Applicabl	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not relevant to this use.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	People (as harvesters).
Vessels	Secondary	Vessels may, in rare cases, be used to access harvest areas.
Anchors	Secondary	When vessels are used, anchors may be set to secure them.
Moving Gear	Secondary	Harvesting of infaunal animals (e.g. clams) may involve small hand dredges pulled manually through the sediment.
Infrastructure	Not Applicable	Not Applicable

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Harvesters have some ability to choose operating areas, but have relatively limited ability to change locations quickly in response to changing conditions or uses.
Moving Gear:	Medium	Dredges and other moving gear are sometimes used to collect animals.
Exclusion		
Permanence:	Low	Intertidal harvesting is an inherently mobile and transitory activity.
Buffer Zones:	Low	Harvesting is not typically protected by exclusion zones.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Intertidal harvesting is sometimes managed spatially at a localized scale, generally within an MPA or as part of other broader fisheries management scheme.
Site Dependence:	High	Successful harvest depends upon access to sites with adequate population numbers of target species and safe harvesting conditions.

Use Profile: Renewable Energy

Section 1. Use Description

Use Includes:

Systems designed to generate electricity from wind, wave, currents, tidal power, hydrothermal energy or ocean thermal energy conversion (OTEC) using turbines, fixed or floating platforms, buoys, dams and other installations and the associated offshore infrastructure including substructures, transmission hubs, generators, cables and service platforms.

Use Excludes:

Onshore power grids; Solar Energy structures.

Use Footprint

The Overall Footprint comprises the Core Acitivity Area(s), and the areas covered by associated underwater cables and devices connected to shore and operational vessels (surface and submarine) and aircraft

Core Activity Area

Core Activities involve the in situ capture and generation of energy using an installed device. These typically occur in Near-Shore and Coastal Zones, but may occur in Oceanic Zones with floating, tethered structures.

Functional Components

Infrastructure (turbines, fixed or floating platforms, buoys, and/or dams, and associated offshore infrastructure including substructures, transmission hubs, generators, cables, service platforms; Support Vessels; People (crew).

Notes and Assumptions

Assumes no solar.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Always	Always	Often	Rarely	Cables run from generation site(s) to onshore.
Core Activity	Never	Never	Sometimes	Often	Rarely	The location will vary w/ bathymetry, energy distributions (e.g. wind fields), and oceanographic conditions.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Always	Always	Always	Always	Assumes most but not all devices extend upward into Air, and all extend down into Seabed.
Core Activity	Often	Always	Always	Always	Always	Assumes most but not all devices extend upward into Air, and all extend down into Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Rarely	Rarely	Sometimes	Sometimes	Sometimes	People occur intermittently on structures for maintenance and operational activities.
Vessels	Never	Rarely	Sometimes	Sometimes	Sometimes	Vessels are involved in installation and maintenance and are more frequently used further offshore.
Anchors	Never	Never	Sometimes	Rarely	Never	Anchors may be used by Vessels during temporary visits to site(s); their use depends on depth and bottom type.
Moving Gear	Never	Rarely	Rarely	Rarely	Rarely	Mobile gear includes installation and maintenance, but not the moving parts of the devices.
Infrastructure	Always	Always	Always	Always	Always	Renewable Energy generation always involves Infrastructure spanning from the generation site (devices) to the Shoreline and potentially beyond

Use Profile: Renewable Energy

	Always	Always	Always	Always	Always	(cables).
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Rarely	Rarely	Never	Assumes people are on rigs, vessels and aircraft at or above the Sea Surface, and relatively rarely in or under the water.
Vessels	Sometimes	Always	Sometimes	Never	Never	Assumes vessels are only surface boats and ships, not subs. Larger vessels may extend up to Air Zone and down to Water Column.
Anchors	Never	Often	Always	Always	Always	When used, anchors extend from Sea Surface to Seabed.
Moving Gear	Sometimes	Often	Often	Often	Sometimes	When used, Mobile Gear may include subs, ROVs, trenching and cable laying machines, helicopters.
Infrastructure	Often	Always	Always	Always	Always	Assume that Infrastructure extends from Sea Surface to Seabed, and some extend into the "Air" Zone.

Section 4. Use Component Ranking

Use Component		Notes
People	Secondary	People are intermittently involved onsite for maintenance and management but typically not for routine operations.
Vessels	Secondary	Vessels are involved mainly to ferry people to the sites, or to conduct assessments and repairs of the infrastructure and devices.
Anchors	Secondary	Anchors may be used by vessels during temporary operations at the sites.
Moving Gear	Secondary	Mobile gear may be temporarily employed by vessels. This Component does not include moving parts of the energy generating devices themselves, which may rotate or oscillate in place but are fixed spatially and do not change location over time.
Infrastructure	Primary	Infrastructure includes all devices, platforms, tethers, cables, and other equipment installed at the site as part of the generation and distribution of renewable energy.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Once installed, renewable energy infrastructure is immobile and cannot move to avoid obstacles or other uses.
Moving Gear:	Low	This use sometimes involves Moving Gear in connection with installation, maintenance or temporary trips by support Vessels.
Exclusion		
Permanence:	High	Renewable Energy infrastructure is permanently installed in the Seabed, along the Seafloor to the Shoreline, and up to the Sea Surface or Air Zone.
Buffer Zones:	High	Energy generation devices typically have an official exclusion zone surrounding their operating area for safety and security purposes.

Section 6. Spatial Management Considerations

Spatial Management:	High	Renewable Energy is heavily regulated and operating areas are determined by government agencies.

Use Profile: Renewable Energy

Site Dependence: High	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.

Use Profile: Sailing

Section 1. Use Description

Use Includes:

Transit, mooring, motoring or anchoring by sailboats, including sailing kayaks and canoes.

Use Excludes:

Motorized Boating, Paddling.

Use Footprint

The Overall Footprint extends from home port to the furthest reaches of a cruise or race; sometimes 10's or even 100's of miles.

Core Activity Area

The Core Area comprises the zone generally covered by a typical users on a day-sail within approx. 10 miles of home port.

Functional Components

People (sailors), Vessels (sail boat, tender/dinghy), Anchors, Mobile Gear (temporary race course markers).

Notes and Assumptions

Most recreational sailboats are under 40', engage in day-sails, and return to home port before night. Few anchor or tie up to installed offshore mooring bouys. Some participate in organized races, but many do not.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Rarely	Rarely	Often	Often	Sometimes	Some larger boats sail in deeper waters on long-distance cruises or races.
Core Activity	Rarely	Rarely	Often	Often	Rarely	Small-boat sailing can originate from the beach and cross the intertidal zone. Most boats stay w/in the Near-Shore and Coastal/Offshore Zones.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Rarely	Sometimes	Sometimes	Some masts extend into Air Zone; hull/keels rarely reach Water Column; boats are sometimes beached; and anchors dig into seabed.
Core Activity	Sometimes	Always	Rarely	Sometimes	Sometimes	Some masts extend into Air Zone; hull/keels rarely reach Water Column; boats are sometimes beached; and anchors dig into seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	As the activity goes offshore, People and Vessels remain constants while associated Components become common in Near-Shore and drop out in Oceanic Zone.
Vessels	Always	Always	Always	Always	Always	Always used.
Anchors	Sometimes	Rarely	Sometimes	Rarely	Never	Anchors are used mostly by cruising boats and mainly in shallow, Near-Shore waters.
Moving Gear	Never	Never	Sometimes	Rarely	Never	Mobile gear - temporary markers and buoys for races, dinghy and safety tow lines - are used mainly Near-Shore.
Infrastructure	Never	Never	Often	Sometimes	Never	Installed infra = mooring and marker buoys and lights - are used routinely in relatively shallow waters.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes

Use Profile: Sailing

People	Never	Always	Never	Never	Never	Assumes people/sailor's typical location is always aboard the vessel at the Sea Surface.
Vessels	Sometimes	Always	Rarely	Sometimes	Never	Vessels may extend into Air w/ masts and superstructure; into WC with deep keels; and onto Seafloor when intentionally beached.
Anchors	Never	Always	Always	Always	Always	When used, anchors always extend from Sea Surface to Seabed.
Moving Gear	Never	Always	Often	Often	Never	When used, temporary markers and buoys w/ weighted lines may extend from Sea Surface to Seafloor.
Infrastructure	Sometimes	Always	Always	Always	Always	When used, installed Infrastructure may extend from Air to Seabed (e.g. markers, buoys, lights).

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Sailing always involves people as the sailors.
Vessels	Primary	Sailing always involves a vessel being sailed.
Anchors	Secondary	Anchors are sometimes used in cruising but less often in day sailing or racing; very place-specific.
Moving Gear	Secondary	Equipment is rarely suspended in the water from sailboats.
Infrastructure	Secondary	Sailing may use fixed navigation aids or mooring buoys, especially long-distance cruisers.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	High	Sailboats can typically manoeuver around obstacles and other uses, given enough notice.
Moving Gear:	Low	Sailing occasionally involves sea anchors, drogues or other temporary gear in the water.
Exclusion		
Permanence:	Low	Sailing is an inherently mobile activity, when it is being conducted.
Buffer Zones:	Medium	Sail boats are generally afforded (legally but not always in practice) a safety zone or right of way relative to other more maneuverable vessels.

Section 6. Spatial Management Considerations

Spatial Management:	Low	Sailing is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
Site Dependence:	Medium	Successful and safe sailing benefits from areas with predictably steady wind, calm seas and uncrowded conditions, but it can be conducted under a wide range of conditions.

Use Profile: SCUBA/Snorkeling

Section 1. Use Description

Use Includes:

SCUBA diving, surface supply diving, snorkeling (free diving).

Use Excludes:

Swimming, Dive Fishing.

Use Footprint

Typically encompasses dive sites and relatively narrow tracks followed by vessels to reach and return from dive sites.

Core Activity Area

Dive site(s), including areas traversed on drift dives, typically occurring in relatively shallow near-shore or coastal waters reachable by swimming or vessels, and extending from the sea surface to the seafloor.

Functional Components

People (divers, boat operators, observers), vessels, anchors, mobile gear (towed sleds, marker bouys), infrastructure (mooring bouys, nav aids).

Notes and Assumptions

Assumes a typical dive profile and gear (i.e. no extreme depths or saturation dives in underwater habitats).

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Sometimes	Rarely	Often	Sometimes	Rarely	Footprint may include entry/exit from shore, which can be the norm in some areas.
Core Activity	Never	Rarely	Often	Sometimes	Rarely	Diving typically occurs in depths less than 100', but may occur in deeper open ocean or intertidal waters. Snorkeling typically occurs in very shallow water less than 50', but may occur deeper in certain areas with clear water (e.g. coral reefs).

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Often	Often	Sometimes	Divers typically occur from the Sea Surface to the Seafloor; large vessels may extend up into the Air Zone and/or use anchors or moorings extending into the Seabed. Snorkelers typically do not extend into the WC, but may contact the Seafloor in shallow waters.
Core Activity	Sometimes	Always	Often	Sometimes	Sometimes	Divers typically occur from the Sea Surface to the Seafloor; large vessels may extend up into the Air Zone and/or use anchors or moorings extending into the Seabed. Snorkelers typically do not extend into the WC, but may contact the Seafloor in shallow waters.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	By definition, if the Use is occurring, it involves People (i.e. divers) wherever it occurs.
Vessels	Sometimes	Rarely	Often	Always	Always	Diving from boats is more common as depths and distance from shore increases.
Anchors	Sometimes	Rarely	Often	Always	Always	Anchors for dive vessels are often used in relatively shallow water but not in extreme depths.
Moving Gear	Sometimes	Sometimes	Sometimes	Sometimes	Sometimes	In all zones, mobile gear (e.g. tow lines and sleds, dive site markers, lift bags, etc.) may be used during the dive.

Use Profile: SCUBA/Snorkeling

Infrastructure	Rarely	Rarely	Sometimes	Sometimes	Never	Mooring buoys and site markers may be used in moderate depths.
Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Often	Often	Never	Always used, divers always begin and end at the surface, often enter the Water Column, often contact the Seafloor but never excavate the Seabed.
Vessels	Always	Always	Sometimes	Sometimes	Never	When used, dive boats typically occupy the Sea Surface and sometimes are intentionally beached on the Seafloor. Larger, deep-draft vessels may also extend upward into the Air Zone.
Anchors	Never	Always	Always	Always	Often	When used, anchors typically extend from the Sea Surface to the Seabed.
Moving Gear	Never	Always	Often	Sometimes	Never	When used, mobile gear (e.g. lines, floats, marker flags) is most often employed in the upper layers of the WC but may be temporarily anchored on the Seafloor.
Infrastructure	Sometimes	Always	Always	Always	Often	When used, fixed mooring buoys or navigation marks extend from Sea Surface to the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Activity always involves people as diver(s) or boat crew.
Vessels	Secondary	Boats are sometimes used to transport divers and gear to and from dive sites, depending on the area.
Anchors	Secondary	Anchors are sometimes used to secure boats to the seafloor.
Moving Gear	Secondary	Mobile gear is sometimes used operate boats (e.g. sea anchors), mark dive sites, or tow divers.
Infrastructure	Secondary	Fixed mooring or navigation buoys are sometimes used by vessels.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Divers and snorkelers have some flexibility in selecting a dive site especially by boat, but have somewhat limited maneuverability once in the water.
Moving Gear:	Medium	Diving and snorkeling may involve safety lines, site markers, floats, lift bags, flags, etc. that may be towed or raised up thru the water.
Exclusion		
Permanence:	Low	Other than saturation diving, typical dives are short-term, mobile and do not occupy space for long periods.
Buffer Zones:	Low	Diving and snorkeling are not typically accompanied by official buffer zones around divers.

Section 6. Spatial Management Considerations

Spatial Management:	Low	Diving and snorkeling is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
Site Dependence:	Medium	Successful diving and snorkeling can be done in a fairly wide range of safe and optimal environmental

Medium	conditions, including safe sea states, clean water, healthy ecosystems, and low crowding by other uses.

Use Profile: Surface Board Sports

Section 1. Use Description

Use Includes:	Use Excludes:
Tow-in and paddle-in surfing, wind-surfing, kite surfing, sailboarding	Paddling, SCUBA/Snorkeling, Swimming.
Use Footprint	**Core Activity Area**
The immedIate activity area plus transit corridors to and from shore, or among use areas.	The immediate area where the activity occurs, typically defined by relevant environmental conditions important for the use, such as good waves, consistent winds, smooth sea conditions, etc.

Functional Components

People, Mobile Gear (tow lines), Vessels (the boards, PWC tow vessels).

Notes and Assumptions

With the exception of tow-in surfing, this use is typically relatively self-contained, consisting mainly of the user and a board operating at the Sea Surface.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Often	Always	Rarely	Never	Allows for beach access, and offshore surf areas around shallow, isolated banks.
Core Activity	Not Applicable	Often	Always	Rarely	Never	Assumes most users originate from shore vs. from vessels offshore; may occur far offshore on isolated, shallow banks.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Often	Often	Always	Rarely	Never	Allows for beach access, and offshore surf areas around shallow, isolated banks.
Core Activity	Not Applicable	Often	Always	Rarely	Never	Assumes most users originate from shore vs. from vessels offshore; may occur far offshore on isolated, shallow banks.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Not Applicable	People are always involves as the user.
Vessels	Always	Always	Always	Always	Not Applicable	Vessels are integral to tow-in surfing or as safety vessels for other board sports.
Anchors	Never	Never	Never	Never	Not Applicable	Not relevant to this use.
Moving Gear	Never	Rarely	Often	Sometimes	Not Applicable	Tow lines are often used in tow-in surfing.
Infrastructure	Never	Never	Never	Never	Never	Not relevant to this use.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Never	Sometimes	Never	People are always involves as the user.
Vessels	Never	Always	Never	Rarely	Never	Boards float at the Sea Surface or are beached at the Shoreline.
Anchors	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not relevant to this use.
Moving Gear	Never	Always	Never	Never	Never	Mobile gear consists of tow-lines for surfing, which operate at or slightly above the Sea

Use Profile: Surface Board Sports

	Never	Always	Never	Never	Never	Surface.
Infrastructure	Not Applicabl	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not relevant to this use.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	This use always involves People; typically one per board.
Vessels	Primary	The "board" is considered a "vessel" for this use.
Anchors	Not Applicable	Not relevant to this use.
Moving Gear	Primary	Tow-in surfing often involves a line from the surfer to the PWC or tow vessel.
Infrastructure	Not Applicable	Not relevant to this use.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Users can select general operating areas, and can move around w/in them, but have somewhat limited maneuverability in real time, especially when actively engaged in the activity.
Moving Gear:	Medium	Some variants of this use involve PWCs or other vessels and tow lines for tow-in surfing.
Exclusion		
Permanence:	Low	Surface board sports are an inherently mobile and transitory use.
Buffer Zones:	Low	Surface board sports do not typically involve officially established exclusion zones to avoid conflicts w/ other uses.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Surface board sports are sometimes managed spatially or temporally w/in a given space to avoid conflicts (e.g. Hawai'i).
Site Dependence:	High	Successful areas for this use are defined by specific and relatively rare environmental conditions such as consistently well-shaped and large waves, consistent winds, adequate water depths, low crowding, etc.

Use Profile: Swimming

Section 1. Use Description

Use Includes:

Short- and long-distance surface swimming and wading any distance from shore, body surfing.

Use Excludes:

SCUBA/Snorkeling, Surface Board Sports.

Use Footprint

Primarily very close to shoreline, often in concentrated areas around beaches or shores with easy access, good conditions and land-based services.

Core Activity Area

Typically shallow waters directly off the shoreline, with the exception of long-distance ocean swimming races and practices.

Functional Components

Swimmers (i.e. people), boundary markers, or course bouys.

Notes and Assumptions

Swimming sometimes occurs in conjunction with other Uses, such as Boating (Motorized and Sailing), and Recreational Fishing from Boats.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Often	Often	Often	Rarely	Never	Assumes some boat-based swimming, and that offshore ocean races are relatively rare.
Core Activity	Always	Always	Always	Never	Never	Assumes that the vast majority of swimming originates from shore and occurs in shallow water.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Never	Always	Rarely	Often	Never	Some swimming is boat-based and not in standing depths.
Core Activity	Never	Always	Rarely	Always	Never	Most swimming originates from and occurs near shore, at the surface, often in standing depths.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Always	Always	Always	As Swimming activities move offshore, the use of components other than People peaks in the Near-Shore and drops toward the Oceanic Zone, where it involves only People and Vessels.
Vessels	Rarely	Rarely	Sometimes	Always	Always	As Swimming activities move offshore, the use of components other than People peaks in the Near-Shore and drops toward the Oceanic Zone, where it involves only People and Vessels.
Anchors	Rarely	Rarely	Sometimes	Sometimes	Never	As Swimming activities move offshore, the use of components other than People peaks in the Near-Shore and drops toward the Oceanic Zone, where it involves only People and Vessels.
Moving Gear	Never	Rarely	Rarely	Sometimes	Never	As Swimming activities move offshore, the use of components other than People peaks in the Near-Shore and drops toward the Oceanic Zone, where it involves only People and Vessels.
Infrastructure	Rarely	Rarely	Rarely	Rarely	Never	Floating markers, platforms, etc. may be involved in all but the Oceanic Zones, where depth limits their use.

Use Profile: Swimming

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Rarely	Often	Never	Swimmers tends to stay at the Surface, rarely diving down to the WC and often standing on the bottom in shallow water.
Vessels	Rarely	Always	Rarely	Sometimes	Never	When used in Swimming, vessels rarely extend into WCZone but do contact Seafloor when beached.
Anchors	Never	Always	Always	Always	Always	When used w/ vessels, anchors always extend from surface to below Seafloor.
Moving Gear	Rarely	Always	Always	Always	Never	When used, temporary floating markers, platforms, etc. always extend from surface to sea floor.
Infrastructure	Sometimes	Always	Always	Always	Often	When used, fixed buoys, markers, lights, etc. often extend from the Air to into the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Activity always involves a person: the swimmer.
Vessels	Secondary	Swimming sometimes occurs from a boat.
Anchors	Secondary	Boats used in swimming sometimes use anchors.
Moving Gear	Secondary	Boats used in swimming sometimes deploy safety lines, floats, or other temporary gear.
Infrastructure	Secondary	Swimming sometimes occurs in specific zones accessed by docks, wharves or floats, and/or delineated by fixed, installed markers, ropes, etc.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Medium	Swimmers are generally able to select their operating area and, to some degree, to actively avoid certain obstacles or areas.
Moving Gear:	Low	Swimming may occasionally, but rarely, involve lines or other floatation gear attached to the swimmer or accompanying vessels.
Exclusion		
Permanence:	Low	Swimming is an inherently mobile activity involving temporary space occupancy by the swimmer.
Buffer Zones:	Low	Swimming rarely involves official buffer zones around individual swimmers.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Swimming is sometimes concentrated in designated zones for safety, access, surveillance, etc.
Site Dependence:	Medium	Although successful and safe swimming requires certain broad environmental conditions, it can often be conducted in a variety of situations.

Use Profile: Tide Pooling

Section 1. Use Description

Use Includes:

Use of the intertidal zone between high and low tides for recreational, scientific or educational purposes.

Use Excludes:

Harvesting from Shore, and Shore Use.

Use Footprint

Overall Footprint is essentially the same as the Core Activity Area, plus the area of beach or Shoreline used to reach and return from the Intertidal.

Core Activity Area

This Use is, by definition, concentrated in the Intertidal Zone, often occurring in tide pools along rocky shores, or on sandy beaches and mudflats elsewhere.

Functional Components

People, cameras, buckets, etc.

Notes and Assumptions

Assumes no consumptive uses; any collecting of animals, plants or other resources is temporary and returned the same day.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Always	Never	Never	Never	This activity is restricted to the Intertidal Zone and Shoreline areas crossed to reach it.
Core Activity	Always	Always	Never	Never	Never	This activity is restricted to the Intertidal Zone and Shoreline areas crossed to reach it.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Never	Sometimes	Never	Always	Sometimes	Sea Surface = tide pools; Sea Floor = rocks, sand, pools; Seabed may be disturbed by digging.
Core Activity	Never	Sometimes	Never	Always	Sometimes	Sea Surface = tide pools; Sea Floor = rocks, sand, pools; Seabed may be disturbed by digging.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Always	Always	Not Applicable	Not Applicable	Not Applicable	By definition, all activity occurs on the Shoreline and Intertidal Zones.
Vessels	Rarely	Rarely	Not Applicable	Not Applicable	Not Applicable	Boats, used rarely and mainly for access to intertidal zones, are limited to the shore area.
Anchors	Never	Rarely	Not Applicable	Not Applicable	Not Applicable	Boats, used rarely and mainly for access to intertidal zones, are limited to the shore area.
Moving Gear	Never	Sometimes	Not Applicable	Not Applicable	Not Applicable	Boats, used rarely and mainly for access to intertidal zones, are limited to the shore area.
Infrastructure	Never	Never	Not Applicable	Not Applicable	Not Applicable	Not applicable.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Never	Always	Not Applicable	Always	Sometimes	People occupy the surface and may dig into Seabed. No Water Column in the Intertidal Zone.
Vessels	Never	Always	Not Applicable	Often	Rarely	When used, boats may be beached in Intertidal Zone for access.
Anchors	Never	Always	Not Applicable	Always	Often	When used (rarely), anchors would extend from Sea Surface to Seabed but not thru Water Column due to limited depth in Intertidal Zone.

Use Profile: Tide Pooling

Moving Gear	Never	Sometimes	Not Applicable	Sometimes	Rarely	When used, digging tools, camera, etc. are at the Sea Surface and on the Sea Floor (i.e. rock, sand, mud).
Infrastructure	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Installed Infra never employed in this Use and therefore these cells are N/A.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Tide pooling always involves people.
Vessels	Not Applicable	Tide pooling is inherently a land-based activity which does not typically require vessels for access or transit.
Anchors	Not Applicable	Since vessels are not typically involved in Tide Pooling, Anchors are not used either.
Moving Gear	Not Applicable	Tide pooling occurs on land and does not involve equipment pulled through the water.
Infrastructure	Not Applicable	Tide pooling does not typically involve fixed structures, buoys or navigation aids.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	High	People conducting tide pooling typically can select locations and manoeuver within them to avoid obstacles or sub-optimal conditions.
Moving Gear:	Low	Tide pooling occurs on land and does not involve equipment pulled through the water.
Exclusion		
Permanence:	Low	Tide pooling involves a mobile, temporary occupation of space by individual people conducting the use.
Buffer Zones:	Low	Tide pooling is not typical afforded official buffer zones.

Section 6. Spatial Management Considerations

Spatial Management:	Medium	Access to and use of tide pools are sometimes managed locally through MPAs or other spatial management schemes.
Site Dependence:	High	Successful tide pooling is heavily dependent upon access to diverse and healthy intertidal habitats with safe environmental conditions, which often vary spatially within any given ocean setting.

Use Profile: Underwater Pipelines

Section 1. Use Description

Use Includes:

Any submerged pipe system used to transport oil, gas, sewage or other fluid.

Use Excludes:

Underwater transmission cables.

Use Footprint

The pipleline path plus any additional ocean areas routinely used during periodic cable inspection and maintenance.

Core Activity Area

The relatively narrow, linear path where the pipe is resting on, buried under, or suspended above the Seafloor and Seabed, typically extending from the Shoreline to its terminus offshore, but sometimes connecting two offshore locations.

Functional Components

Pipeline(s); Other Infrastructure (installed structures or devices to mark, secure, connect or operate the piplelines and their contents) Vessels and People (periodic inspection and maintenance using vessels, submersibles and/or divers).

Notes and Assumptions

Assumes that piplelines may run from sea to land (e.g. to an onshore tank farm) or from one offshore location to another (e.g. oil field collection network), and that their lengths and associated infrastructure may vary considerably. This Use does not include any one-time activities associated with the initial installation of the pipeline(s).

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Always	Always	Often	Sometimes	Assumes fewer pipelines and associated inspection/maintenance requirements, in very deep water and/or far offshore.
Core Activity	Always	Always	Always	Often	Sometimes	Assumes fewer pipelines in very deep water and/or far offshore.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Rarely	Rarely	Sometimes	Always	Always	Presence in Air and Sea Surface stems from ship-based maintenance and inspection of pipes.
Core Activity	Never	Rarely	Sometimes	Always	Always	Pipes reach Sea Surface at land; may extend upward into Water Column; and always rest on the Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Rarely	Rarely	Rarely	Rarely	Rarely	People are involved only rarely and during inspection and maintenance (this use excludes installation).
Vessels	Never	Never	Rarely	Rarely	Rarely	Vessels are present only occasionally, mainly during inspection and maintenance, and mainly beyond the Intertidal Zone.
Anchors	Never	Never	Rarely	Rarely	Never	Vessel anchors are present only occasionally, mainly during inspection and maintenance, and only in water of moderate depth.
Moving Gear	Never	Never	Rarely	Rarely	Rarely	Mobile gear is used occasionally for inspection and repair.
Infrastructure	Always	Always	Always	Always	Always	The pipeline itself, along with any associated structures, is permanently installed on, under or near the Seafloor along its entire length.

