# APPENDIX 1. SOCIAL MAPS OF LAND AND SEA: TRADITIONAL ECOLOGICAL GEOGRAPHIES

How people tie themselves to the land is one of the critical areas of inquiry in human subsistence studies, and especially so across northern landscapes where landscape has played such a central role in the history of indigenous peoples. The data presented here fall under the category of what we have termed Traditional Ecological Geographies (TEG). This term is important for several reasons. First, Traditional Ecological Knowledge (TEK) studies are oriented towards data that are often time independent. This means that when a researcher asks about hunting territories, the answer might include every area that anyone in the group ever used, oftentimes extending back generations. TEK studies are critical when one is interested in the interactions between particular ecosystems, people, and harvested resources, or in indications of their changes through time. The opposite approach is to ask "where did you kill a caribou in 2009?" This gives a specific point on map, and from multiple points, recent and specific land use maps can be created. This is a group's Traditional Ecological Geography and the approach used in this study. The TEG approach allows respondents to report not only where hunted, fished, or gathered, but also to report where they would have hunted fished or gathered under normal conditions, or if the species were available. So rather than collect data on where one hunted a caribou in the past, we collected maps that report where one usually hunts caribou, or seal, or ptarmigan, for example. The TEG approach results in a map of land use and perceptions of household and community landscape. It does not attempt to elucidate ecological data.

We did not separate the maps based on commercial versus subsistence as this would have been a false dichotomy. Often we find that a provider's access to chitons or octopus, for example, is dictated by where that provider anchors his or her set net. As this is the case for nearly all species harvested, especially the marine species, the thus the land use maps for individuals are not separated by commercial versus non-commercial intent.

Here we present two forms of TEG mapping. In the first section, we look at the four individual villages, and their village-wide harvest maps for each class of resources. Secondly, we look at harvest maps for a number of key providers from across the region, and tie these distributions into other aspects of their economies and politics. Overlapping zones indicate reporting by different harvesters and intensity of use. These zones were mapped by the informants during the interviews. Base-maps of the region, adapted from 1:63360 USGS map sheets, were provided during each interview and the informants drew directly on the maps, or approved our mapping of these data. When the maps were completed, they were shown to members of the communities for approval. The maps below were created in a geographic information system from the interview maps.

## GENERAL VILLAGE HARVEST MAPS

Nelson Lagoon maps (Figures 1-7) show expansive traditional landscapes for Nelson Lagoon residents. The areas of interest described by residents include caribou areas and sockeye salmon spawning grounds, as well as many cabins, camps, runways, and lodges. Former drill pads from

1980s onshore oil and gas activity appear on the basemap, and are sites of importance to Nelson Lagoon residents who use the old roads and a runway built at the time of exploration. Nelson Lagoon's residents drive southwest down the beach for many miles and harvest along the uplands and interior. They travel by boat throughout the lagoon, Herendeen Bay, Port Moller and north up the coast past Bear River. The large terrestrial mammal hunting areas in Figures 128 and 131) are closed caribou hunting territories. Residents have not been allowed to hunt for several years, but all of them noted calving areas, key hunting sites, and where the herd typically ranges. They also highlighted the sockeye spawning lakes, which supports Nelson Lagoon families, the village, their culture, and the economic base. Many of the clam and cockle digging areas are now empty places where they used to get what they needed, but still retain hope that these clam beds will recover. Birding areas are still used heavily, but they cannot legally harvest Emperor geese. Nelson Lagoon residents generally have a very intimate knowledge of the lands and waters around their village and throughout their commercial fishing range, but they are struggling to maintain this connection as they hope for caribou hunting to open once again.

Port Heiden use maps (Figures 8-15) show broad traditional areas of importance. Areas of interest to Port Heiden include caribou and moose territories and calving areas. They are also concerned with the locations of many sport operations on state lands to the northeast of the village. Just like in Nelson Lagoon, caribou hunting is closed but residents indicated where they range and where they used to hunt. These are still important sites for residents, and they have been able to conduct a few educational and cultural harvests authorized by permit during the closed years in order to keep the younger generation engaged with the animals. There is a substantial road system in the village area and many people are able to access fishing, hunting, and berrypicking sites using roads and 4-wheeler trails. Inside Port Heiden, skiff and commercial sized boats are used to hunt marine mammals and birds, and to fish numerous species. There is no harbor or dock so commercial boats are only launched for the salmon season, making it so most boating in the lagoon is done using skiffs throughout much of the year. Subsistence beach nets are also picked by people moving along the nets wearing dry suits. There are few clear points of reference on the tundra, and residents use GoogleEarth and GPS to pinpoint locations for themselves and one another. Even without obvious landmarks, Port Heiden residents are intimately aware of the landscape and waters.

Maps of False Pass use areas (Figures 16-23) cover Unimak Island, the lower section of the Alaska Peninsula, and the Sanak Islands. Residents have excellent access to the north Pacific and Bering Sea. Commercial vessels are used to travel long distances, and may be used for separate subsistence trips. Travel to Sanak is for cattle and bird hunting and must be conducted using large vessels. The Sanak Corporation has intentionally removed foxes in order to boost the bird populations. Trucks and 4-wheelers are used around the village and in the creek beds to travel west up the valley behind the village for bird hunting and other pursuits. Caribou hunting areas indicated here are places where they would normally hunt if a season was open, and they remain key locations in the ecological map of residents. False Pass hunters and fishermen have a strong relationship to the lands and waters of their region.

Akutan use maps (Figures 24-31) cover the areas around Akutan, Akun, Rootok, Avatanak, and Tigalda Islands in the Krenitzin Islands group. Cattle on Akun Island are managed by an Akutan Corporation employee who, along with several young men from the village, brings subsistence

beef to the community rather than individual harvesters using the herd. Akutan's areas of interest include key development sites for their new harbor at the head of Akutan Bay and an airport on Akun Island. It also shows the "Trident slick" where Trident Seafoods dumps plant waste. Pollution in the bay affecting fish and birds was a concern, and some hunters and fishermen felt they needed to harvest outside the bay. The map shows important sea lion rookeries on the west and south shores of the Akutan Island as well. Sites are accessed by boat and skiff. Commercial halibut boats are used to travel throughout the southern islands. Few terrestrial mammals mean that most harvesting is done on beaches or at sea. Akutan's hunters and fishermen travel long distances in the few commercial sized vessels home-ported in the village.

