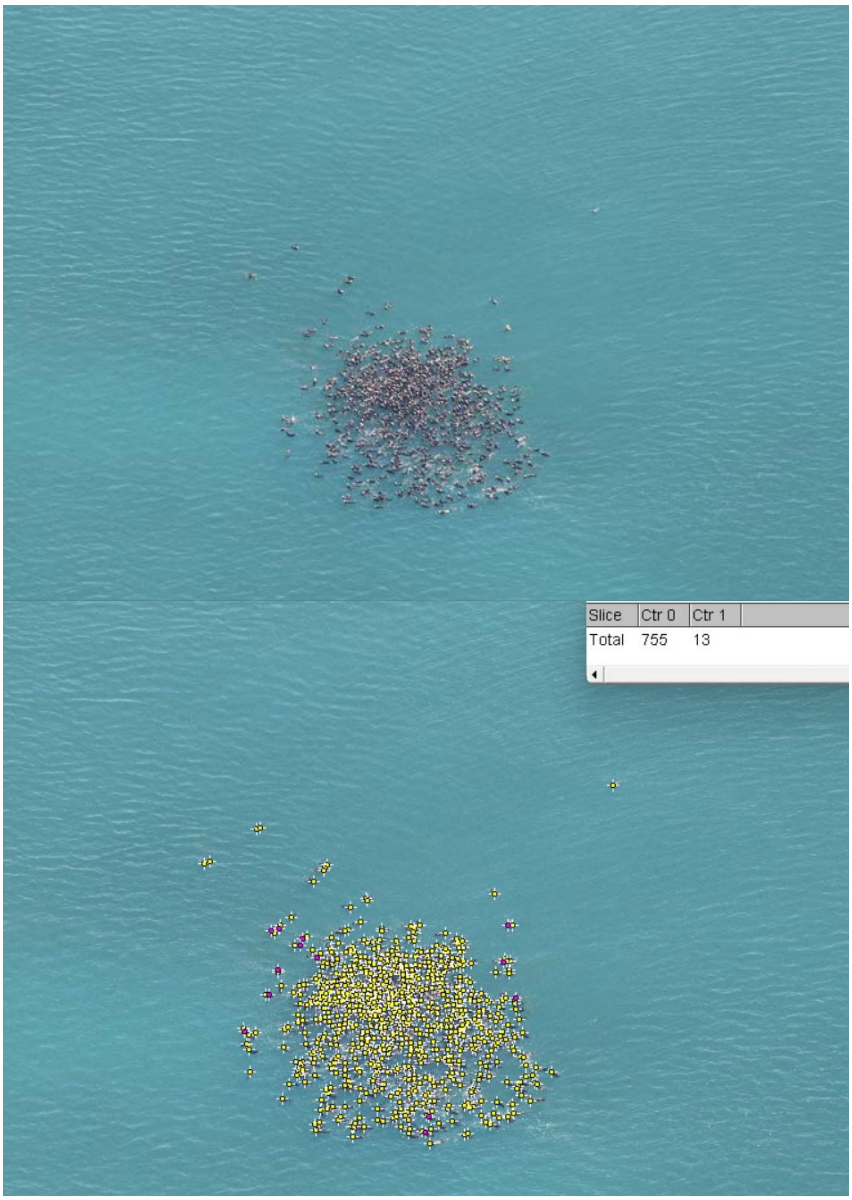
Results of the 2025 Survey of the Sea Otter Population in Washington State



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Introduction

Northern sea otters, *Enhydra lutris kenyoni* (hereafter sea otter or otter), historically ranged throughout much of the coastal North Pacific. In the western North Pacific Ocean, sea otters could be found from the northern islands of Japan through the Commander and Aleutian Islands, including areas as far north as the Pribilof Islands. In the eastern North Pacific Ocean, sea otters ranged from the Alaska Peninsula south along the coast to Oregon (Wilson *et al.* 1991). In Washington, areas of sea otter concentration were reported from the Columbia River north along the coast of the Olympic Peninsula (Scheffer 1940). Washington's sea otter population was extirpated through hunting by the early 1900s. In an effort to reintroduce otters to Washington, sea otters were captured at Amchitka Island, Alaska, in 1969 and 1970 and translocated to states/provinces where they had been extirpated, including locations in Alaska, British Columbia, Washington, and Oregon. In Washington, a total of 59 sea otters were translocated to the outer coast of the Olympic Peninsula, with 29 individuals released near Point Grenville in 1969 and an additional 30 otters released near La Push in 1970 (Jameson *et al.* 1982; Jameson *et al.* 1986). In 2004, Washington State published a recovery plan for sea otters (Lance *et al.* 2004), and the status of the Washington sea otter population is reviewed by the WDFW every five years (for the most recent status review see Sato *et al.* 2018). Sea otters are currently listed as a Threatened species in the State of Washington and are protected under the Marine Mammal Protection Act of 1972.