Use Profile: Underwater Pipelines

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Rarely	Rarely	Never	People on vessels may extend into Air Zone; people in submersibles may occur in the Water Column and Seafloor.
Vessels	Often	Always	Sometimes	Never	Never	Vessels may extend up to Air and down to Water Column, but not to Seafloor and Seabed.
Anchors	Never	Always	Always	Always	Always	Vessel anchors typically extends from the Sea Surface to the Seabed.
Moving Gear	Never	Always	Often	Sometimes	Rarely	Mobile gear for inspection and maintenance may range from Sea Surface to Seafloor.
Infrastructure	Never	Rarely	Never	Always	Often	Pipelines are typically laid upon or suspended above the Sea Floor, or buried in the Seabed.

Section 4. Use Component Ranking

Use Component		Notes
People	Secondary	People are present only occasionally, mainly during inspection and maintenance (this use excludes the installation phase).
Vessels	Secondary	Vessels are present only occasionally, mainly during inspection and maintenance (this use excludes installation).
Anchors	Secondary	Vessel anchors are present only occasionally, mainly during inspection and maintenance (this use excludes installation).
Moving Gear	Secondary	Mobile gear, used to inspect (e.g. ROVs) or maintain/repair pipes, are present only occasionally.
Infrastructure	Primary	The pipeline itself is permanently installed on, under or near the Seafloor, along with any associated structures.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Once installed, Pipelines have no ability to change location in response to changing conditions.
Moving Gear:	Low	Pipeline inspection and maintenance can require mobile gear, but only for short periods.
Exclusion		
Permanence:	High	Pipelines are inherently stationary and intended to occupy space indefinitely.
Buffer Zones:	High	Pipelines typically have officially established buffer zones to avoid entanglement with other uses and gear.

Section 6. Spatial Management Considerations

Spatial Management:	High	Pipelines are typically sited through governmental management and regulatory process.
Site Dependence:	High	Pipeline routes require the correct geological and ecological conditions which tend to vary spatially.

Use Profile: Underwater Transmission Cables

Section 1. Use Description

Use Includes:

Cables installed on the seafloor or seabed to transmit data, communications, and electricity generated on land.

Use Excludes:

Lost fishing gear, renewable electricity transmission cables.

Use Footprint

The cable path plus any additional ocean areas routinely used during periodic cable inspection and maintenance.

Core Activity Area

The relatively narrow, linear path where the cable is resting on, buried under, or suspended above the Seafloor and Seabed, typically extending from the Shoreline to its terminus offshore.

Functional Components

Cable(s); Other Infrastructure (installed devices to mark, secure, connect or operate the cables) Vessels and People (periodic inspection and maintenance using vessels, submersibles and/or divers).

Notes and Assumptions

Assumes all cables are for transmission from land sources over long distances (e.g. betw contiguous regions or continents separated by water), often extending into the Oceanic Zone. Does not incude much shorter data cables used to carry scientific information from offshore instruments to shore. Also, this Use does not include any one-time activities associated with the initial installation of the cable(s).

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Always	Always	Always	Often	Often	Includes cables running along a coast-line in relatively shallow, Near-Shore water and maintenance and repair activities.
Core Activity	Always	Always	Always	Often	Often	Includes cables running along a coast-line in relatively shallow, Near-Shore water.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Sometimes	Often	Always	Often	Presence in Air and Sea Surface stems from ship-based maintenance and inspection of cables.
Core Activity	Never	Rarely	Often	Always	Often	Cables reach Sea Surface near land and typically involve the WC, Seafloor and Seabed.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Rarely	Rarely	Rarely	Rarely	Rarely	People are involved only rarely and during inspection and maintenance (this use excludes installation).
Vessels	Never	Never	Rarely	Rarely	Rarely	Vessels are present only occasionally, mainly during inspection and maintenance, and mainly beyond the Intertidal Zone.
Anchors	Never	Never	Rarely	Rarely	Never	Vessel anchors are present only occasionally, mainly during inspection and maintenance, and only in water of moderate depth.
Moving Gear	Never	Never	Rarely	Rarely	Rarely	Mobile gear is used occasionally for inspection and repair.
Infrastructure	Always	Always	Always	Always	Always	The cable itself, along with any associated structures, is permanently installed on, under or near the Seafloor along its entire length.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Sometimes	Always	Rarely	Rarely	Never	People on vessels may extend into Air Zone;

Use Profile: Underwater Transmission Cables

	Sometimes	Always	Rarely	Rarely	Never	people in submersibles may occur in the Water Column and Seafloor.
Vessels	Often	Always	Sometimes	Never	Never	Vessels may extend up to Air and down to Water Column, but not to Seafloor and Seabed.
Anchors	Never	Always	Always	Always	Always	Vessel anchors typically extends from the Sea Surface to the Seabed.
Moving Gear	Never	Always	Often	Sometimes	Rarely	Mobile gear for inspection and maintenance may range from Sea Surface to Seafloor.
Infrastructure	Never	Rarely	Rarely	Always	Often	Cables are typically suspended near the Sea Floor, or buried in the Seabed; their occurrence in the Water Column is rare (e.g. spanning a gap).

Section 4. Use Component Ranking

Use Component		Notes
People	Secondary	People are present only occasionally, mainly during inspection and maintenance (this use excludes the installation phase).
Vessels	Secondary	Vessels are present only occasionally, mainly during inspection and maintenance (this use excludes installation).
Anchors	Secondary	Vessel anchors are present only occasionally, mainly during inspection and maintenance (this use excludes installation).
Moving Gear	Secondary	Mobile gear, used to inspect (e.g. ROVs) or maintain/repair cables, are present only occasionally.
Infrastructure	Primary	The cable itself is permanently installed on, under or near the Seafloor and Seabed, along with any associated structures.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	Low	Once installed, Cables have no ability to change location in response to changing conditions.
Moving Gear:	Low	Cable inspection and maintenance can require mobile gear, but only for short periods relative to the life of the cable operation.
Exclusion		
Permanence:	High	Cables are inherently stationary and intended to occupy space indefinitely.
Buffer Zones:	High	Cables typically have buffer zones to avoid entanglement with other uses and gear.

Section 6. Spatial Management Considerations

Spatial Management:	High	Cables are typically sited through governmental management and regulatory process.
Site Dependence:	High	Cable routes require access to the correct geological, oceanographic and ecological conditions, all of which tend to vary spatially.

Use Profile: Wildlife Viewing at Sea

Section 1. Use Description

Use Includes:	Use Excludes:
Boat-based wildlife viewing at sea, usually on a commercial vessel.	Incidental wildlife viewing from shore or while at sea pursuing other uses.
Use Footprint	**Core Activity Area**
The Core Activity Area(s) and any other areas transited to and from the harbor or among viewing areas.	The primary area(s) where animals are observed, often while stationary or motoring/sailing at slow speeds.

Functional Components

People, Vessel(s).

Notes and Assumptions

Generally, but not always, involves relatively large, motorized vessels; sometimes involves sailing vessels w/ auxilliary power; exludes incidental observing of marine animals while sailing, fishing, boating, etc.

Section 2. General Space Use

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
Use Footprint	Never	Never	Often	Often	Rarely	Shape of footprint dictated in part by distribution of target species, plus weather, sea state, etc.
Core Activity	Never	Never	Often	Often	Rarely	Some operations may travel several miles offshore and into very deep water to find animals.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
Use Footprint	Sometimes	Always	Sometimes	Never	Never	Shape of footprint dictated in part by distribution of target species, plus weather, sea state, etc.
Core Activity	Sometimes	Always	Sometimes	Never	Never	Some large vessels extend into Air Zone and Water Column; anchoring is generally not an option.

Section 3. Space Use By Component

Horizontal Zone	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic	Notes
People	Not Applicable	Not Applicable	Always	Always	Always	Often engage in the use in large numbers (e.g. 25-75). Never on Shore or Intertidal Zones.
Vessels	Not Applicable	Not Applicable	Always	Always	Always	Generally large and motorized. Never on Shore or Intertidal Zones.
Anchors	Not Applicable	Not Applicable	Rarely	Rarely	Never	Not generally used and would pose risks to marine animals. Never on Shore or Intertidal Zones.
Moving Gear	Not Applicable	Not Applicable	Never	Never	Never	Not generally used and would pose risks to marine animals. Never on Shore or Intertidal Zones.
Infrastructure	Not Applicable	Not Applicable	Rarely	Rarely	Never	May involve nav markers and buoys. Never on Shore or Intertidal Zones.

Vertical Zone	Air	Sea Surface	Water Column	Sea Floor	Seabed	Notes
People	Rarely	Always	Never	Never	Never	People always remain on the vessel at the Sea Surface, unless it sinks.

Use Profile: Wildlife Viewing at Sea

Vessels	Sometimes	Always	Sometimes	Never	Never	Vessels always remain at the Sea Surface but may extend deeper into the WC.
Anchors	Never	Always	Always	Always	Often	When used, anchors extend from Sea Surface to Seabed.
Moving Gear	Never	Always	Often	Rarely	Never	When used (rare), mobile gear would tend to be in the upper layers of the WC.
Infrastructure	Rarely	Always	Always	Always	Often	When used, mooring and navigation buoys always extend from Sea Surface to Sea Bed.

Section 4. Use Component Ranking

Use Component		Notes
People	Primary	Activity always involves people in the role of 'user' and vessel crew.
Vessels	Primary	Activity always involves a vessel, typically a mid- to large-sized boat capable of transporting many (10's) people.
Anchors	Secondary	Vessels may rarely anchor for safety reasons, but typically remain mobile during the activity.
Moving Gear	Secondary	Vessels may temporarily use gear in the water such as sea anchors, underwater cameras or hydrophones.
Infrastructure	Secondary	Vessels may use navigation or mooring buoys periodically, although they typically follow well known local routes.

Section 5. Functional Characteristics of Space Use

Use Characteristic		Notes
Interference		
Operational Mobility:	High	Vessels are typically able to manoeuver to avoid obstacles or risks.
Moving Gear:	Low	Activity may occasionally and temporarily use suspended gear (e.g. cameras, hydrophones) during the use.
Exclusion		
Permanence:	Low	Wildlife viewing is inherently mobile activity involving a temporary occupation of ocean space.
Buffer Zones:	Medium	Vessels may be afforded localized safety zones that apply to approach by other vessels during transit.

Section 6. Spatial Management Considerations

Spatial Management:	Low	Wildlife Viewing may occasionally be allocated to specific zones in MPAs or other spatial management schemes.
Site Dependence:	Medium	While successful viewing requires the vessel being where the wildlife is, those locations change dynamically and often unpredictably as animals move from place to place. Consequently, the overall dependence of Wildlife Viewing from Vessels on specific sites is Medium for the whole Use, but High during any given outing depending on the target animals' distribution and abundance in real time.

APPENDIX VII

Space Use Profile Guidelines

GUIDELINE FOR DETERMINING AND INTERPRETING FUNCTIONAL CHARACTERISTICS OF SPACE USE		
OPERATIONAL MOBILITY		
DEFINITION	**VALUES**	**NOTES**
Contributes to use interference ** High Rankings for operational mobility suggest lower potential interference.* The degree to which the use typically can select or modify, in advance or in real time, it's area of operation and thus control it's movements and location (both Horizontally and Vertically) in response to the surrounding environment, including the presence of other uses or their components.	**HIGH = The Use typically has operational mobility** and is not typically tied to a specific operating area. These uses can often select among different operating areas, and are able to perceive and respond to surrounding conditions quickly and safely (e.g. motorized boating, paddling, beach use). They do not generally use tethered components deployed in the water (Value = 1)	*Operationally Mobile Uses are less likely to unintentionally encounter, interact with, or create conflict with other Uses in the same general area. Consequently, they may offer more options for spatial planners to allocate co-occurring uses to appropriate areas.*
	MEDIUM = The Use has moderate or situational Operational Mobility. These include uses with more limited options for preferred operating areas, relatively modest abilities to change location or direction of movement once the Use is underway, and/or limited ability to perceive and respond quickly to surrounding conditions and potential threats (e.g. SCUBA, surfing, swimming, sailing). (Value = 0.5)	*Uses in this broad category, vary widely in their likelihood of interacting with or creating conflict with other co-occurring uses depending on how the Use is being pursued, and upon the operational and space use profiles of the other Use(s) in the area.*
	LOW = The Use typically lacks Operational Mobility. These Uses are generally either inherently stationary (e.g. oil rigs, wind turbines, cables, pipelines, aquaculture pens), or can move but also routinely involve tethered components and gear moving through the air, water and along the Seafloor (e.g. commercial and recreational fishing; cable laying; military operations). (Value = 0)	*Uses that lack Operational Mobility have a higher potential for creating unplanned interaction and potential conflict with other Uses, and provide limited options for spatial planners' allocation of areas among co-occurring uses.*

MOVING GEAR		
DEFINITION	**VALUES**	**NOTES**
Contributes to use interference ** High Rankings for moving gear suggest higher potential interference.* The degree to which the use typically involves non-human components (e.g. fishing nets) that are lowered, raised, dragged or propelled in the air, at the Sea Surface, through the Water Column, along the Seafloor, and/or through the Seabed with little or no real-time ability to either sense or respond to the immediate operating environment, including the presence of other uses or their components.	***HIGH = The Use typically deploys moving gear in the water.*** These Uses generally involve either: (i) gear tethered to vessels (e.g. fishing gear, dredges, tow barges, cable burying devices, ROVs); or, (ii) manned or autonomous submersibles that may move long distances underwater before being recovered. (Value = 1)	*Uses that involve moving gear in the water have the potential to create direct interactions between those moving components and other co-occurring Uses. The effects of these interactions will depend on the nature of space occupancy and functional nature of each Use.*
	MEDIUM = The Use may occasionally deploy moving gear in the water. These Uses may involve moving gear during certain conditions (e.g. submersibles used for pipeline inspections, sea anchors or drogues on sailboats, marker buoys for sailboat racing, dive flags), but not as a routine or constant aspect of the typical pursuit. (Value = 0.5)	*A value of "Maybe" for moving gear in the water indicates that the potential for creating interaction and conflict between co-occurring Uses may exist, and that it may vary widely and unpredictably depending on how each Use occupies ocean space in the area at the time that they meet and interact.*
	LOW = The Use does not employ moving gear in the water. These Uses are often relatively self-contained and do not routinely deploy moving components in the water (e.g. swimming, SCUBA). (Value = 0)	*Uses that do not typically involve moving gear in the water are often less likely to create interactions and potential conflicts with other Uses than those that do.*

PERMANENCE OF SPACE OCCUPANCY		
DEFINITION	**VALUES**	**NOTES**
Contributes to site exclusion ** High Rankings for permanence of space occupancy suggest higher potential exclusion.* The degree to which the use typically occupies a fixed area of ocean indefinitely (e.g. Renewable Energy wind turbines, pylons and transmission cables, oil pipelines).	***HIGH = The Use typically occupies a fixed area of the ocean indefinitely.*** These Uses involve fixed equipment or infrastructure in the water that do not generally change location. Permanent equipment is typically installed in the Seabed, extending upward thru the Water Column to the Sea Surface, and sometimes into the Air Zone (e.g. oil rigs, navigation buoys, aquaculture pens). (Value = 1)	*The Use's permanent occupation of ocean space will generally pre-empt, and thus, conflict with, most other potentially co-occurring uses seeking to occupy the same space.*
	***MEDIUM = The Use may or may not occupy a fixed area of the ocean indefinitely, or it may move periodically* from one location to another as conditions change (e.g. tethered renewable energy production rigs, aquaculture pens).** (Value = 0.5)	*The Use's flexible space occupancy means that the types and levels of conflict it may create with other co-occurring uses may vary considerably during the life-span of the Use, depending on its space occupation profile at any given time.*
	LOW = The Use does not occupy a fixed area of the ocean indefinitely or more around after relatively long periods in one place. These Uses are inherently mobile and either cannot occupy a fixed space permanently (e.g. divers, swimmers, snorkelers), or could technically remain stationary but can only be pursued successfully when moving (e.g. shipping). (Value = 0)	*The typical Use does not a priori preempt other uses from co-occurring in the same space at all times. The effects of its interactions with other Uses will depend on their frequency, nature and timing.*

BUFFER ZONES		
Contributes to site exclusion ** High Rankings for buffer zones suggest higher potential exclusion.* The degree to which the use's Core Activity Area is typically surrounded by an official, governmentally established buffer or exclusion zone that prohibits or limits approach by other uses for safety, security or other reasons (e.g. energy facility safety zone or military security exclusion zone).	***HIGH = The Use employs established Buffer Zones***, often for commercial or industrial activities (e.g. energy production facilities, cables, pipelines), or military operations. Many of these Uses involve the permanent installation of fixed infrastructure that could be vulnerable to accidental or intentional damage. (Value = 1)	*Buffer Zones can significantly magnify the effective footprint of the Use beyond it's immediate Main Activity Area. While minimizing the likelihood of direct interactions and conflicts, such Uses typically exclude most or all others from the immediate operating area. Consequently, they may limit planners' options for allocating co-occurring Uses.*
	MEDIUM = The Use may activate Buffer Zones during certain limited time periods or conditions. Examples may include: right-of-way or approach limits around vessels performing certain activities (e.g. towing, sailing, anchoring); temporary area closures during military operations (e.g. training, missile launches); and, "diver down" flags around dive sites. (Value = 0.5)	*Uses that sometimes involve Buffer Zones may affect other co-occurring uses depending on when and where are in effect, and how they impact other activities. As a group, these Uses may provide significant, if complex, options for planners for flexibly allocating space among co-occurring uses.*
	LOW = The Use does not typically involve Buffer Zones. These uses tend to be transitory and generally unregulated activities often pursued by individuals for recreational purposes (e.g. swimming, surfing, snorkeling, beach use, tide-pooling). (Value = 0)	*Uses lacking Buffer Zones often occupy relatively small operating areas around the Main Activity Area and do not typically create regulatory impediments to other Uses operating nearby.*

GUIDELINE FOR DETERMINING AND INTERPRETING SPATIAL MANAGEMENT CONSIDERATIONS		
SITE DEPENDENCE		
DEFINITION	**VALUES**	**NOTES**
MANAGEMENT CONSIDERATION The degree to which the successful pursuit of the use requires access to specific ocean areas that possess certain essential and unevenly distributed resources, ecosystem features, or environmental conditions that are integral to the use (e.g. oil platforms near oil deposits, wind farms in areas of reliable wind, surf spots near consistent surf breaks, fishing areas where fish are abundant).	***HIGH = The Use is site dependent,*** requiring specific, spatially or temporally discontinuous, environmental features. Such uses include commercial-scale extraction of natural resources (e.g. energy, minerals, fish), or recreational activities dependent upon special environmental or ecological conditions (e.g. consistent surf breaks, high biodiversity, abundant marine mammals or birds). (Value = 1)	*Site Dependent Uses need to operate in specific areas and consequently may displace, pre-empt or create conflict with other Uses seeking the same operating areas. Site Dependency among multiple competing Uses may limit or complicate planners' options for allocating space occupancy among competing valued uses.*
	MEDIUM = The Use may be site dependent. These uses can often be pursued in a greater variety of ocean areas, buttheir relative success may be influenced by the availability of certain unevenly distributed desired ecosystem features (e.g. waves for surfing; clean water for swimming; healthy ecosystems for snorkeling and SCUBA; calm sea conditions for kayaking; abundant fish for sport fishing; mobile animals for wildlife viewing). (Value = 0.5)	*Although these Uses are most successful in areas where certain desired conditions are reliably present, they can also be conducted in a variety of sub-optimal conditions (e.g. surfing smaller waves, diving in damaged habitats, sailing in low wind). This spatial flexibility may provide allocation options for spatial planners, while increasing the need for trade-offs with other competing uses.*
	LOW = The Use is not site dependent. These uses do not generally require specific ecosystem or environmental conditions and thus can be pursued successfully in most basically suitable ocean areas (e.g. adequate operating depths for vessels). Examples of such Uses may include: shipping, motorized boating, military vessels. (Value = 0)	*Because they are not typically tied to specific ocean areas or features, Uses that are not Site Dependent are less likely to create conflict with other co-occurring uses over specific areas, and should provide greater options for planners seeking to allocate uses across space.*

SPATIALLY MANAGED		
DEFINITION	**VALUES**	**NOTES**
MANAGEMENT CONSIDERATION The degree to which the use's operating area is typically influenced by a government agency or planning entity that determines where, how and when it may operate with a broader ocean setting (e.g. offshore discharge pipes, trawling zones, shipping lanes).	***HIGH = The Use is typically spatially managed***. These often heavily regulated Uses include industrial or commercial activities involving: (i) extraction of natural resources (e.g. energy, minerals, fish); (ii) dredging or dumping on the Seafloor; or, (iii) shipping and other vessel movements. (Value = 1)	*Having the legal authorities and tools to allocate certain uses to appropriate areas creates the potential to avoid direct conflicts with other Uses, but sometimes at the expense of access by those Uses to desired operating areas.*
	MEDIUM = The Use may, in certain circumstances, be spatially managed. These Uses are not typically managed spatially except over very broad areas (e.g. motorized boating, sailing) but may be allocated to or away from specific areas through local zoning schemes or marine protected areas, thereby providing a degree of spatial management to meet local needs. (Value = 0.5)	*Using MPAs or other zoning schemes can minimize interactions and conflicts among co-occurring Uses, if those authorities can be employed at the appropriate scale.*
	LOW = The Use is not typically managed spatially. These generally include unregulated activities, often pursued by individuals for recreational, scientific or cultural purposes (e.g. swimming, paddling, surfing, tide-pooling, beach use, SCUBA). In general, these Uses do not involve the routine installation of fixed infrastructure or the deployment of moving gear in the water. (Value = 0)	*Uses that are not routinely managed spatially (e.g. swimming) have the potential for creating interactions and conflicts with other Uses and may, thus, pose challenges to spatial planners who may lack the tools and authorities to influence their location relative to other uses.*

APPENDIX VIII

Ocean Use Comparison Reports

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Beach Use

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	3.00	7.00	0.00	7.60	0.00
Vessels	3.00	7.00	0.00	0.00	0.00
Anchors	0.00	5.60	0.00	19.00	13.00
Moving Gear	3.00	5.60	0.00	15.20	7.80
Installed Infrastructure	8.00	14.00	0.00	38.00	26.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	4.76	7.84	0.00	31.92	14.98
Overall Vertical Interaction	11.90				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	7.00	6.00	7.00	0.00	0.00
Vessels	0.00	6.00	7.00	0.00	0.00
Anchors	0.00	0.00	7.00	0.00	0.00
Moving Gear	0.00	6.00	5.00	0.00	0.00
Installed Infrastructure	34.00	32.00	24.00	0.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	8.16	6.14	6.05	0.00	0.00
Overall Horizontal Interaction	4.07				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Low-Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Beach access is sometimes controlled directly or influenced indirectly by the presence of relevant infrastructure (e.g. parking, restrooms, etc.).
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful Beach Use is influenced by many place-based factors but can often be pursued in a variety of settings.

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Dive Fishing

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	0.00	40.00	13.20	10.40	0.00
Vessels	0.00	40.00	19.80	0.00	0.00
Anchors	0.00	32.00	33.00	26.00	16.00
Moving Gear	0.00	32.00	26.40	20.80	9.60
Installed Infrastructure	0.00	80.00	66.00	52.00	32.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.00	64.00	40.73	28.08	13.17
Overall Vertical Interaction	29.20				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	5.00	19.00	20.00	0.00
Vessels	0.00	5.00	19.00	20.00	0.00
Anchors	0.00	0.00	19.00	14.00	0.00
Moving Gear	0.00	9.00	13.00	14.00	0.00
Installed Infrastructure	0.00	24.00	64.00	68.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	2.42	26.88	27.20	0.00
Overall Horizontal Interaction	11.30				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Dive fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful dive fishing requires certain environmental conditions, including safe sea states, abundant prey and low crowding.

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Fishing with Benthic Fixed Gear

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	7.80	40.00	10.40	9.60	0.00
Vessels	7.80	40.00	15.60	0.00	0.00
Anchors	0.00	32.00	26.00	24.00	17.00
Moving Gear	7.80	32.00	20.80	19.20	10.20
Installed Infrastructure	20.80	80.00	52.00	48.00	34.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	8.84	64.00	35.66	28.80	15.74
Overall Vertical Interaction	30.61				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	21.00	20.00	18.00
Vessels	0.00	0.00	21.00	20.00	18.00
Anchors	0.00	0.00	21.00	14.00	0.00
Moving Gear	0.00	0.00	14.00	14.00	12.00
Installed Infrastructure	0.00	0.00	70.00	68.00	60.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	29.40	31.09	15.43
Overall Horizontal Interaction	15.18				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium-High
Moving Gear	Low-Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Benthic fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Fishing with Benthic Mobile Gear

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	3.60	40.00	9.60	8.00	0.00
Vessels	3.60	40.00	14.40	0.00	0.00
Anchors	0.00	32.00	24.00	20.00	17.00
Moving Gear	3.60	32.00	19.20	16.00	10.20
Installed Infrastructure	9.60	80.00	48.00	40.00	34.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	3.50	64.00	32.91	24.00	15.74
Overall Vertical Interaction	28.03				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	20.00	20.00	18.00
Vessels	0.00	0.00	20.00	20.00	18.00
Anchors	0.00	0.00	20.00	14.00	0.00
Moving Gear	0.00	0.00	14.00	14.00	12.00
Installed Infrastructure	0.00	0.00	68.00	68.00	60.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	28.56	31.09	15.43
Overall Horizontal Interaction	15.01				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Intertidal Harvest

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	1.20	14.00	1.20	9.60	0.00
Vessels	1.20	14.00	1.80	0.00	0.00
Anchors	0.00	11.20	3.00	24.00	14.00
Moving Gear	1.20	11.20	2.40	19.20	8.40
Installed Infrastructure	3.20	28.00	6.00	48.00	28.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.99	28.51	2.62	36.65	14.66
Overall Vertical Interaction	16.69				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	5.00	8.00	10.00	0.00	0.00
Vessels	0.00	8.00	10.00	0.00	0.00
Anchors	0.00	0.00	10.00	0.00	0.00
Moving Gear	0.00	8.00	7.00	0.00	0.00
Installed Infrastructure	24.00	38.00	34.00	0.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	2.09	11.05	7.79	0.00	0.00
Overall Horizontal Interaction	4.19				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Intertidal commercial harvesting is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful harvest depends upon adequate population numbers of target species, and safe operating conditions and access.

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Pelagic Fishing

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	12.60	40.00	10.40	4.00	0.00
Vessels	12.60	40.00	15.60	0.00	0.00
Anchors	0.00	32.00	26.00	10.00	8.00
Moving Gear	12.60	32.00	20.80	8.00	4.80
Installed Infrastructure	33.60	80.00	52.00	20.00	16.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	14.28	64.00	32.09	9.60	6.58
Overall Vertical Interaction	25.31				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	22.00	20.00	19.00
Vessels	0.00	0.00	22.00	20.00	19.00
Anchors	0.00	0.00	22.00	14.00	0.00
Moving Gear	0.00	0.00	14.00	14.00	13.00
Installed Infrastructure	0.00	0.00	72.00	68.00	64.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	30.24	31.09	16.46
Overall Horizontal Interaction	15.56				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Pelagic fishing is sometimes managed spatially at a localized scale, generally within an MPA or other broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful Pelagic Fishing depends upon the presence of target species, and safe operating conditions.