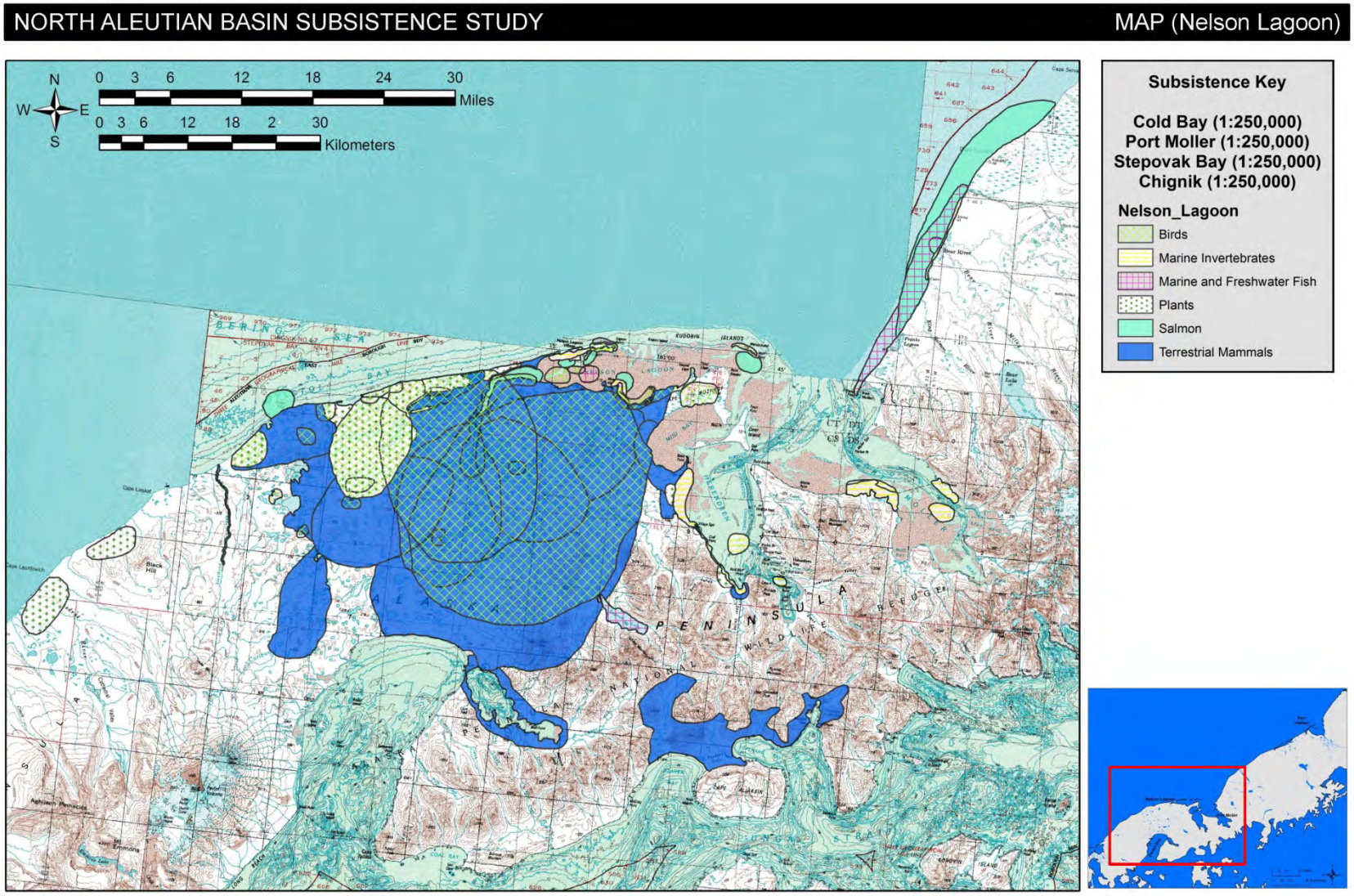


**Figure 1. Overview map of all subsistence harvesting zones for the village of Nelson Lagoon.**

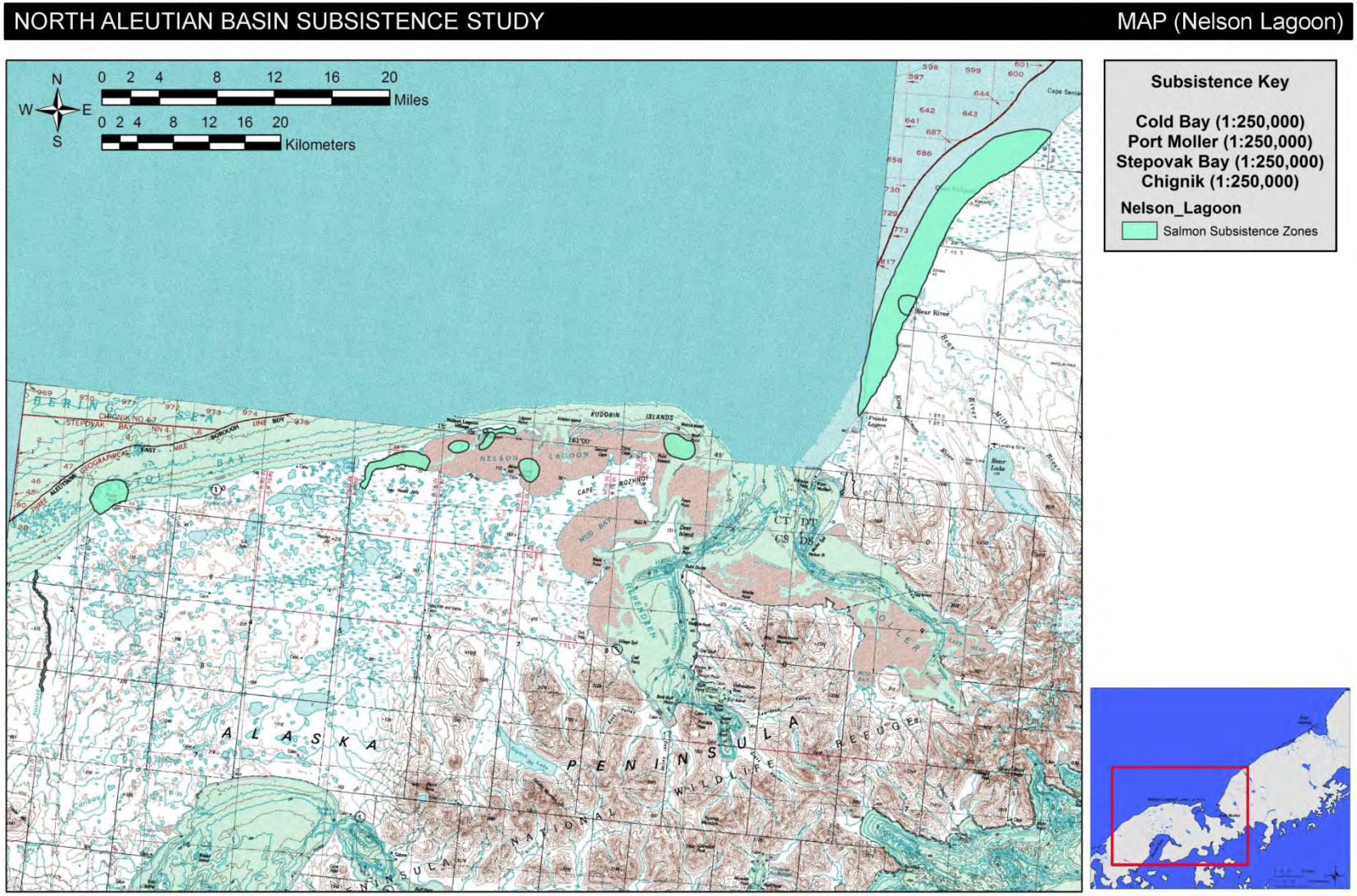


**Figure 2. Salmon harvesting zones for the village of Nelson Lagoon.**

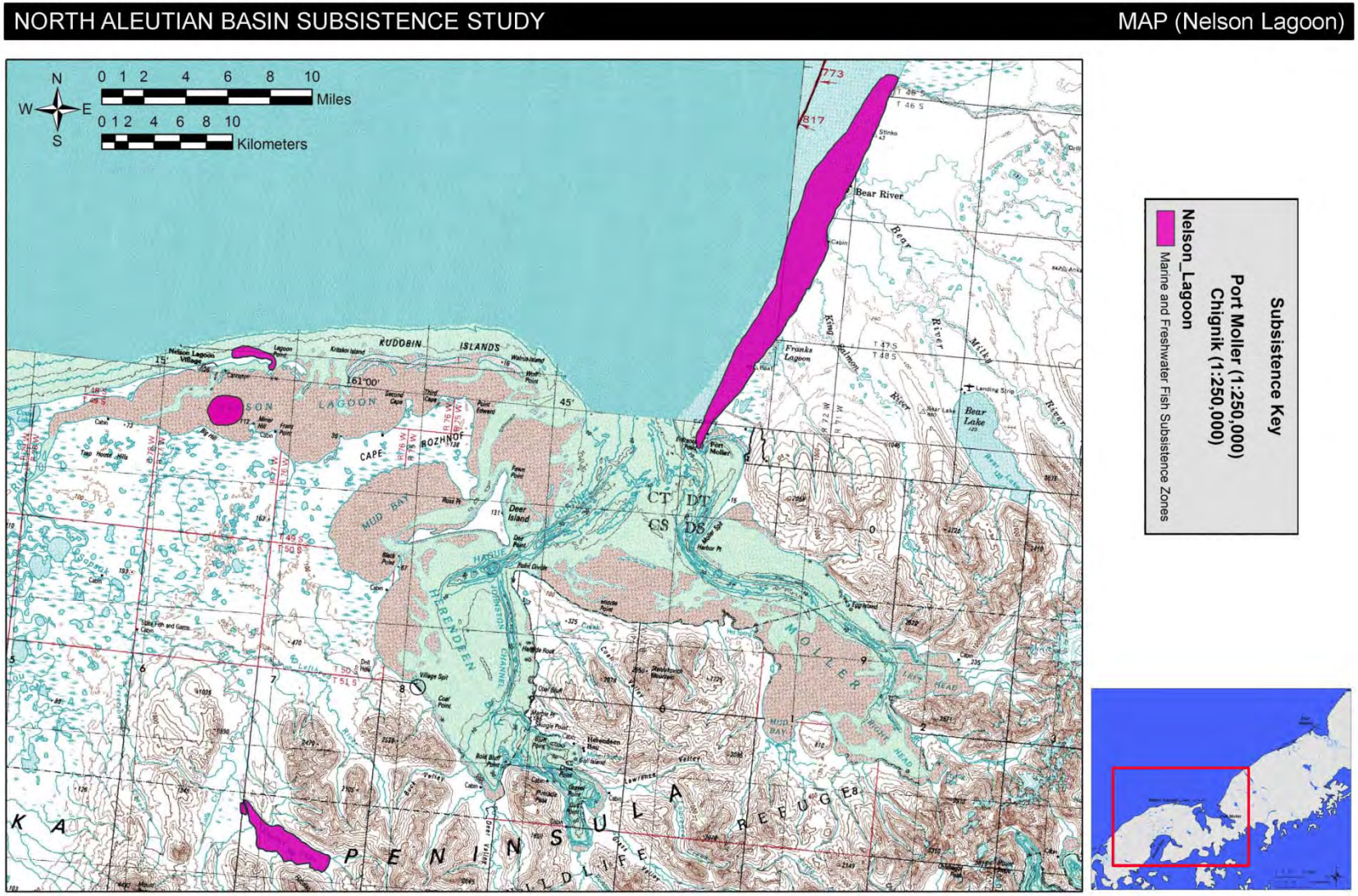


**Figure 3. Marine and freshwater fish harvest zones for the village of Nelson Lagoon.**

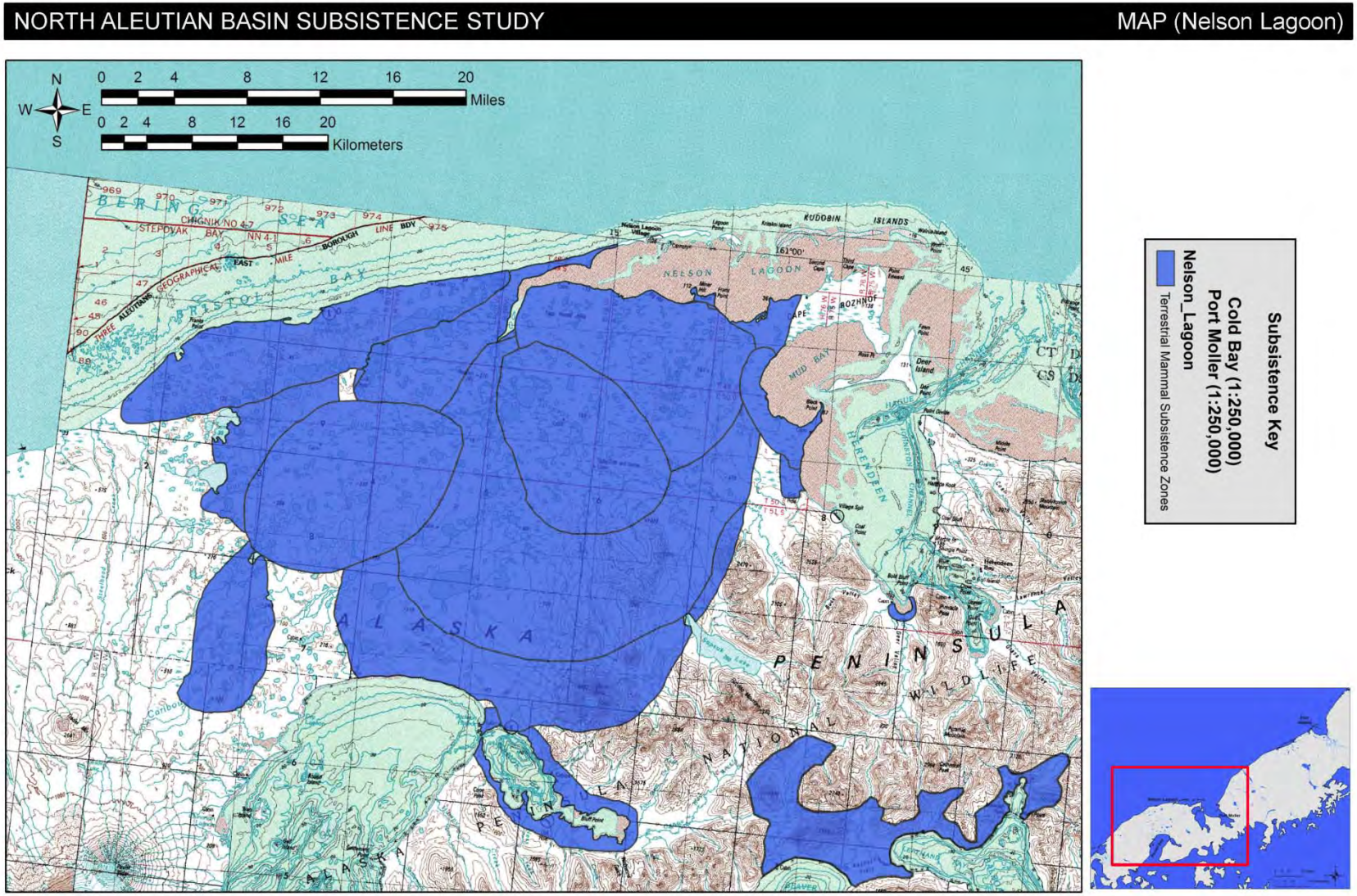


**Figure 4. Terrestrial mammal hunting zones for the village of Nelson Lagoon.**

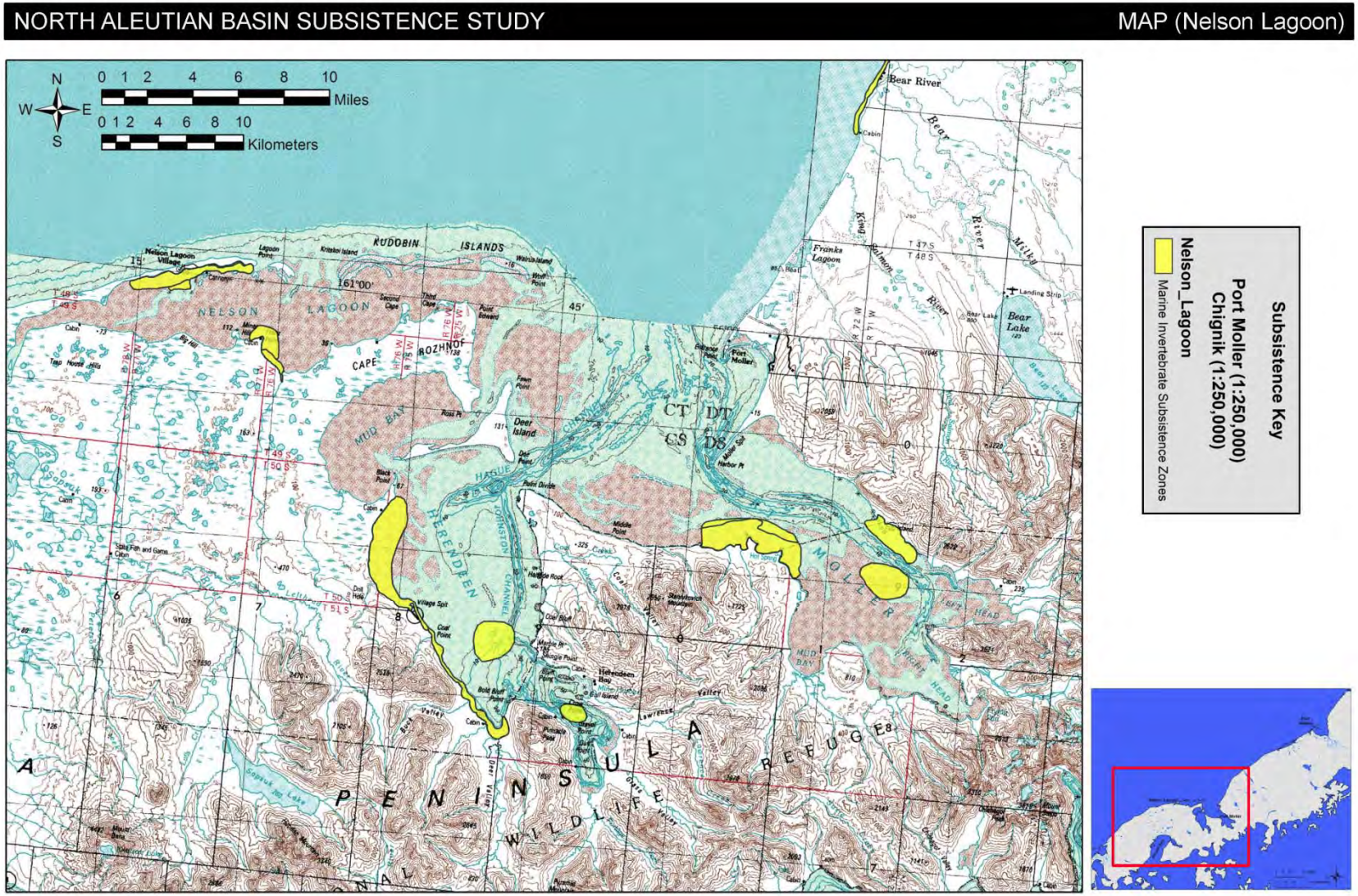


**Figure 5. Invertebrate harvesting zones for the village of Nelson Lagoon.**

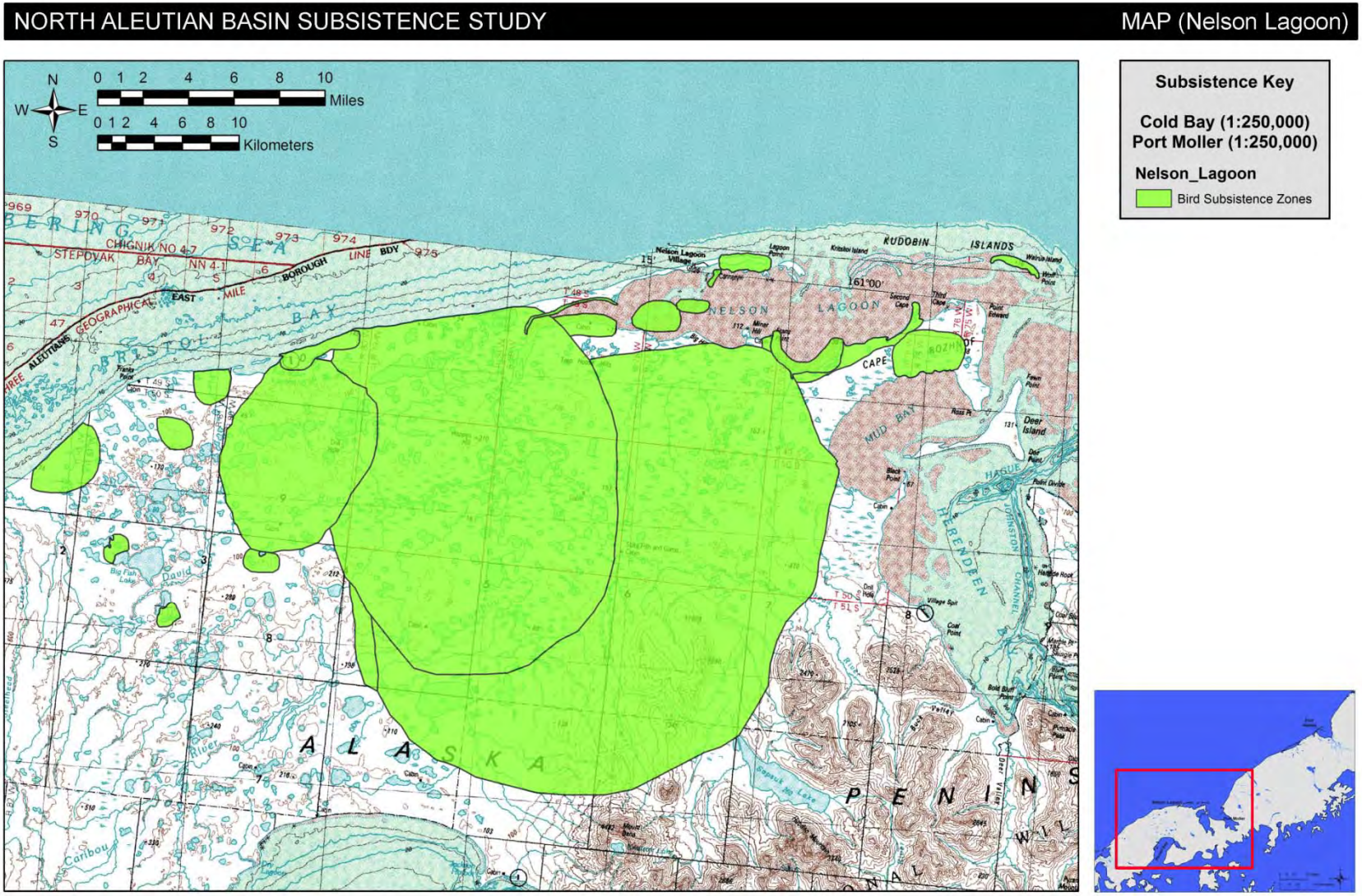


**Figure 6. Bird and egg harvesting zones for the village of Nelson Lagoon.**

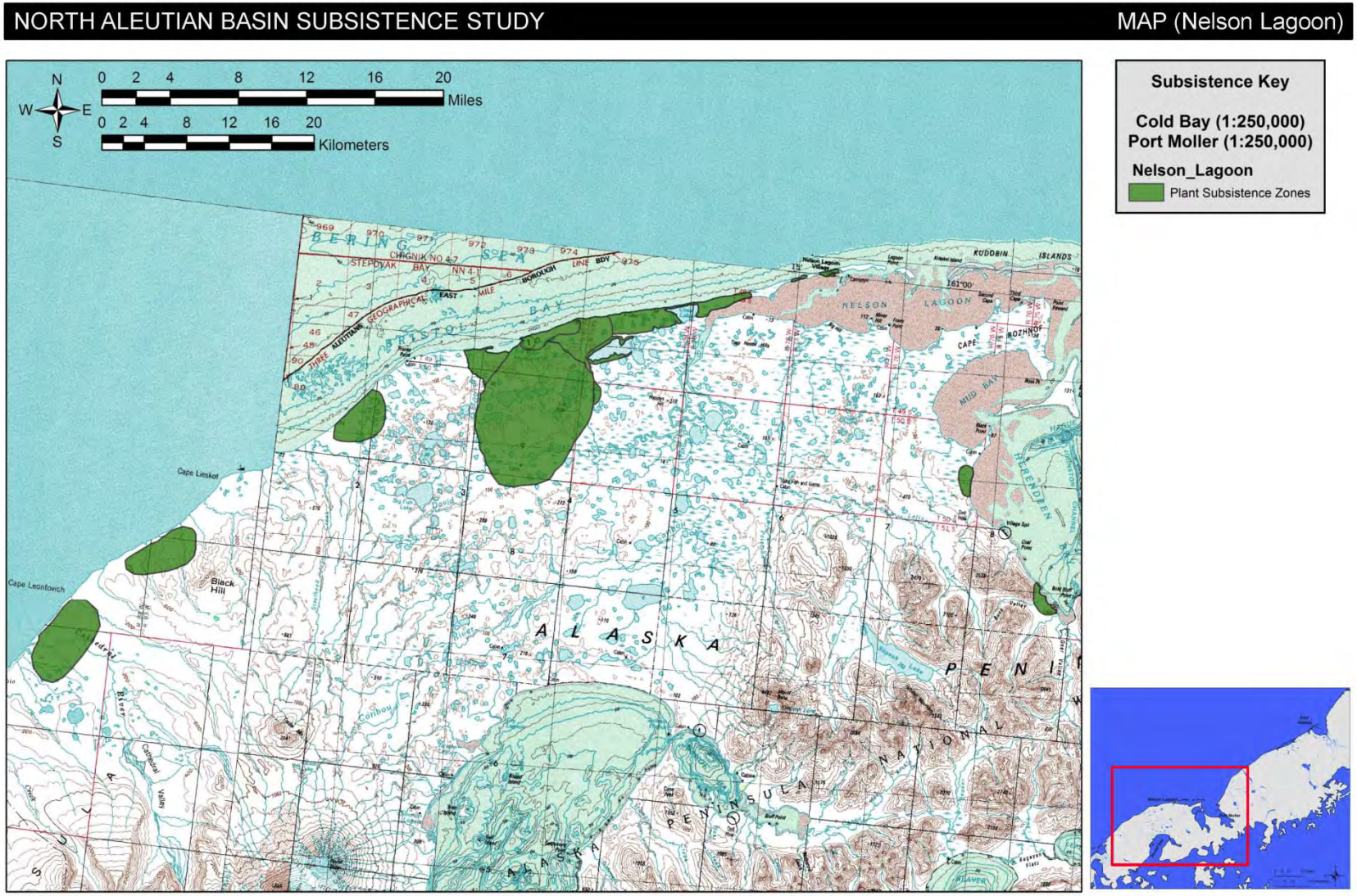


**Figure 7. Plant harvesting zones for the village of Nelson Lagoon.**

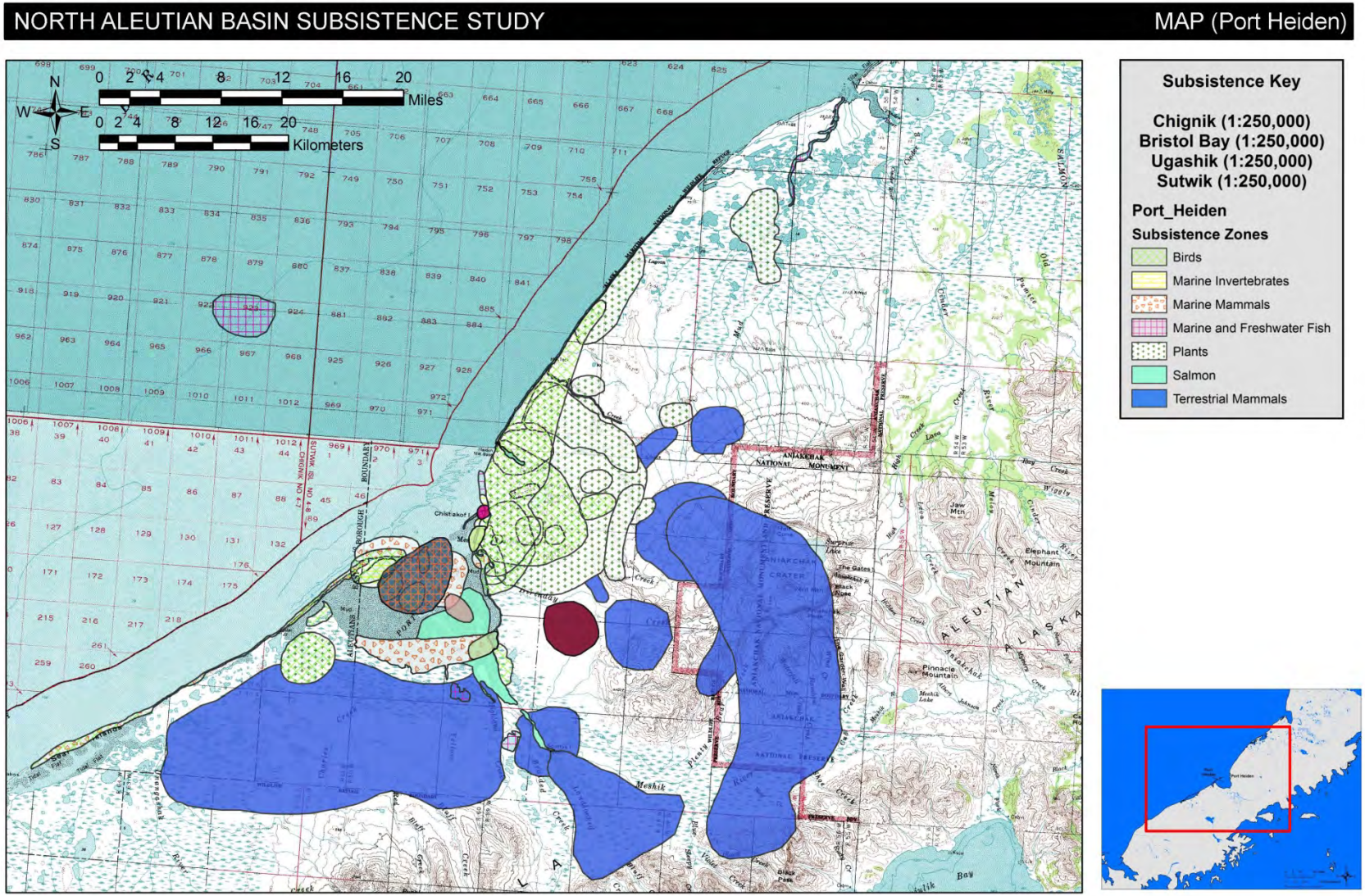


**Figure 8. Overview map of all subsistence harvesting zones for the village of Port Heiden.**

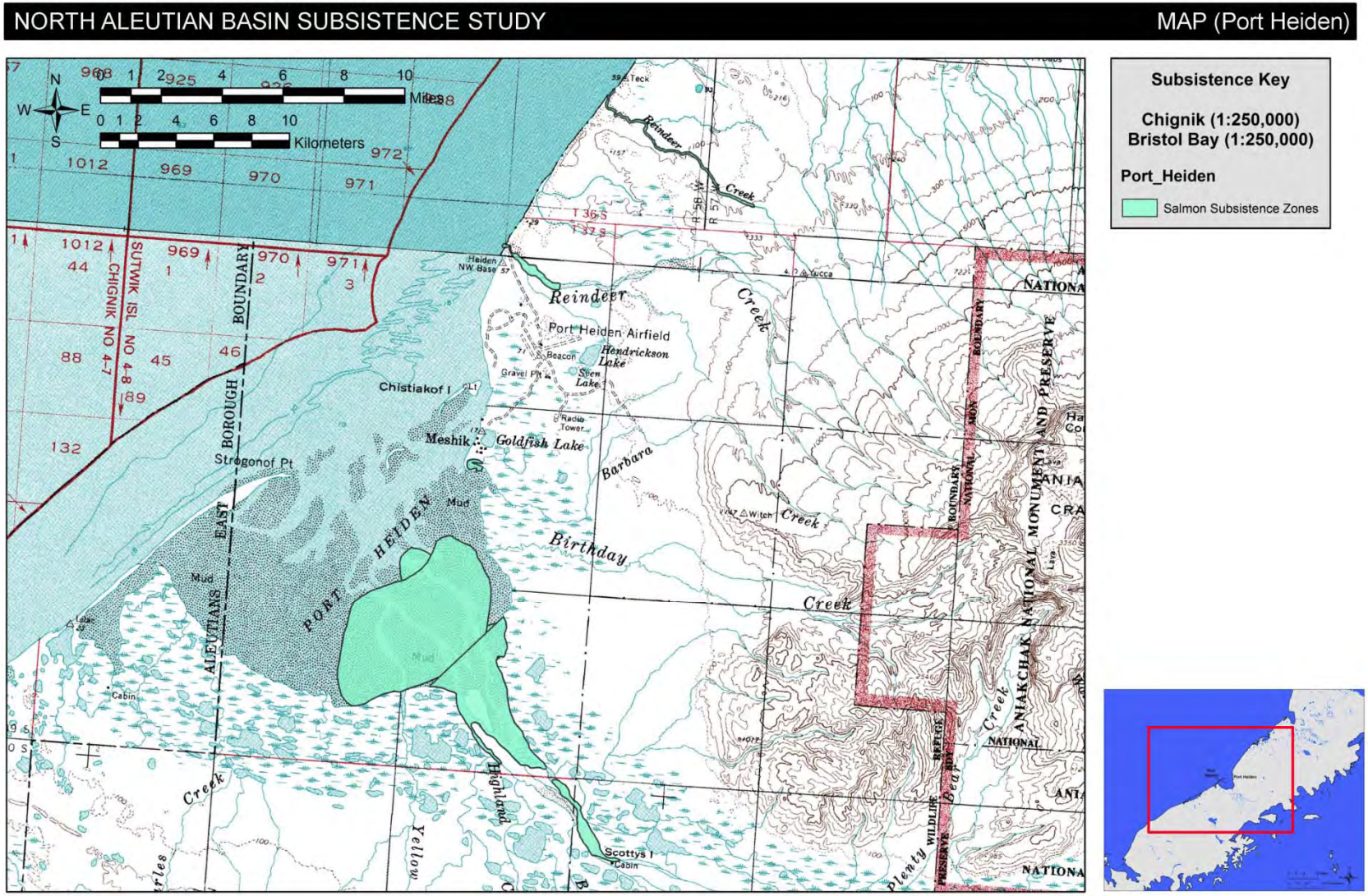


**Figure 9. Salmon harvesting zones for the village of Port Heiden.**

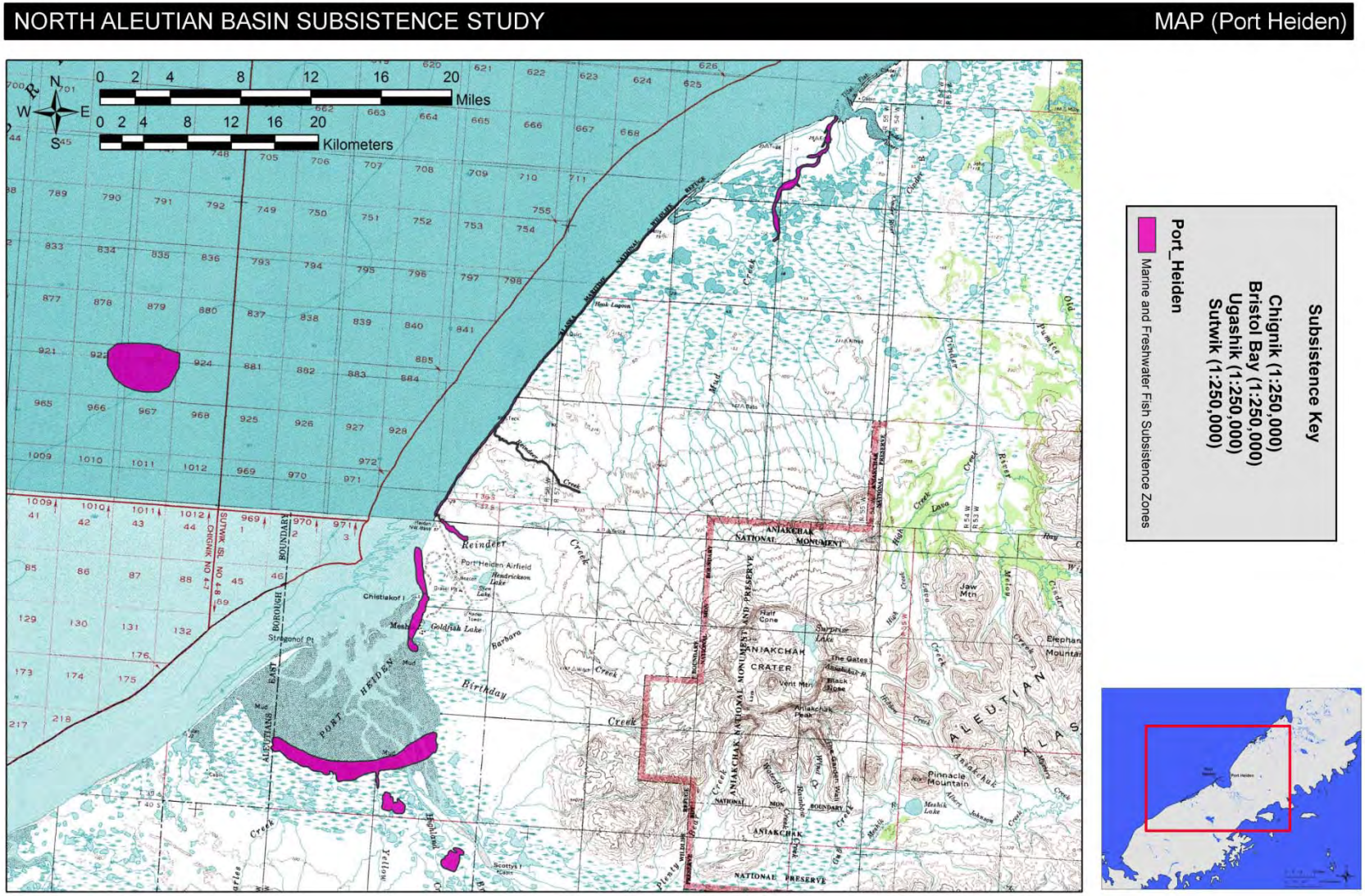


**Figure 10. Marine and freshwater fish harvest zones for the village of Port Heiden.**

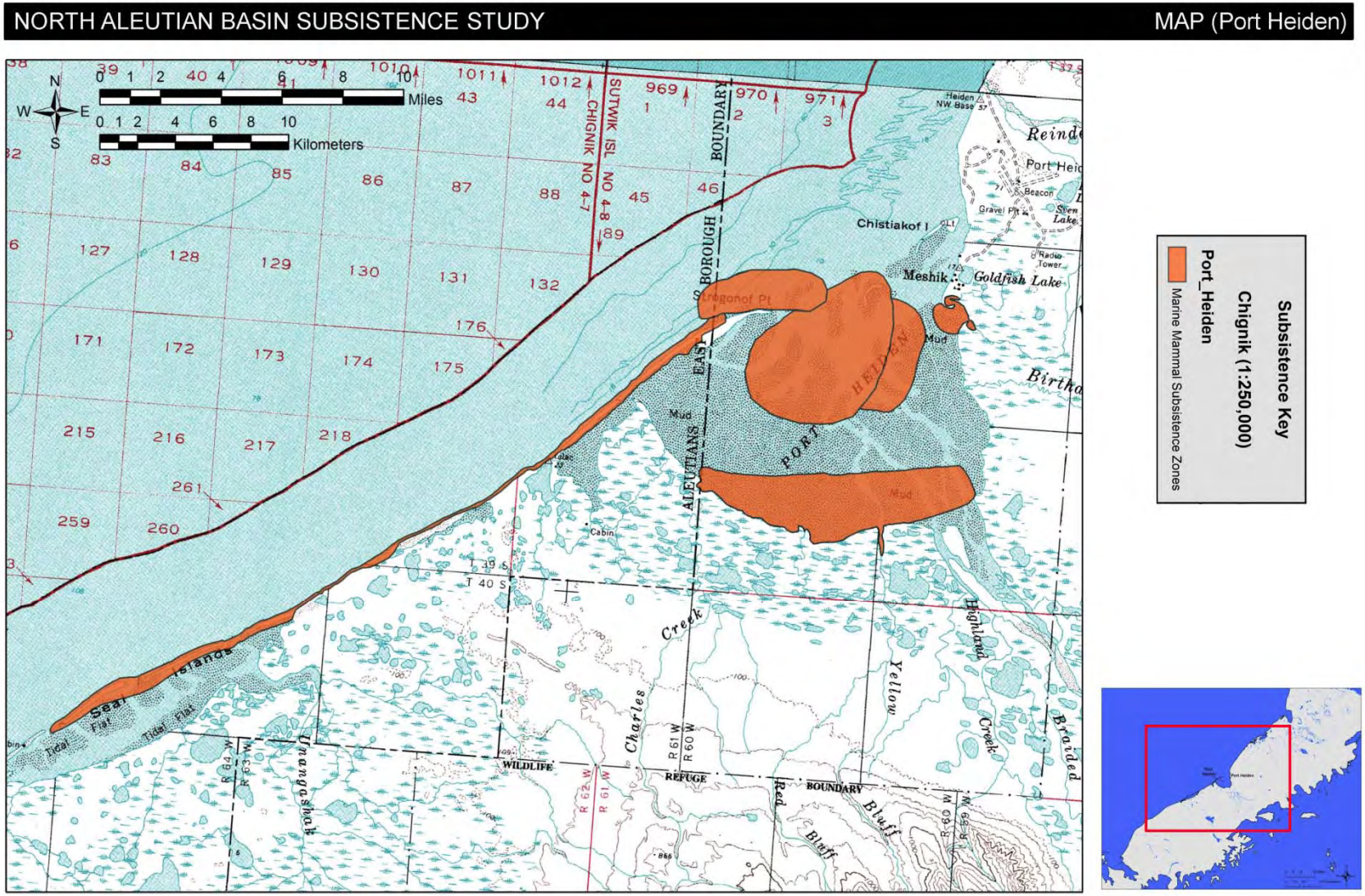


**Figure 11. Marine mammal hunting zones for the village of Port Heiden.**

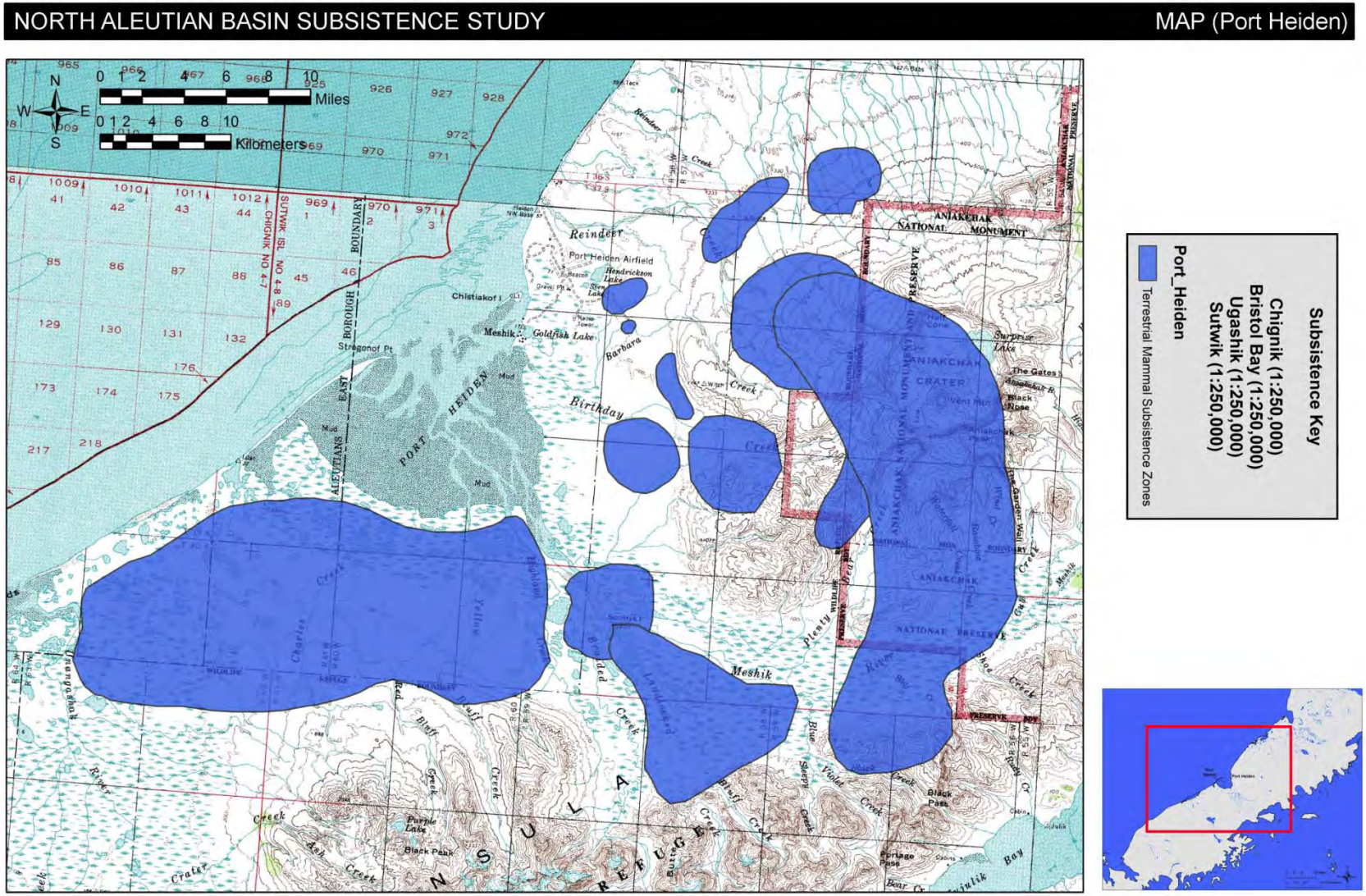


**Figure 12. Terrestrial mammal hunting zones for the village of Port Heiden.**

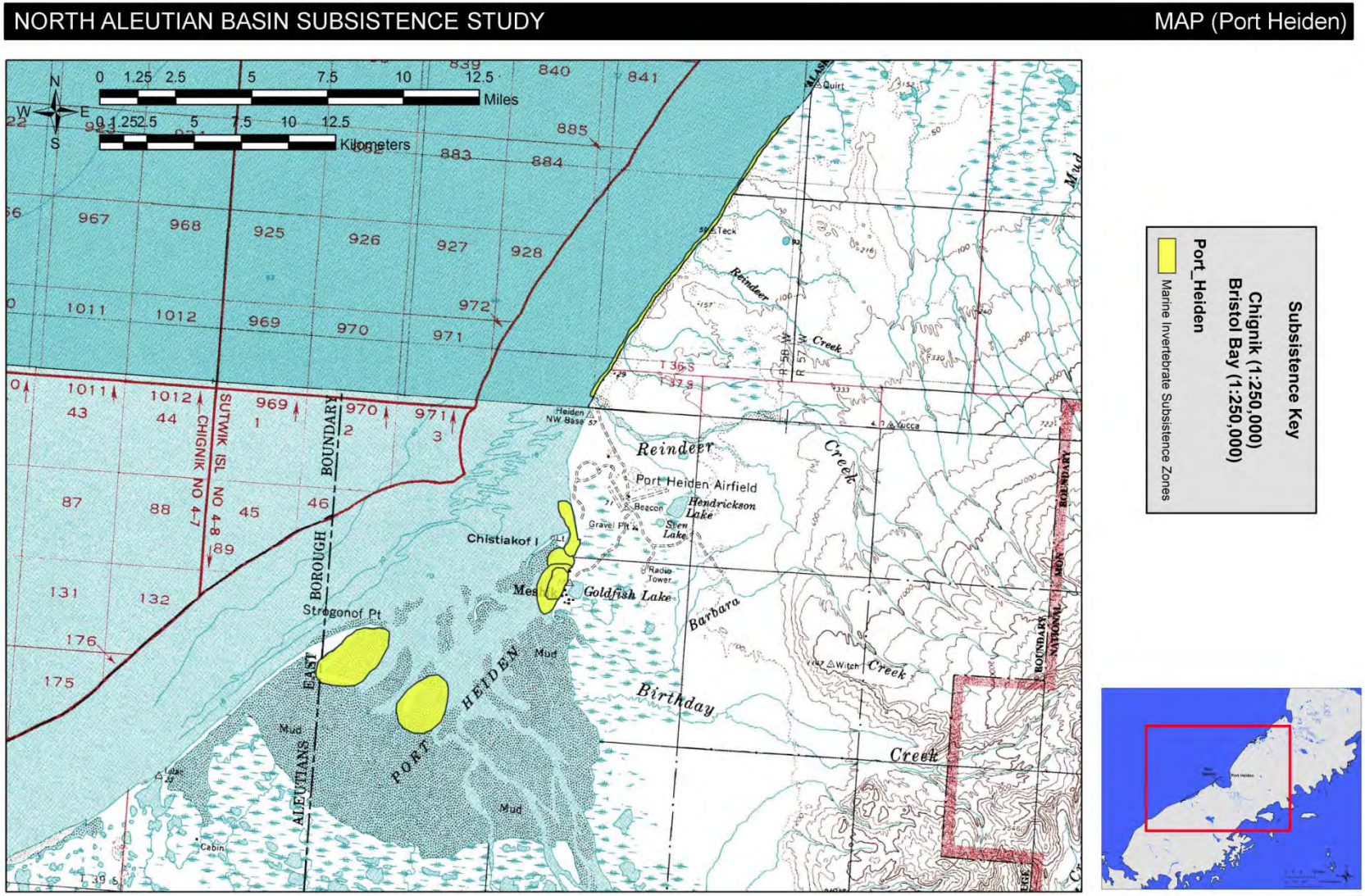


**Figure 13. Invertebrate harvesting zones for the village of Port Heiden.**

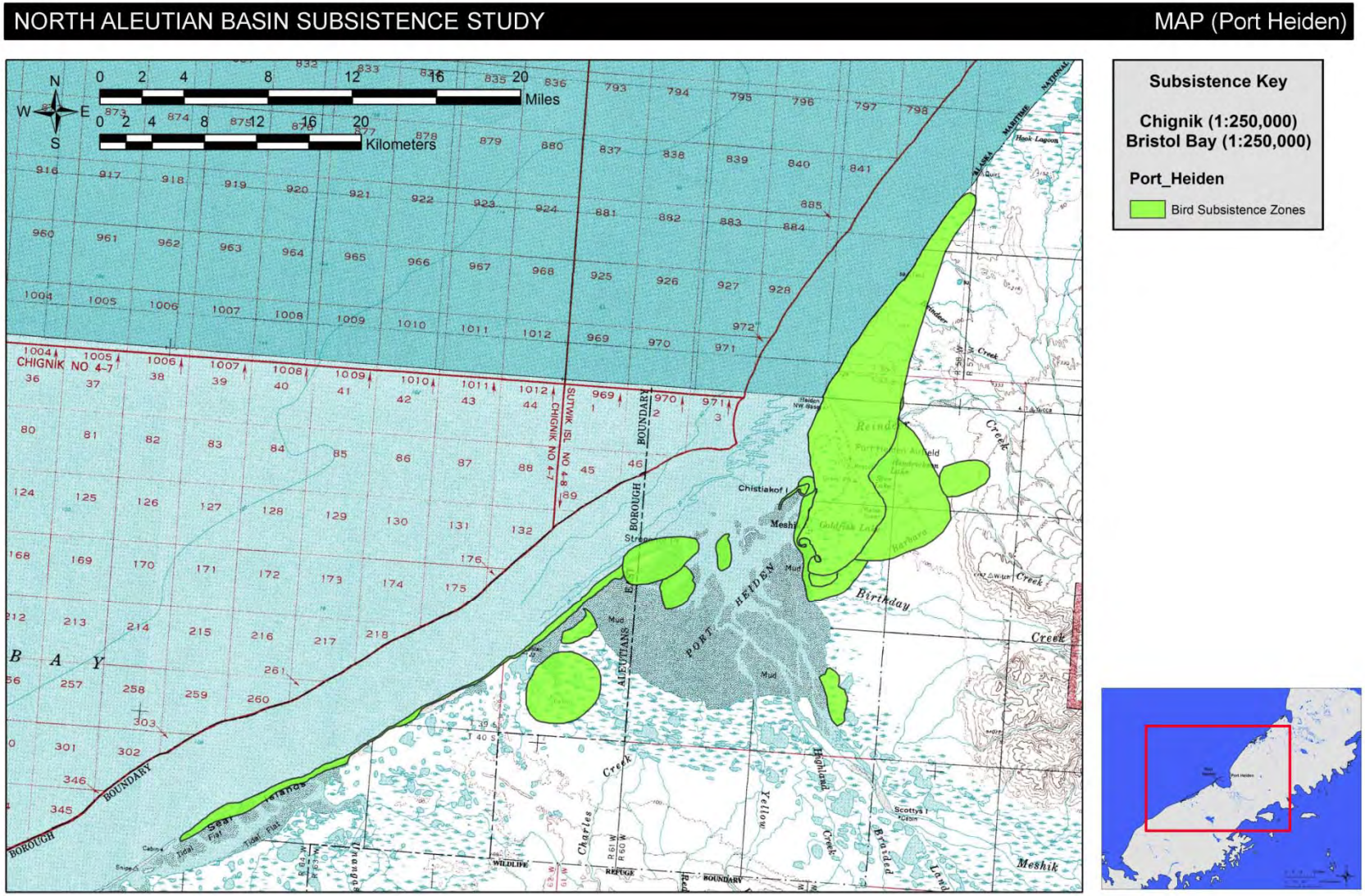


**Figure 14. Bird and egg harvesting zones for the village of Port Heiden.**

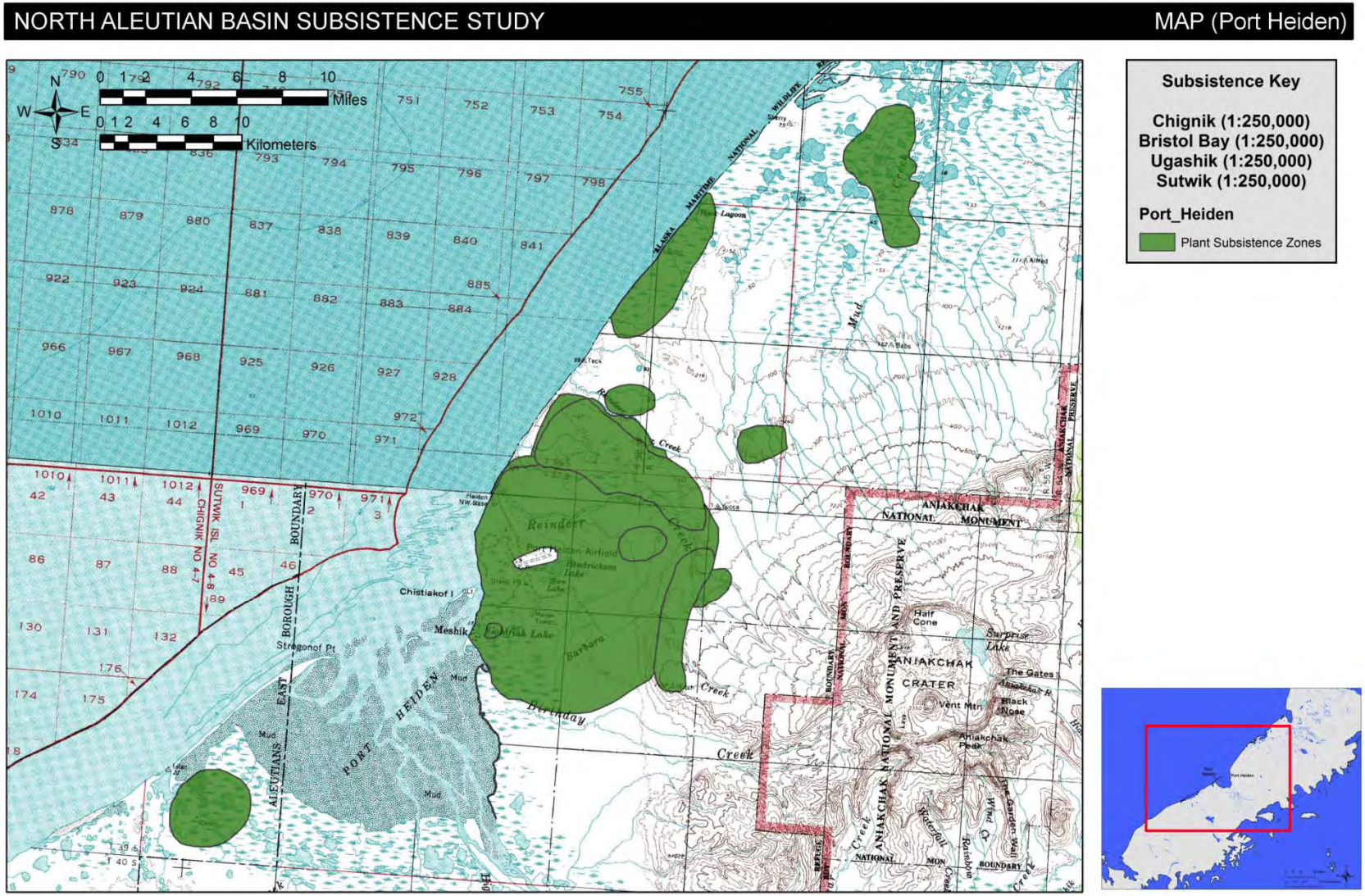


**Figure 15. Plant harvesting zones for the village of Port Heiden.**

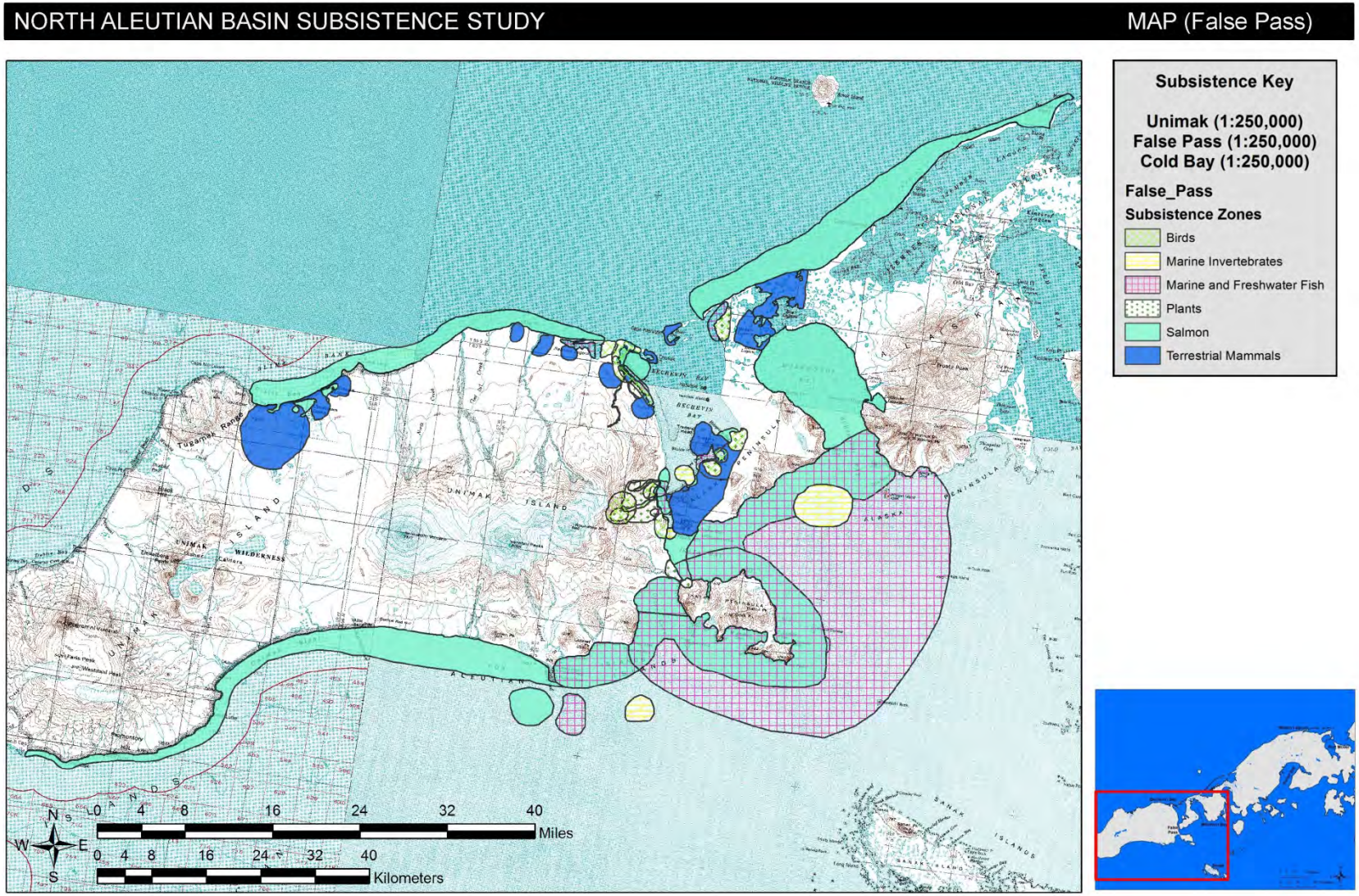


**Figure 16. Overview map of all subsistence harvesting zones for the village of False Pass.**

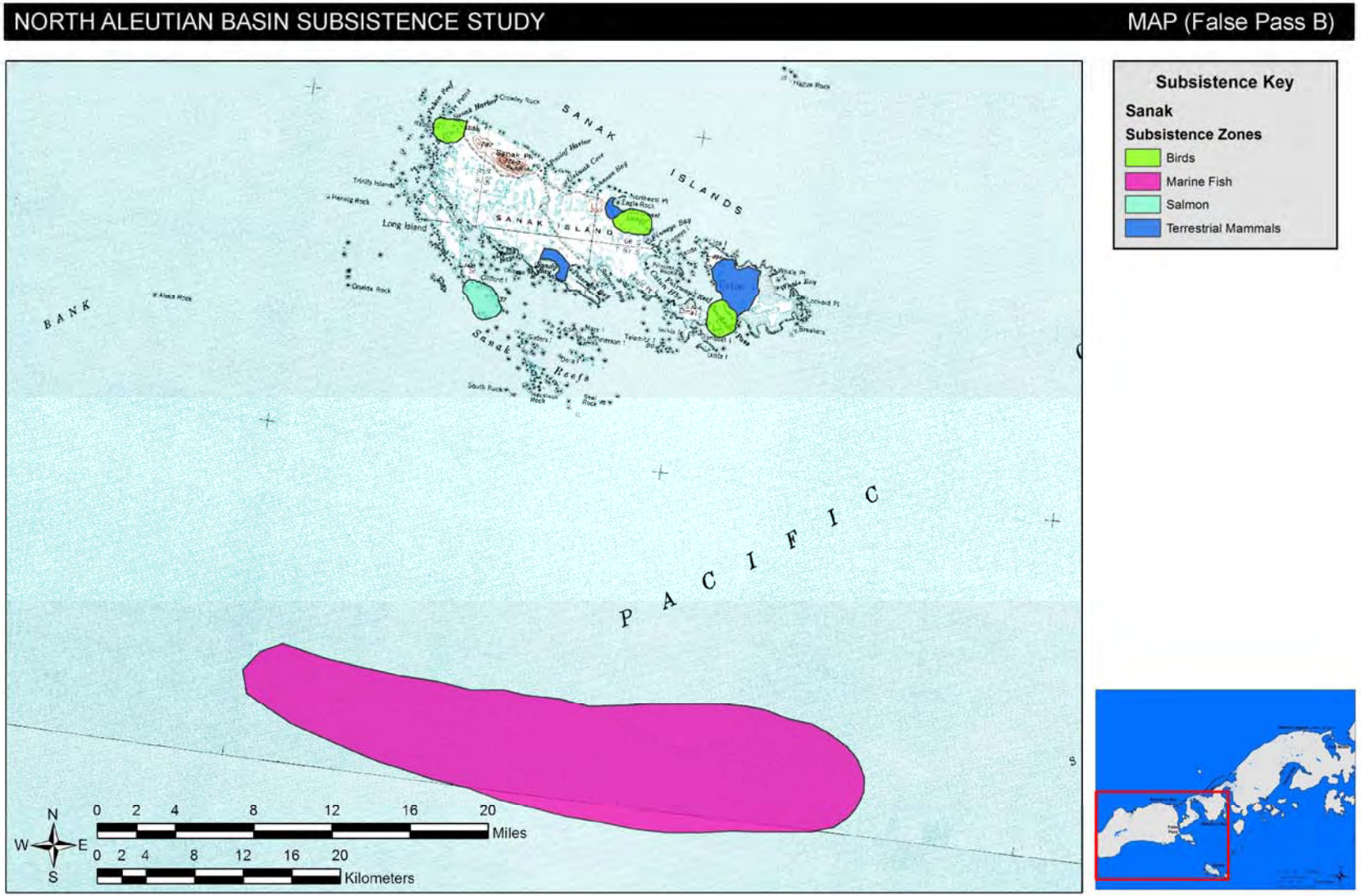


**Figure 17. Overview map of all Sanak Island subsistence harvesting zones for the village of False Pass.**

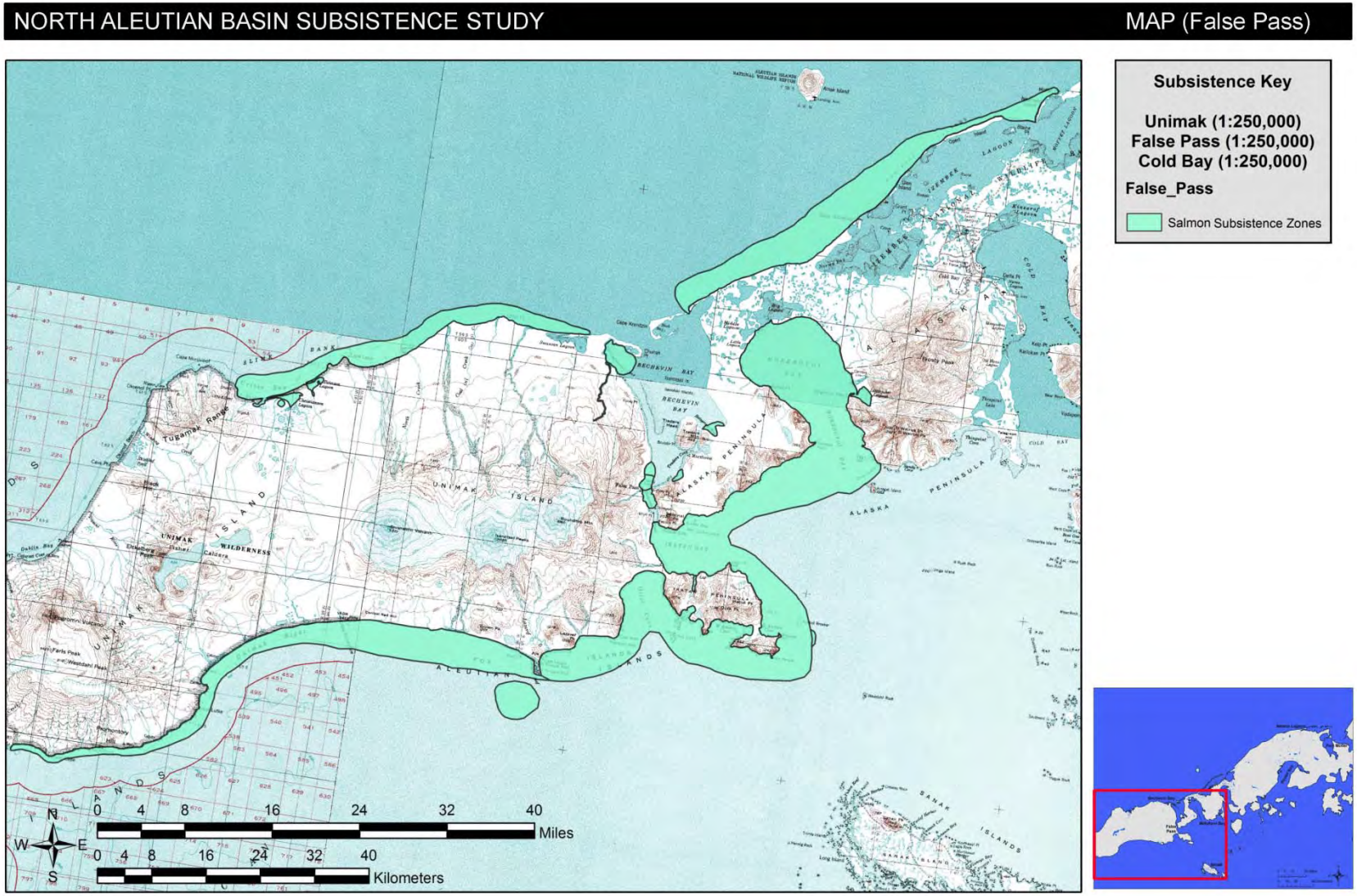


**Figure 18. Salmon harvesting zones for the village of False Pass.**

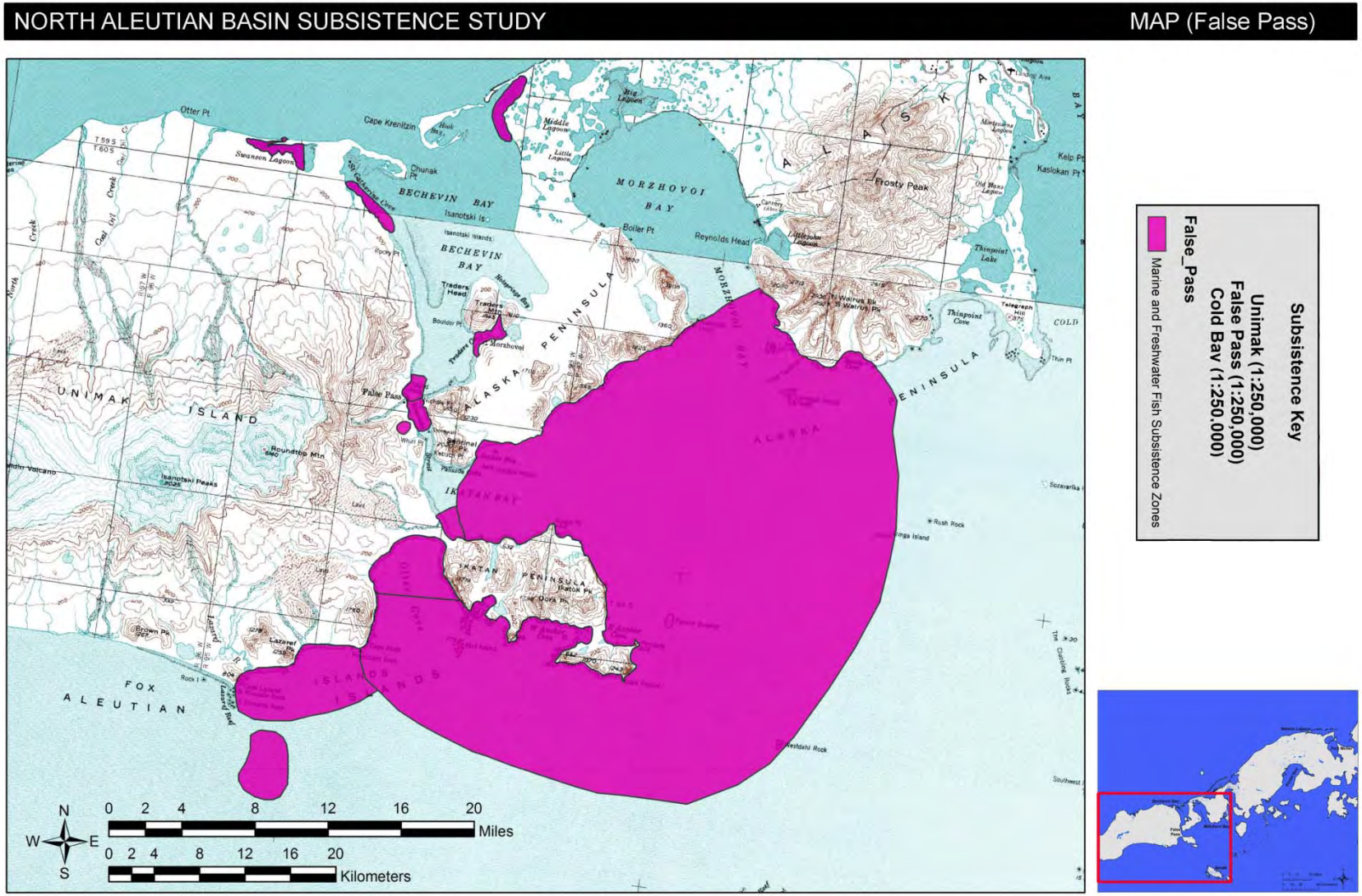


