Environmental Studies Program: Studies Development Plan | FY 2023–2024

Title	Characterization of the Distribution, Movements, and Foraging Habitat of Endangered Leatherback Turtles in Designated Critical Habitat off the U.S. West Coast (PC-23-04)
Administered by	Pacific OCS Regional Office
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Procurement Type(s)	Inter-agency Agreement
Conducting Organization(s)	National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center; with support from UpWell Turtles (NGO)
Total BOEM Cost	TBD
Performance Period	Phase I: FY 2023–2026 (June 2023–October 2025) Phase II: FY 2026–2028 (June 2026–June 2028)
Final Report Due	TBD
Date Revised	August 5, 2022
PICOC Summary	
Problem	The occurrence and habitat use for leatherback sea turtles that occur offshore Oregon and Washington is currently unknown. The absence of these data makes it extremely challenging to accurately assess potential impacts to this species from offshore renewable energy development.
Intervention	Systematic aerial surveys and telemetry tagging of leatherback sea turtles in Oregon and Washington waters will be conducted to understand their abundance, distribution, and habitat use in this region, and compare with existing data for offshore central California.
Comparison	The data will form the baseline of comparison to understand potential impacts from offshore renewable energy development offshore Oregon and Washington, as well as any BOEM-related activities that may occur in these areas.
Outcome	The combined data will 1) fill a key data gap on leatherback distribution, abundance, and habitat use off northern California, Oregon, and Washington, and 2) provide a more robust sample size to assess leatherback use of the central California marine ecosystem.
Context	Northern California, Oregon, and Washington

BOEM information need(s) to be addressed: This project will provide BOEM and NMFS with information essential for evaluating and conducting environmental reviews (Endangered Species Act [ESA] and National Environmental Policy Act) of proposed BOEM-permitted activities, including renewable energy activities, and for mitigating potential impacts on endangered leatherbacks and their prey. These data will fill a key data gap on leatherback distribution, abundance, and habitat use offshore northern California, Oregon, and Washington.

Background: Pacific leatherback turtles, *Dermochelys coriacea*, are federally listed as endangered under the ESA and are recognized as being under threat of extirpation within the Pacific Ocean. Leatherbacks that nest at beaches in the tropical western Pacific migrate across the Pacific to forage on seasonally abundant sea nettles, *Chrysaora fuscescens*, in two known areas off the U.S. West Coast: central California and Oregon-Washington (OR-WA) between June and November. Both areas are designated as Leatherback Critical Habitat (77 FR 4169, 27 February 2012). Since 2000, integrated aerial survey, telemetry, and in-water sampling have been successfully conducted off central California to characterize leatherback distribution, movements, abundance, habitat use, foraging behavior, and health. Some information on leatherback occurrence is available off OR-WA, but no estimate of leatherback abundance is available for that region. Previous studies were very limited seasonally, and had limited sample sizes. NOAA aerial surveys designed to document leatherback occurrence off OR-WA during 2010, 2011, 2014, and 2021 and telemetry tracks of three leatherback turtles tagged at western Pacific nesting beaches that foraged off OR-WA have revealed that leatherback use of this area is highly variable, patchy, and—at present—spatially unpredictable (Benson et al. 2011, 2020; NMFS and USFWS 2020). This study would significantly expand the dataset.

Objectives: Characterize the distribution, movements, and foraging habitat of endangered leatherback turtles in designated Critical Habitat offshore northern California, Oregon, and Washington.

Methods: This is a two-phase study in which Phase I will inform the feasibility of Phase II.

Phase I: Leatherback occurrence in the study area is largely unknown; therefore, this first phase will focus on three years of replicated aerial surveys to document distribution and estimate abundance via line transect methodology. If leatherbacks are routinely sighted in the first two years, the third year of aerial surveys will support satellite and acoustic telemetry efforts to identify movements, following at-sea capture of leatherbacks, using a specially designed leatherback capture vessel complemented by vessel-based telemetry. The plane will guide the boat to surfacing leatherbacks. Sampling will be conducted from early June to early October during leatherback foraging season, targeting waters offshore northern California, including the Humboldt Wind Energy Area, Oregon, and Washington.

Phase II: Following successful detection of leatherback sea turtles for Phase I, Phase II proposes two additional years of satellite and acoustic telemetry to identify movements following at-sea capture of leatherbacks using a specially designed leatherback capture vessel, with plane support to guide the boat to surfacing leatherbacks and suction-cup attached VHF/camera tags with time-depth recorders for fine-scale foraging and behavior studies, also using leatherback capture techniques described above for satellite telemetry.

Specific Research Question(s): The following research questions address leatherback ecology, demography, and status along the U.S. West Coast and will be considered in an environmental context, especially relating to climate change:

Phase I:

1. What are the key areas of aggregation and/or high use for leatherbacks foraging within the poorly-understood ESA-designated Critical Habitat off northern California, Oregon, and Washington?
2. When do leatherback turtles occur in the Pacific Northwest (i.e., Oregon and Washington)? Does this vary between California and Pacific Northwest foraging grounds?

Phase II:

3. When compared to existing central California data, do leatherbacks move between California and Pacific Northwest foraging grounds, or are the foraging populations discrete?
4. Does the occurrence of leatherbacks offshore Oregon and Washington inform the status of the population?
5. How do foraging leatherbacks use vertical and horizontal habitat, and what prey species are being consumed, in neritic waters off the U.S. West Coast? Does this vary regionally and temporally?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Benson SR, Eguchi T, Foley DG, Forney KA, Bailey H, Hitipeuw C, Samber BP, Tapilatu RF, Rei V, Ramohia P, Pita J, Dutton PH. 2011. Large-scale movements and high-use areas of western Pacific leatherback turtles, *Dermochelys coriacea*. Ecosphere. 2(7):art84. doi:10.1890/ES11-00053.1

Benson SR, Forney KA, Moore JE, LaCasella EL, Harvey JT, Carretta JV. 2020. A long-term decline in the abundance of endangered leatherback turtles, *Dermochelys coriacea*, at a foraging ground in the California Current Ecosystem. Global Cons Ecol. 24:e01371. doi:10.1016/j.gecco.2020.e01371

[NMFS and USFWS] National Marine Fisheries Service, U.S. Fish and Wildlife Service. 2020. Endangered Species Act status review of the leatherback turtle (*Dermochelys coriacea*). Report to the National Marine Fisheries Service Office of Protected Resources and U.S. Fish and Wildlife Service.