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Commercial Shipping

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	10.20	30.00	7.20	4.00	0.00
Vessels	10.20	30.00	10.80	0.00	0.00
Anchors	0.00	24.00	18.00	10.00	10.00
Moving Gear	10.20	24.00	14.40	8.00	6.00
Installed Infrastructure	27.20	60.00	36.00	20.00	20.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	15.41	56.00	25.92	9.80	8.40
Overall Vertical Interaction	23.11				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	16.00	15.00	14.00
Vessels	0.00	0.00	16.00	15.00	14.00
Anchors	0.00	0.00	16.00	10.00	0.00
Moving Gear	0.00	0.00	10.00	10.00	9.00
Installed Infrastructure	0.00	0.00	52.00	50.00	46.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	18.20	26.67	16.56
Overall Horizontal Interaction	12.29				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Outside of established shipping lanes near land, vessel traffic is not highly controlled on a local scale.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Shipping often follows established vessel traffic lanes for safety and efficiency, especially near land, as well as reasonable weather and sea states along its planned routes.

Use 1: Renewable Energy

Use 2: Cruise Ships

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	10.20	39.00	10.40	6.80	0.00
Vessels	10.20	39.00	15.60	0.00	0.00
Anchors	0.00	31.20	26.00	17.00	15.00
Moving Gear	10.20	31.20	20.80	13.60	9.00
Installed Infrastructure	27.20	78.00	52.00	34.00	30.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	13.21	62.40	32.09	16.32	12.34
Overall Vertical Interaction	27.27				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	9.00	8.00	20.00	19.00	14.00
Vessels	0.00	8.00	20.00	19.00	14.00
Anchors	0.00	0.00	20.00	12.00	0.00
Moving Gear	0.00	8.00	14.00	12.00	9.00
Installed Infrastructure	46.00	40.00	68.00	62.00	46.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	4.73	3.66	24.48	28.34	11.83
Overall Horizontal Interaction	14.61				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Cruise ship transit lanes and destinations are often managed spatially by various federal, state and local authorities.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Transit depends on established vessel traffic lanes for safety and efficiency, and on reliable access to specific destinations (e.g. mooring, anchoring, docking).

Use Comparison Report

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Use 1:	Renewable Energy
Use 2:	Kayak Fishing

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	1.20	40.00	7.20	12.00	0.00
Vessels	1.20	40.00	10.80	0.00	0.00
Anchors	0.00	32.00	18.00	30.00	6.00
Moving Gear	1.20	32.00	14.40	24.00	3.60
Installed Infrastructure	3.20	80.00	36.00	60.00	12.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.78	64.00	22.22	28.80	3.09
Overall Vertical Interaction	23.78				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	9.00	10.00	22.00	20.00	18.00
Vessels	0.00	10.00	22.00	20.00	18.00
Anchors	0.00	0.00	22.00	14.00	0.00
Moving Gear	0.00	10.00	14.00	14.00	12.00
Installed Infrastructure	44.00	52.00	72.00	68.00	60.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	4.75	30.24	23.31	6.17
Overall Horizontal Interaction	12.90				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Kayak fishing is not typically managed spatially other than in local MPAs or through broader-scale fisheries management measures.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful Kayak Fishing depends upon the presence of target species, and safe operating conditions.

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Use 1:	Renewable Energy
Use 2:	Mariculture

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	6.60	30.00	10.00	8.40	0.00
Vessels	6.60	30.00	15.00	0.00	0.00
Anchors	0.00	24.00	25.00	21.00	15.00
Moving Gear	6.60	24.00	20.00	16.80	9.00
Installed Infrastructure	17.60	60.00	50.00	42.00	30.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	8.73	56.00	36.00	26.46	16.20
Overall Vertical Interaction	28.68				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	6.00	13.00	12.00	5.00
Vessels	0.00	6.00	13.00	12.00	5.00
Anchors	0.00	0.00	13.00	8.00	0.00
Moving Gear	0.00	8.00	9.00	8.00	4.00
Installed Infrastructure	0.00	32.00	44.00	40.00	18.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	7.04	21.56	18.67	4.32
Overall Horizontal Interaction	10.32				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	Medium-High
Moving Gear	Low-Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Mariculture operations are typically allocated to specific areas by permitting agencies.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful mariculture requires certain environmental conditions (e.g. depth, water quality, water movement) that often vary spatially.

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Use 1:	Renewable Energy
Use 2:	Marine Debris

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	5.40	20.00	7.20	6.40	0.00
Vessels	5.40	20.00	10.80	0.00	0.00
Anchors	0.00	16.00	18.00	16.00	5.00
Moving Gear	5.40	16.00	14.40	12.80	3.00
Installed Infrastructure	14.40	40.00	36.00	32.00	10.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	6.68	36.65	21.99	19.55	4.58
Overall Vertical Interaction	17.89				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	4.00	6.00	13.00	13.00	0.00
Vessels	0.00	6.00	13.00	13.00	0.00
Anchors	0.00	0.00	13.00	8.00	0.00
Moving Gear	0.00	6.00	9.00	8.00	0.00
Installed Infrastructure	20.00	32.00	44.00	42.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	3.49	7.45	20.16	18.33	0.00
Overall Horizontal Interaction	9.89				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	This Use is not likely to be managed spatially.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	This Use is targeted to areas that are considered likely to have marine debris by virtue of their location, exposure, topography, oceanography, etc.

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Use 1:	Renewable Energy
Use 2:	Mining and Mineral Extraction

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	12.60	40.00	10.40	12.00	0.00
Vessels	12.60	40.00	15.60	0.00	0.00
Anchors	0.00	32.00	26.00	30.00	20.00
Moving Gear	12.60	32.00	20.80	24.00	12.00
Installed Infrastructure	33.60	80.00	52.00	60.00	40.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	16.32	64.00	35.66	36.00	20.57
Overall Vertical Interaction	34.51				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	10.00	10.00	22.00	22.00	19.00
Vessels	0.00	10.00	22.00	22.00	19.00
Anchors	0.00	0.00	22.00	14.00	0.00
Moving Gear	0.00	10.00	15.00	14.00	13.00
Installed Infrastructure	48.00	48.00	74.00	72.00	64.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	6.58	6.58	31.08	28.80	13.17
Overall Horizontal Interaction	17.24				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Both dredging/mining and renourishment are heavily regulated at multiple governmental levels.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	The successful use requires proper environmental conditions (e.g. extracted resource) and governmental approvals.

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Use 1:	Renewable Energy
Use 2:	Motorized Boating

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	5.40	35.00	7.20	9.20	0.00
Vessels	5.40	35.00	10.80	0.00	0.00
Anchors	0.00	28.00	18.00	23.00	10.00
Moving Gear	5.40	28.00	14.40	18.40	6.00
Installed Infrastructure	14.40	70.00	36.00	46.00	20.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	6.59	60.31	18.61	23.78	8.86
Overall Vertical Interaction	23.63				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	9.00	9.00	18.00	16.00	13.00
Vessels	0.00	9.00	18.00	16.00	13.00
Anchors	0.00	0.00	18.00	11.00	0.00
Moving Gear	0.00	9.00	12.00	11.00	9.00
Installed Infrastructure	46.00	44.00	60.00	54.00	44.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	6.50	27.14	26.58	9.75
Overall Horizontal Interaction	13.99				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Low-Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Motorized Boating is sometimes but relatively rarely zoned as part of spatial management schemes, particularly in zoned MPAs.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful and safe Motorized Boating requires certain environmental conditions, including levels of crowding by other uses.

Use 1: Renewable Energy

Use 2: Non-Commercial Fishing (Benthic Fixed Gear)

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	3.60	30.00	6.40	5.60	0.00
Vessels	3.60	30.00	9.60	0.00	0.00
Anchors	0.00	24.00	16.00	14.00	13.00
Moving Gear	3.60	24.00	12.80	11.20	7.80
Installed Infrastructure	9.60	60.00	32.00	28.00	26.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	4.08	56.00	23.04	17.64	12.48
Overall Vertical Interaction	22.65				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	6.00	16.00	16.00	14.00
Vessels	0.00	6.00	16.00	16.00	14.00
Anchors	0.00	0.00	16.00	10.00	0.00
Moving Gear	0.00	10.00	11.00	10.00	10.00
Installed Infrastructure	0.00	32.00	54.00	52.00	48.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	5.52	26.46	27.73	11.52
Overall Horizontal Interaction	14.25				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium-High
Moving Gear	Low-Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful benthic fishing with fixed gear requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use 1:	Renewable Energy
Use 2:	Non-Commercial Fishing (Benthic Mobile Gear)

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	6.00	40.00	9.60	8.80	0.00
Vessels	6.00	40.00	14.40	0.00	0.00
Anchors	0.00	32.00	24.00	22.00	15.00
Moving Gear	6.00	32.00	19.20	17.60	9.00
Installed Infrastructure	16.00	80.00	48.00	44.00	30.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	5.83	64.00	29.62	23.76	12.34
Overall Vertical Interaction	27.11				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	10.00	22.00	21.00	19.00
Vessels	0.00	10.00	22.00	21.00	19.00
Anchors	0.00	0.00	22.00	14.00	0.00
Moving Gear	0.00	14.00	14.00	14.00	13.00
Installed Infrastructure	0.00	50.00	72.00	70.00	64.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	7.20	30.24	32.00	16.46
Overall Horizontal Interaction	17.18				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Benthic mobile fishing is Benthic mobile fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

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Use 1:	Renewable Energy
Use 2:	Ocean Dumping

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	7.80	32.00	8.80	5.20	0.00
Vessels	7.80	32.00	13.20	0.00	0.00
Anchors	0.00	25.60	22.00	13.00	10.00
Moving Gear	7.80	25.60	17.60	10.40	6.00
Installed Infrastructure	20.80	64.00	44.00	26.00	20.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	5.44	55.14	32.49	16.80	5.54
Overall Vertical Interaction	23.08				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	17.00	17.00	14.00
Vessels	0.00	0.00	17.00	17.00	14.00
Anchors	0.00	0.00	17.00	11.00	0.00
Moving Gear	0.00	0.00	12.00	11.00	10.00
Installed Infrastructure	0.00	0.00	58.00	56.00	48.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	18.74	27.57	13.29
Overall Horizontal Interaction	11.92				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	High
Moving Gear	Low-Medium	Buffer Zones	High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Approved dump sites are determined and regulated by governmental agencies.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Dumping is often only allowed in delineated areas with specific environmental features (e.g. substrate, currents), and the use depends on access to those sites.

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Use 1:	Renewable Energy
Use 2:	Paddling

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	1.80	35.00	5.20	10.00	0.00
Vessels	1.80	35.00	7.80	0.00	0.00
Anchors	0.00	28.00	13.00	25.00	7.00
Moving Gear	1.80	28.00	10.40	20.00	4.20
Installed Infrastructure	4.80	70.00	26.00	50.00	14.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	1.26	60.31	9.60	25.85	5.43
Overall Vertical Interaction	20.49				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	11.00	11.00	17.00	16.00	14.00
Vessels	0.00	11.00	17.00	16.00	14.00
Anchors	0.00	0.00	17.00	10.00	0.00
Moving Gear	0.00	11.00	12.00	10.00	10.00
Installed Infrastructure	54.00	54.00	58.00	52.00	48.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	7.98	10.63	29.98	19.20	10.63
Overall Horizontal Interaction	15.68				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Low-Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Paddling is not typically managed spatially except w/ relatively rare zoning schemes such as MPAs and other forms of spatial management.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Safe/enjoyable paddling requires a certain range of sea state and environmental conditions, including levels of crowding by other users.

Use 1: Renewable Energy

Use 2: Permanent Research Areas

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	9.00	31.00	10.00	10.40	0.00
Vessels	9.00	31.00	15.00	0.00	0.00
Anchors	0.00	24.80	25.00	26.00	16.00
Moving Gear	9.00	24.80	20.00	20.80	9.60
Installed Infrastructure	24.00	62.00	50.00	52.00	32.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	9.42	48.07	33.23	30.24	14.18
Overall Vertical Interaction	27.03				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	8.00	9.00	17.00	18.00	17.00
Vessels	0.00	9.00	17.00	18.00	17.00
Anchors	0.00	0.00	17.00	12.00	0.00
Moving Gear	0.00	9.00	11.00	12.00	12.00
Installed Infrastructure	42.00	44.00	56.00	60.00	58.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	4.65	8.66	25.33	25.85	12.85
Overall Horizontal Interaction	15.47				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	Medium-High
Moving Gear	Low-Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Permanent study areas are occasionally delineated in spatial management schemes.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Permanent study areas are typically selected for their unique characteristics, and returning to the same reference area is often critical to the success of permanent research and monitoring stations.

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Use 1:	Renewable Energy
Use 2:	Recreational Dive Fishing

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	0.00	30.00	9.60	7.60	0.00
Vessels	0.00	30.00	14.40	0.00	0.00
Anchors	0.00	24.00	24.00	19.00	6.00
Moving Gear	0.00	24.00	19.20	15.20	3.60
Installed Infrastructure	0.00	60.00	48.00	38.00	12.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.00	56.00	34.56	21.28	5.04
Overall Vertical Interaction	23.38				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	4.00	16.00	16.00	13.00
Vessels	0.00	4.00	16.00	16.00	13.00
Anchors	0.00	0.00	16.00	10.00	0.00
Moving Gear	0.00	8.00	10.00	10.00	8.00
Installed Infrastructure	0.00	18.00	52.00	52.00	42.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	2.19	25.48	24.27	10.08
Overall Horizontal Interaction	12.40				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Dive fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful dive fishing requires certain environmental conditions, including safe sea states, abundant prey and low crowding.

Use 1: Renewable Energy

Use 2: Recreational Fishing from Boats for Benthic Species

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	7.80	40.00	9.60	10.40	0.00
Vessels	7.80	40.00	14.40	0.00	0.00
Anchors	0.00	32.00	24.00	26.00	17.00
Moving Gear	7.80	32.00	19.20	20.80	10.20
Installed Infrastructure	20.80	80.00	48.00	52.00	34.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	7.58	64.00	32.91	31.20	15.74
Overall Vertical Interaction	30.29				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	22.00	21.00	18.00
Vessels	0.00	0.00	22.00	21.00	18.00
Anchors	0.00	0.00	22.00	14.00	0.00
Moving Gear	0.00	0.00	14.00	14.00	12.00
Installed Infrastructure	0.00	0.00	72.00	70.00	60.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	30.24	32.00	15.43
Overall Horizontal Interaction	15.53				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Benthic sport fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful benthic fishing requires the presence of target species and favorable operating conditions (e.g. sea state, weather, crowding).

Use 1: Renewable Energy

Use 2: Recreational Fishing from Boats for Pelagic Species

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	12.60	40.00	10.40	4.00	0.00
Vessels	12.60	40.00	15.60	0.00	0.00
Anchors	0.00	32.00	26.00	10.00	8.00
Moving Gear	12.60	32.00	20.80	8.00	4.80
Installed Infrastructure	33.60	80.00	52.00	20.00	16.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	14.28	64.00	32.09	9.60	6.58
Overall Vertical Interaction	25.31				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	22.00	21.00	18.00
Vessels	0.00	0.00	22.00	21.00	18.00
Anchors	0.00	0.00	22.00	14.00	0.00
Moving Gear	0.00	0.00	15.00	14.00	12.00
Installed Infrastructure	0.00	0.00	74.00	70.00	60.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	31.08	32.00	15.43
Overall Horizontal Interaction	15.70				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Pelagic fishing is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful Pelagic Fishing depends upon the presence of target species, and safe operating conditions.

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Use 1:	Renewable Energy
Use 2:	Recreational Fishing From Shore

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	2.40	18.00	3.20	6.40	0.00
Vessels	2.40	18.00	4.80	0.00	0.00
Anchors	0.00	14.40	8.00	16.00	0.00
Moving Gear	2.40	14.40	6.40	12.80	0.00
Installed Infrastructure	6.40	36.00	16.00	32.00	0.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	3.26	40.32	13.82	24.19	0.00
Overall Vertical Interaction	16.32				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	8.00	8.00	6.00	0.00	0.00
Vessels	0.00	8.00	6.00	0.00	0.00
Anchors	0.00	0.00	6.00	0.00	0.00
Moving Gear	0.00	8.00	4.00	0.00	0.00
Installed Infrastructure	40.00	40.00	20.00	0.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	9.60	12.80	11.76	0.00	0.00
Overall Horizontal Interaction	6.83				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Fishing from shore is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful fishing depends upon the presence of the target species and favorable operating conditions such as waves, beach access, low crowding, and good weather.

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Use 1:	Renewable Energy
Use 2:	Recreational Intertidal Harvest

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	0.00	14.00	0.00	9.60	0.00
Vessels	0.00	14.00	0.00	0.00	0.00
Anchors	0.00	11.20	0.00	24.00	14.00
Moving Gear	0.00	11.20	0.00	19.20	8.40
Installed Infrastructure	0.00	28.00	0.00	48.00	28.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.00	28.51	0.00	36.65	14.66
Overall Vertical Interaction	15.97				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	5.00	7.00	9.00	0.00	0.00
Vessels	0.00	7.00	9.00	0.00	0.00
Anchors	0.00	0.00	9.00	0.00	0.00
Moving Gear	0.00	7.00	6.00	0.00	0.00
Installed Infrastructure	24.00	34.00	30.00	0.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	2.09	9.89	6.87	0.00	0.00
Overall Horizontal Interaction	3.77				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Intertidal harvesting is sometimes managed spatially at a localized scale, generally within an MPA or as part of a broader fisheries management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful harvest depends upon access to sites with adequate population numbers of target species and safe harvesting conditions.

Use Comparison Report

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Use 1:	Renewable Energy
Use 2:	Sailing

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	5.40	35.00	7.20	8.00	0.00
Vessels	5.40	35.00	10.80	0.00	0.00
Anchors	0.00	28.00	18.00	20.00	10.00
Moving Gear	5.40	28.00	14.40	16.00	6.00
Installed Infrastructure	14.40	70.00	36.00	40.00	20.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	6.59	60.31	18.61	20.68	8.86
Overall Vertical Interaction	23.01				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	9.00	9.00	18.00	16.00	12.00
Vessels	0.00	9.00	18.00	16.00	12.00
Anchors	0.00	0.00	18.00	11.00	0.00
Moving Gear	0.00	9.00	12.00	11.00	8.00
Installed Infrastructure	46.00	44.00	60.00	54.00	40.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	3.40	4.33	27.14	26.58	8.86
Overall Horizontal Interaction	14.06				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Low-Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Sailing is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful and safe sailing benefits from areas with predictably steady wind, calm seas and uncrowded conditions, but it can be conducted under a wide range of conditions.

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Use 1:	Renewable Energy
Use 2:	SCUBA/Snorkeling

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	4.80	30.00	10.00	9.60	0.00
Vessels	4.80	30.00	15.00	0.00	0.00
Anchors	0.00	24.00	25.00	24.00	8.00
Moving Gear	4.80	24.00	20.00	19.20	4.80
Installed Infrastructure	12.80	60.00	50.00	48.00	16.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	6.35	56.00	36.00	26.88	7.68
Overall Vertical Interaction	26.58				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	8.00	8.00	14.00	16.00	14.00
Vessels	0.00	8.00	14.00	16.00	14.00
Anchors	0.00	0.00	14.00	10.00	0.00
Moving Gear	0.00	8.00	10.00	10.00	9.00
Installed Infrastructure	42.00	38.00	48.00	52.00	46.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	4.05	23.52	24.27	11.04
Overall Horizontal Interaction	12.58				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Diving and snorkeling is occasionally managed spatially at a localized scale, generally within an MPA or as part of other broader management scheme.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful diving and snorkeling can be done in a fairly wide range of safe and optimal environmental conditions, including safe sea states, clean water, healthy ecosystems, and low crowding by other uses.

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Use 1:	Renewable Energy
Use 2:	Surface Board Sports

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	0.00	30.00	0.00	4.00	0.00
Vessels	0.00	30.00	0.00	0.00	0.00
Anchors	0.00	24.00	0.00	10.00	0.00
Moving Gear	0.00	24.00	0.00	8.00	0.00
Installed Infrastructure	0.00	60.00	0.00	20.00	0.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.00	50.40	0.00	9.80	0.00
Overall Vertical Interaction	12.04				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	8.00	10.00	17.00	16.00	0.00
Vessels	0.00	10.00	17.00	16.00	0.00
Anchors	0.00	0.00	17.00	10.00	0.00
Moving Gear	0.00	10.00	11.00	10.00	0.00
Installed Infrastructure	40.00	48.00	56.00	52.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	10.24	31.36	20.80	0.00
Overall Horizontal Interaction	12.48				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low-Medium	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Surface board sports are sometimes managed spatially or temporally w/in a given space to avoid conflicts (e.g. Hawai'i).
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful areas for this use are defined by specific and relatively rare environmental conditions such as consistently well-shaped and large waves, consistent winds, adequate water depths, low crowding, etc.

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Use 1:	Renewable Energy
Use 2:	Swimming

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	4.20	30.00	8.40	10.40	0.00
Vessels	4.20	30.00	12.60	0.00	0.00
Anchors	0.00	24.00	21.00	26.00	9.00
Moving Gear	4.20	24.00	16.80	20.80	5.40
Installed Infrastructure	11.20	60.00	42.00	52.00	18.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	3.17	56.00	23.52	36.40	5.40
Overall Vertical Interaction	24.90				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	6.00	7.00	12.00	14.00	9.00
Vessels	0.00	7.00	12.00	14.00	9.00
Anchors	0.00	0.00	12.00	9.00	0.00
Moving Gear	0.00	7.00	8.00	9.00	6.00
Installed Infrastructure	32.00	36.00	40.00	46.00	30.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	6.40	9.60	22.40	12.27	3.60
Overall Horizontal Interaction	10.85				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Swimming is sometimes concentrated in designated zones for safety, access, surveillance, etc.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Although successful and safe swimming requires certain broad environmental conditions, it can often be conducted in a variety of situations.

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Use 1:	Renewable Energy
Use 2:	Tide Pooling

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	0.00	10.00	0.00	4.00	0.00
Vessels	0.00	10.00	0.00	0.00	0.00
Anchors	0.00	8.00	0.00	10.00	6.00
Moving Gear	0.00	8.00	0.00	8.00	3.60
Installed Infrastructure	0.00	20.00	0.00	20.00	12.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	0.00	22.40	0.00	21.00	8.64
Overall Vertical Interaction	10.41				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	4.00	4.00	0.00	0.00	0.00
Vessels	0.00	4.00	0.00	0.00	0.00
Anchors	0.00	0.00	0.00	0.00	0.00
Moving Gear	0.00	4.00	0.00	0.00	0.00
Installed Infrastructure	20.00	20.00	0.00	0.00	0.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	6.00	8.00	0.00	0.00	0.00
Overall Horizontal Interaction	2.80				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Low-Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Access to and use of tide pools are sometimes managed locally through MPAs or other spatial management schemes.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Successful tide pooling is heavily dependent upon access to diverse and healthy intertidal habitats with safe environmental conditions, which often vary spatially within any given ocean setting.

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Use 1:	Renewable Energy
Use 2:	Underwater Pipelines

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	4.20	24.00	5.60	8.00	0.00
Vessels	4.20	24.00	8.40	0.00	0.00
Anchors	0.00	19.20	14.00	20.00	15.00
Moving Gear	4.20	19.20	11.20	16.00	9.00
Installed Infrastructure	11.20	48.00	28.00	40.00	30.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	3.17	31.36	17.92	28.00	18.00
Overall Vertical Interaction	19.69				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	5.00	5.00	11.00	11.00	10.00
Vessels	0.00	5.00	11.00	11.00	10.00
Anchors	0.00	0.00	11.00	7.00	0.00
Moving Gear	0.00	5.00	7.00	7.00	6.00
Installed Infrastructure	24.00	24.00	36.00	36.00	32.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	4.80	6.40	20.16	19.20	9.60
Overall Horizontal Interaction	12.03				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	High
Moving Gear	Low	Buffer Zones	High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Pipelines are typically sited through governmental management and regulatory process.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Pipeline routes require the correct geological and ecological conditions which tend to vary spatially.

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Underwater Transmission Cables

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	4.20	24.00	7.20	8.00	0.00
Vessels	4.20	24.00	10.80	0.00	0.00
Anchors	0.00	19.20	18.00	20.00	15.00
Moving Gear	4.20	19.20	14.40	16.00	9.00
Installed Infrastructure	11.20	48.00	36.00	40.00	30.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	3.17	31.36	25.92	28.00	16.20
Overall Vertical Interaction	20.93				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	5.00	5.00	11.00	11.00	10.00
Vessels	0.00	5.00	11.00	11.00	10.00
Anchors	0.00	0.00	11.00	7.00	0.00
Moving Gear	0.00	5.00	7.00	7.00	6.00
Installed Infrastructure	24.00	24.00	36.00	36.00	32.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	4.80	6.40	20.16	19.20	11.52
Overall Horizontal Interaction	12.42				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Medium-High	Permanence	High
Moving Gear	Low	Buffer Zones	High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Cables are typically sited through governmental management and regulatory process.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	Cable routes require access to the correct geological, oceanographic and ecological conditions, all of which tend to vary spatially.

Use Comparison Report

Monday, June 15, 2015

Use 1:	Renewable Energy
Use 2:	Wildlife Viewing at Sea

Component Vertical Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Air	Sea Surface	Water Column	Sea Floor	Seabed
People	7.20	35.00	8.00	4.80	0.00
Vessels	7.20	35.00	12.00	0.00	0.00
Anchors	0.00	28.00	20.00	12.00	8.00
Moving Gear	7.20	28.00	16.00	9.60	4.80
Installed Infrastructure	19.20	70.00	40.00	24.00	16.00

Average Vertical Scores

The weighted average of all component interactions, displayed as a percentage, for each vertical zone, adjusted for the relative involvement of each component and the core use zones.

Average Vertical Interaction	8.79	60.31	23.63	7.75	4.43
Overall Vertical Interaction	20.98				

Component Horizontal Interaction Values

The degree of interaction, displayed as a percentage, of the listed component for Use 1 with all components of Use 2.

	Shoreline	Intertidal	Nearshore	Coastal/Offshore	Oceanic
People	0.00	0.00	14.00	14.00	12.00
Vessels	0.00	0.00	14.00	14.00	12.00
Anchors	0.00	0.00	14.00	10.00	0.00
Moving Gear	0.00	0.00	10.00	10.00	8.00
Installed Infrastructure	0.00	0.00	48.00	48.00	40.00

Average Horizontal Scores

The weighted average of all component interactions, displayed as a percentage, for each horizontal zone, adjusted for the relative involvement of each component and the core use zones.

Average Horizontal Interaction	0.00	0.00	21.71	23.63	8.86
Overall Horizontal Interaction	10.84				

Functional Characteristics Of Space Use

The degree to which both uses' four functional characteristics interact to influence the nature and consequences of conflict through Interference and/or Exclusion.

	Interference		Exclusion
Operational Mobility	Low-Medium	Permanence	Medium
Moving Gear	Low	Buffer Zones	Medium-High

Management Implications

The influence of the two uses' combined levels of site dependence and potential for spatial management on planning options to minimize conflict by allocating uses to different operating areas.

	Use 1	Use 2
Spatial Management	Renewable Energy is heavily regulated and operating areas are determined by government agencies.	Wildlife Viewing may occasionally be allocated to specific zones in MPAs or other spatial management schemes.
Site Dependence	Successful energy generation depends heavily on the reliable presence and optimum distribution of the target energy resource (e.g. wind, waves, current) in the operating area.	While successful viewing requires the vessel being where the wildlife is, those locations change dynamically and often unpredictably as animals move from place to place. Consequently, the overall dependence of Wildlife Viewing from Vessels on specific sites is Medium for the whole Use, but High during any given outing depending on the target

		animals' distribution and abundance in real time.