**Figure 19. Marine and freshwater fish harvest zones for the village of False Pass.**

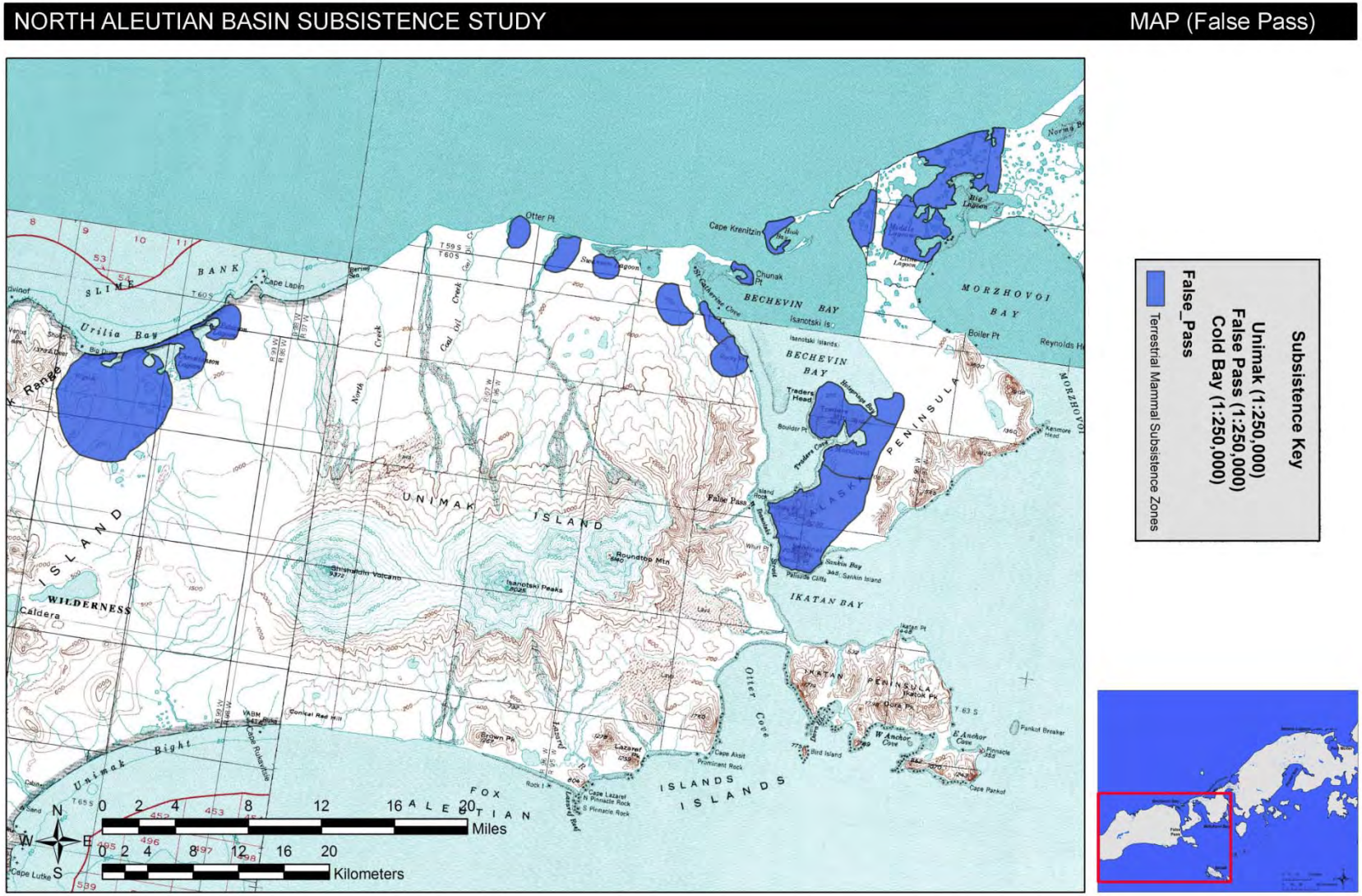


**Figure 20. Terrestrial mammal hunting zones for the village of False Pass.**

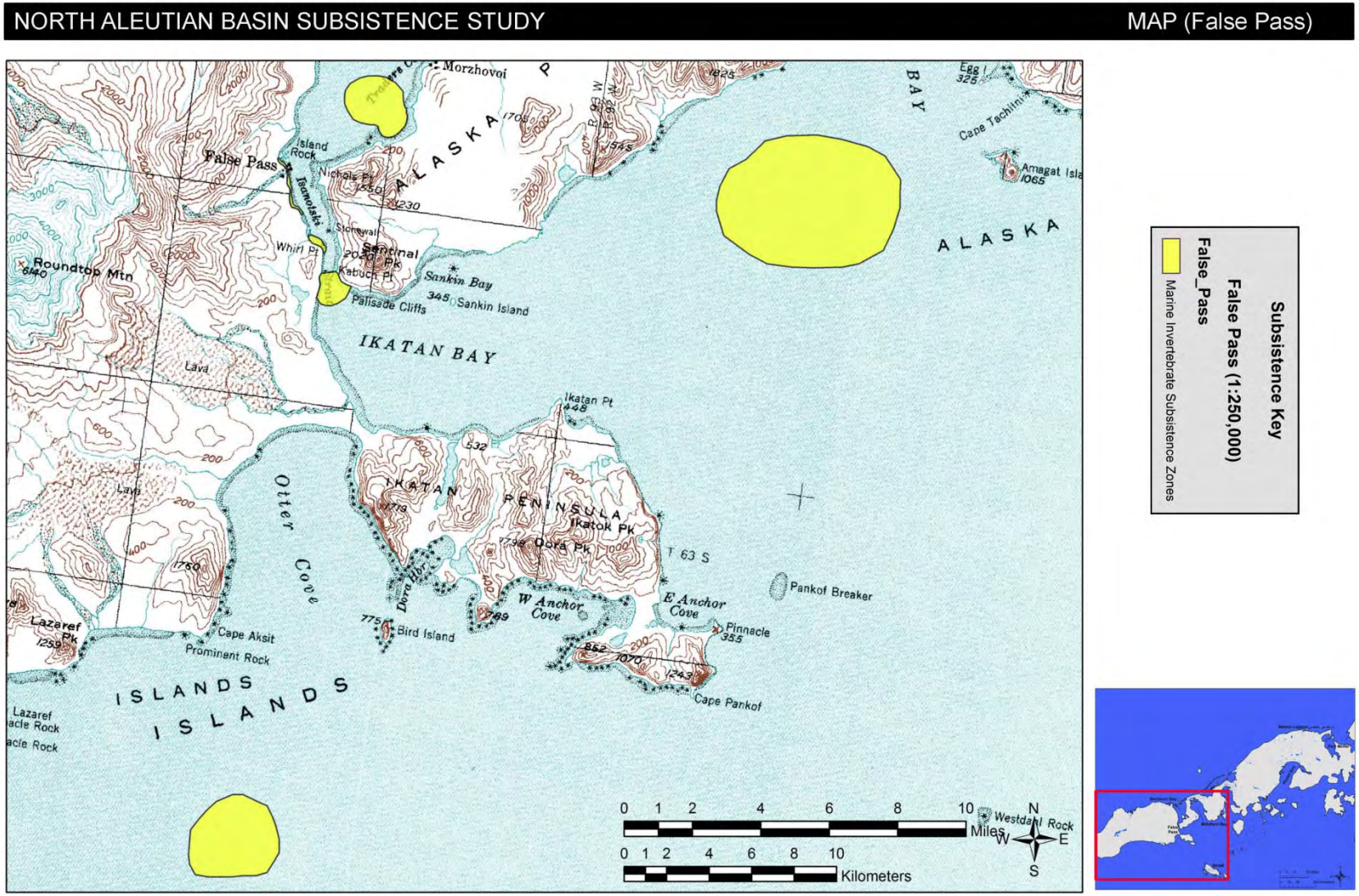


**Figure 21. Invertebrate harvesting zones for the village of False Pass.**

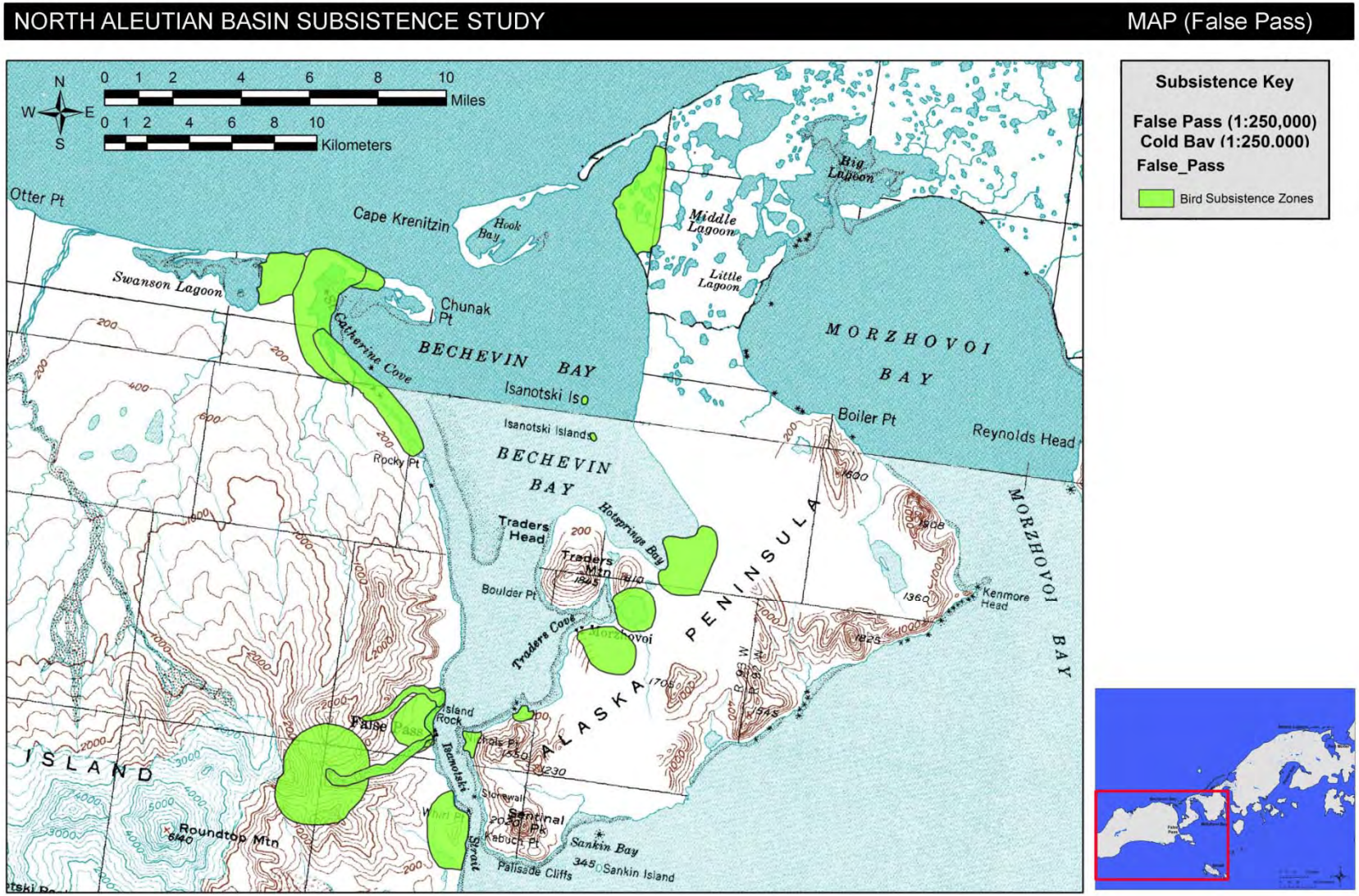


**Figure 22. Bird and egg harvesting zones for the village of False Pass.**

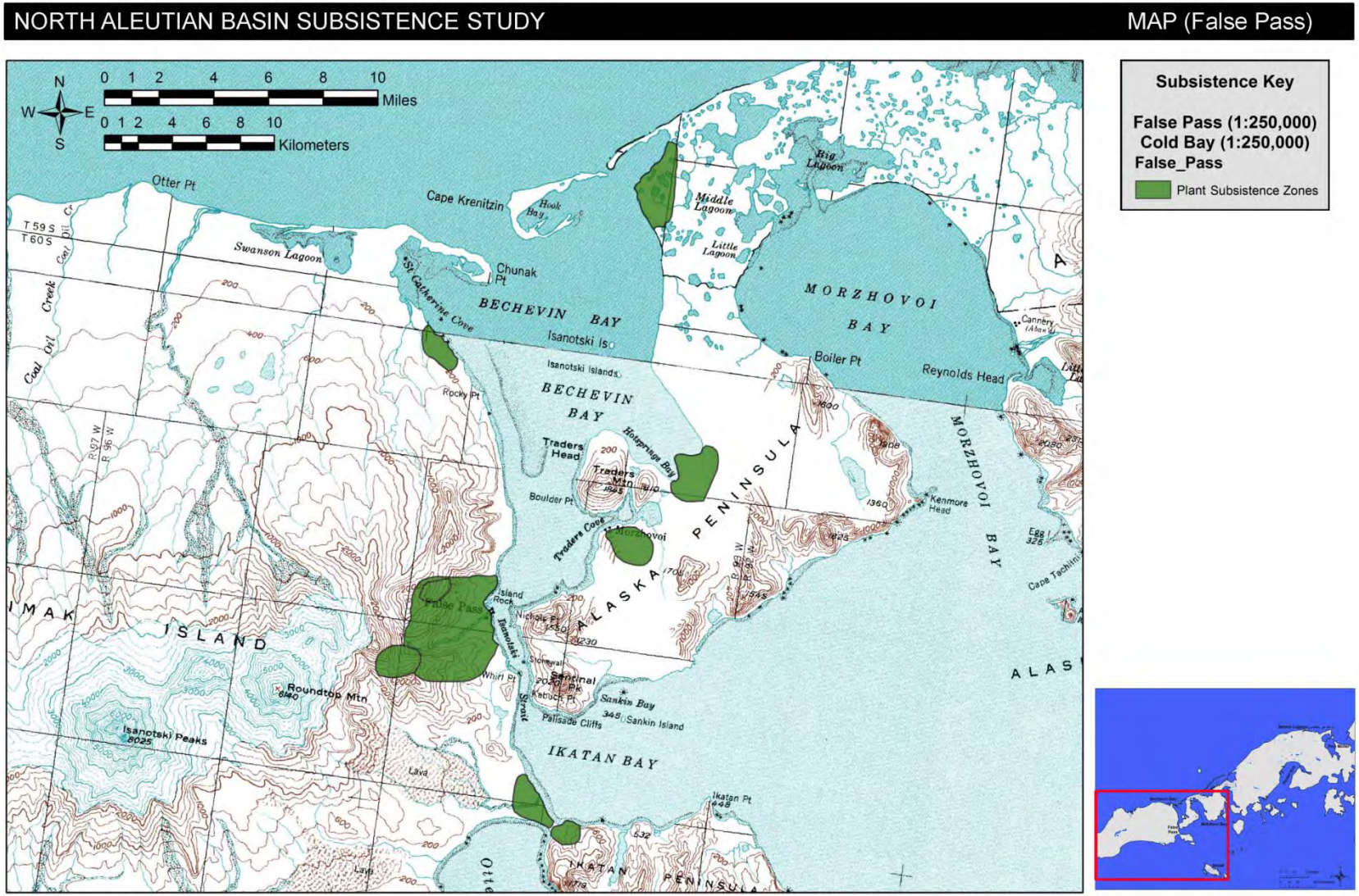


**Figure 23. Plant harvesting zones for the village of False Pass.**

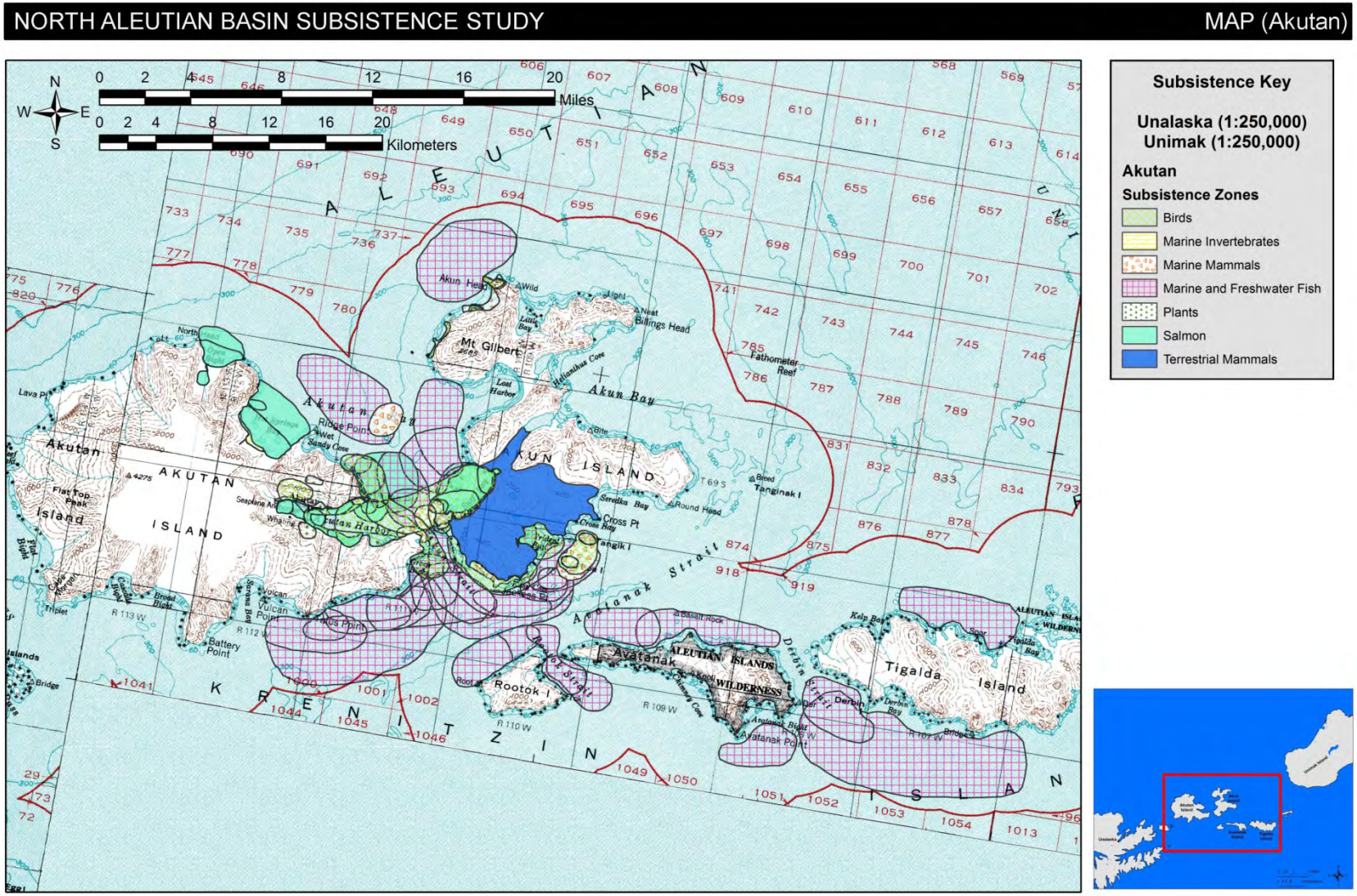


**Figure 24. Overview map of all subsistence harvesting zones for the village of Akutan.**

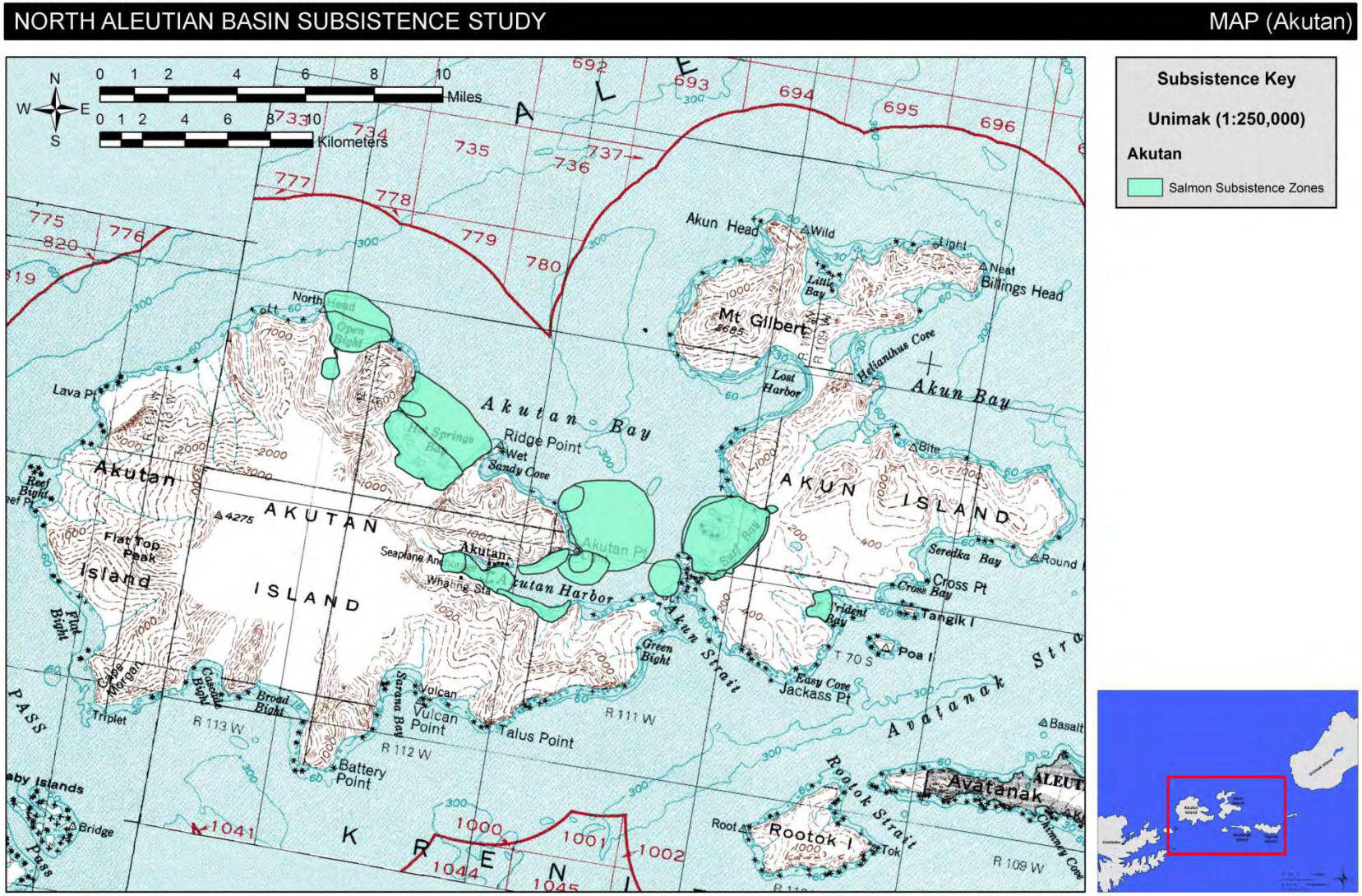


**Figure 25. Salmon harvesting zones for the village of Akutan.**

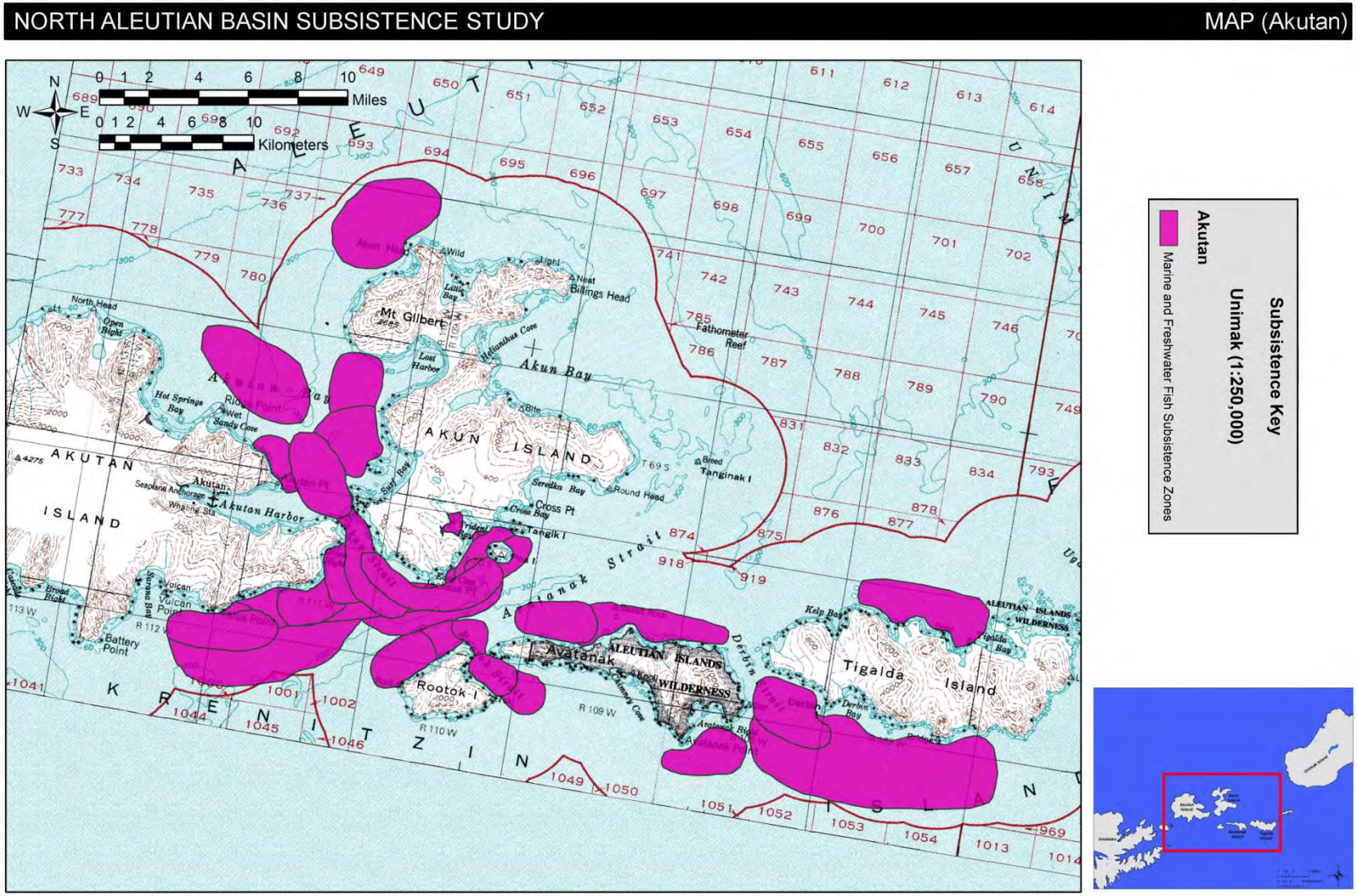


**Figure 26. Marine and freshwater fish harvest zones for the village of Akutan.**

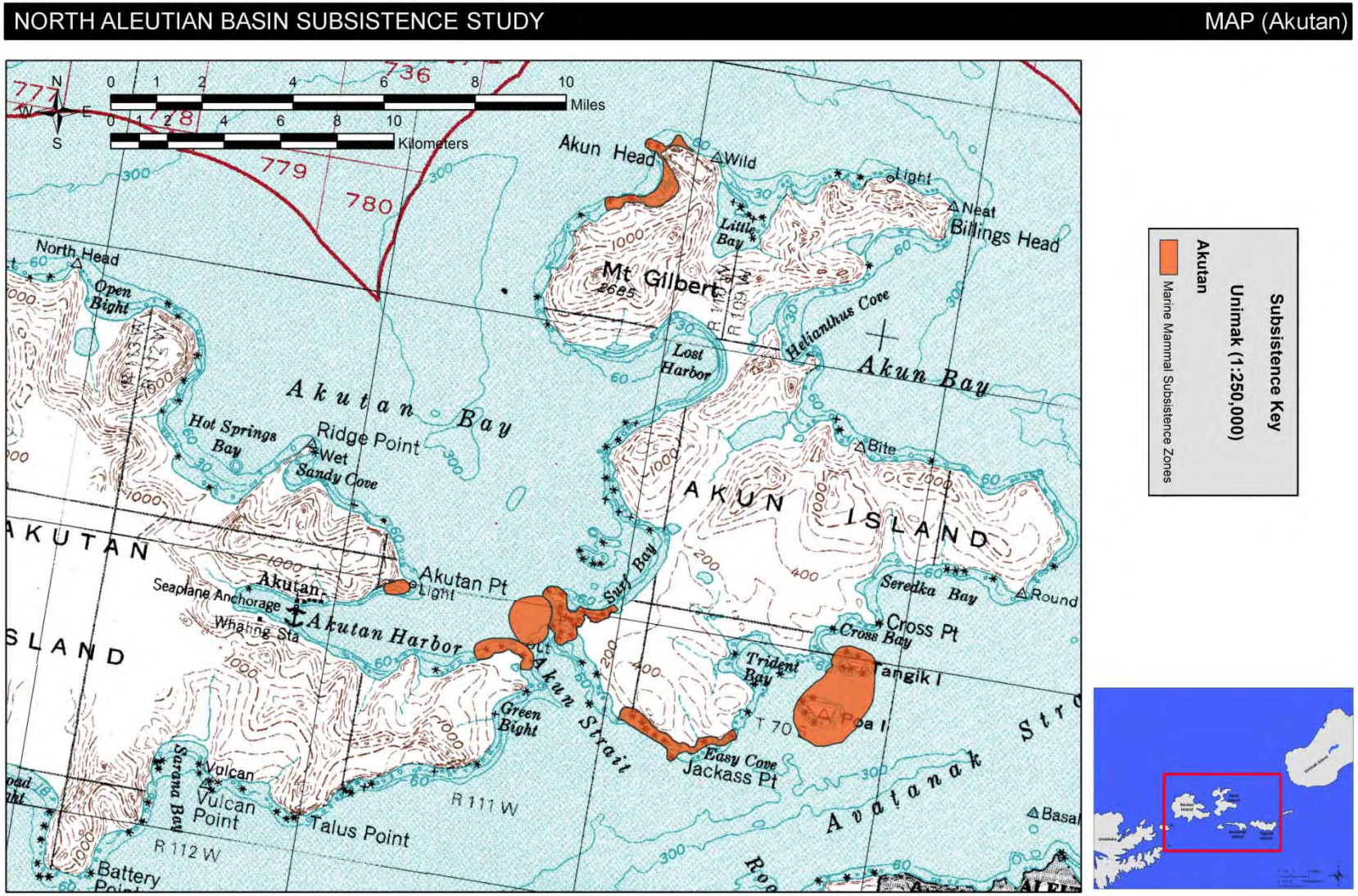


**Figure 27. Marine mammal hunting zones for the village of Akutan.**

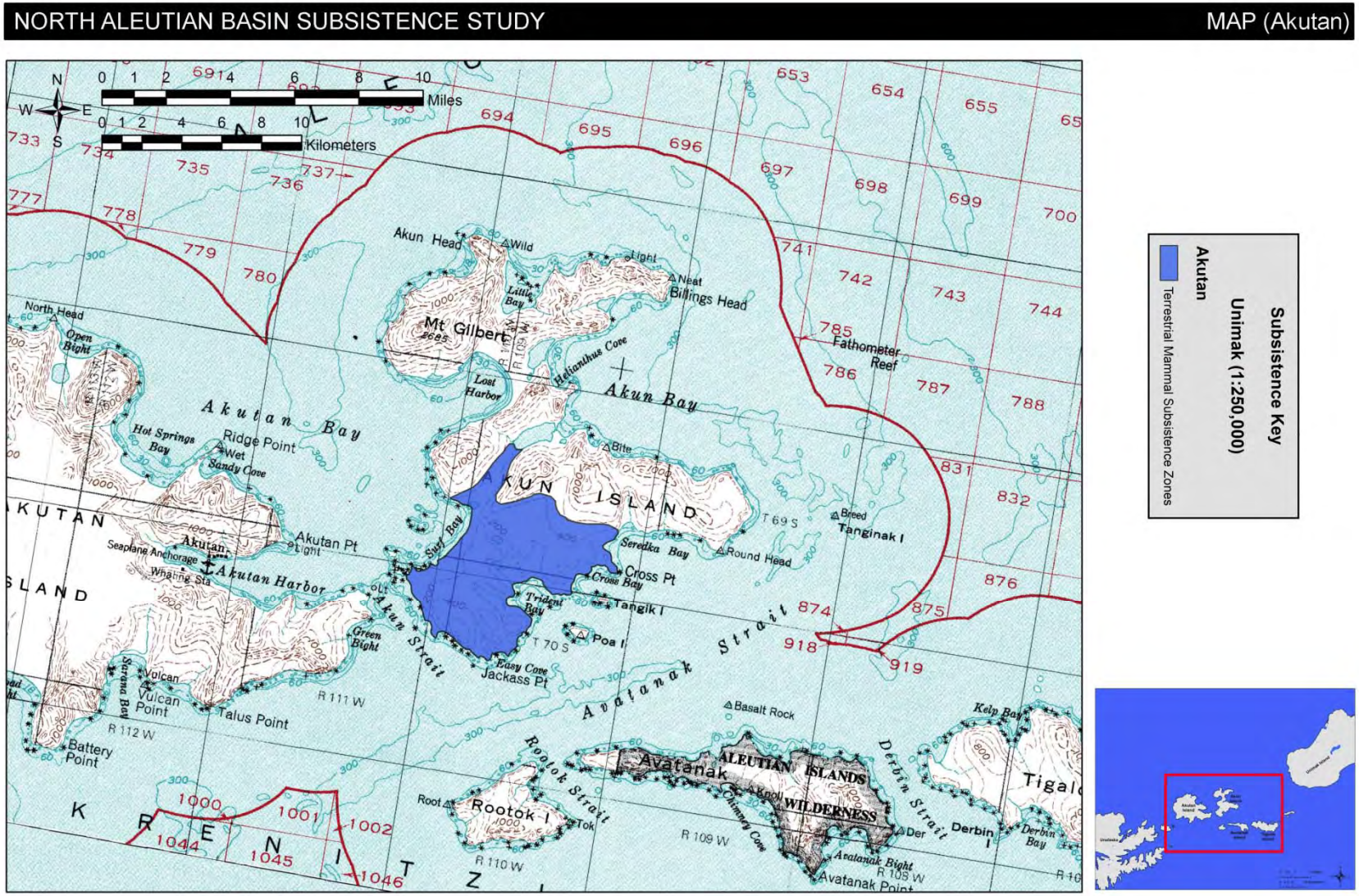


**Figure 28. Terrestrial mammal hunting zones for the village of Akutan.**

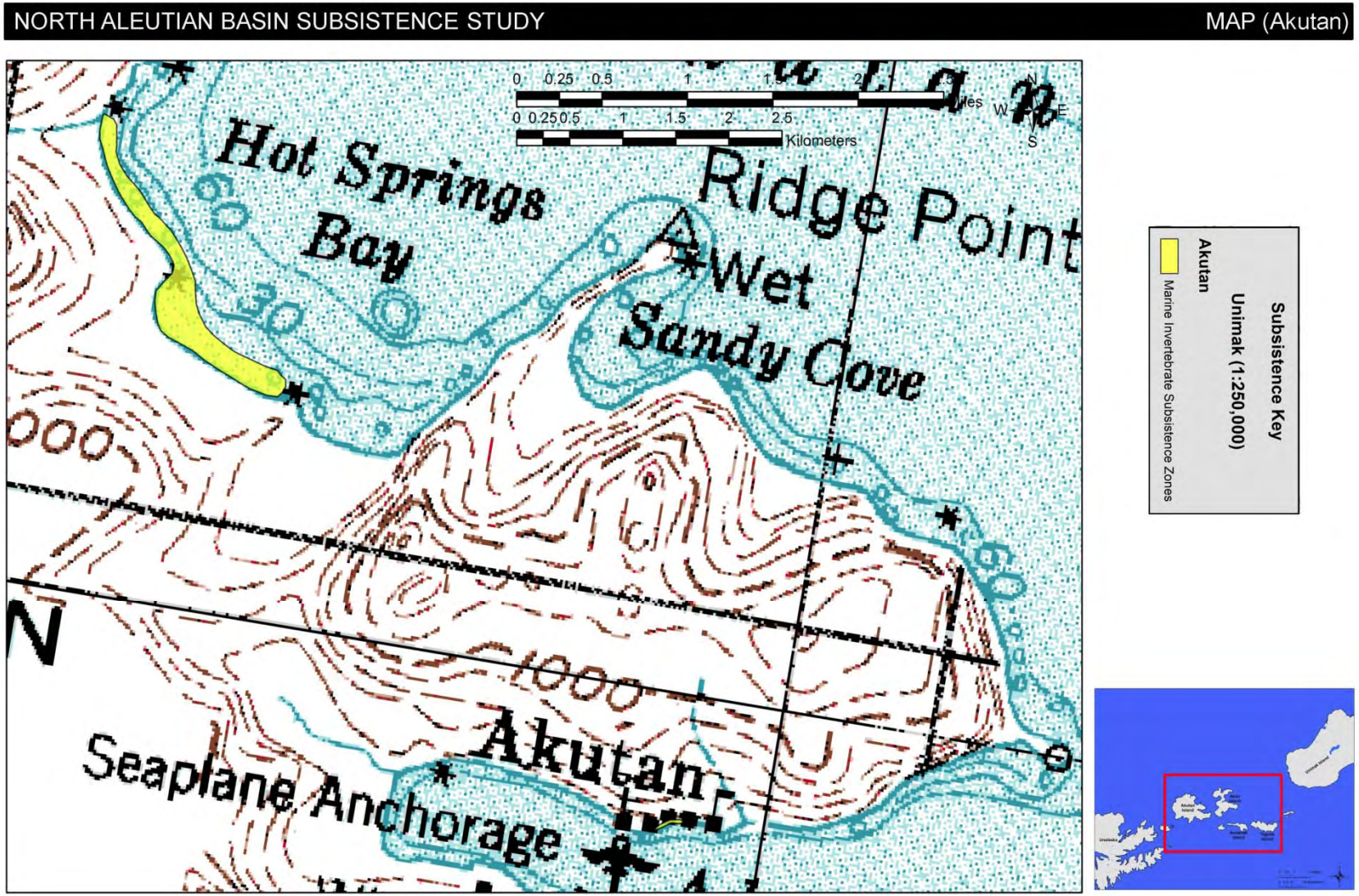


**Figure 29. Invertebrate harvesting zones for the village of Akutan.**

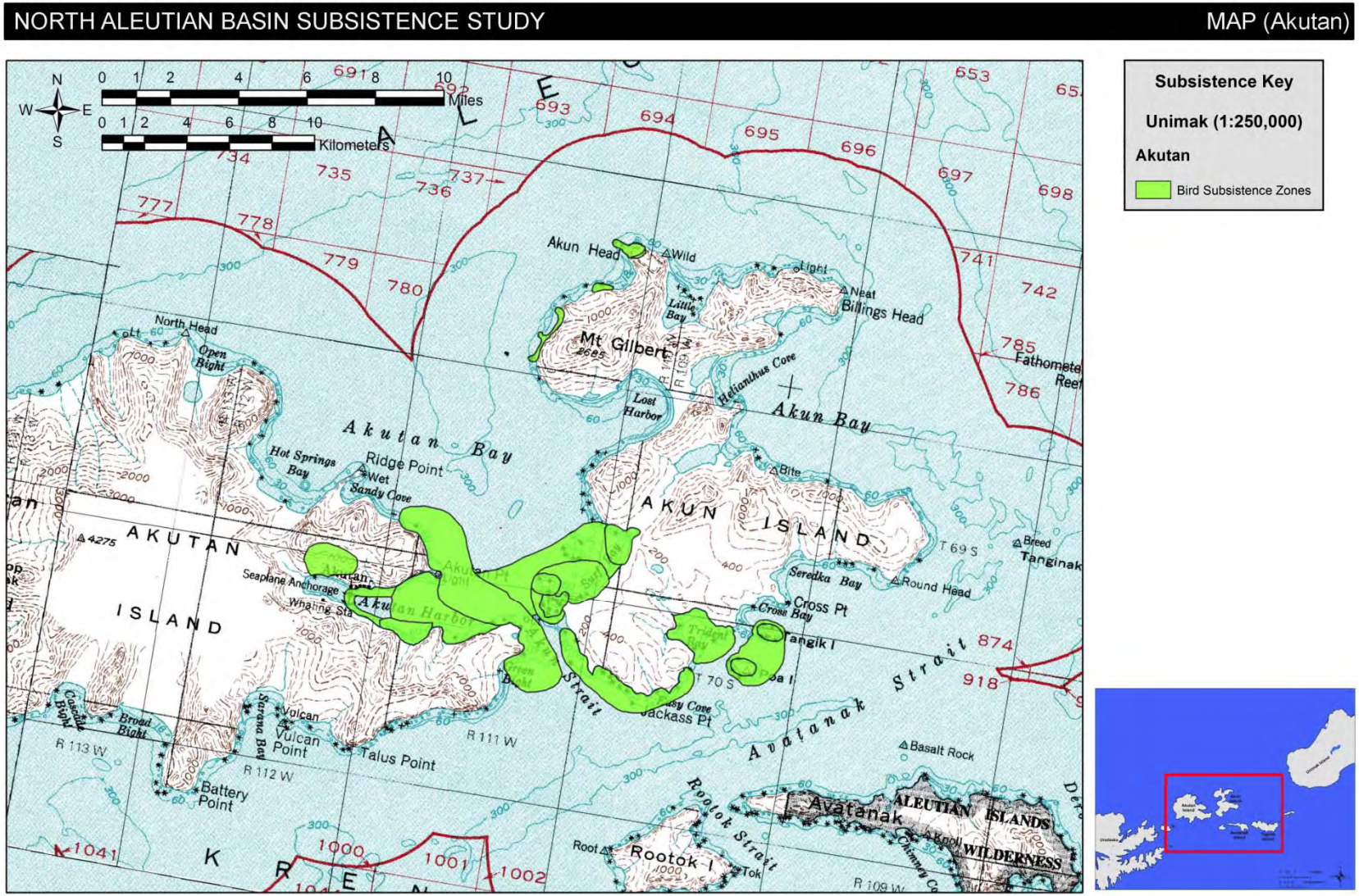


**Figure 30. Bird and egg harvesting zones for the village of Akutan.**

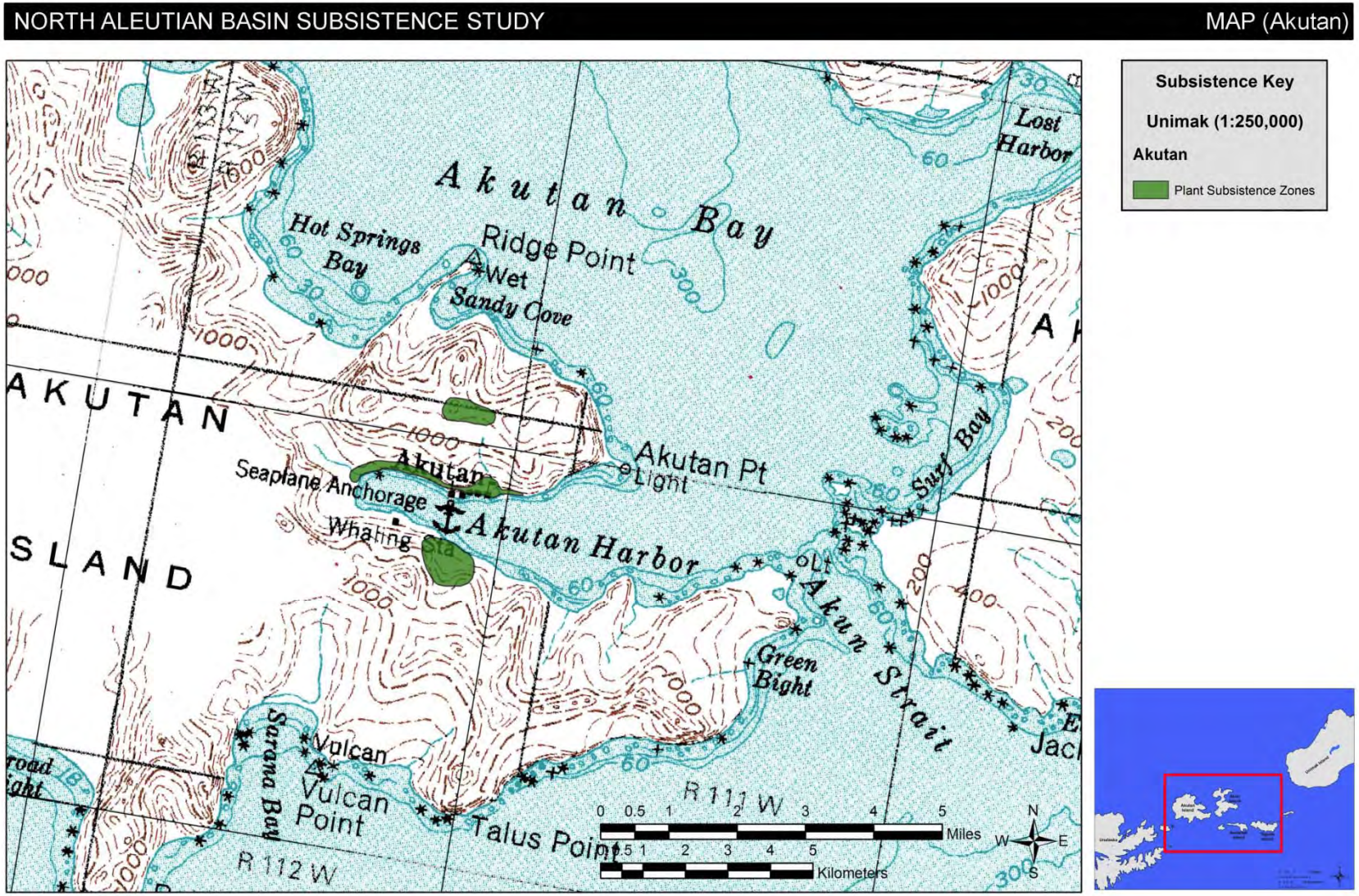


**Figure 31. Plant harvesting zones for the village of Akutan.**

## HOUSEHOLD/INDIVIDUAL HARVEST MAPS

Surveyed individuals indicated harvest areas and other key sites of importance on maps, oftentimes by drawing on the maps themselves. Most people who provided data for maps to indicate important harvesting areas were already active harvesters, although there was a broad range of use areas, species preferred, and intensity of use.

### Nelson Lagoon

Figure 32 shows the map of a key provider in Nelson Lagoon who indicated both current and former harvesting areas. This man is a commercial fisherman and part of a large extended family. He has not hunted caribou in several years, but he noted calving areas, key hunting sites, and where the herd typically ranges. He also has not found