Since 1989, aerial and ground surveys have been conducted by WDFW and USFWS/USGS to monitor Washington's sea otter population. Only three years of counts are missing from this time series – 2009 due to poor weather conditions, 2018 due to lack of funding, and 2020 due to the COVID-19 pandemic. In 1989, the population was estimated to be 208 sea otters, living primarily in the rocky habitats north of La Push, but with a small number counted as far south as Destruction Island. By 2019, the population had grown to at least 2,785 otters (Jeffries *et al.* 2019). During this time, sea otters have continued to occupy the primary range between Point Grenville and Cape Flattery, with population growth occurring within this range. Extralimital reports of sea otters, which most likely originated from this coastal Washington population, include detections

as far south as Bandon, Oregon, along the coast and detections in the Strait of Juan de Fuca, San Juan Islands, Admiralty Inlet, Bellingham Bay, and southern Puget Sound. A translocated population of sea otters also occurs along the outer Vancouver Island coast from Barkley Sound to Cape Scott.

Methods

Washington sea otter surveys are a collaborative effort that has included biologists and volunteers from the Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Olympic Coast National Marine Sanctuary, Olympic National Park, The Seattle Aquarium, Point Defiance Zoo and Aquarium, the Quinault Indian Nation, and the University of Washington.

Survey Protocol

Sea otter aerial surveys were flown in WDFW's Partenavia P-68C-TC (N 357 PN) and covered coastal waters within the historical range of sea otters in Washington. A reconnaissance flight from Tillamook Rock, OR (45.3852º N -124.0184º W), north to Cape Flattery, WA (48.3861º N; -124.7261º W), then east into the Strait of Juan de Fuca to Freshwater Bay (48.1432º N; -123.6089º W), WA, is typically conducted the day prior to beginning surveys to establish sea otter distribution and investigate the possibility of range expansion. This reconnaissance flight is then followed by as many as three consecutive days of surveys covering coastal waters from just north of Grays Harbor, WA, at Copalis Rocks (47.2952º N; -124.2610º W) to Cape Flattery, and then east in the Strait of Juan de Fuca to Freshwater Bay. For discussion purposes, this survey area is broken up into a southern segment (from La Push south) and northern segment (from La Push north and into the Strait of Juan de Fuca).

Surveys were flown at approximately 800–1000' Above Ground Level (AGL) following a trackline along the coast about 0.5 mile from shore, allowing observation of a strip from the shoreline to ~2 miles offshore. This trackline covered all kelp beds and nearshore rocks and reefs along the outer Washington coast from Copalis Rocks north into the Strait of Juan de Fuca. The flight crew consisted of the pilot and three observers – a primary observer, secondary observer/data recorder, and a tertiary observer. The primary observer sat in the right front seat and was responsible for locating otters and directing the pilot; photographing otters with a digital camera (Canon EOS 7D Mark II equipped with a 100–400 mm lens); and counting (groups < 25 otters) or estimating (groups >25 otters) group size. The secondary observer in the right rear seat looked for otters, especially individuals or small groups near to but not part of large groups, and recorded times, counts, locations, and photo numbers on a flight log. The tertiary observer sat in the rear left seat, focusing on locating offshore groups and otters that the primary and secondary observers may have missed while focusing on the right side of the plane. For larger groups of sea otters, the aircraft circled clockwise to enable the primary observer to estimate numbers of otters and take digital photos without glare from the sun. For safety purposes, Automatic Flight Following (AFF) was used to track real-time locations for the aircraft. A Garmin GPSmap76Cx was used to record track lines and ArcGIS Survey Maps app was run on a tablet as an additional tool to help orient observers by providing the plane's position in real time on a map of the Washington coast.