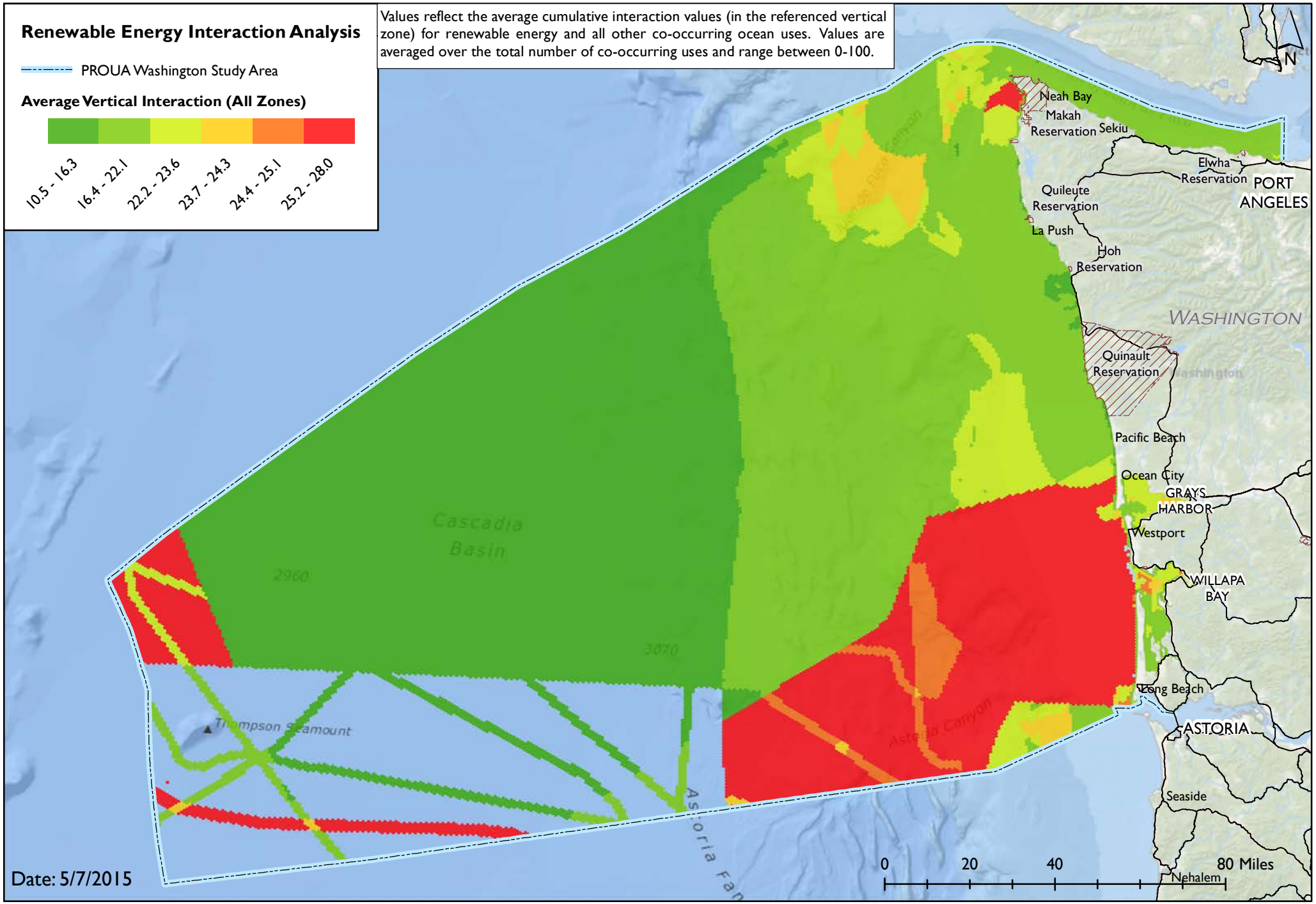
APPENDIX IX

Ocean Use Interaction Potential Maps by Geography

THE WASHINGTON OCEAN USES ATLAS

Participatory ocean use mapping to inform marine spatial planning in Washington's marine waters

BOEM
Bureau of Ocean Energy Management



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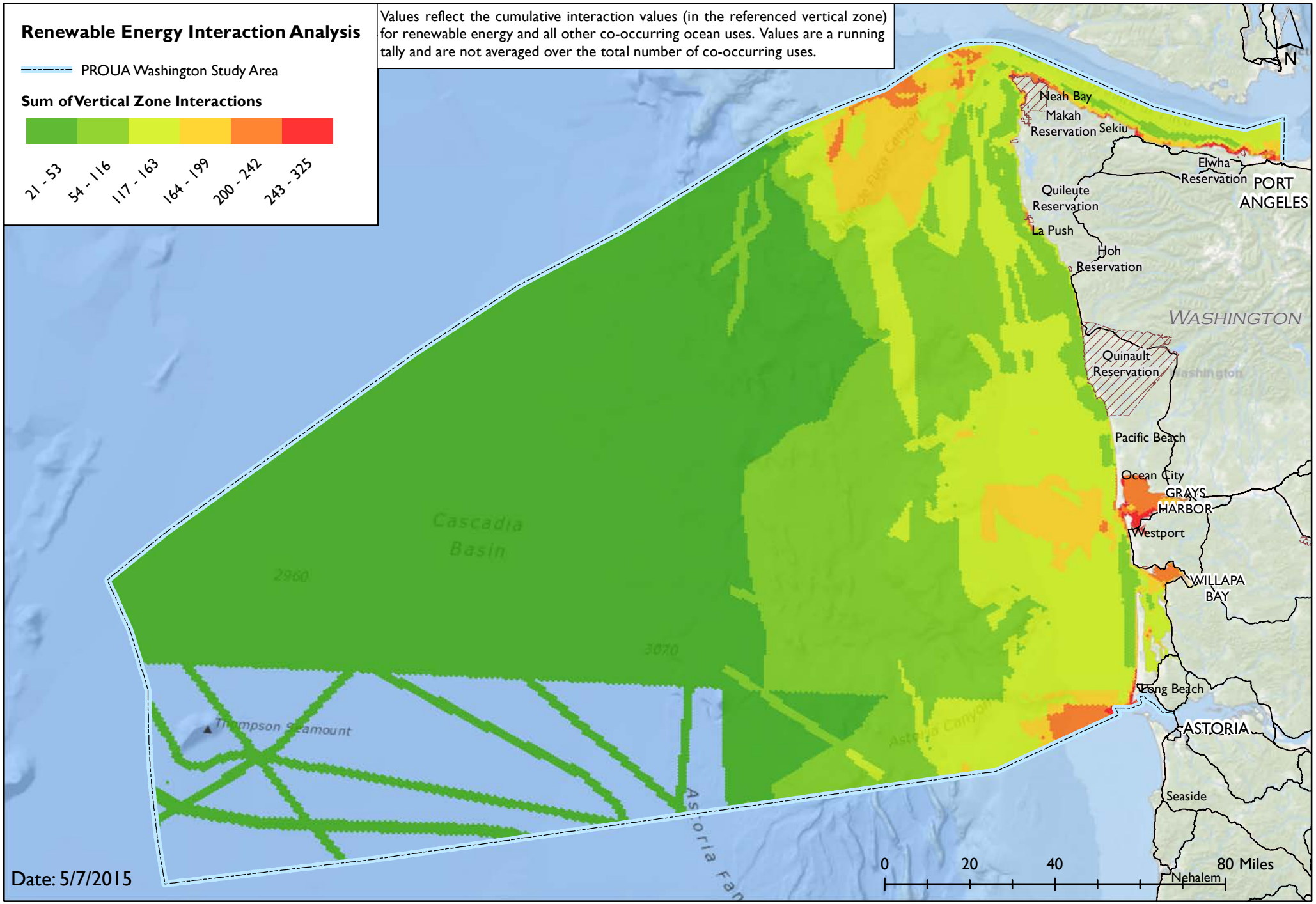

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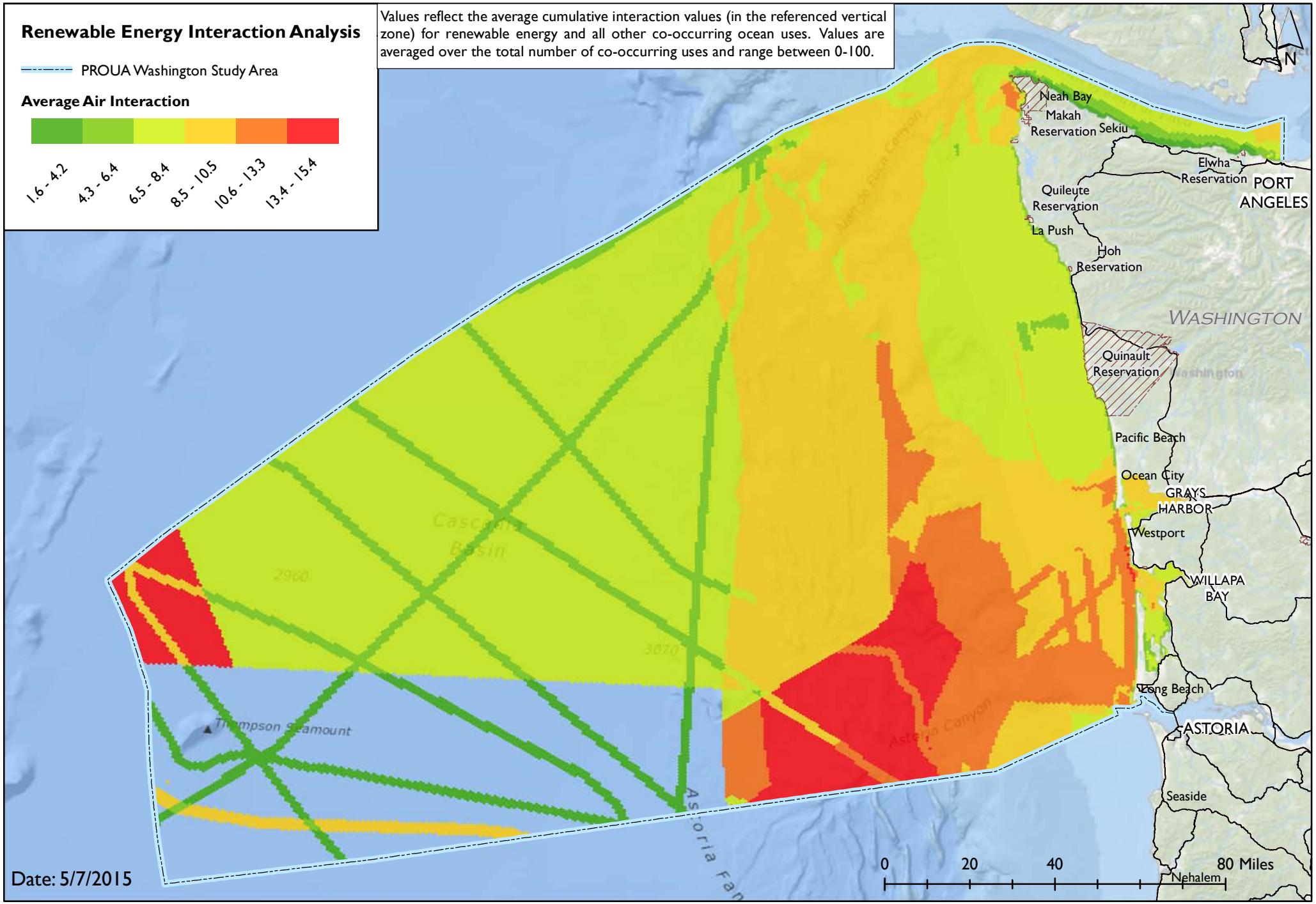

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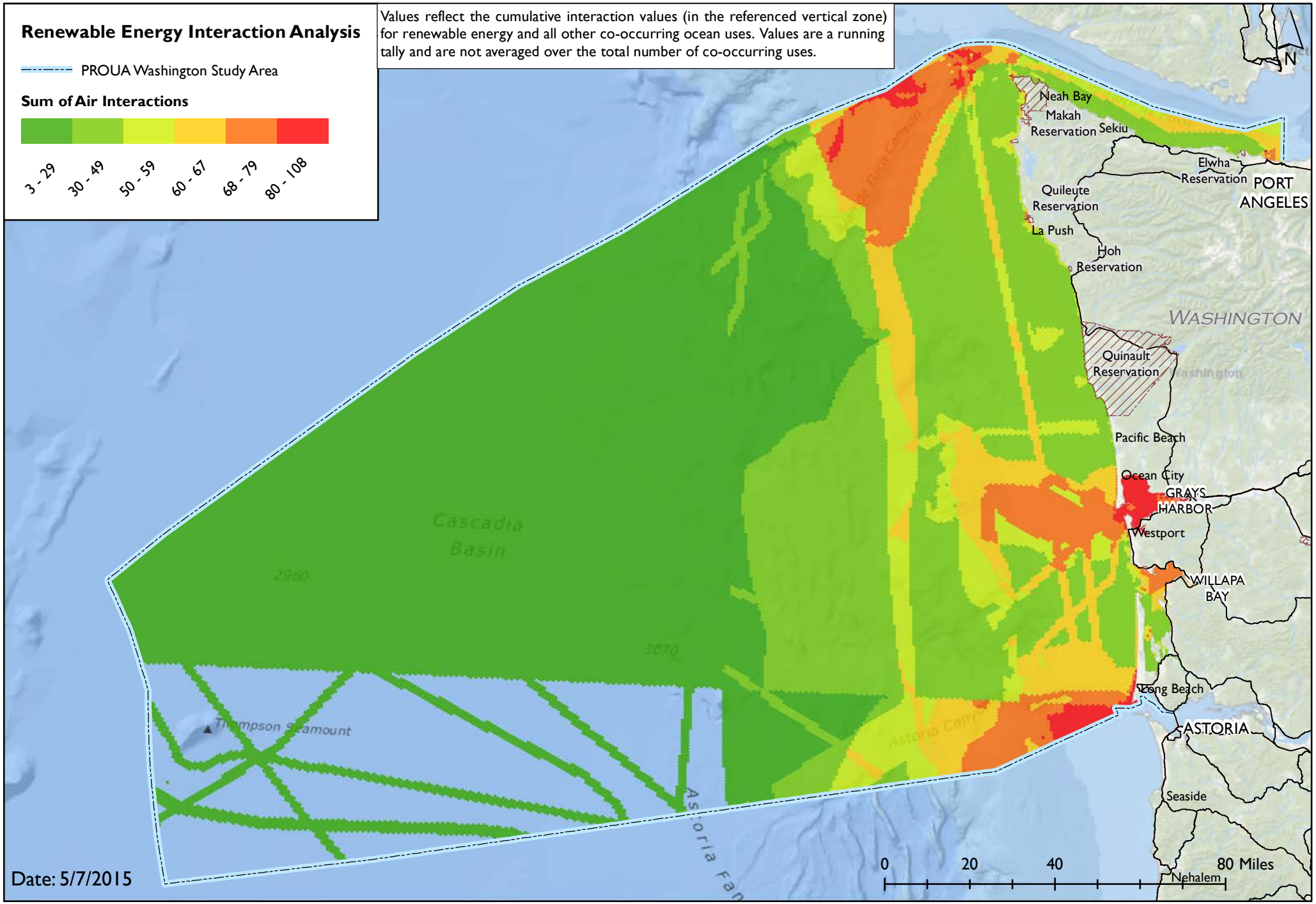

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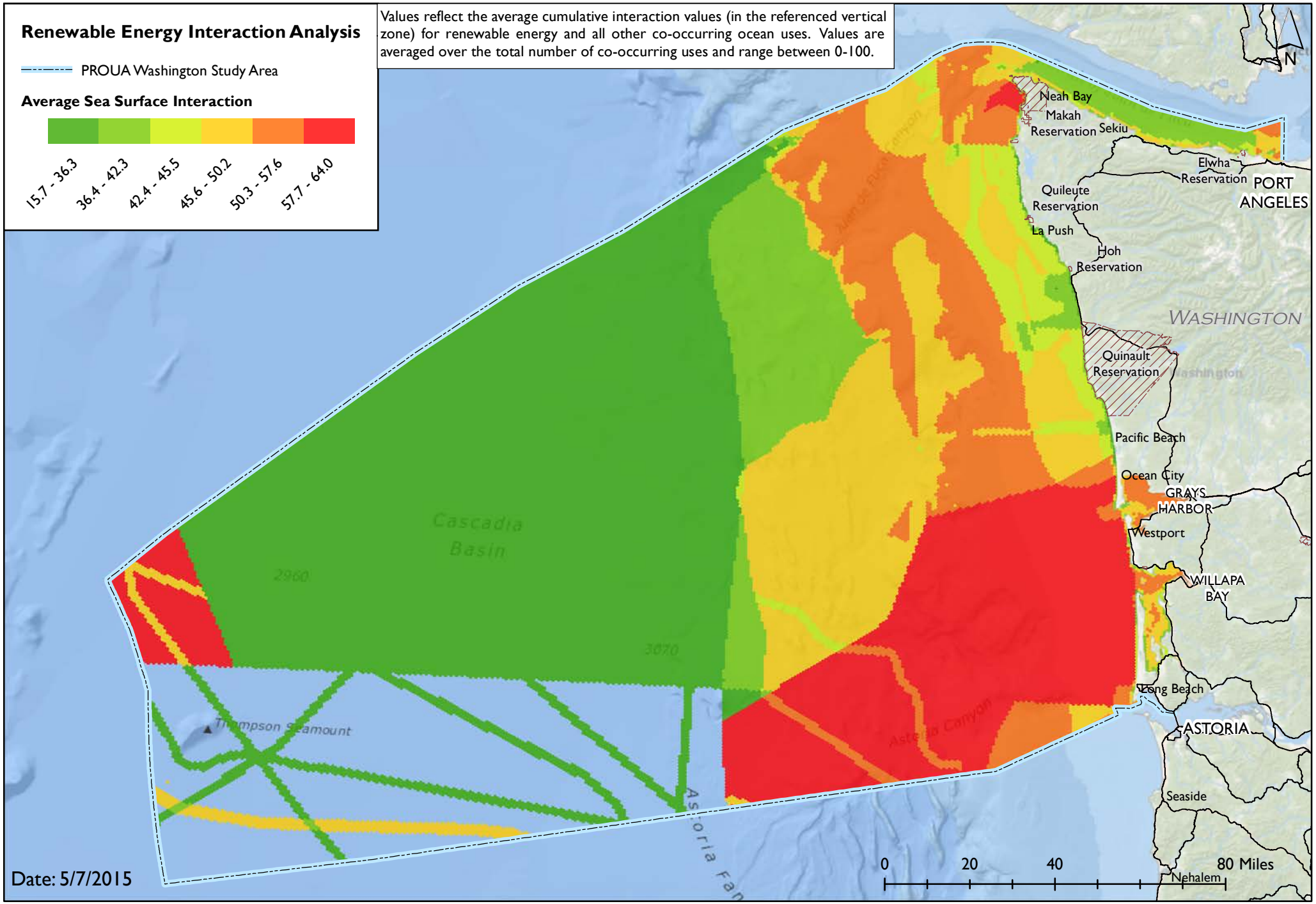

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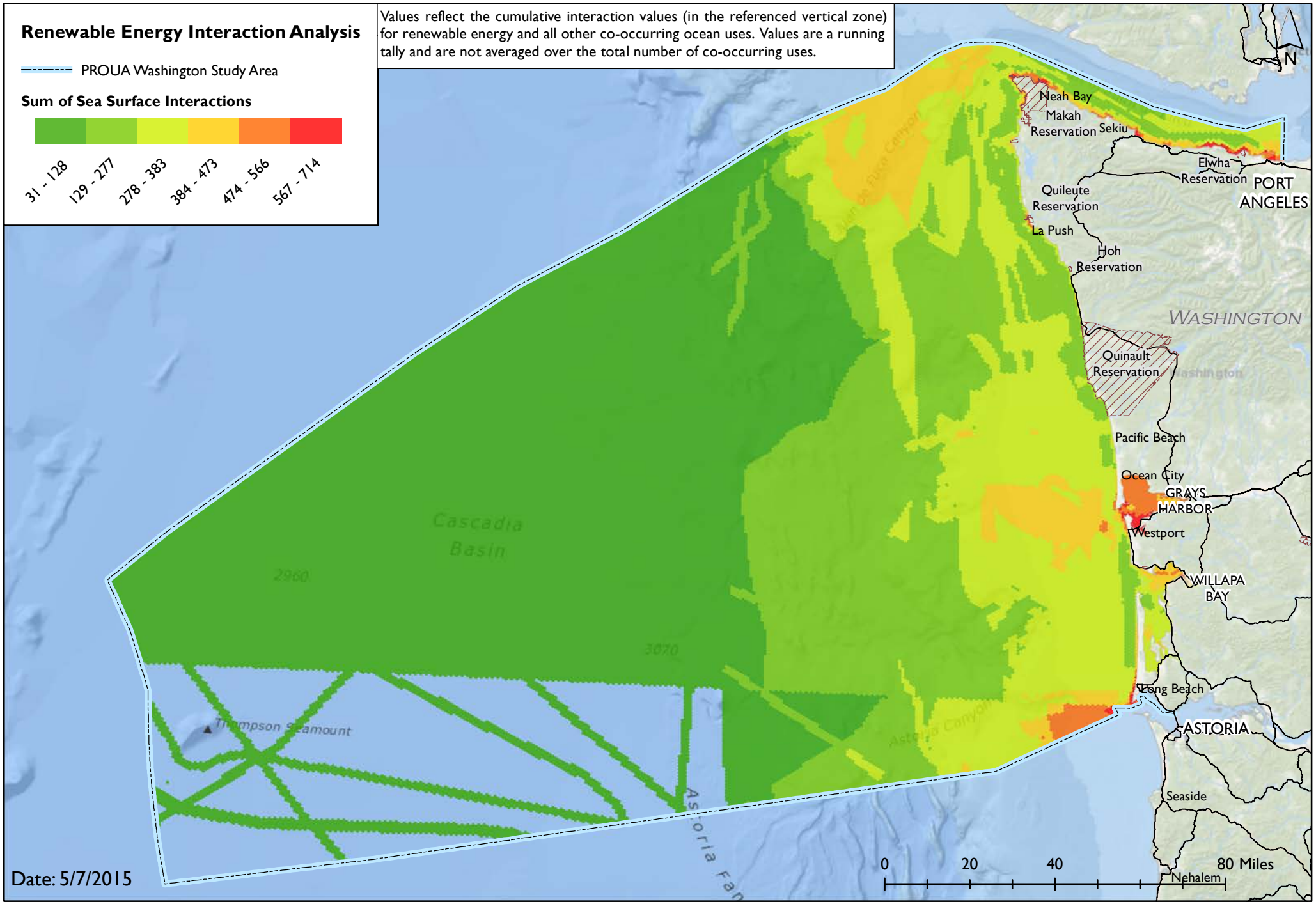

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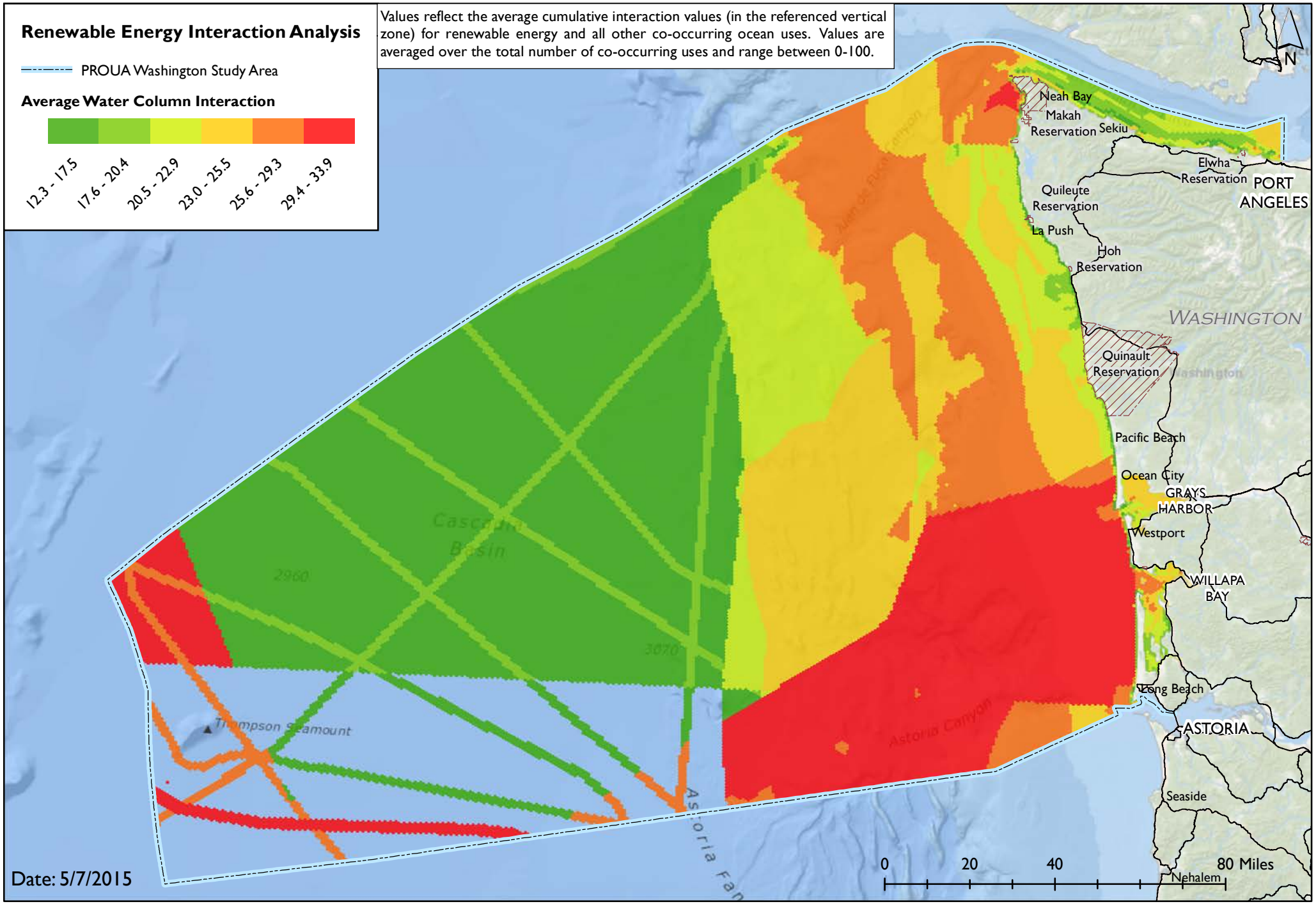