many cockles and razor clams to gather in recent years near the airstrip because of sea otters eating them, yet he drew in these important areas. He also indicated cabins that he uses as well as those belonging to others in the village. His main subsistence activity outside of fishing was caribou hunting, and this map tells a story of loss and hope for recovery.

Figure 33 indicates the current activity of a retired fisherman and his household. He no longer owns a commercial fishing boat but indicated many places where he use to fish, which boats he owned or operated, and his successes. The family now uses a large skiff or joins others on their boats to get to certain sites around the lagoon. Berries, ducks, some fish and ptarmigan are harvested by driving to the sites on the spit or up the beach. The retired fisherman occasionally still hunts ducks and ptarmigan, gathers berries and intertidal foods, and fishes off the village dock. Other adults in his household actively subsistence fish from skiffs and share their catches through dinners and gifts.

Figure 34 was provided by a woman and her husband, neither of whom fish commercially. They travel to sites throughout the region usually in family groups using their own skiffs or family-owned vessels. They will drive 30 miles southwest down the beach for salmonberries and ptarmigan. Extended family originated in Herendeen Bay, and the area around the old village remains to be critical subsistence grounds for the entire family. Clam digging, berry picking, fishing, and even bear hunting occur around the old village. Near the modern village site, gull and tern eggs are taken from Egg/Heart Island across from the village dock and along the airstrip. Berries are gathered in and around town.

### Port Heiden

Figure 35 shows the map of a commercial fisherman supporting a very large family under his own roof and several other relatives in the village. He owns a separate business as well, which helps support the family financially and with jobs. He primarily hunts and fishes, and his spouse and children pick fish from subsistence nets near the village, pick berries, and look for clams. Because he is a commercial fisherman, he pointed out the line where Area M commercial fishing boats fish and described their desire to let their own Area T permits fish closer to the village.