In 2022, two offshore survey legs were added to each sea otter survey to investigate an apparent shift towards increased offshore habitat use by Washington's sea otters. These offshore survey legs indicated substantial, if inconsistent, use of the area surveyed 2 – 4 miles offshore between Split and Willoughby rocks and Destruction Island in the 2022 surveys (Clark *et al.* 2023a). In 2024, these offshore legs were expanded to trial two approaches for surveying the broader habitat offshore of the Washington coast. The first of these was a series of three offshore transects at a distance of ~4, ~6, and ~8 miles from the shoreline, flown north to south, north to south, and south to north, respectively (Figure 1). Only the innermost (~4 miles offshore) of these transects was flown in the area north of Hoh Head, where the continental shelf, thus suitable otter habitat, is narrower than in the southern portion of the range. The second survey approach was a series of broad zig-zag transects that were flown from north to south and covered a range of offshore habitat from ~3–8 miles offshore, while reducing the amount of time dedicated to surveying in the farthest offshore areas where otters were least likely to be present (Figure 1). All new offshore survey components were flown after the traditional survey had been completed to maintain consistency of that standardized approach across years. Neither of the two approaches for surveying offshore habitat introduced in 2024 resulted in new otters or groups of otters being added to the total count, as all groups encountered during the offshore segments had been previously observed and counted from the traditional inshore survey line. Given these results and the safety concerns and costs associated with flying offshore, no dedicated offshore segments were flown in 2025.

Ground-based Surveys

During a typical survey of Washington's sea otter population, teams of ground observers conduct shore-based, visual surveys of nearshore sea otter habitat at multiple locations on the Washington Coast using binoculars and spotting scopes. Observations of adults (independent) and large or small pups (dependent) are recorded on a topo or aerial photo delineated with the viewable area during each count (noting visual obstructions and environmental conditions that limit visibility during the count). In 2025, however, funding delays meant that the single aerial survey ultimately flown was scheduled on short notice. As a result, a concurrent ground-based survey could not be coordinated and did not occur in conjunction with the aerial survey as would typically occur.

Photo Counts and Analyses

All digital images of groups of otters taken during the aerial surveys were reviewed and the best photo of each group was identified for use in counting. The best photos are those that are in focus, at an appropriate zoom, have minimal sun glare, and ideally capture the otters rafted at the surface, not swimming directionally or diving. Authors counted adults and pups in the digital images using Image J 1.5i (http://imagej.nih.gov/ij) and collectively agreed on the number of otters in each photo. Photo counts only included otters that were distinguishable (*e.g.*, submerged objects that could not be confidently identified as otters were not counted). Pups identified within digital

images were distinguished from adults and classified as dependent based on their small size, wooly light brown pelage, and close association/orientation (generally resting on the chest) with an adult.

Counts of adults and pups from the digital images were then added to the counts of otters observed during the survey but not photographed (groups smaller than ~25 individuals) to obtain the full count of sea otters from the aerial surveys. The final estimate thus consisted of the sum of the most accurate aerial count of larger groups and estimates of small groups or individuals made during the aerial survey.

Once a total count was calculated for each flight, the flight with the highest total count was selected as the annual estimate. The resulting estimates represent the minimum Washington population count, because there is no correction factor to account for individual animals or small groups off the flight path, outside of the survey area, animals not detected or underwater when the plane flew over. Variance and/or confidence limits for these estimates are not calculated because annual estimates are based on the single highest count.

The average rate of population change (% increase or decrease) was calculated from annual counts from 1989 to 2023, and an exponential curve was fit to the count data. This approach provides an estimate of sea otter population growth based on all years in the time series, but also allows prediction across gaps in the dataset (*i.e.*, 2009, 2018, 2020) and assessment of model fit using the proportion of deviance explained by the model (McFadden's unadjusted pseudo-R^2). A 3-year moving average is included in the Appendix for comparison with previous reports (Supplementary Figure 1).

Results

2025 Survey Details

Due to delays in receiving funding, the 2025 sea otter aerial survey could not be flown during the typical survey period during the second half of June. Instead, a single survey flight was flown on July 28, 2025, from Tillamook Rock, north along the Washington Coast, and into the Strait of Juan de Fuca. The 2025 survey crew consisted of M. Kimbrel (pilot), C. Clark (primary observer, right front seat), S. Ament (secondary observer/data recorder, right rear seat), and C. Pasi (tertiary observer, left rear seat). All observers had prior experience conducting sea otter surveys in Washington and were originally trained by the same biologist (S. Jeffries) who led these surveys for many years.

Photo Counts

Photos from the single survey on July 28 counted (Table 1). The July 28 flight included a survey of the entire Washington sea otter range, as well as potential sea otter habitat in northern Oregon and southern Washington (Figure 1). The survey covered the nearshore waters, reefs, and kelp beds, as well as offshore rocks and islands. Observation conditions were excellent.