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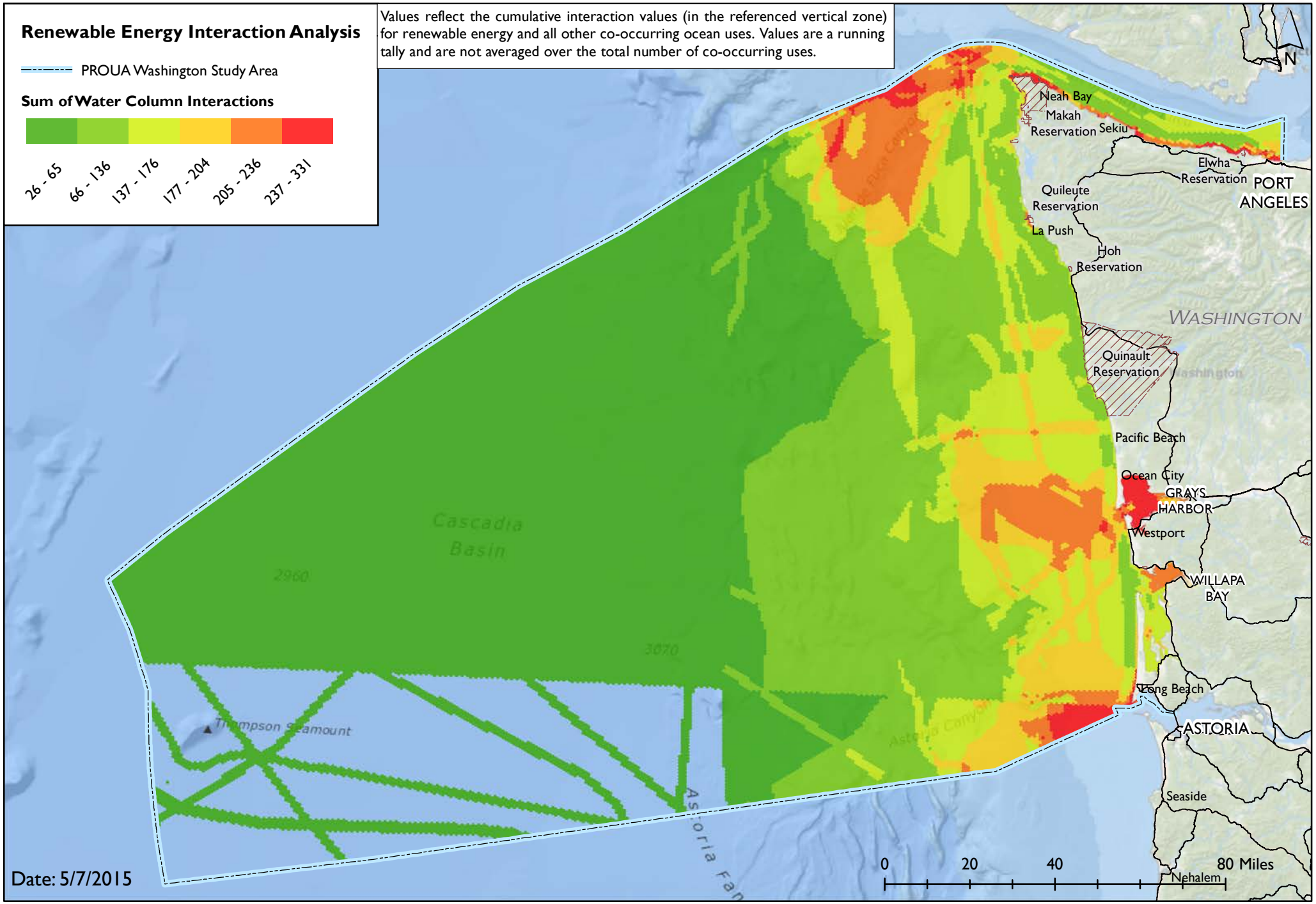

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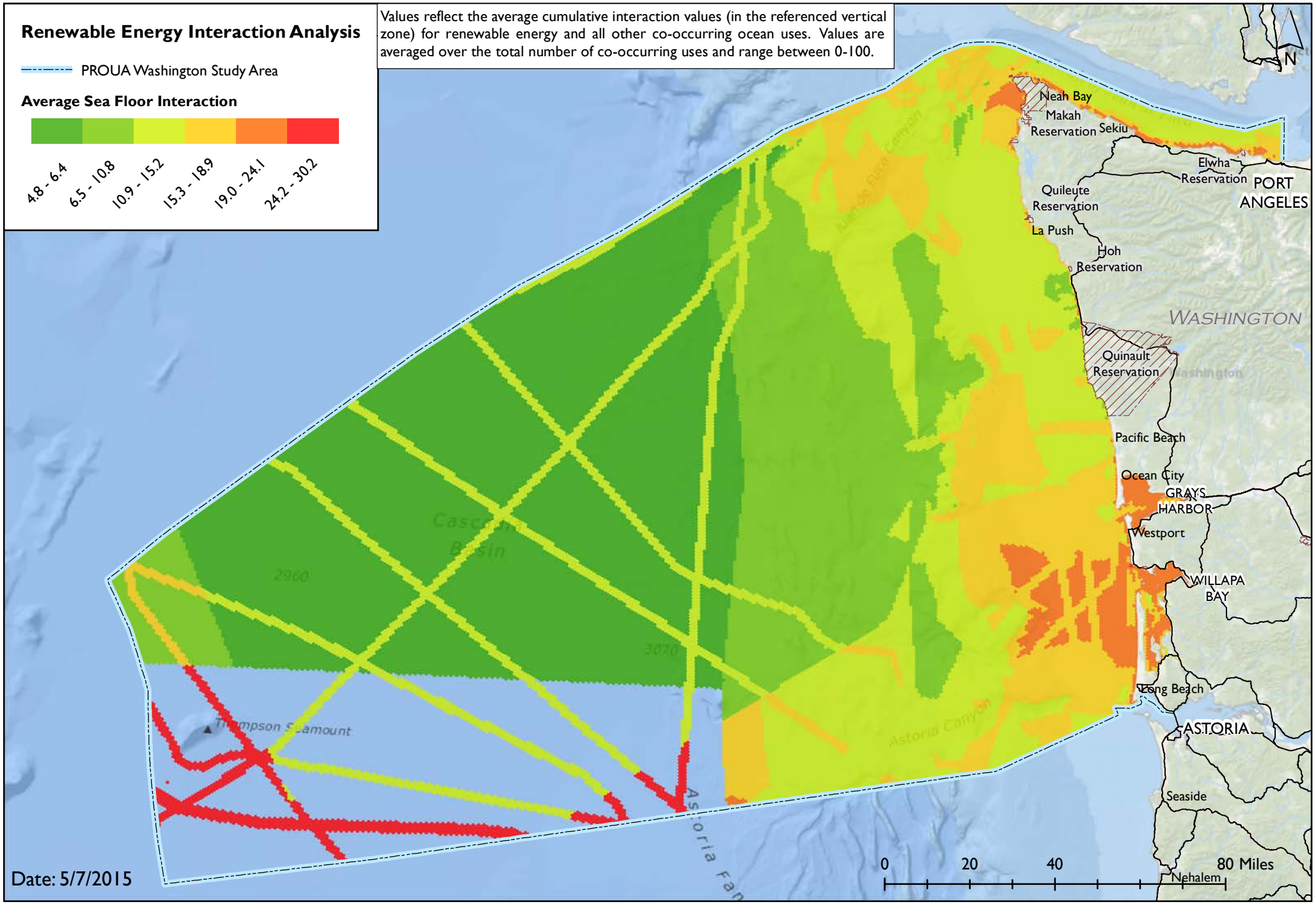

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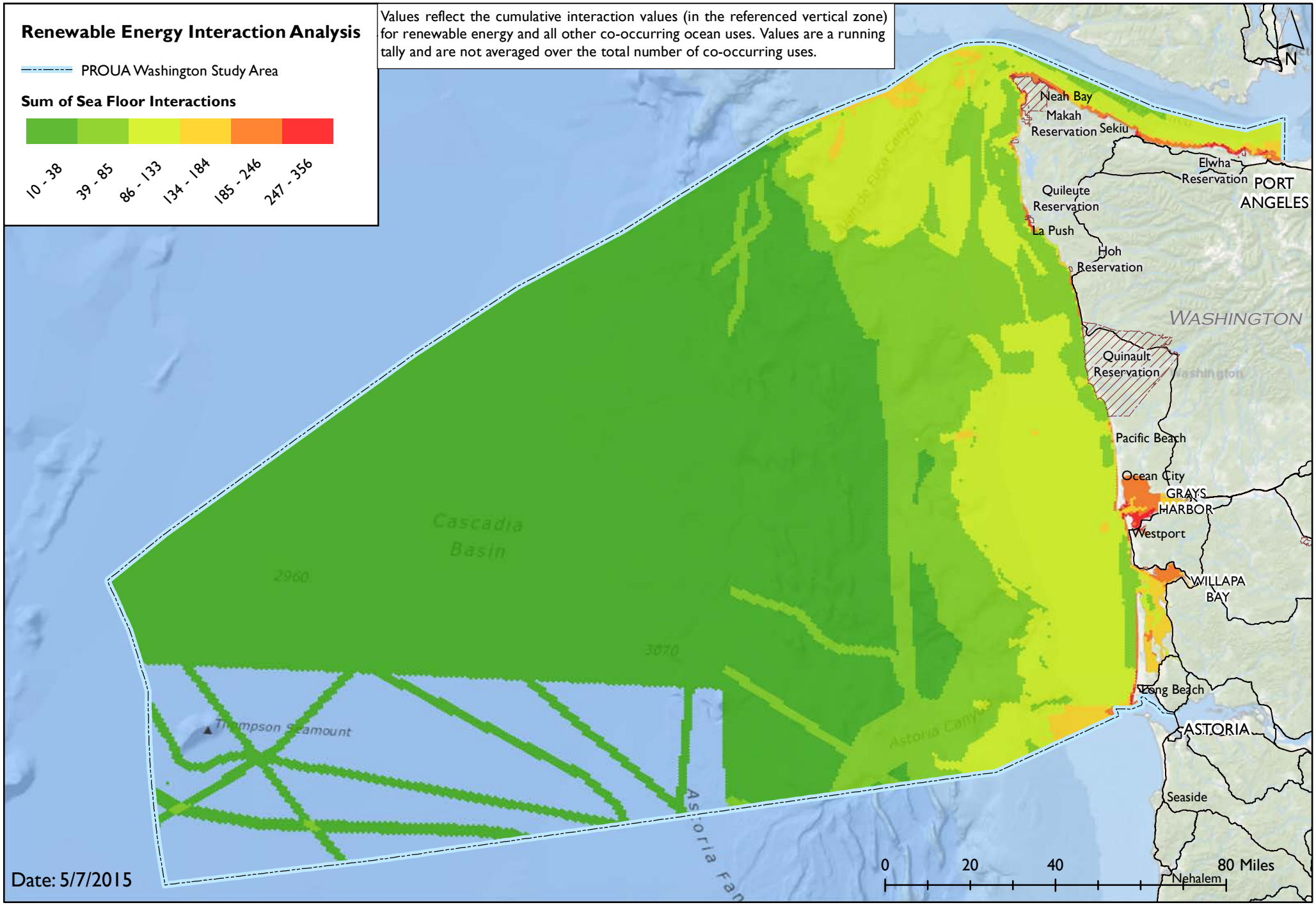

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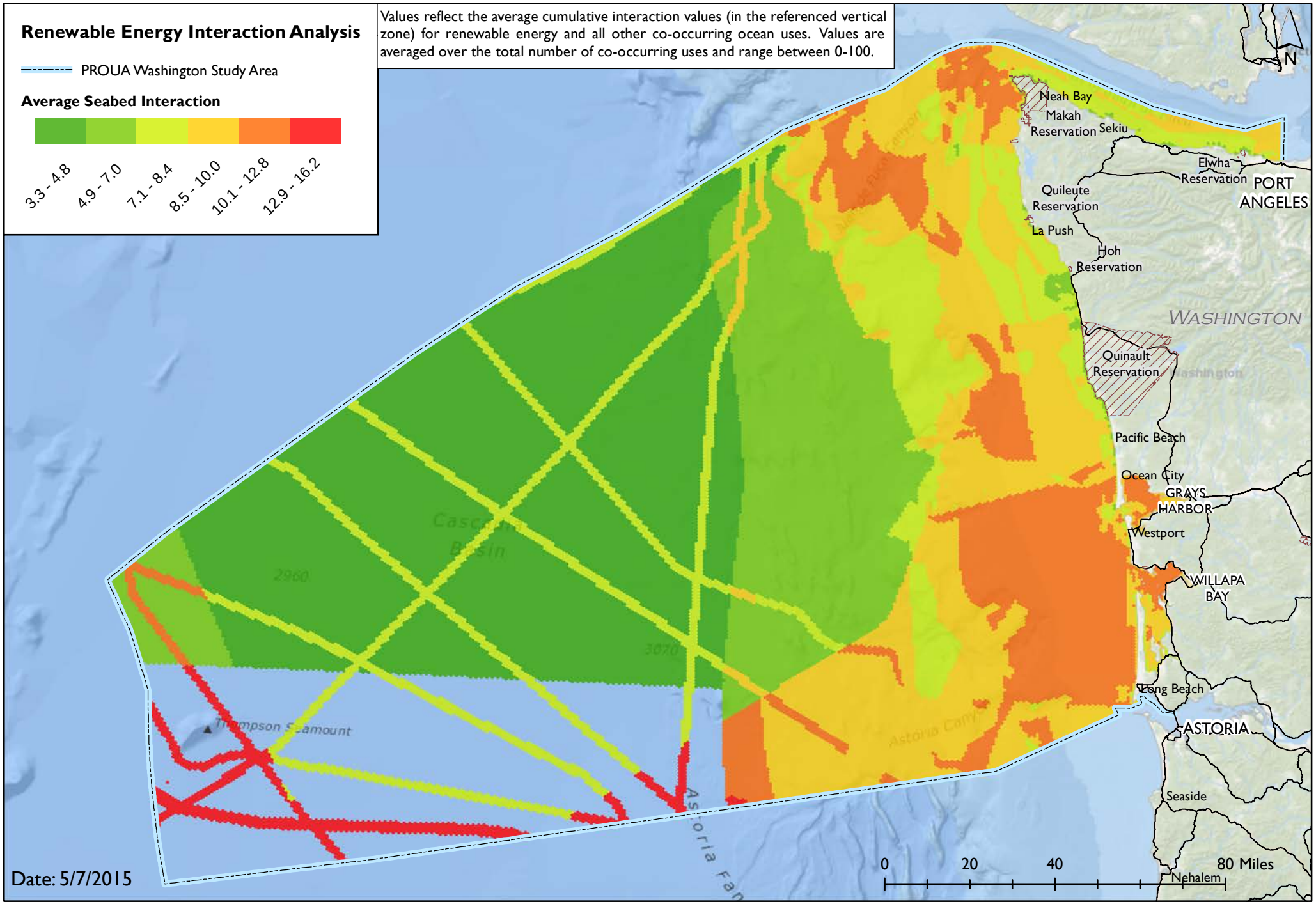

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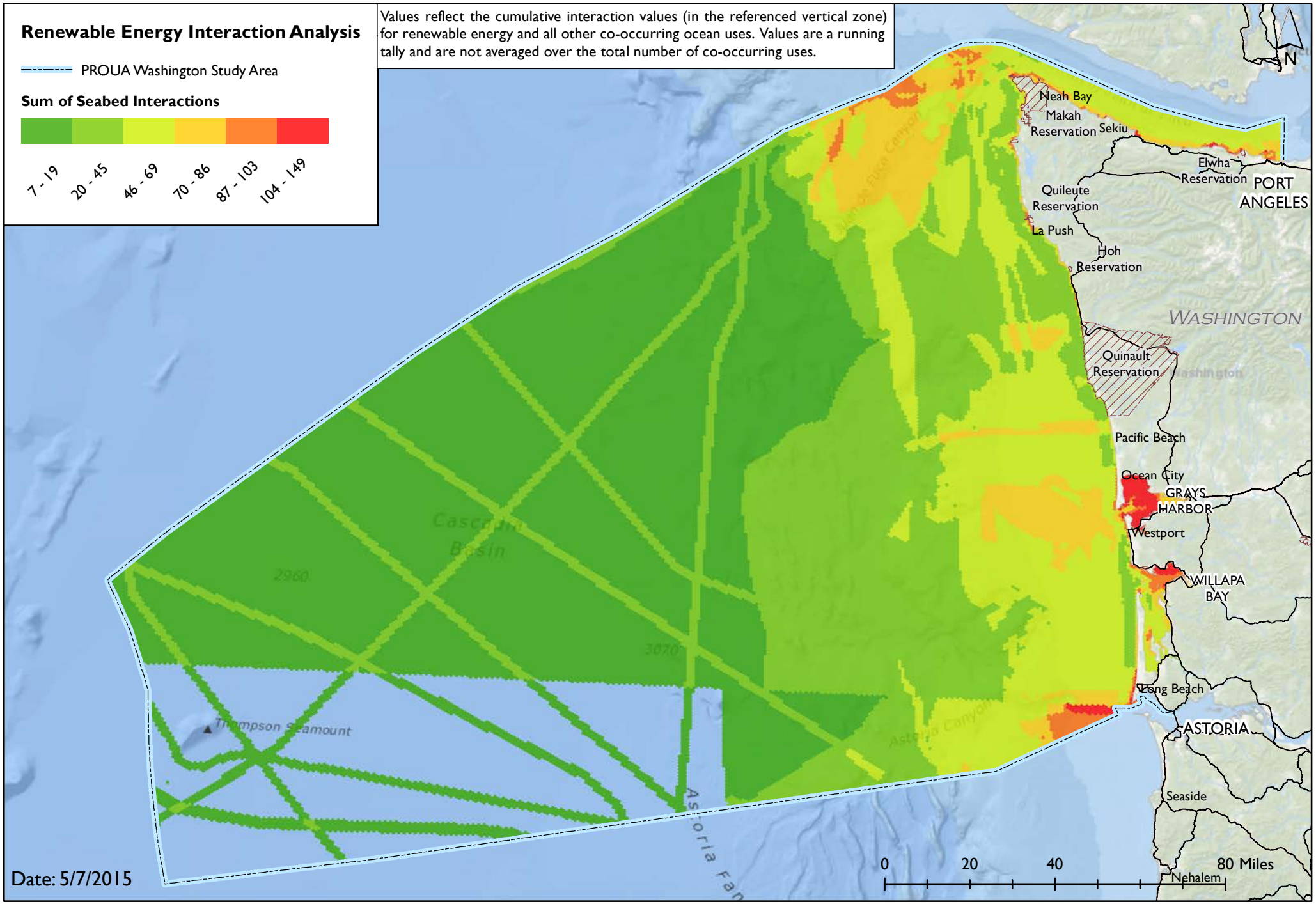

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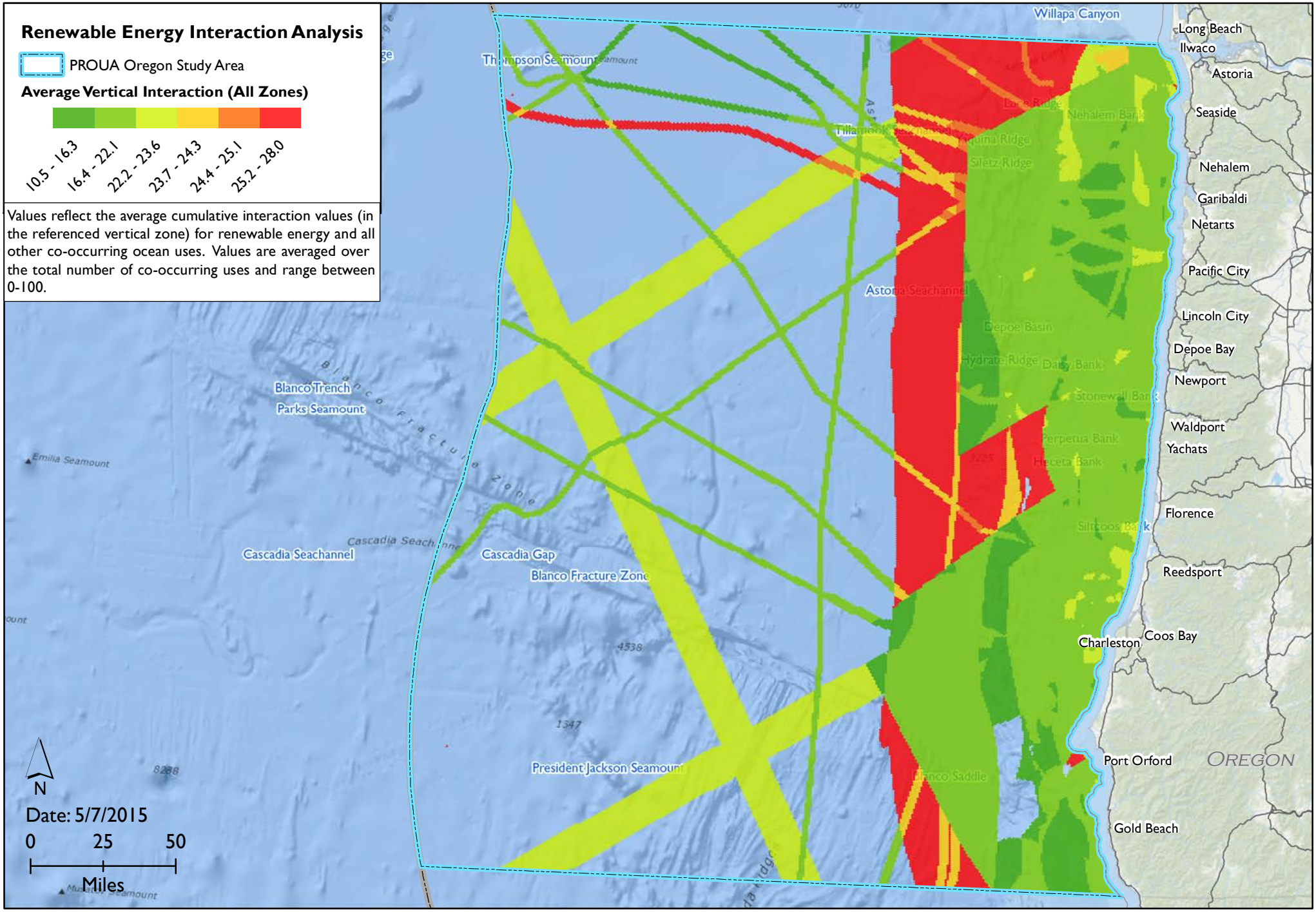

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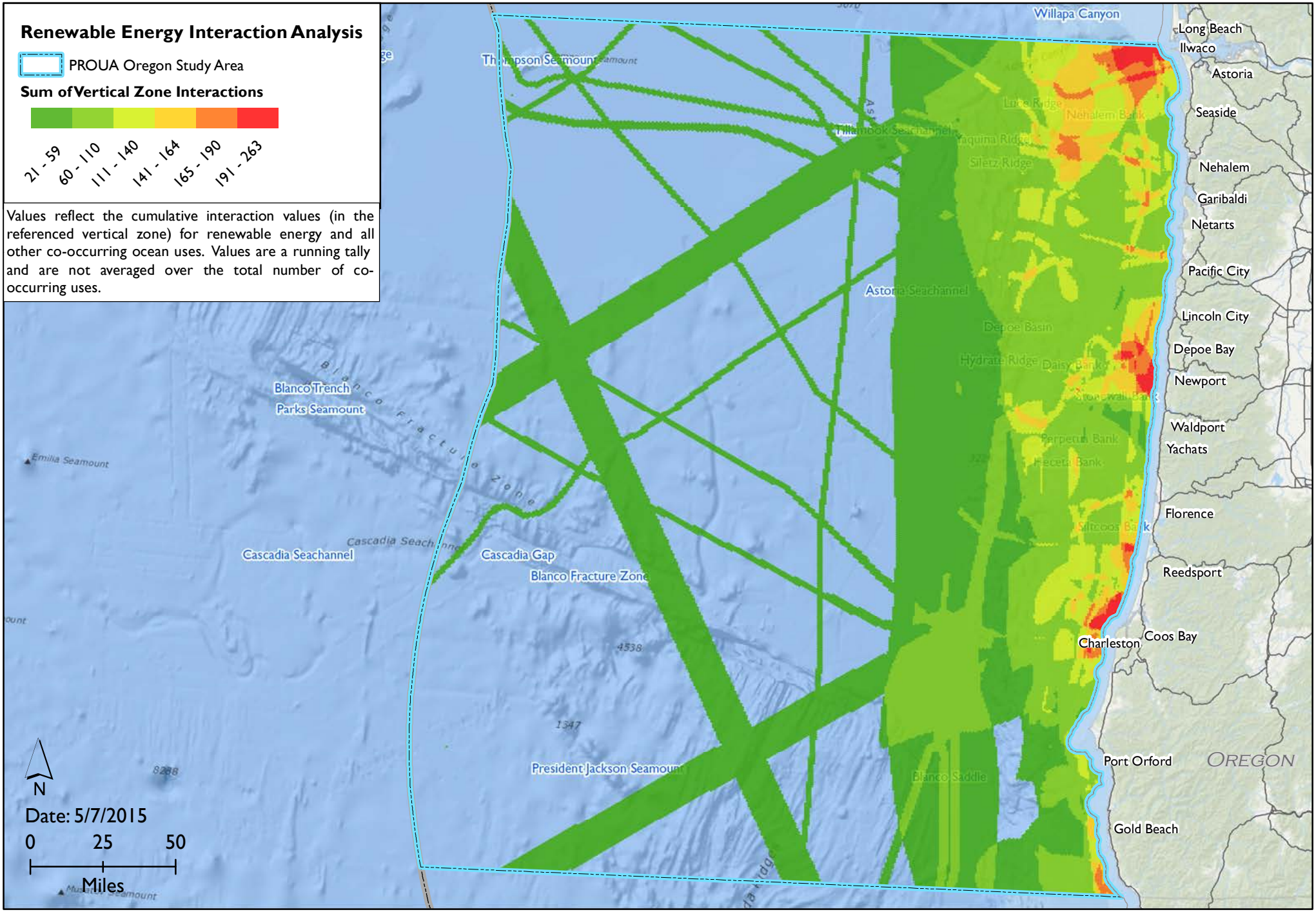