Figure 36 is the map of a prominent couple who are key harvesters and highly subsistence active. There are no commercial fishermen in the household. Instead the husband is a top hunter,

teaching hunting techniques and rules to youth, and has worked as a sport hunting guide. Both know the lands and waters intimately, and use a large variety of land and sea mammals, fish, and plants. This map demonstrates their geographic range and variety of activities. Like others in the village, they use GPS frequently to mark places where they harvested so they can return to key places and show others important sites. They also note the locations of wolves using GPS, and will alert others to help track them. The respondent also pointed out places where he had killed wolves, and where known wolf packs were denning. A local group of hunters had killed 15 wolves on their own, and the state only killed four in the same area using airplanes. The map also indicates sport hunting and fishing operations, which the couple monitors with great interest, since they see a negative impact on their subsistence. A few cabins near Strogonof Point were also noted as fully operational and places to camp while goose and duck hunting in the fall.

Figure 37 shows the substantial harvest range of a couple. The husband is a commercial fisherman and employs his adult children on the boat. The wife works in environmental cleanup and harvests substantial quantities of many species around the village. This map does not necessarily reflect harvesting in 2009, but shows all the places that are important to their household. In terms of species used, this household reported the most variety.

**False Pass**

Figure 38 shows the commercial and subsistence range for a very active seiner and his family in False Pass. They participate in numerous commercial fisheries and harvest a huge variety of wild foods, and described both spatially with equal value. They give away approximately half of their homepack to family and friends in the village and in Sand Point, King Cove, and Nelson Lagoon. Their second map (Figure 39) gives a close up of activities within the pass. Oftentimes, this couple will invite