The number of sea otters observed during the survey conducted on July 28 was 3,494 (Table 1). All otters were observed from the traditional nearshore flight path, though as in past years if groups of otters were spotted offshore, the aircraft diverted to count these otters before picking up the nearshore flight path where it was left off. This resulted in 284 otters being counted in offshore habitat and 3,210 seen in inshore habitat during the July 28 survey. During this survey, 2,979 otters (85%) were observed in the area south of La Push and 515 otters (15%) were seen north of La Push. The July 28 survey counts included a total of 58 pups, with 47 of these seen south of La Push and 11 north of La Push.

Because it was the only count for 2025, the 3,494 sea otters seen on July 28 represented the minimum abundance for this year and was used to estimate the growth curve for this population. The growth trend of the Washington sea otter population was modeled using a generalized linear model (GLM) with a quasipoisson distribution and a log link, which is effectively the same as the exponential models used in previous reports, but corrects for overdispersion and provides confidence intervals around the trend line. Fit to the minimum abundance of sea otters in Washington from 1989 – 2025, this GLM explained 92% of the deviance in the data (Figure 3).

No ground-based survey was conducted in 2025, thus no ground counts were available for comparison with aerial survey counts of the same sites, nor was more detailed information about group composition available for this year.

Discussion

The 3,494 sea otters observed during the 2025 survey represents a new high count for Washington's sea otters and continues the close fit with the trend of exponential growth observed in this population since surveys began in the 1980s. Previous reports calculated population growth by averaging the year-to-year changes in minimum sea otter abundance (*i.e.*, survey counts) across the time series. Using this approach, the average population growth rate through 2025 would be estimated at 9.25%; however, given the excellent fit of the quasipoisson GLM (which closely approximates an exponential growth curve) for the time series of sea otter counts (Figure 3), population growth rate can be estimated more appropriately by extracting this term from the model output. Using this approach, the estimated annual growth rate of Washington's sea otter population is 7.06% per year.

The use of offshore habitat by sea otters in Washington has been a focus of discussion in recent years (*e.g.*, Clark *et al.* 2023b, 2024). Since 2019, the number of sea otters counted during aerial surveys has demonstrated substantially more variability than earlier in the time series, with high counts occurring in years when groups of otters were observed offshore and low counts occurring in years when offshore groups were not observed. This suggests that offshore groups were present during those years but not seen by observers in the plane. This hypothesis is further supported by the number of otters observed in the northern and southern segments of the Washington sea otter range (Figures 4 and 5), as years with low counts tended to have the expected number of animals observed north of La Push, but substantially lower than expected numbers of otters seen in the southern portion of the range where the majority of offshore habitat use has previously been observed. In 2025, sea otters were recorded using offshore habitat in the typical

range of 2 – 4 miles offshore in the area between Split and Willoughby rocks and Destruction Island (Figure 2B). These observations totaled 284 otters, or 8.1% of the animals counted during the 2025 survey, in offshore habitat. This is lower than previous years with high counts and large groups of otters observed offshore (*e.g.*, 2019: 985 otters or 35.4% of observations, 2022: 1,128 otters or 38.7% of observations, 2024: 481 otters or 17.6% of observations; Jeffries *et al.* 2019, Clark *et al.* 2023a, 2024). In 2025, more than 1,200 sea otters were observed around Destruction Island, an area to potentially be a starting point for offshore foraging trips by groups of otters. Though a relatively low proportion of otters were seen offshore in 2025 as compared with other years with high counts and offshore otter observations, the high abundance at Destruction Island may lend support for the idea that this area is used for staging and resting between offshore foraging trips.

Recent sea otter survey reports have also discussed an apparent recent reversal of the trend observed over much of the aerial survey time series of an increasing proportion of Washington's sea otter population being found south of La Push (*e.g.*, Clark *et al.* 2024). This pattern was relatively consistent from the late 1990s through 2019, but appeared to change in the 2021 – 2024 surveys (Figure 5). The 2025 survey data contrasted strongly with these recent surveys, returning to the previously observed trend with 85% of sea otters observed south of La Push and only 15% observed in the area north of La Push. The 515 otters observed in the northern segment of the range in 2025 fit with the generally stable or slowly growing number of otters observed in this area throughout the survey record, with the increasing proportion of otters in the southern segment of the range being driven primarily by increases in counts south of La Push (Figure 5). The 2024 survey results represent the only notable deviation from this trend, with nearly 1,000 otters counted north of La Push, demonstrating relatively large scale movements of sea otters along the coastline which can result in the distribution of sea otters within their range shifting meaningfully from year to year and likely on shorter timescales that are not captured by the annual surveys.