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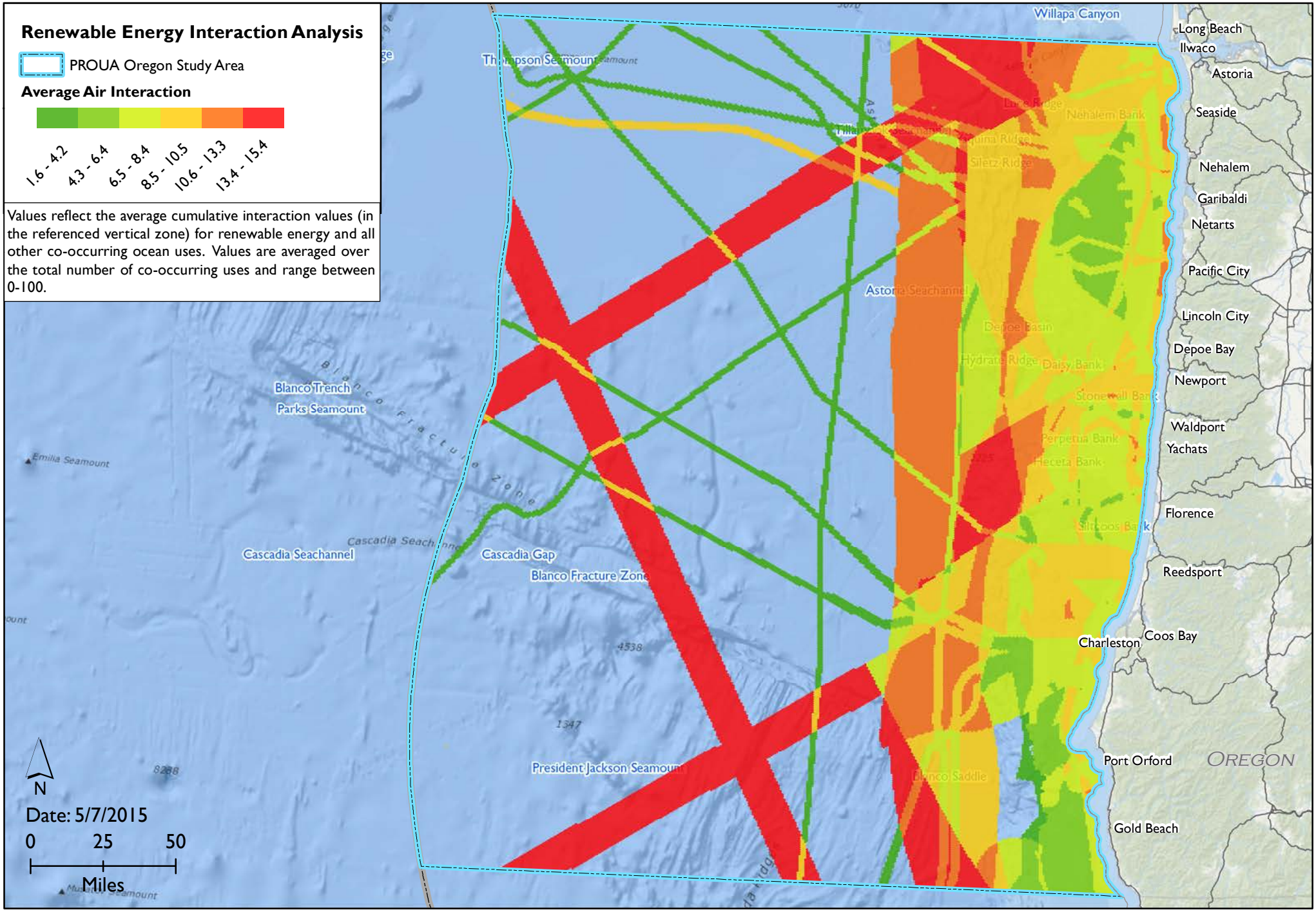

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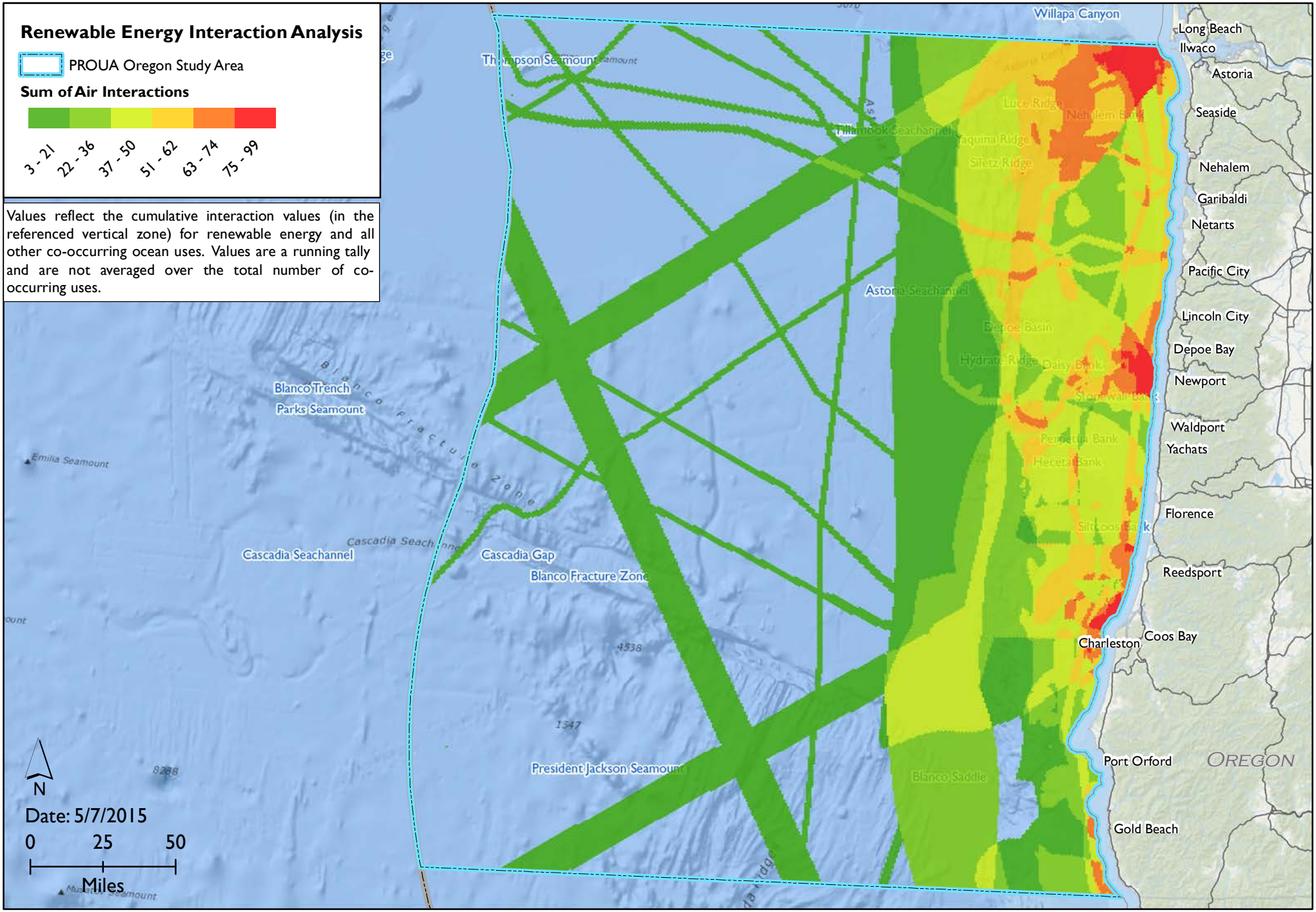

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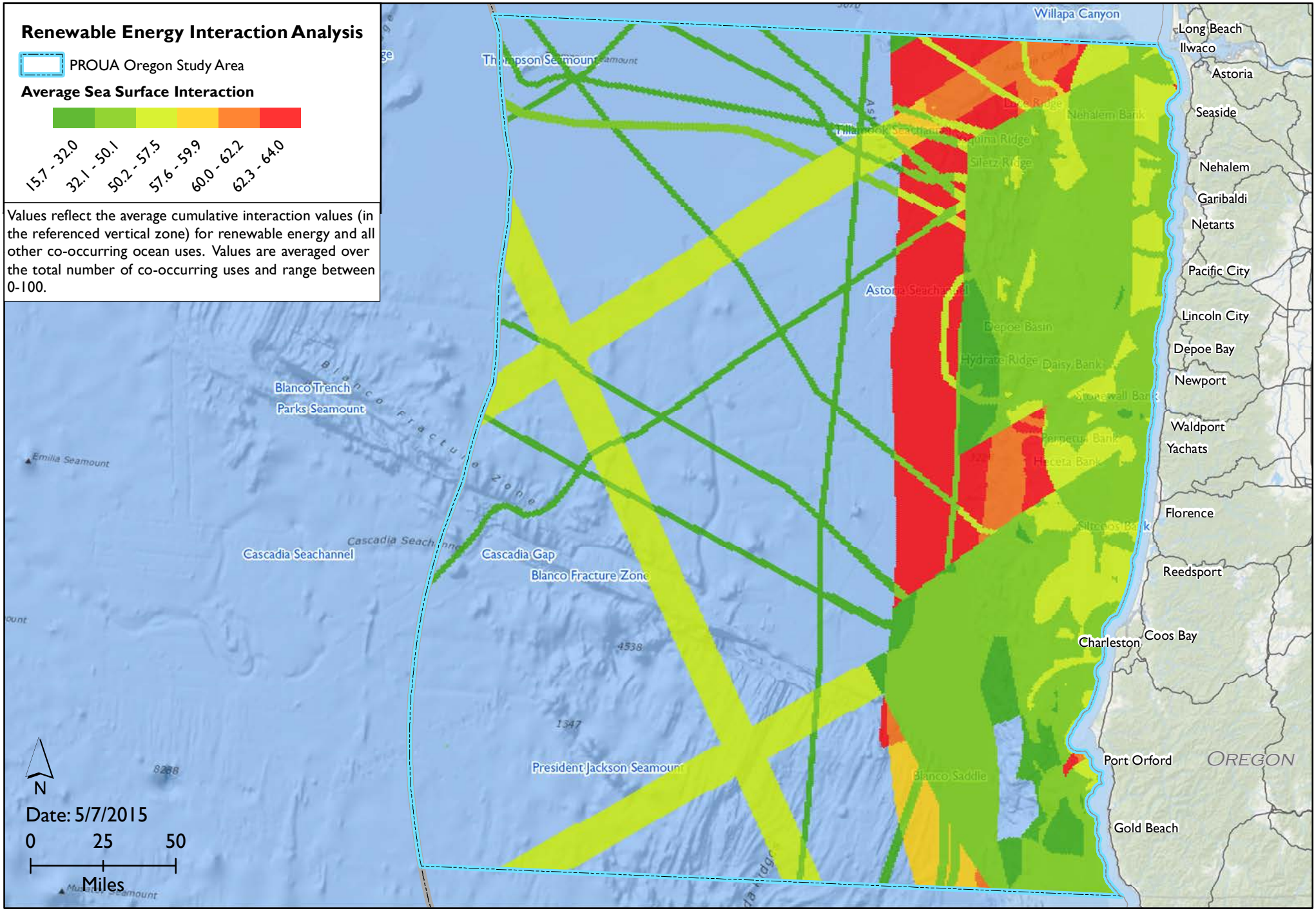

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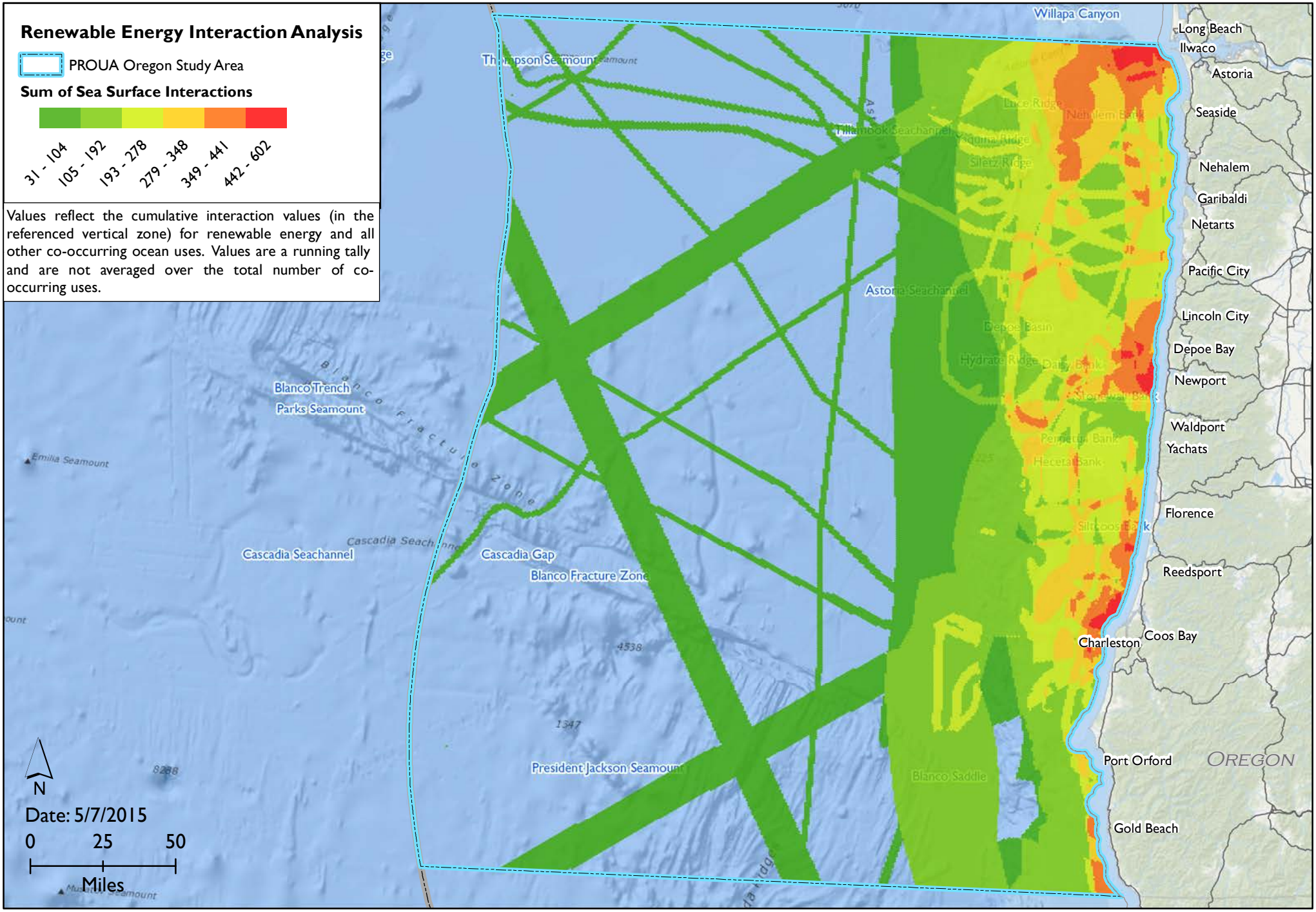

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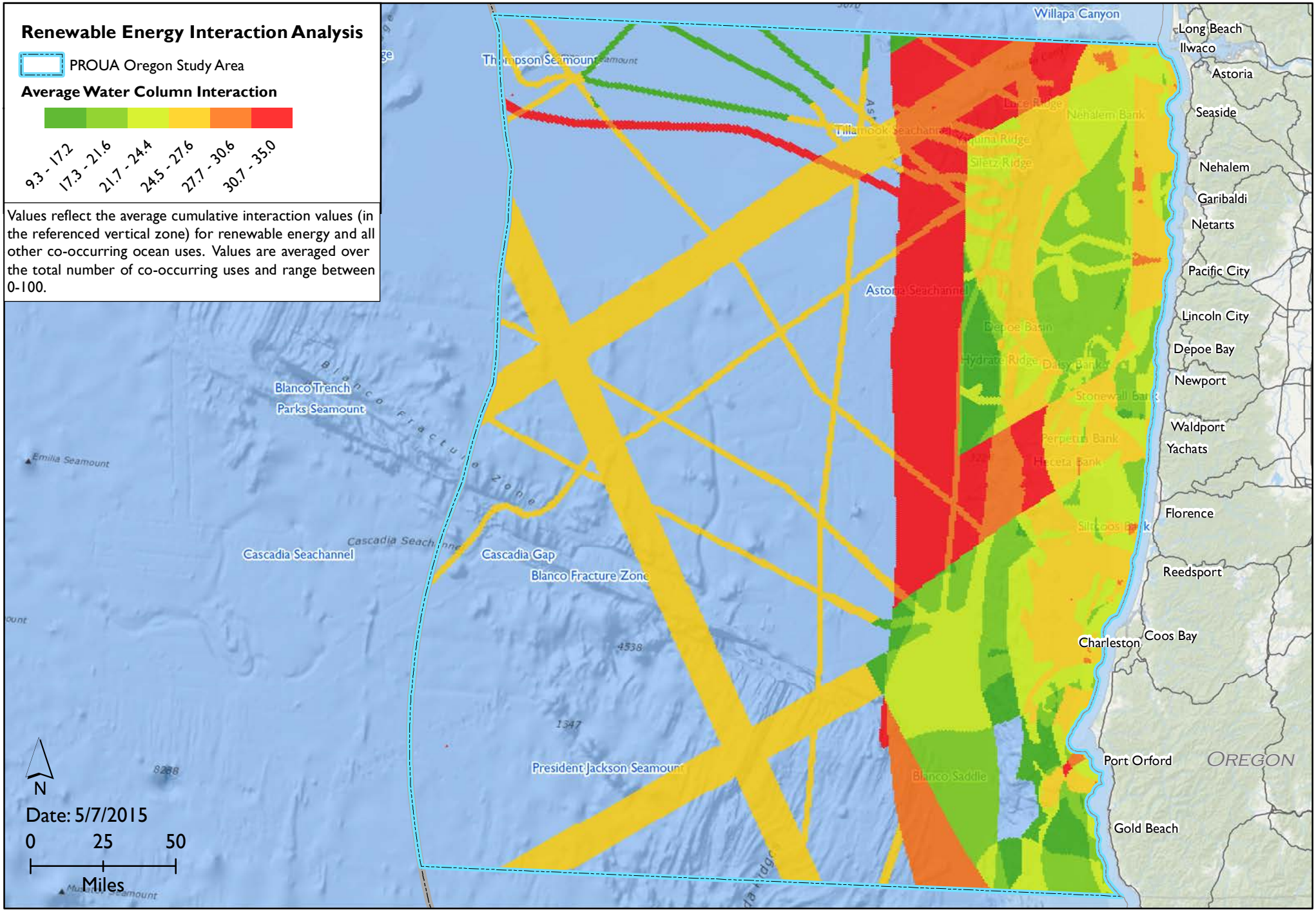

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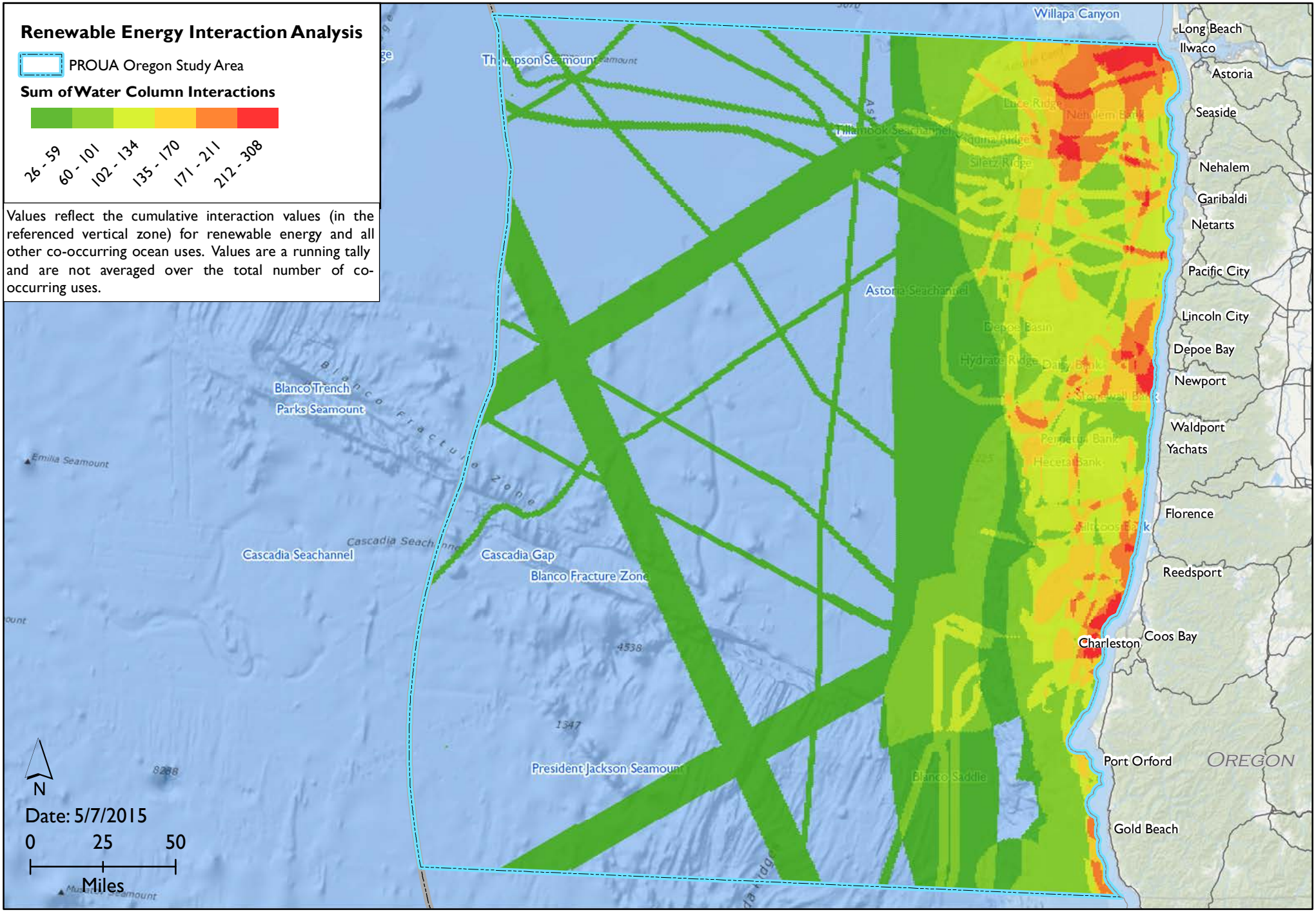

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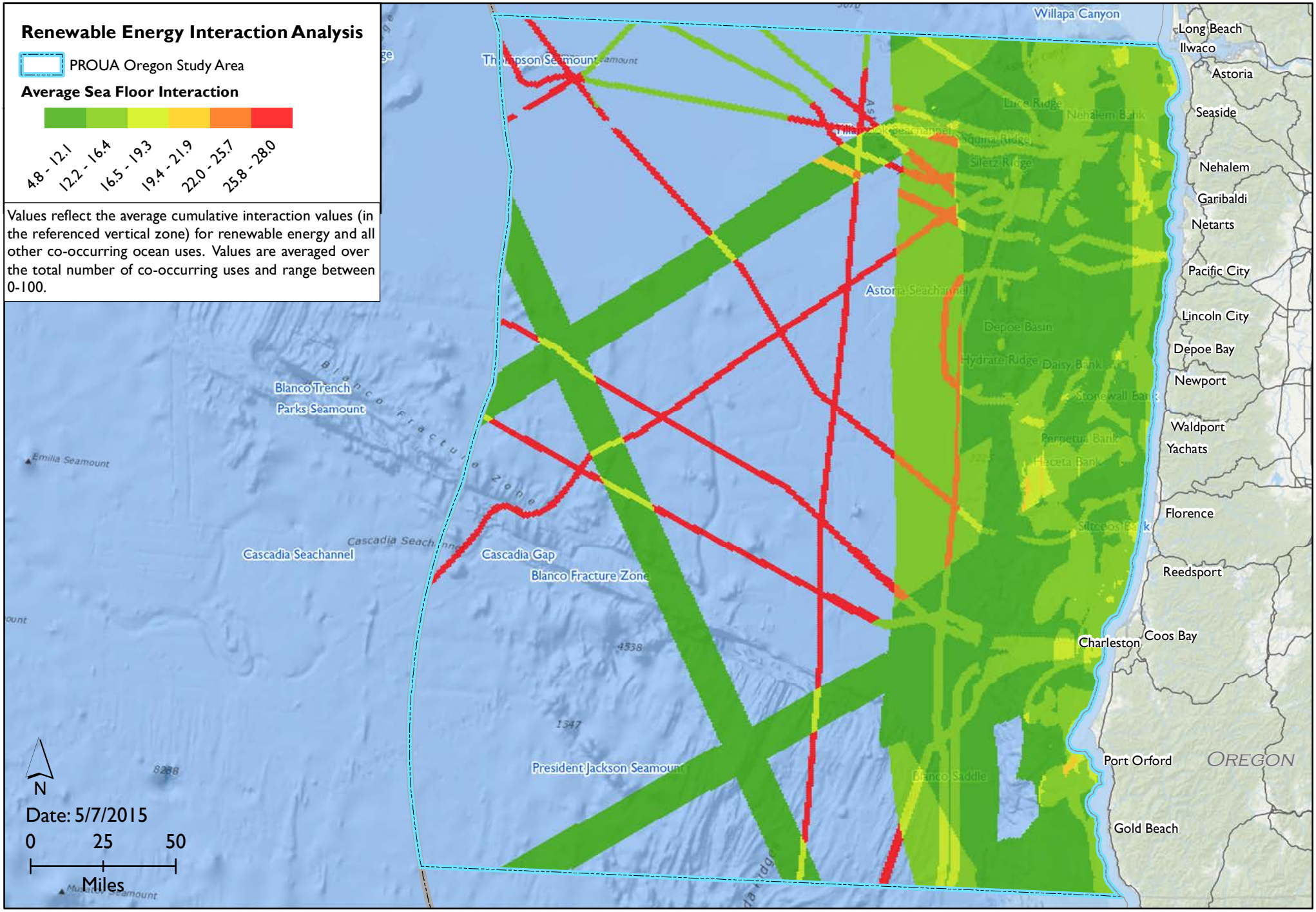

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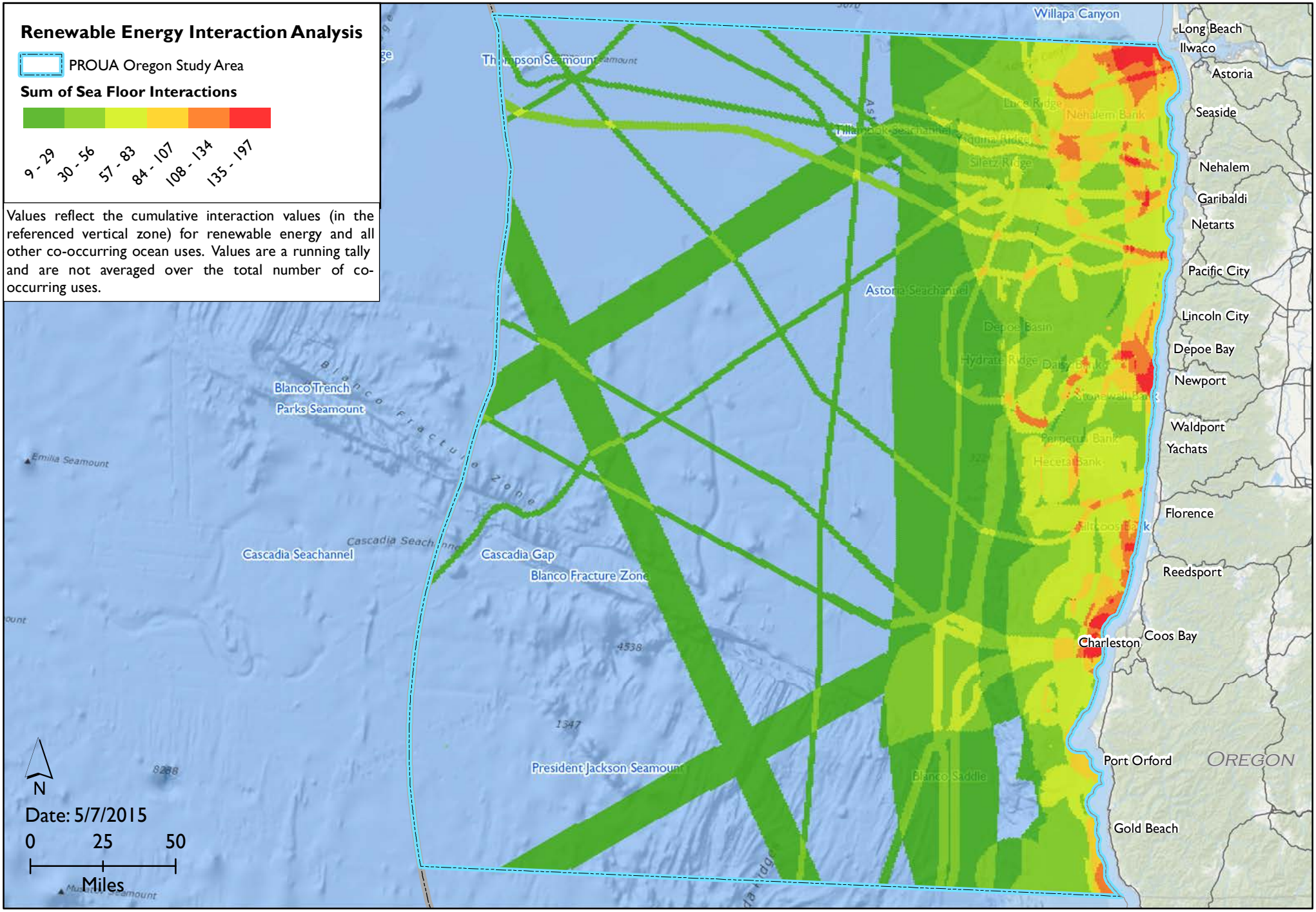