others from the village on boating trips in the pass to hunt and fish. Again, caribou areas are places where they normally would hunt if there was an open season. They also take cattle and birds from the Sanak Islands, and fish halibut south of the islands along the Sanak Bank. They take the largest variety of species in the village, the largest quantity, and share the most.

Figure 40 is a map provided by a man who crews on a set gillnetter and removes subsistence salmon from the commercial nets for home use. This is a good illustration of the difference in range if you fish on a set gillnet boat versus a seiner. Figure 38 shows the distances traveled by a seiner. This man also hunts ptarmigan, which are really abundant currently, and indicated places he normally hunted caribou when the season was open. He also takes cattle from Sanak but, because he does not own his own vessel, he does this as part of a large group from the village.

Figure 41 is the territory used by a single woman who hunts, gathers, and fishes alone and with family members. She does most of her harvesting in areas close to the village accessible by truck or 4-wheeler, and has great access to numerous species.

**Akutan**

Figure 42 shows the map of a man who is not a commercial fisherman but owns a large skiff and covers a wide range of subsistence use areas. There are no land mammals harvested for food on

the island, so most subsistence harvesting occurs on beaches or at sea. He hunts numerous seabirds between Akutan and Akun Islands, and takes seals from Akun Strait and the southern edge of Akun. Subsistence halibut trips are made at the mouth of Akutan Harbor and south of the island.

Figure 43 shows the activity of a young man supporting a wife and two children, one of which is also an active hunter alongside his father. These men are the primary sea lion hunters in the village. They also harvest a great deal of salmon in several bays and take halibut south of Akun. Duck hunting occurs in Akutan Harbor and Trident Bay on Akun.

Figure 44 shows the activity of an occasional crewman on a commercial cod boat, but someone who primarily subsistence harvests using skiffs around the island. He has participated in seal hunting trips to the south of Akun Island.