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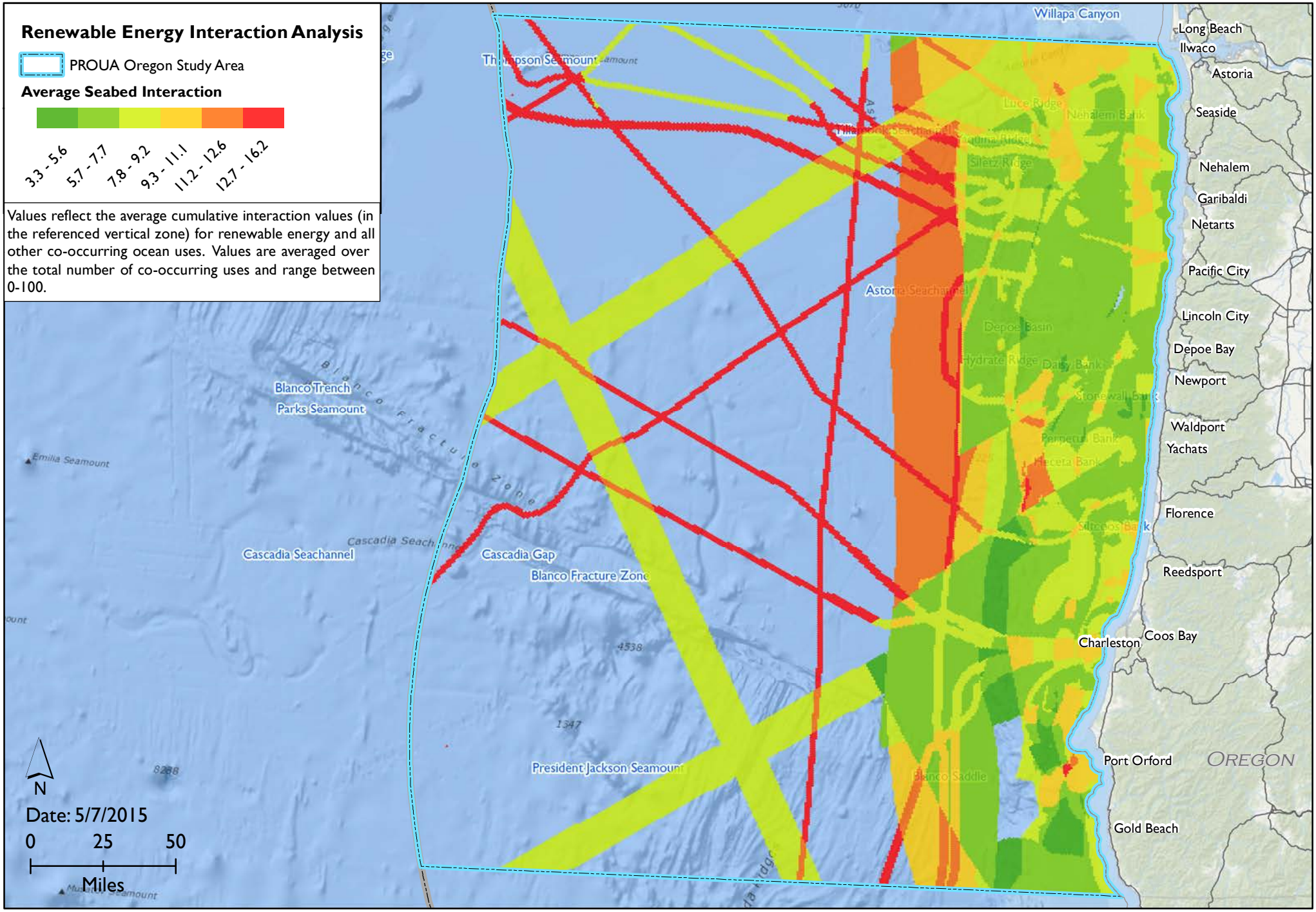

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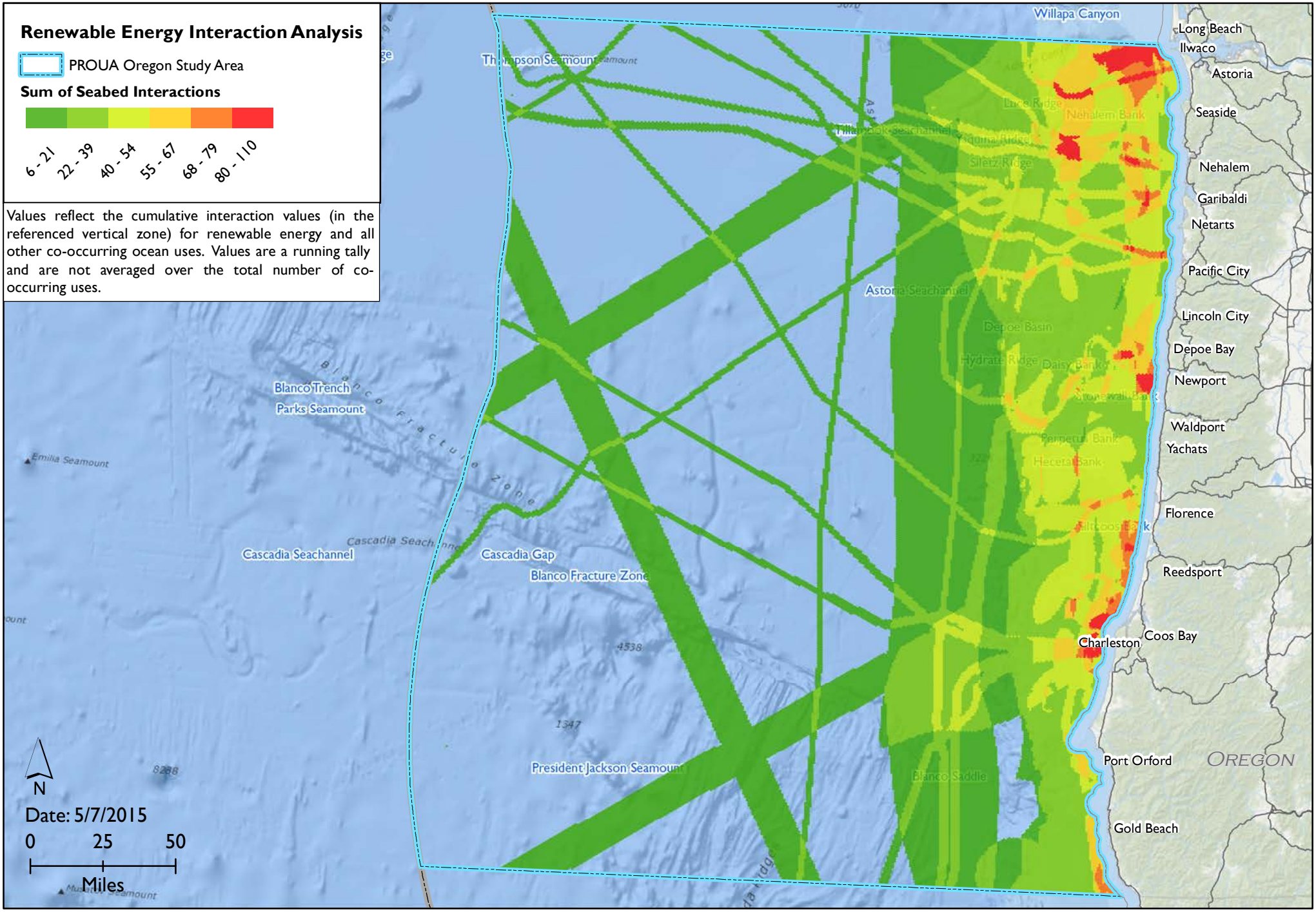

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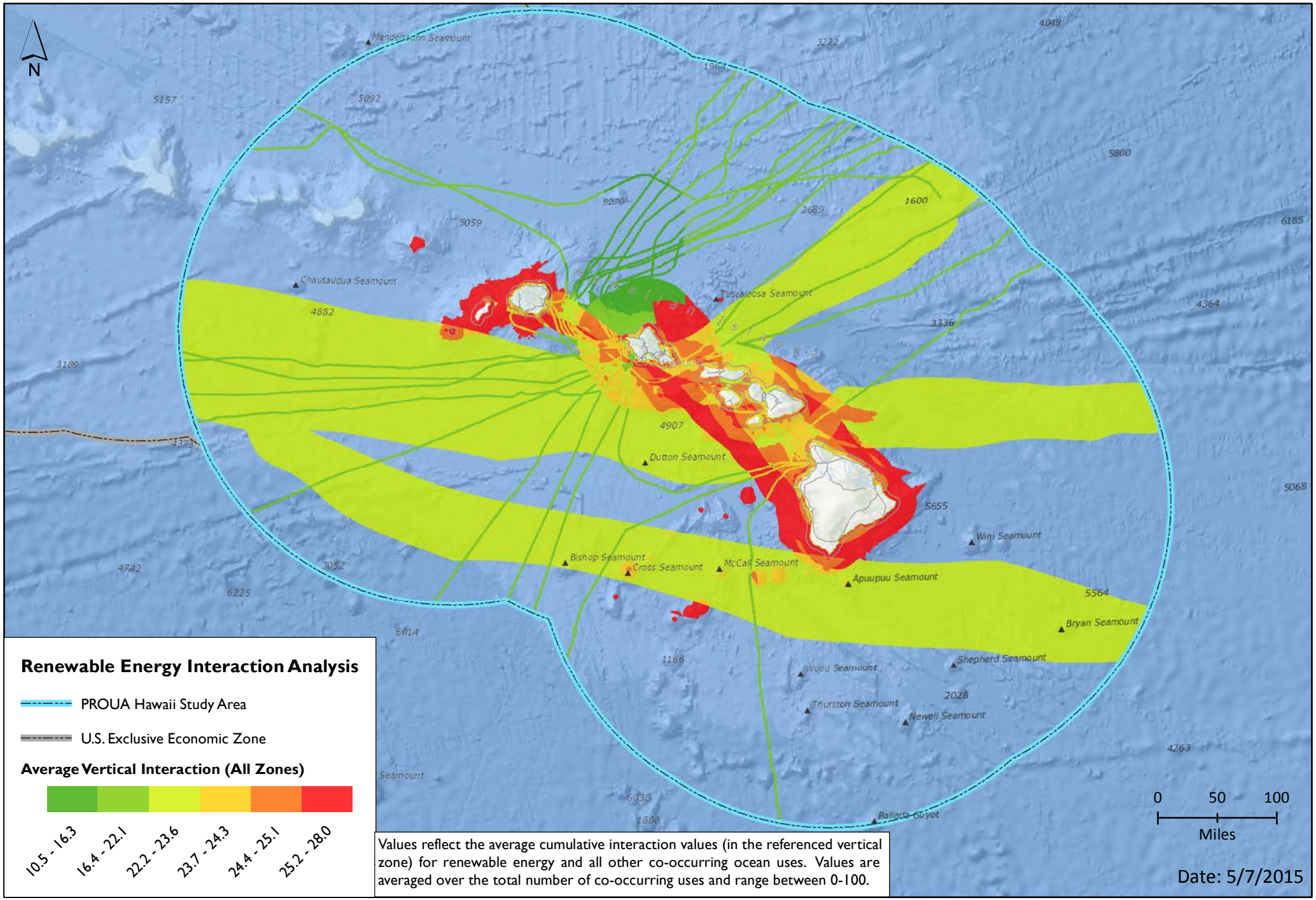

Values reflect the average cumulative interaction values (in the referenced vertical zone) for renewable energy and all other co-occurring ocean uses. Values are averaged over the total number of co-occurring uses and range between 0-100.

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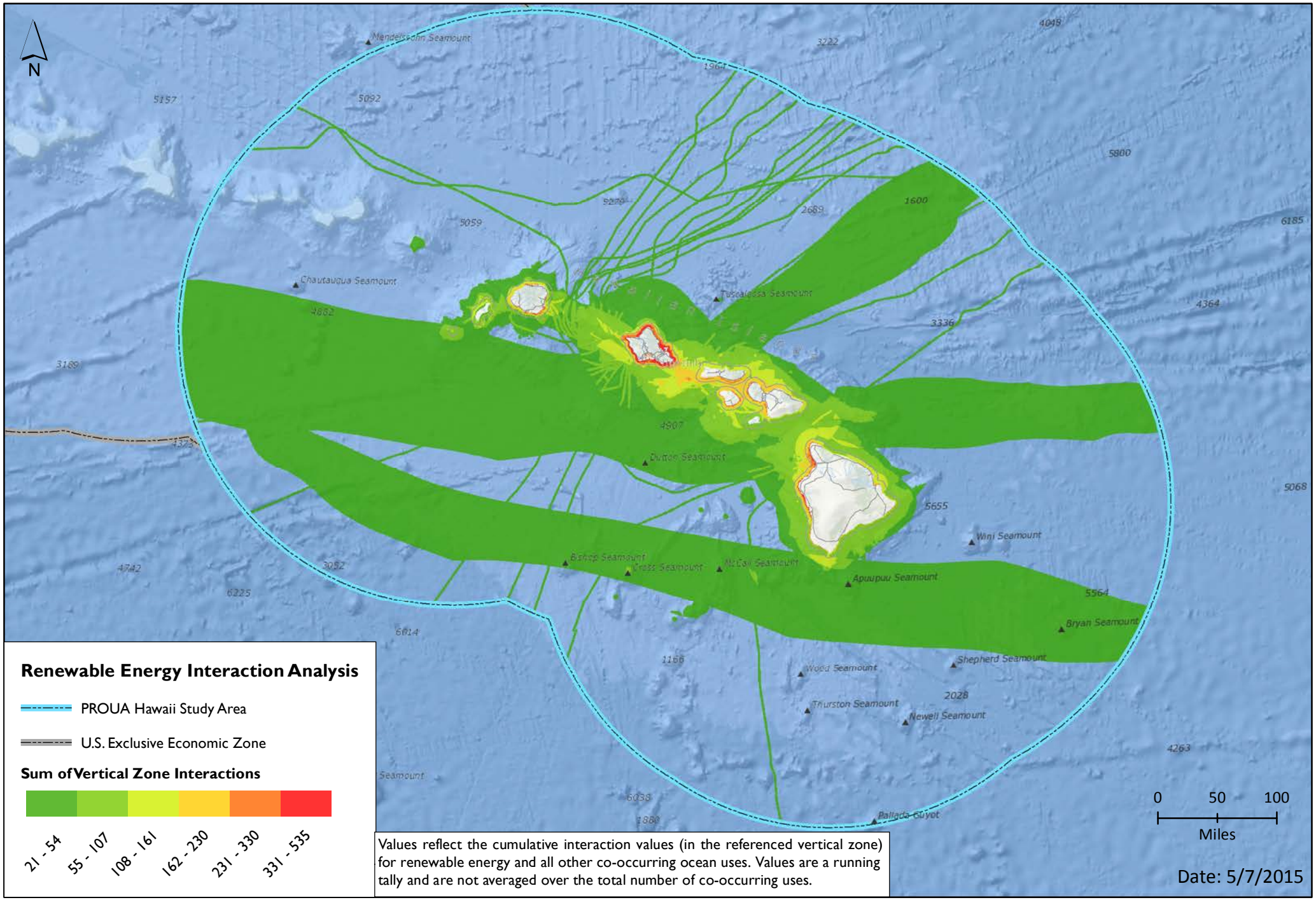

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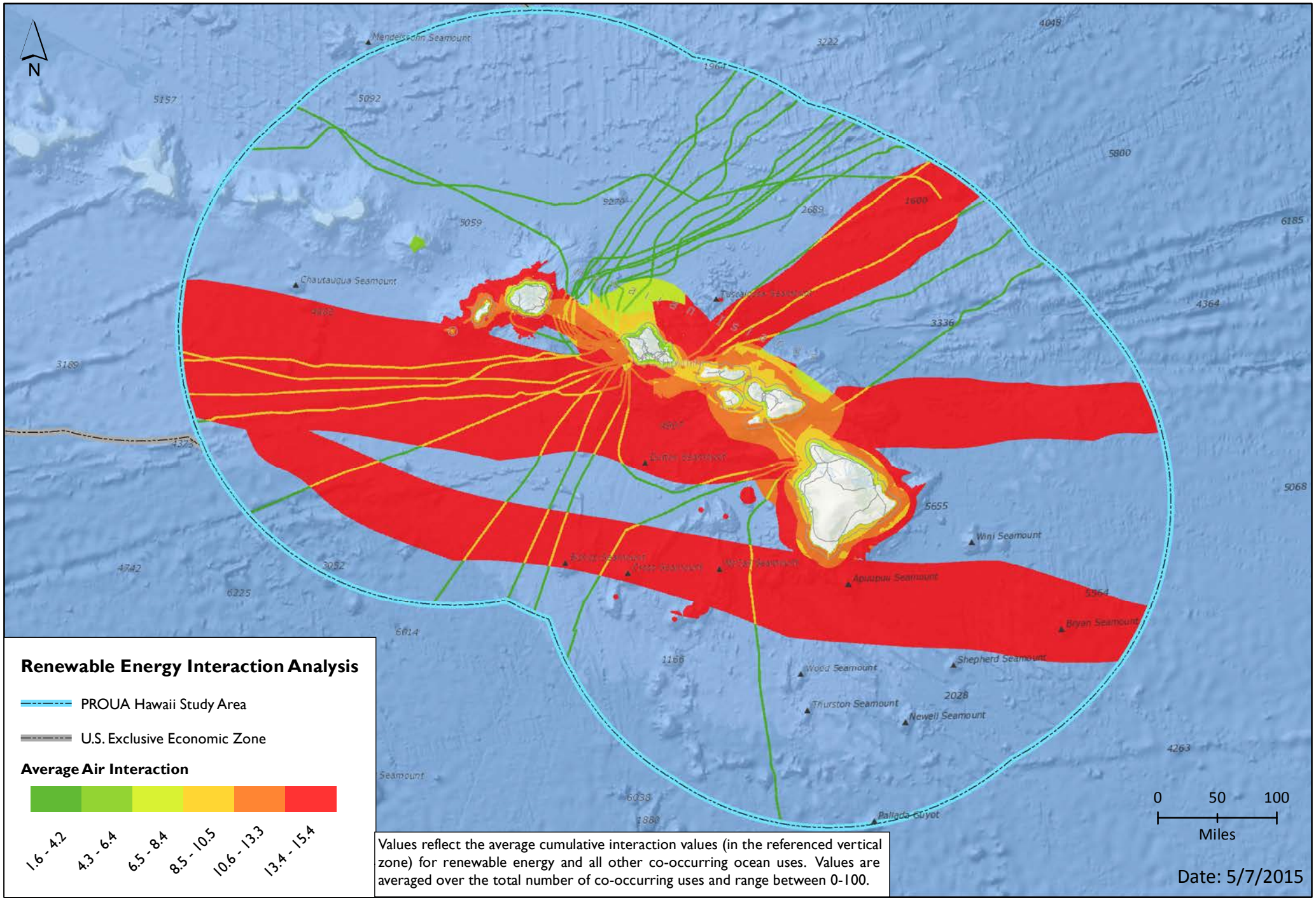

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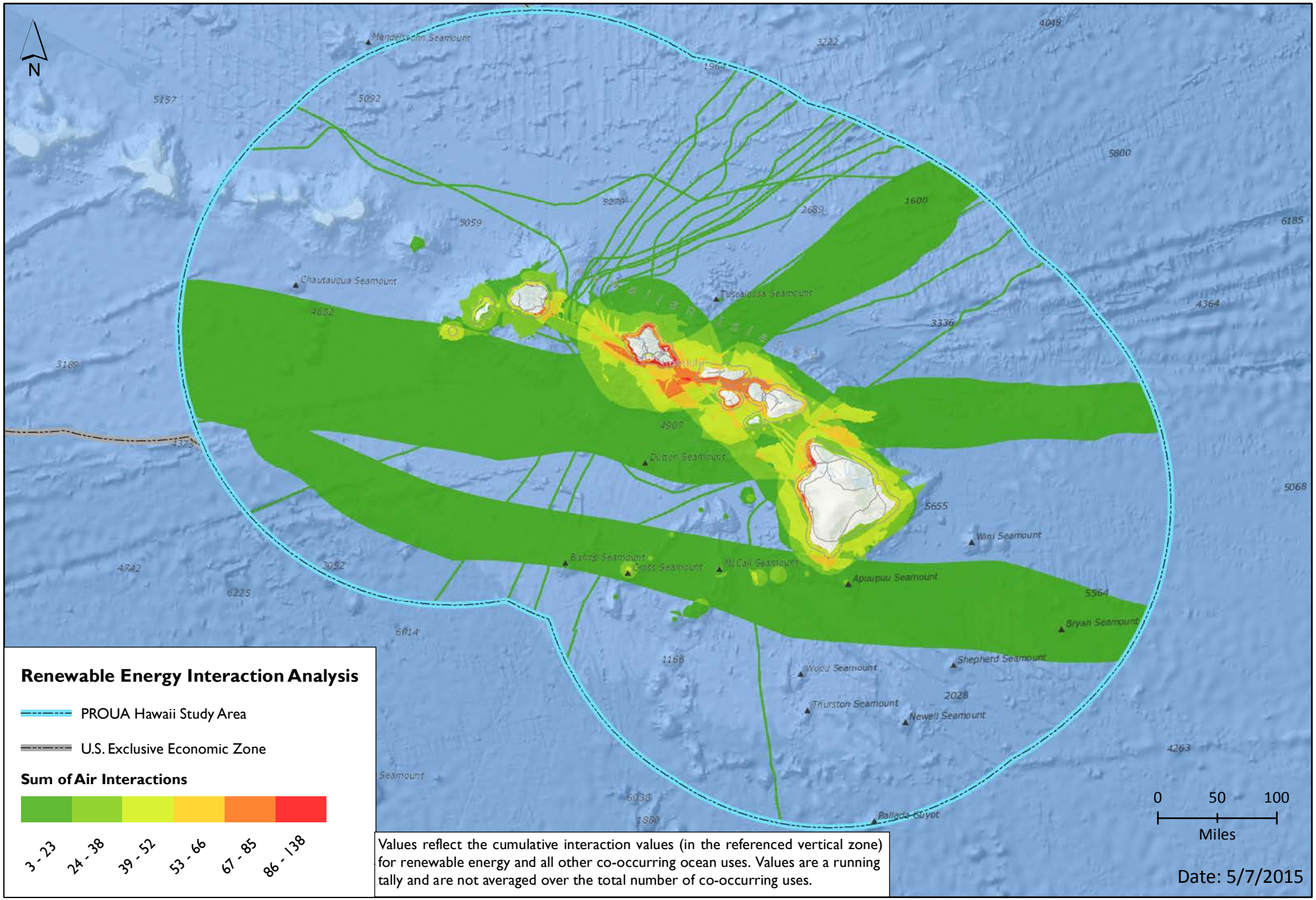

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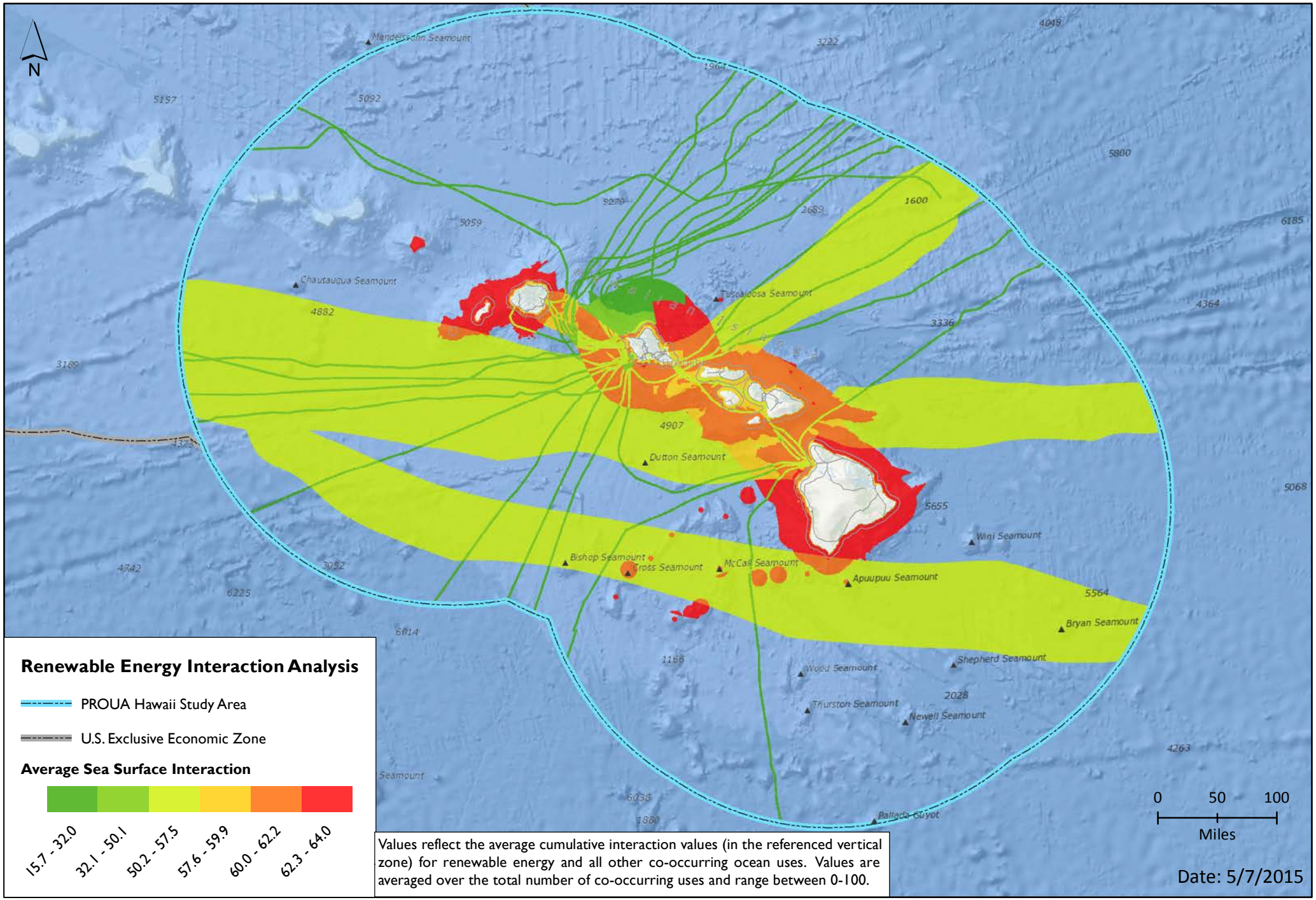

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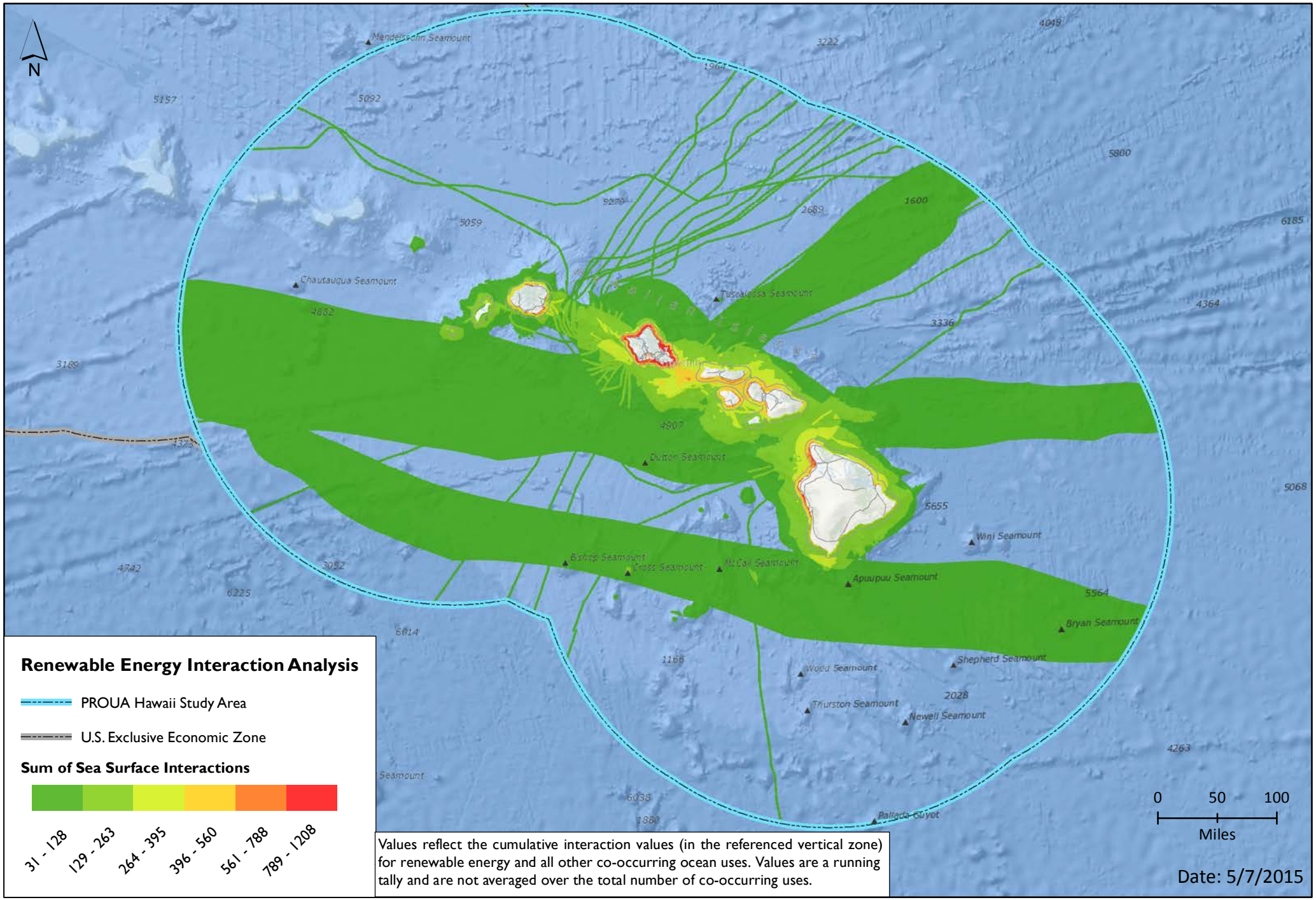

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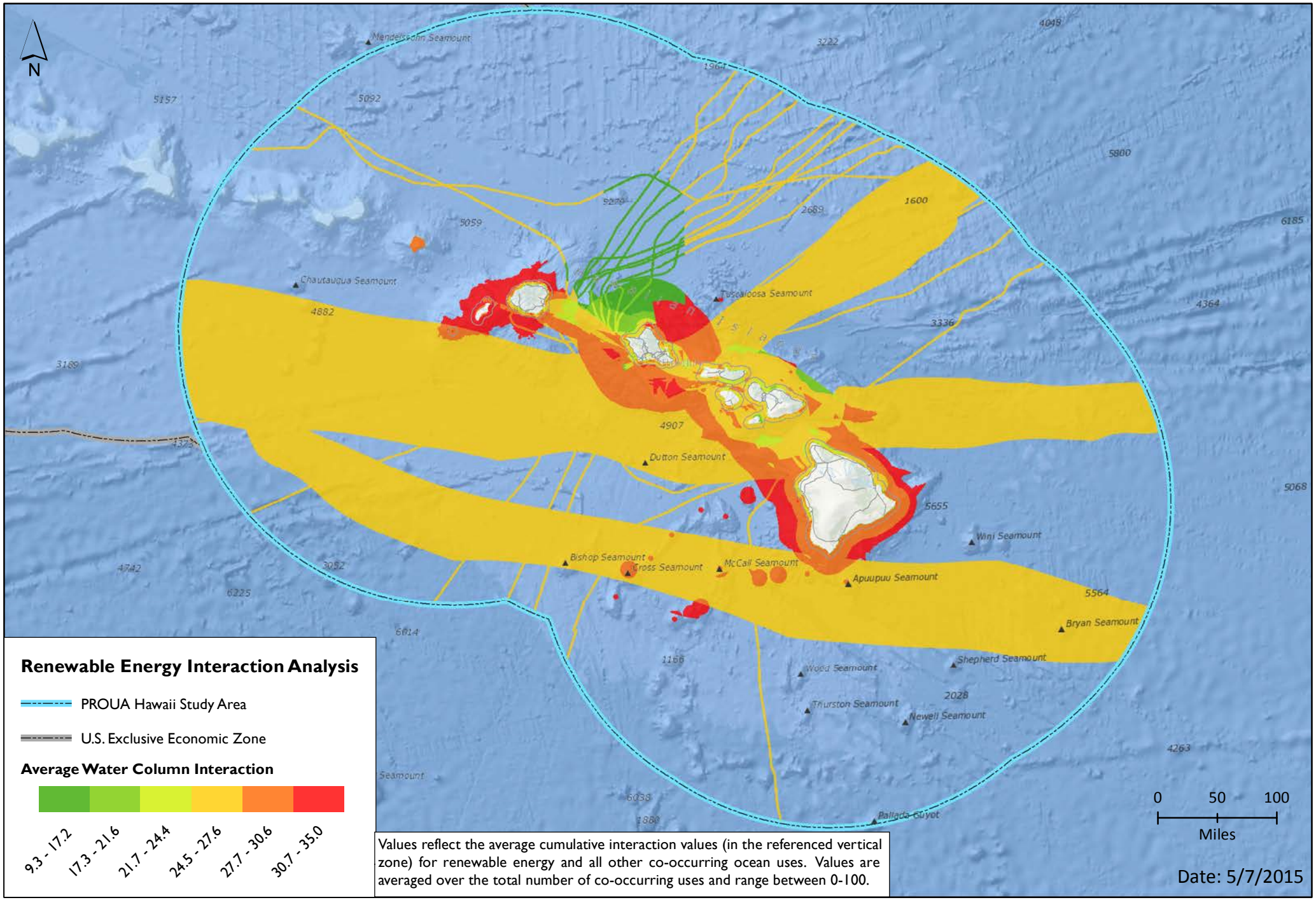

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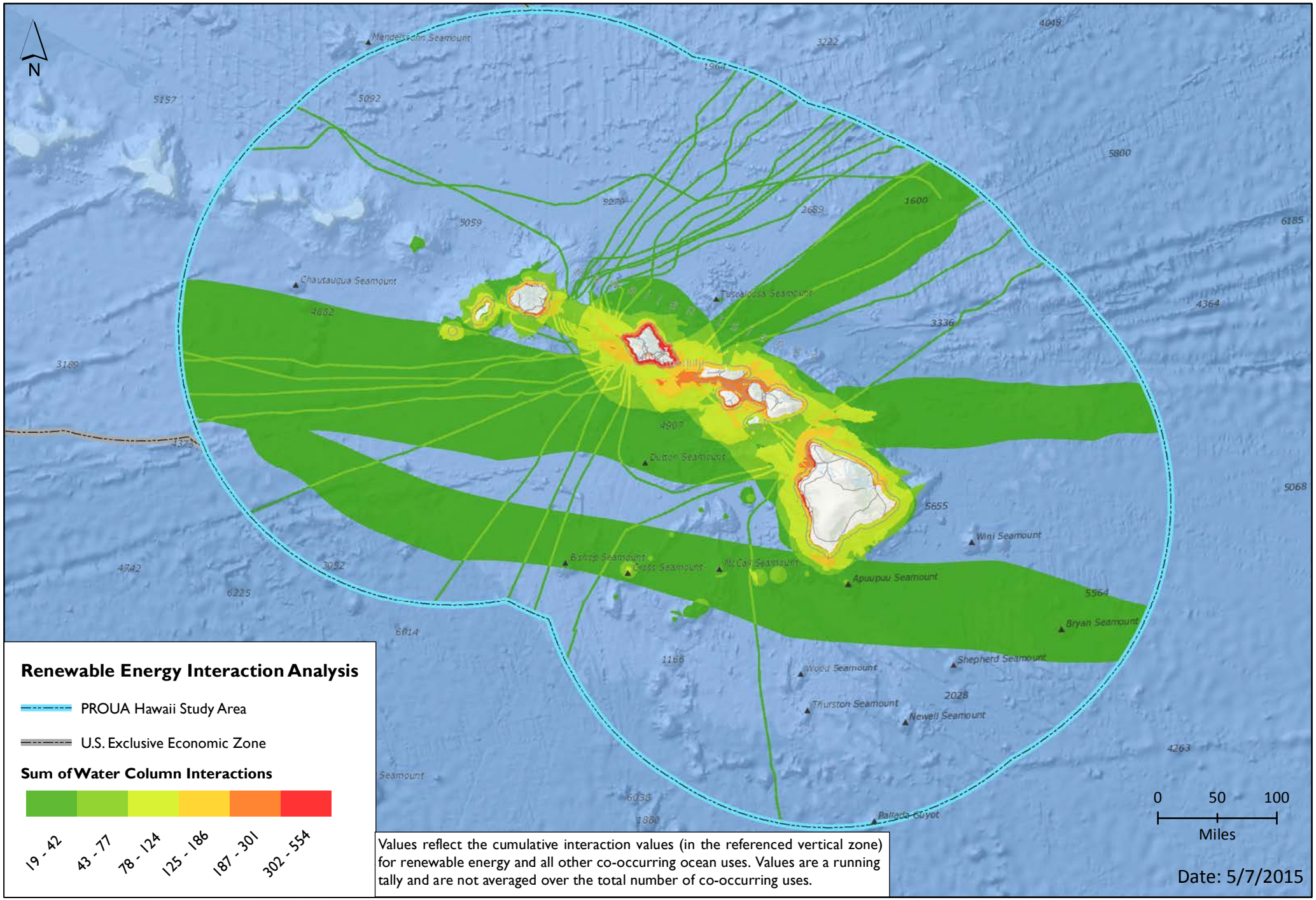

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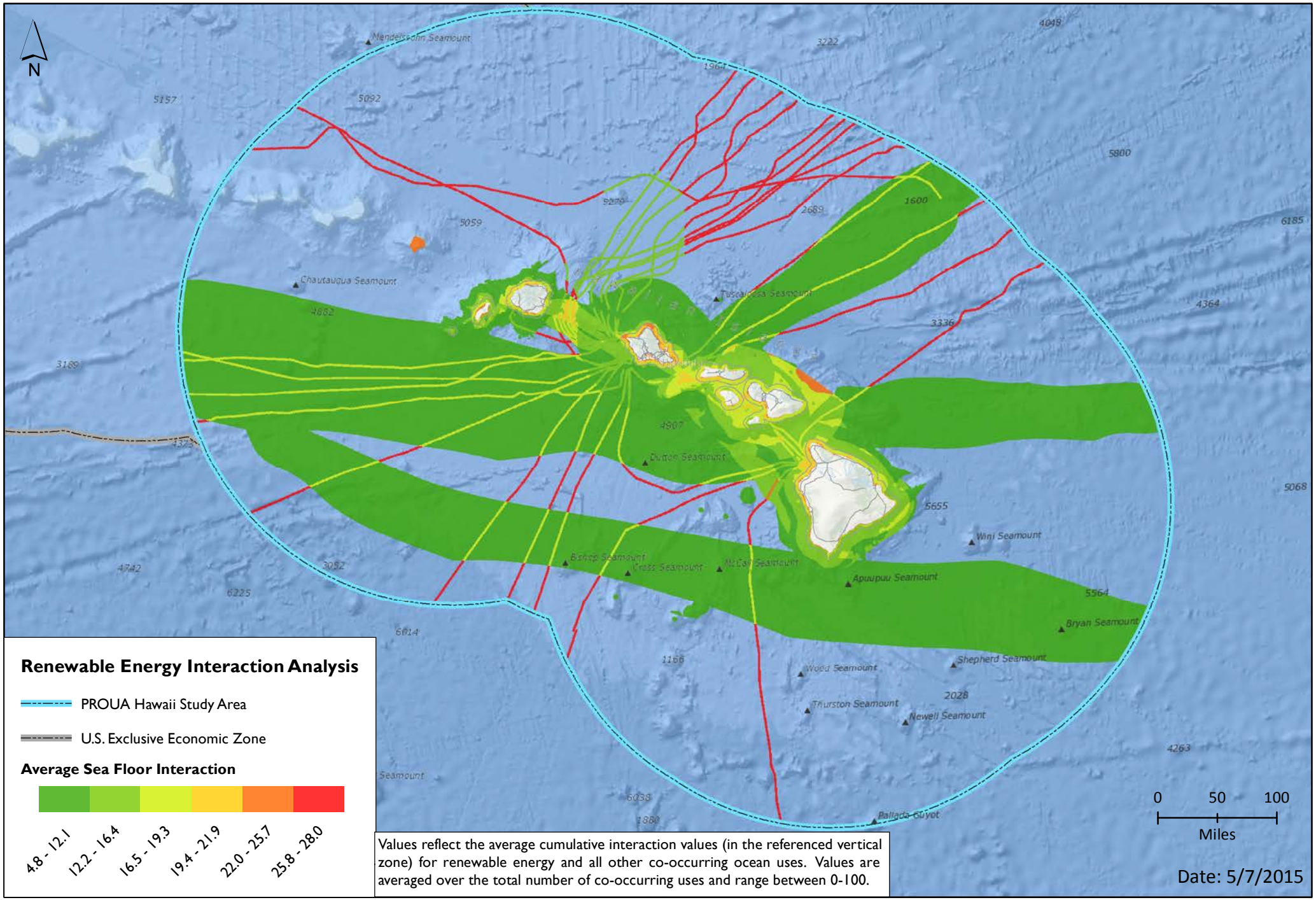

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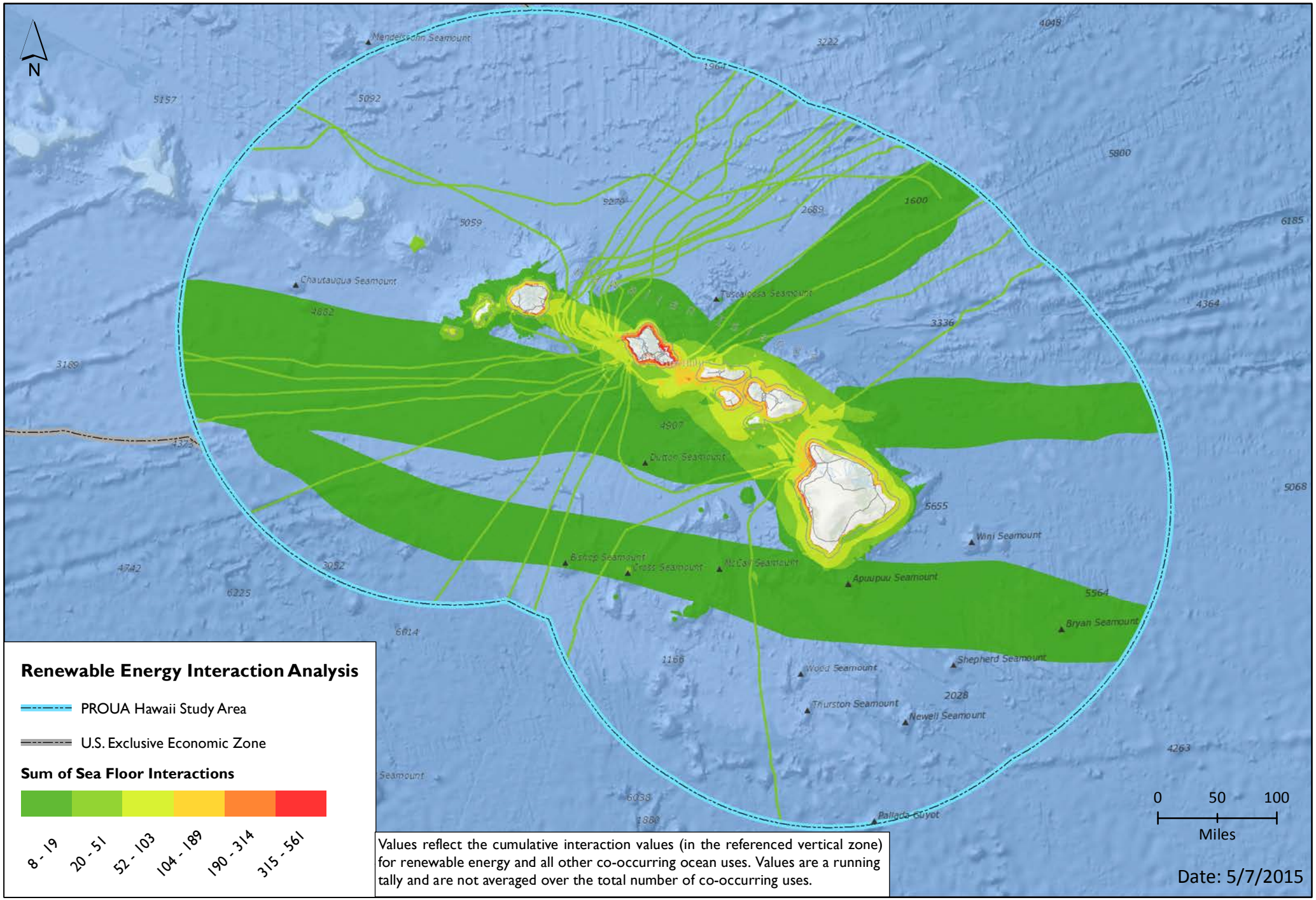

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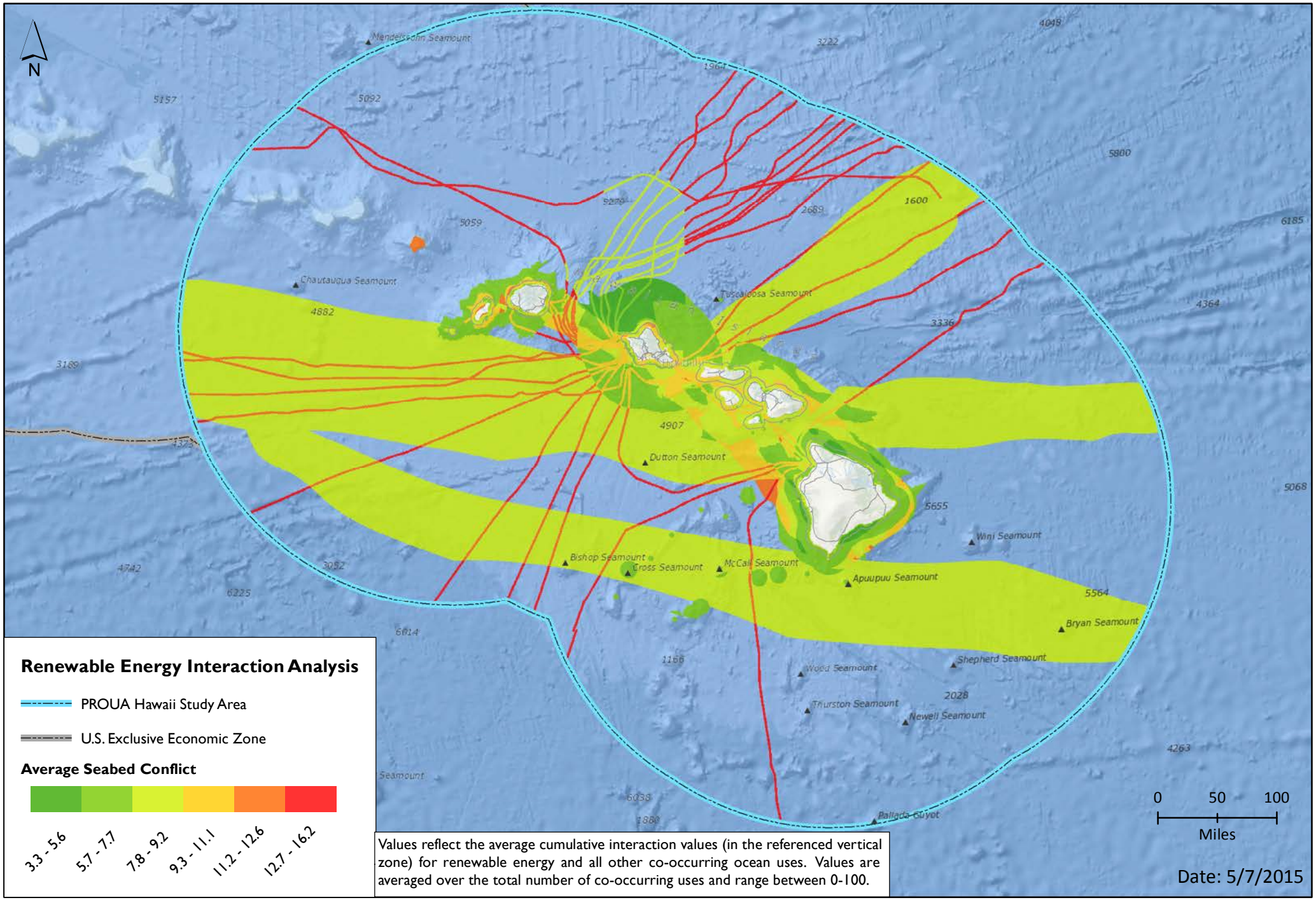

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Date: 5/7/2015

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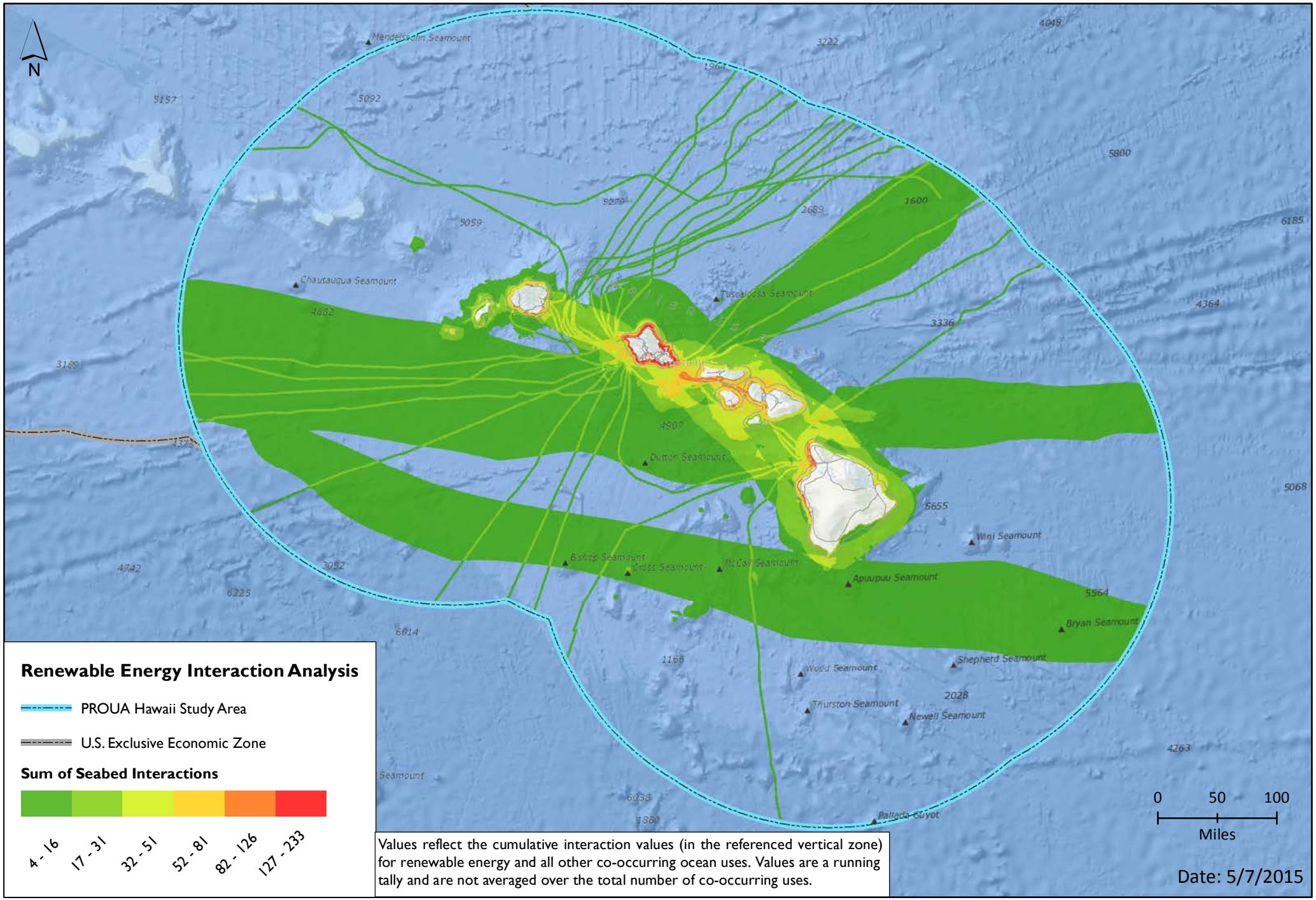

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