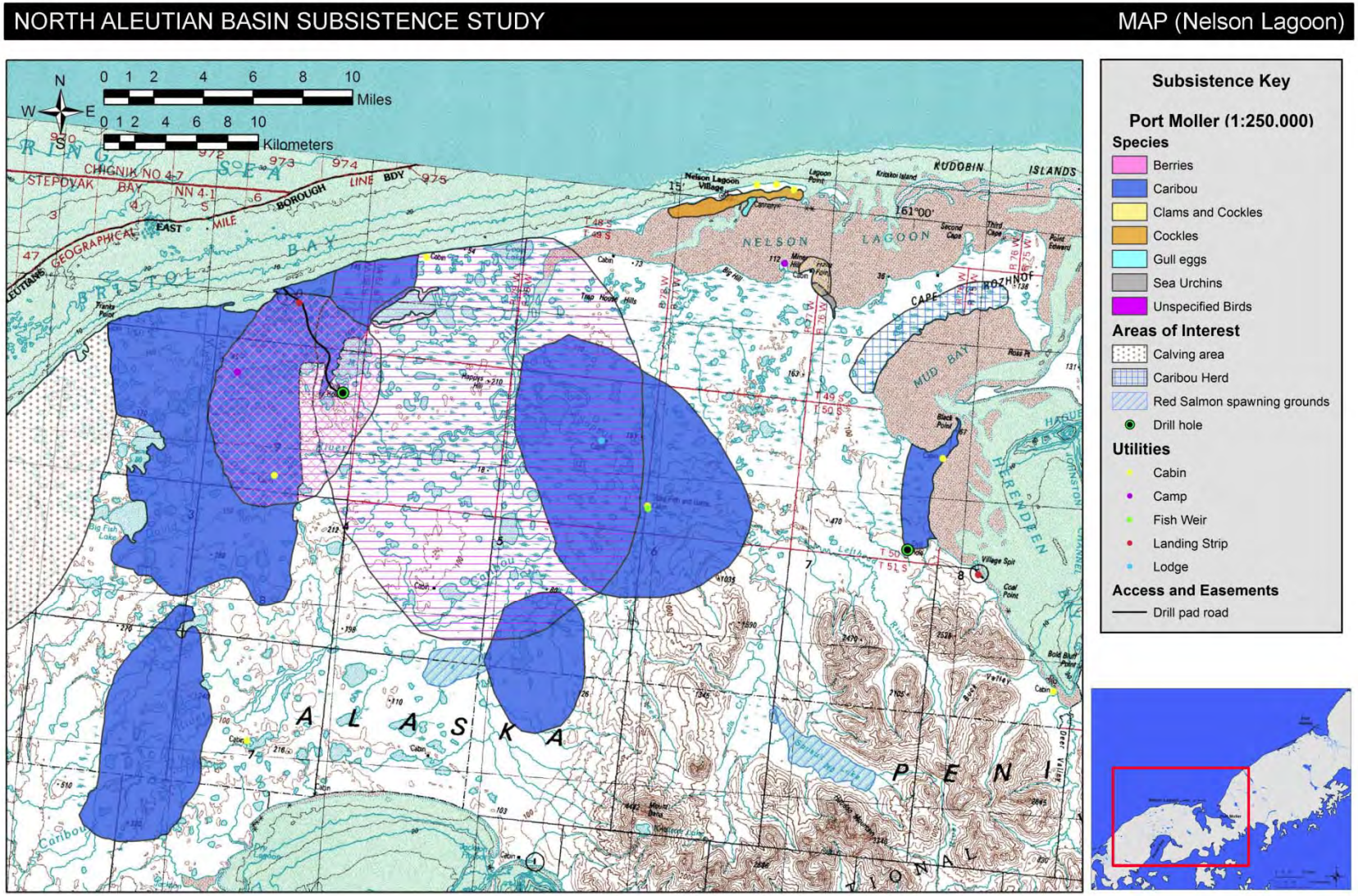


**Figure 32. Harvesting zones for a key provider in Nelson Lagoon.**

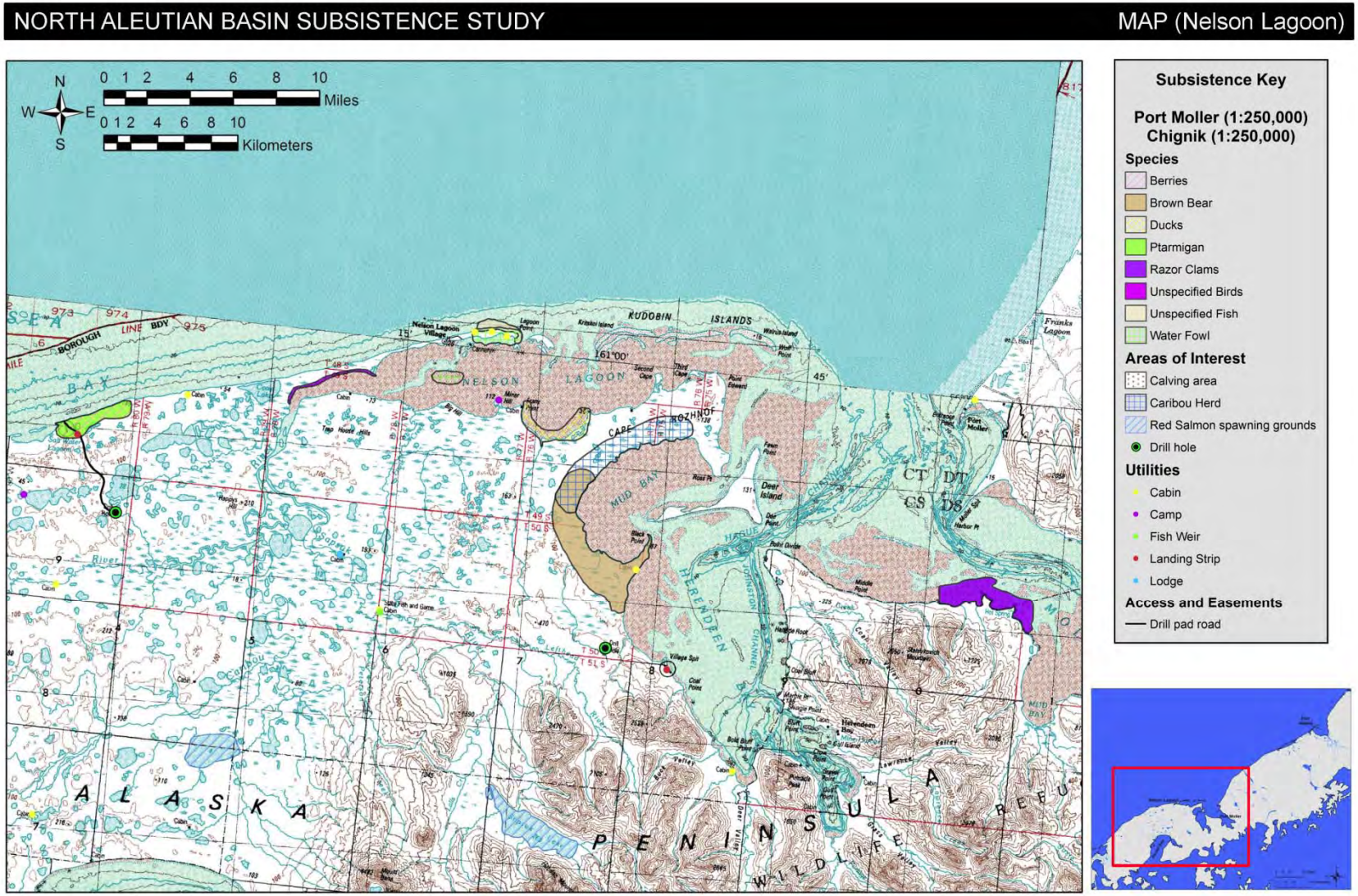


**Figure 33. Harvesting zones for a Nelson Lagoon household that includes a former commercial fisherman.**

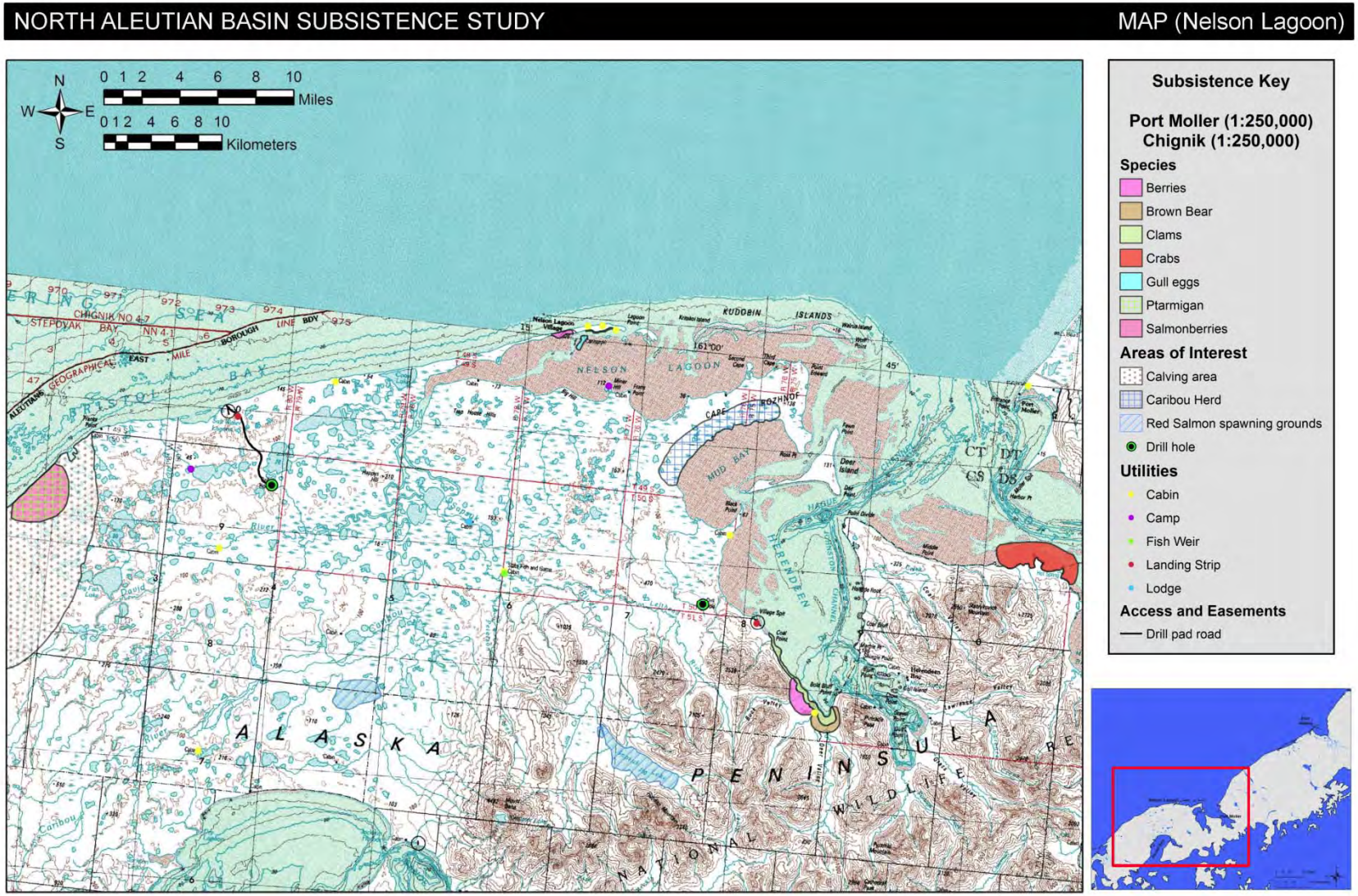


**Figure 34. Harvesting zones for a Nelson Lagoon household.**

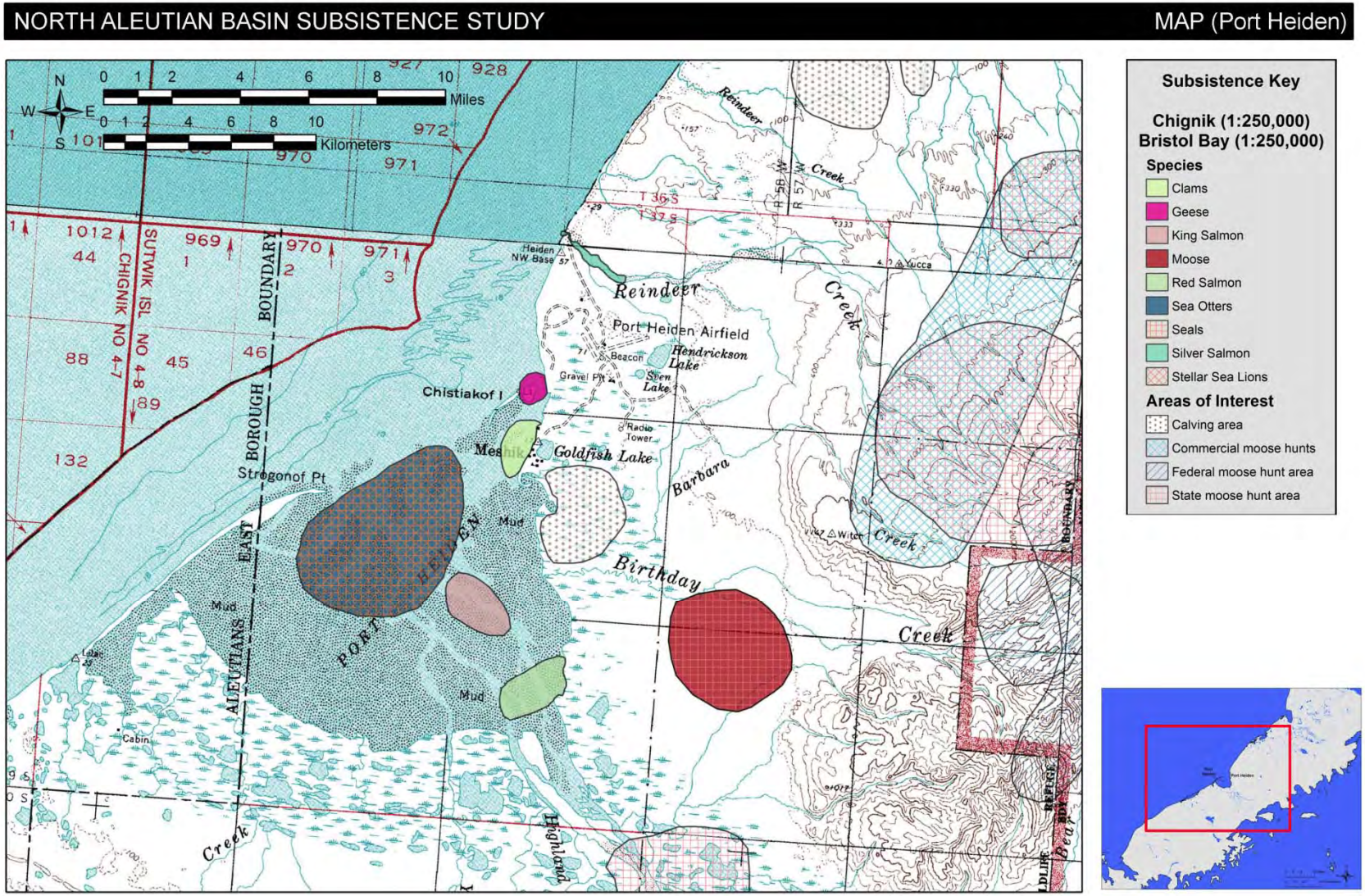


**Figure 35. Harvesting zones for a Port Heiden household that includes a commercial fisherman.**

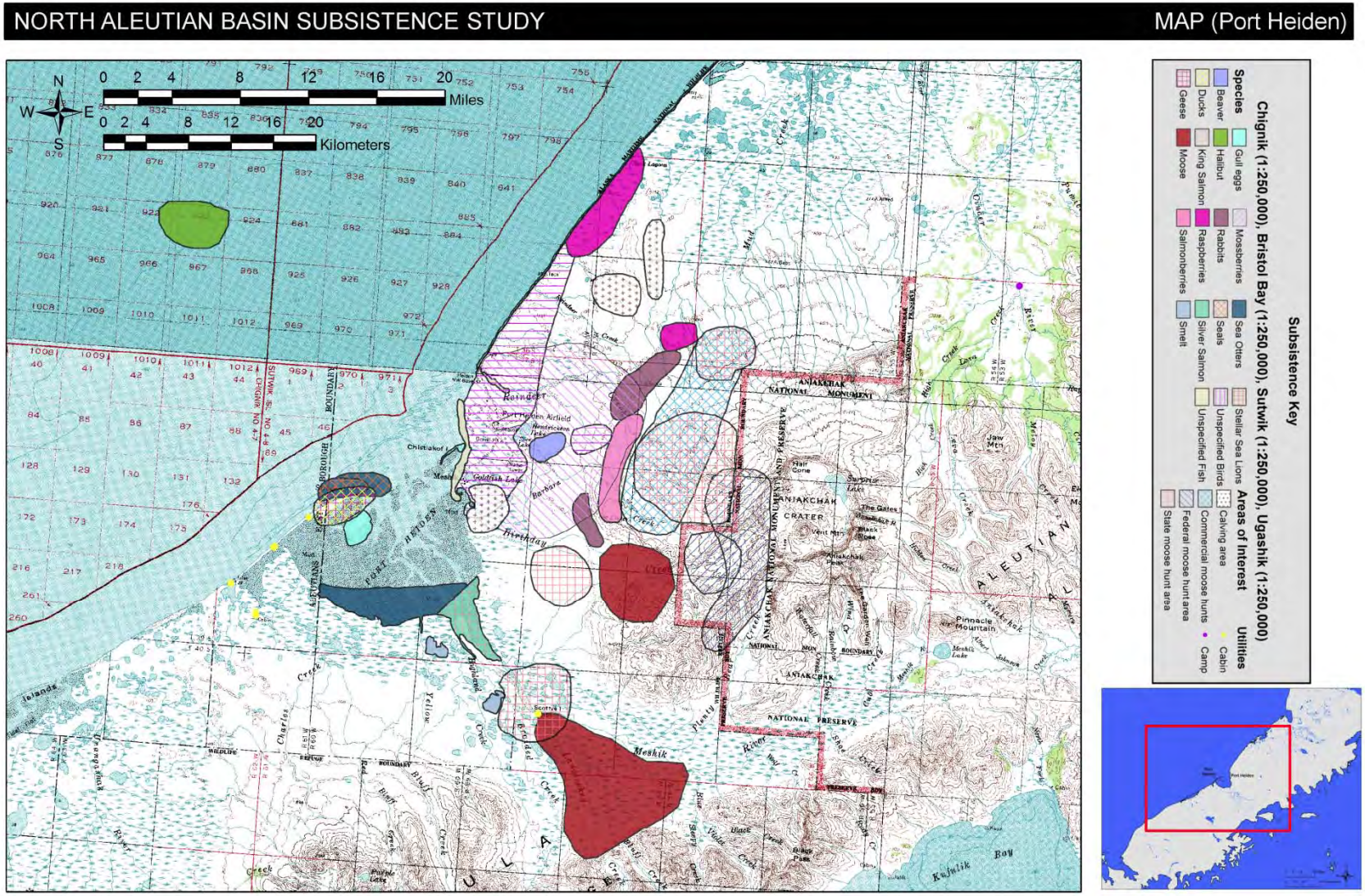


**Figure 36. Harvesting zones for a prominent household in Port Heiden.**

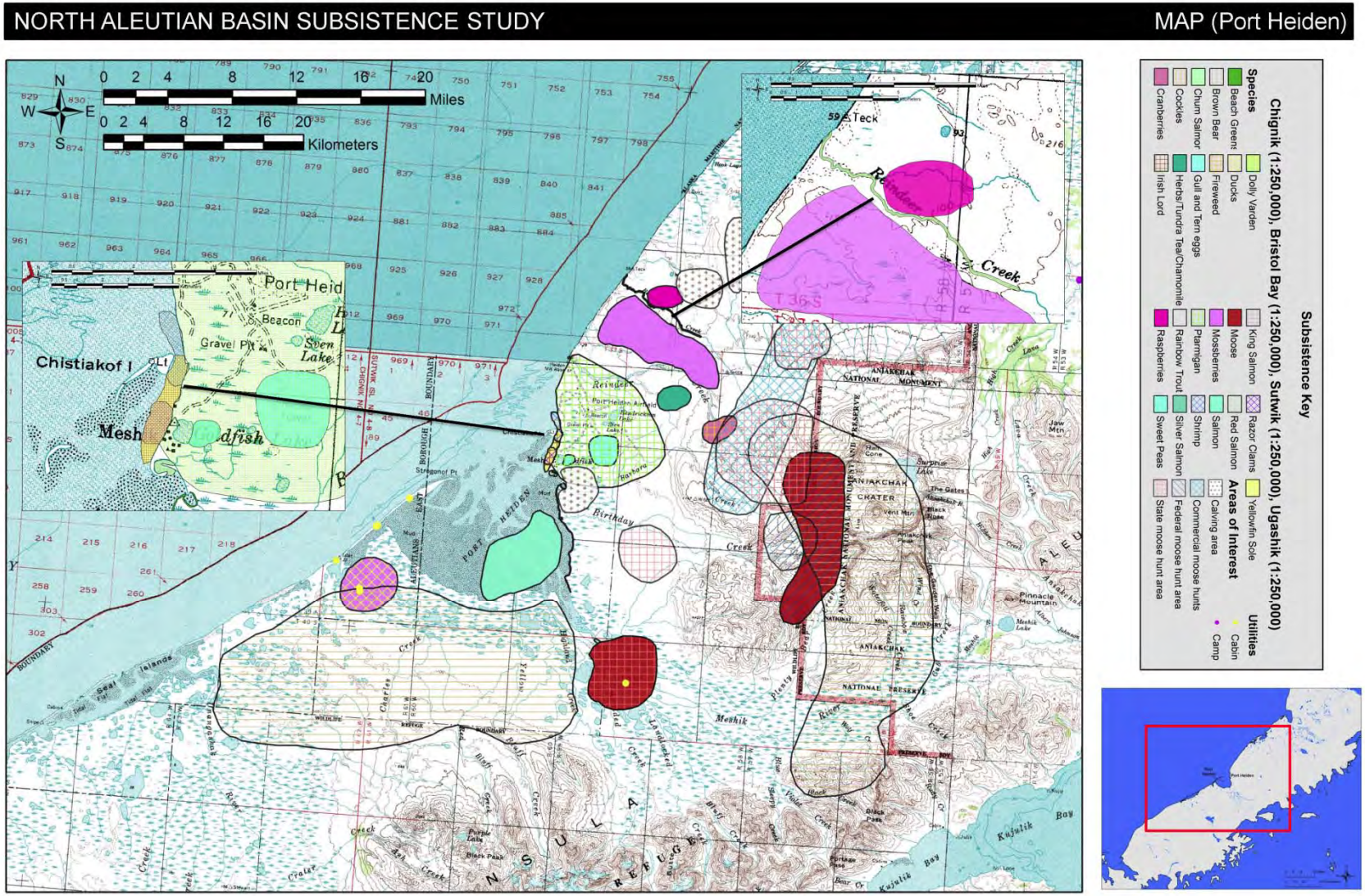


**Figure 37. Harvesting zones for a Port Heiden husband and wife.**

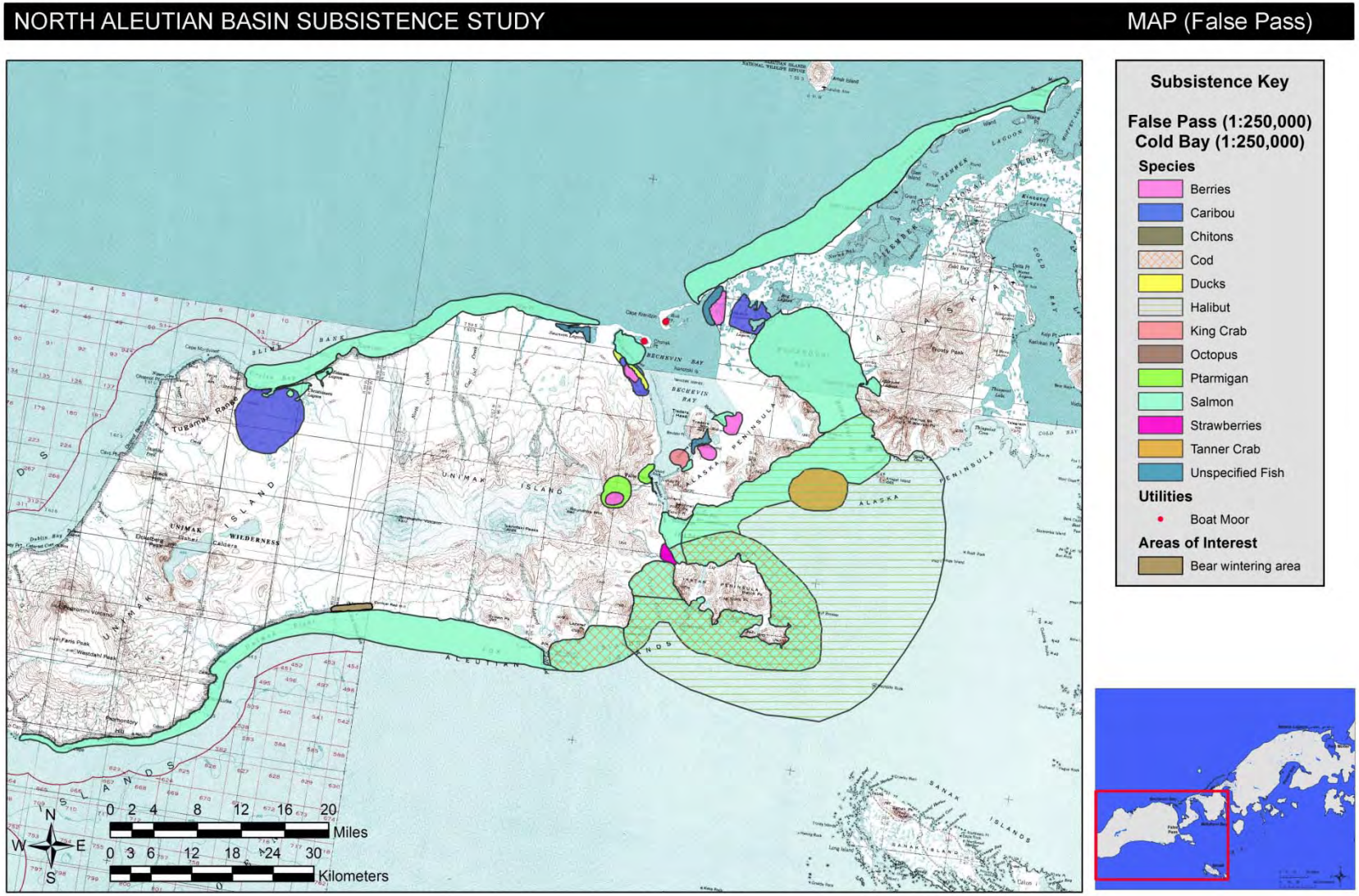


**Figure 38. Harvesting zones for a False Pass household that includes a commercial fisherman.**

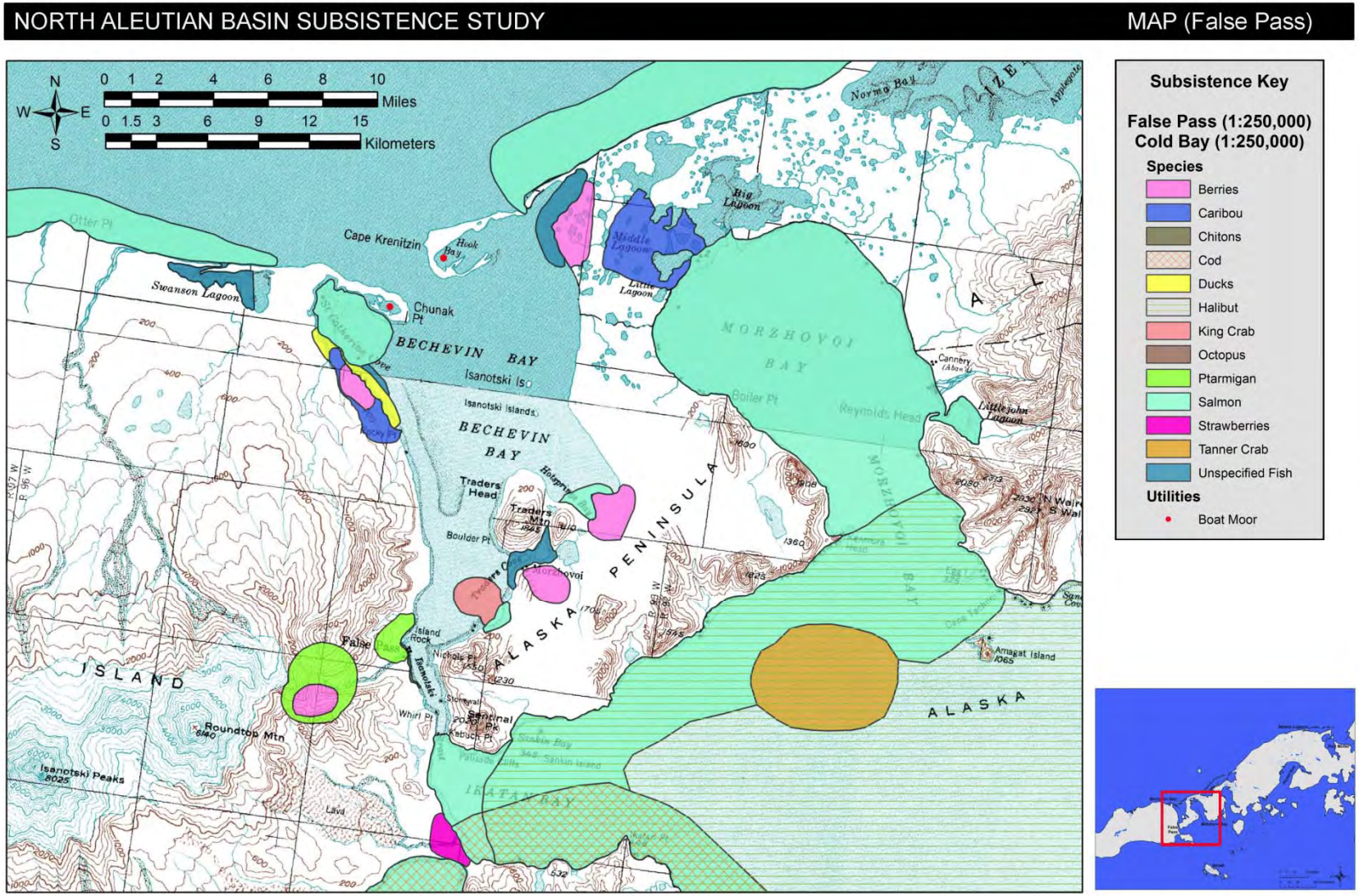


**Figure 39. Close-up of the harvesting zones for the False Pass household in Figure 38.**

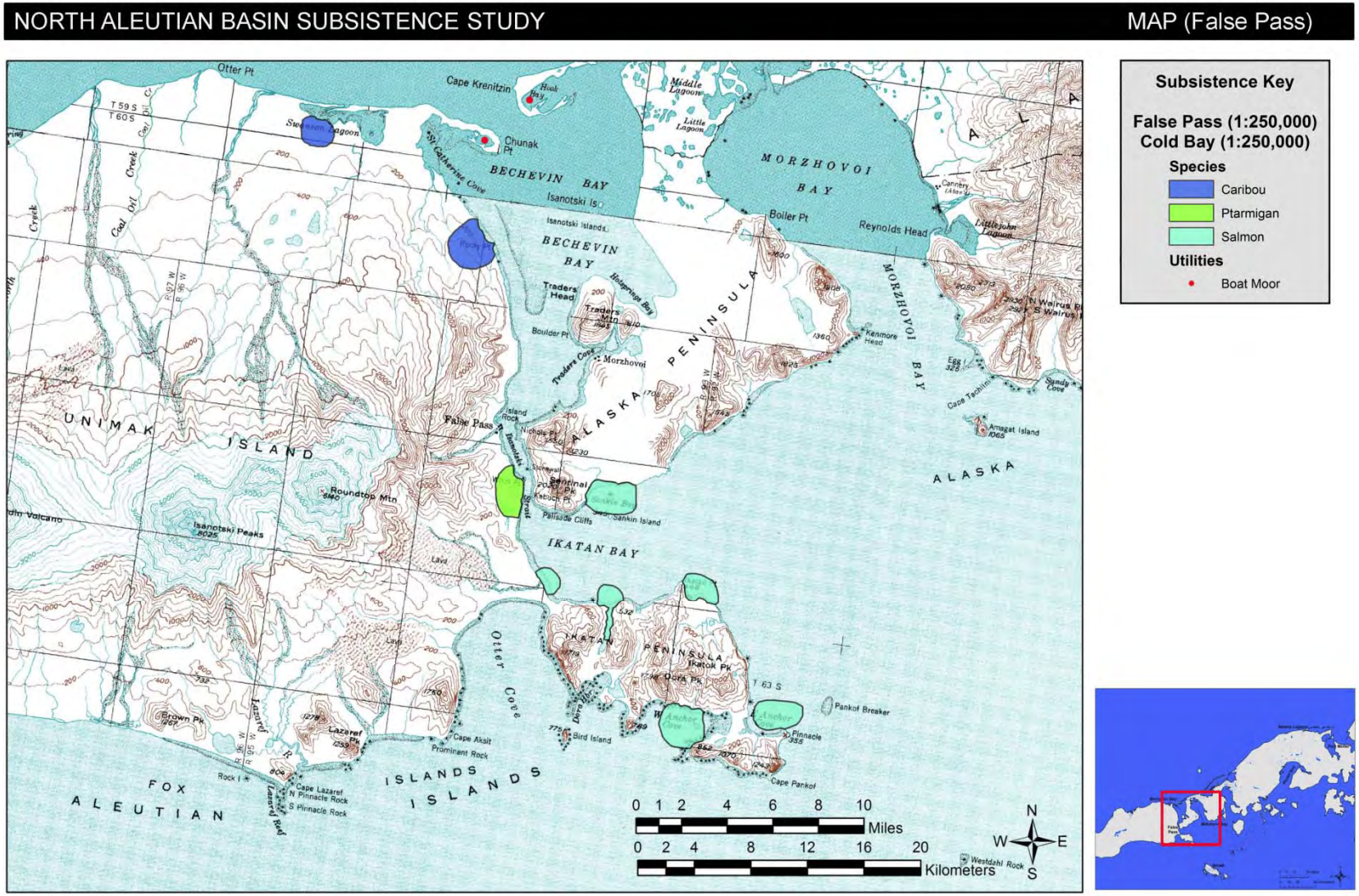


**Figure 40. Harvesting zones for a False Pass household led by someone who crews on a commercial fishing boat.**

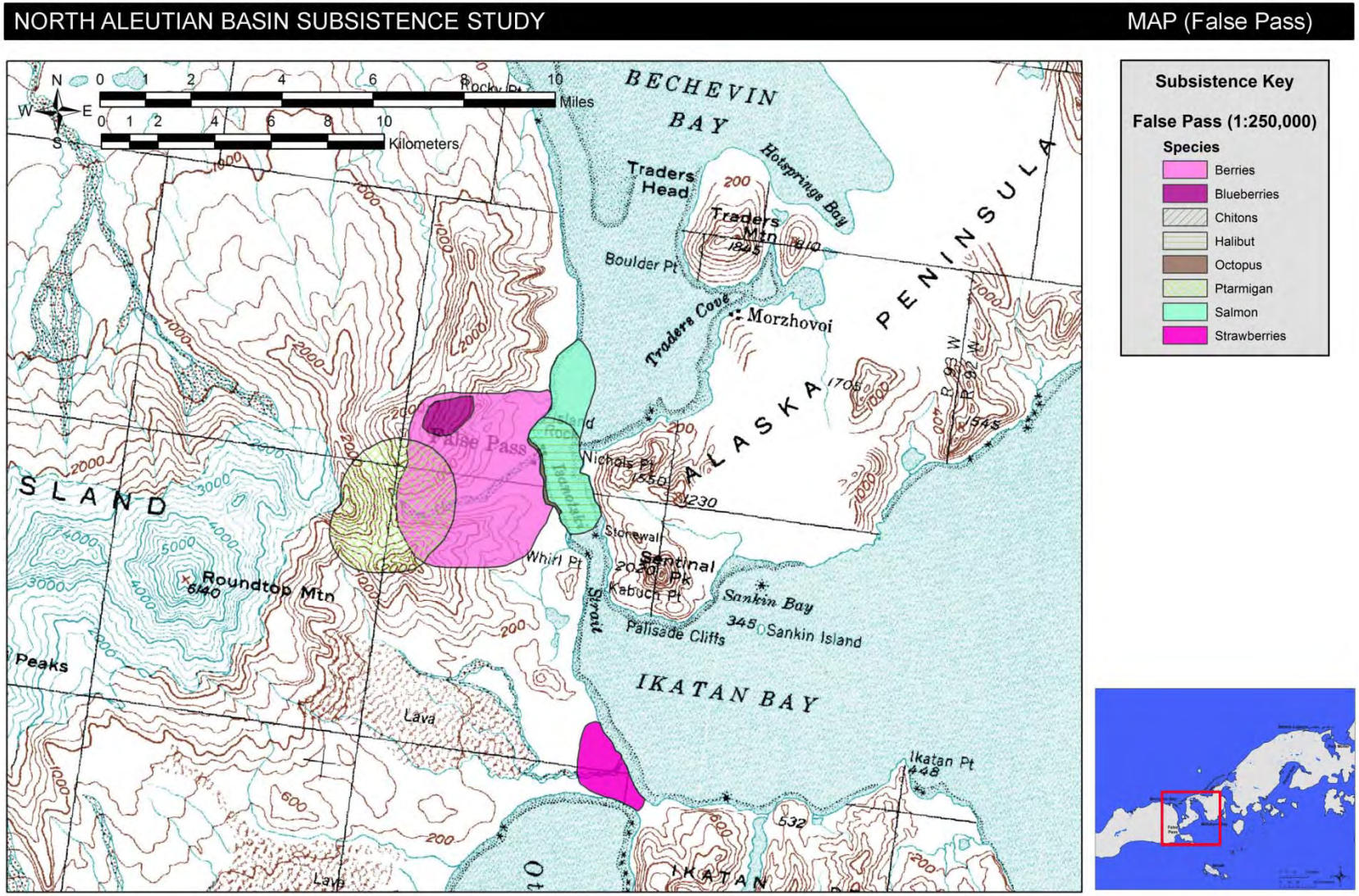


**Figure 41. Harvesting zones for a False Pass household run by a single woman.**

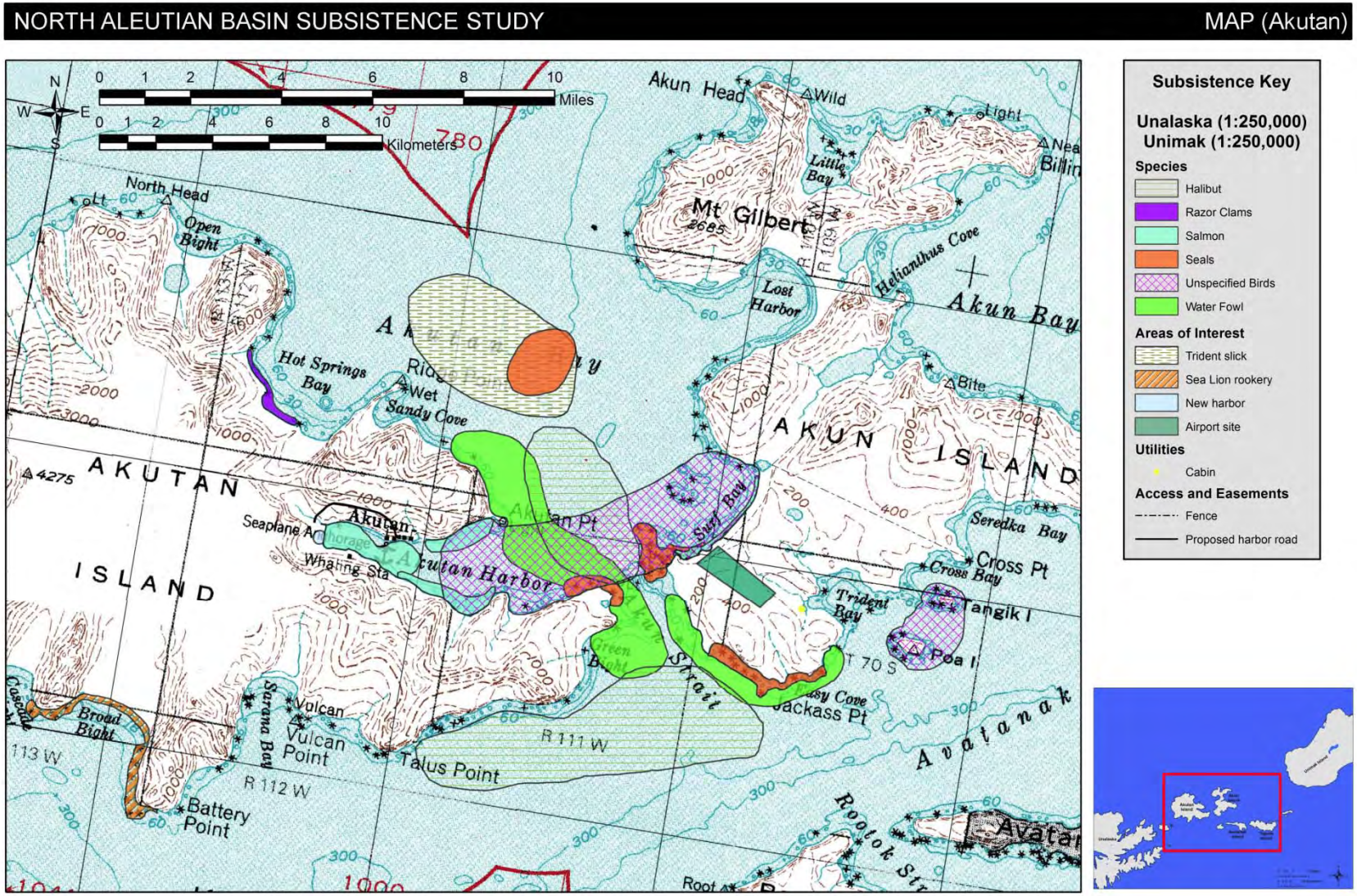


**Figure 42. Harvesting zones for an Akutan household with a man who owns a large skiff.**

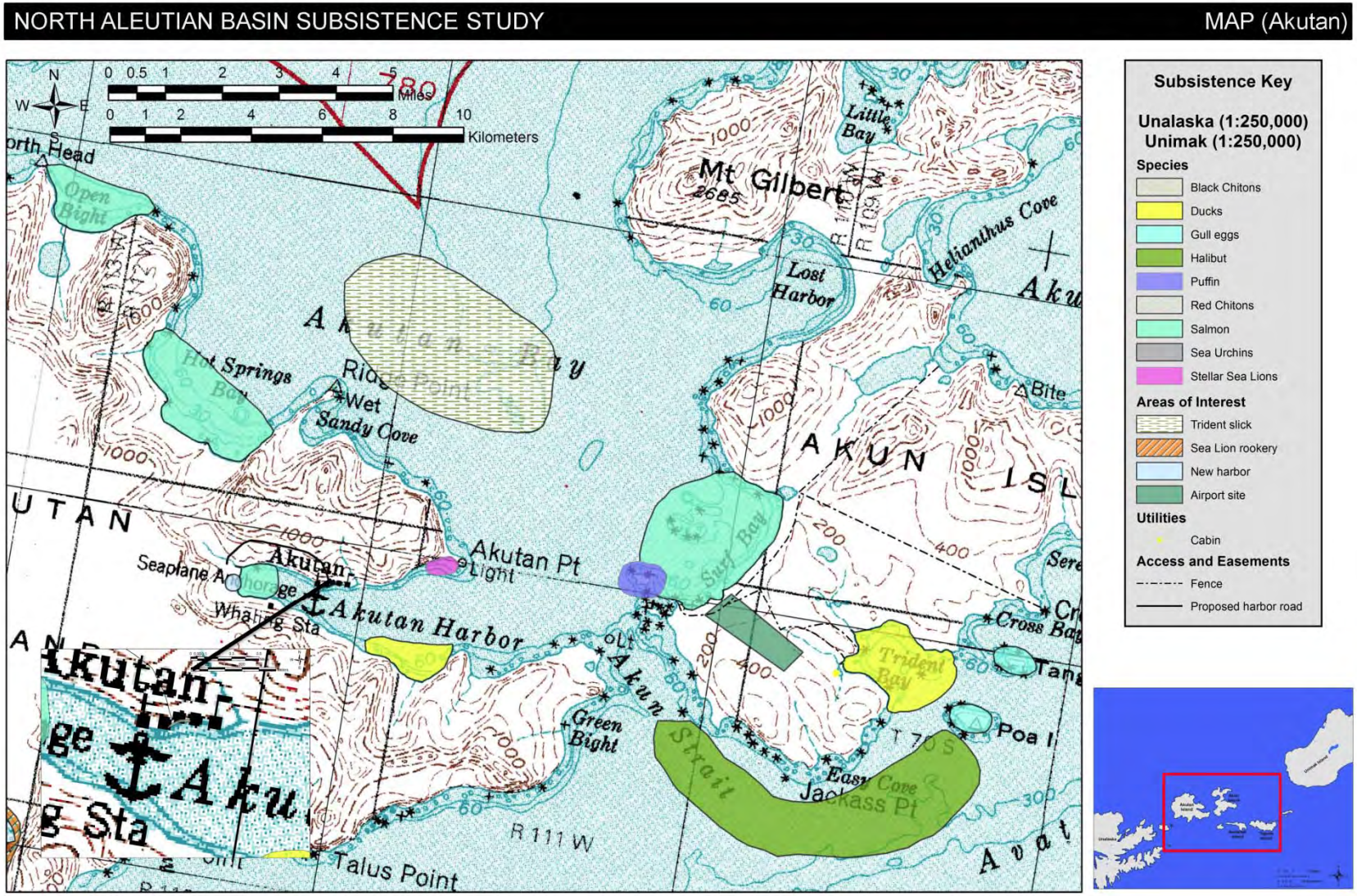


**Figure 43. Harvesting zones for an Akutan household with a skiff and multiple males.**

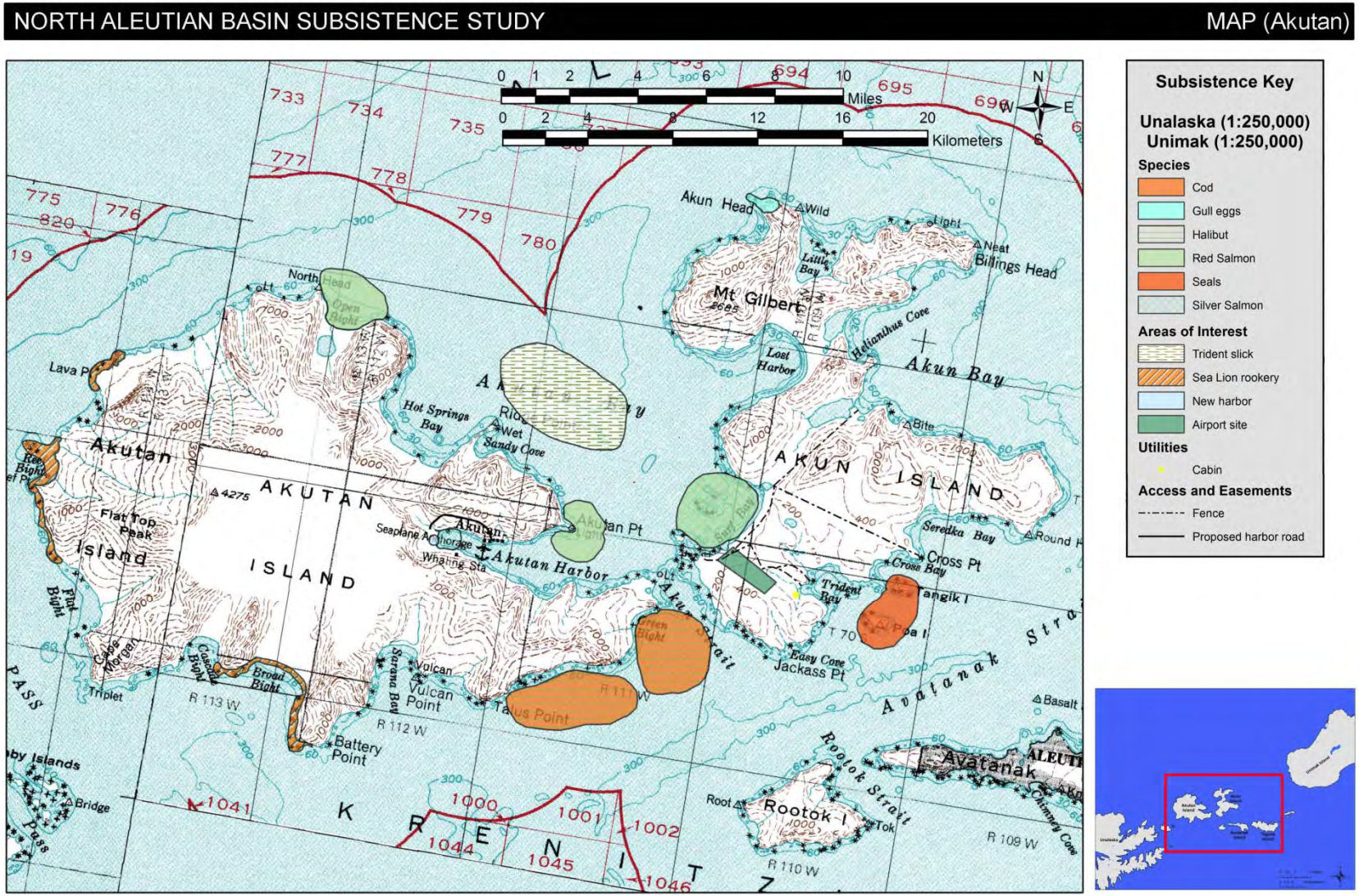


**Figure 44. Harvesting zones for a couple in an Akutan household.**