During the 2025 survey, the southernmost sightings were of three sea otters observed off the sandy beaches of the Long Beach Peninsula. No otters were observed at Tatoosh Island, where at least a small number of animals are typically found. The farthest north observations were two otters in the area around Point of Arches; however, a group of 20 otters was observed in Clallam Bay in the Strait of Juan de Fuca. Aerial survey counts within the Strait generally consist of one or zero animals, though ground observers, researchers, and members of the public have previously reported seeing up to ~30 sea otters in Clallam Bay (*e.g.*, Clark *et al.* 2024). In January 2025, a member of the public reported seeing eight otters in Clallam Bay and staff and volunteers from the Seattle Aquarium observed otters at this location during each of a series of 2025 shore-based surveys. These observations further support the idea that this location is consistently used by a group or groups of sea otters and make Clallam Bay the location farthest into the inland marine waters of the Salish Sea that is documented year-round habitat for more than single otters or very small groups of <5 otters. Within the Salish Sea in 2025, sea otters were consistently reported by the Pacific Whale Watch Association and members of the public in the vicinity of Race Rocks, Victoria, Port Angeles, and the northwest San Juan Islands, though these reports seem likely to consist of the same ~3 – 5 individuals using these locations throughout the year.

Within the core range of Washington's sea otter population, several observations or reports were made of sea otter using offshore habitat. These included two individual otters spotted 4.5 and

nine miles west of Ruby Beach by a WDFW team conducting boat-based seabird and marine mammal surveys and two otters observed by USFWS staff two and three miles west of La Push. Several offshore otter sightings also occurred during an aerial survey for sea turtles conducted by USGS, which included one individual 10 miles west of Sand Point, another 7.25 miles west of Sand Point, an otter seven miles west of Duk Point, and another individual 6.5 miles west of Grayland Beach. These surveyors on these flights also recorded a group of ~250 sea otters four miles offshore of the mainland and ~0.5 miles south of Destruction Island, which is consistent with the locations of other large rafts of otters using offshore habitat seen during sea otter surveys conducted since 2019. Taken together with the southernmost and northern/easternmost observations of sea otters in 2025, these results are consistent with the idea that Washington's sea otter population is not substantially increasing its range southward or into the Salish Sea and are instead making more use of offshore habitat than when the population was smaller. That said, the observations of individuals or small groups of sea otters off the southern Washington coast and at several locations in the Strait of Juan de Fuca and farther into the Salish Sea may indicate that the geographic range of Washington's sea otter population is slowly expanding in these directions.

Acknowledgements

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Tables

Table 1. Results of the complete survey of the Washington sea otter population conducted on July 28, 2025. Independent = Adults; Dependent = Large or Small Pups. All otters observed during this survey were seen as part of the traditional inshore survey of the coast. The "In/Offshore" column indicates whether these groups were associated with the coastline, rocks, or islands, or were observed in open water habitats >1 mile from these features.

Location	*In/Offshore*	*Independent*	*Dependent*	*Total*
SOUTH SURVEY SEGMENT				
Long Beach Peninsula	Inshore	3	0	3
Ocean Shores	Inshore	2	0	2
Cape Elizabeth	Inshore	2	0	2
Split and Willoughby Rocks	Inshore	12	0	12
Offshore Raft River	Offshore	206	4	210
South of Destruction Island	Offshore	74	0	74
Destruction Island	Inshore	1,228	0	1,228
Destruction Island Overlook	Inshore	2	0	2
Hoh River Area	Inshore	1	0	1
Diamond Rock Area	Inshore	771	17	788
Rock 443	Inshore	426	2	428
Perkins Reef	Inshore	154	24	178
Toleak Point	Inshore	2	0	2
Giants Graveyard	Inshore	49	0	49
NORTH SURVEY SEGMENT				
Chilean Memorial Area	Inshore	14	0	14
Cape Johnson Area	Inshore	60	4	64
Sandy Island Area	Inshore	2	0	2
Carroll Island	Inshore	1	0	1
Jagged Island Area	Inshore	15	0	15
Cedar Reef Area	Inshore	152	0	152
Yellow Banks Area	Inshore	2	1	3
Sand Point Area	Inshore	146	3	149
Ozette Island	Inshore	3	0	3
Duk Point	Inshore	87	3	90
Point of Arches Area	Inshore	2	0	2
Clallam Bay	Inshore	20	0	20
Survey Total		3,436	58	3,494

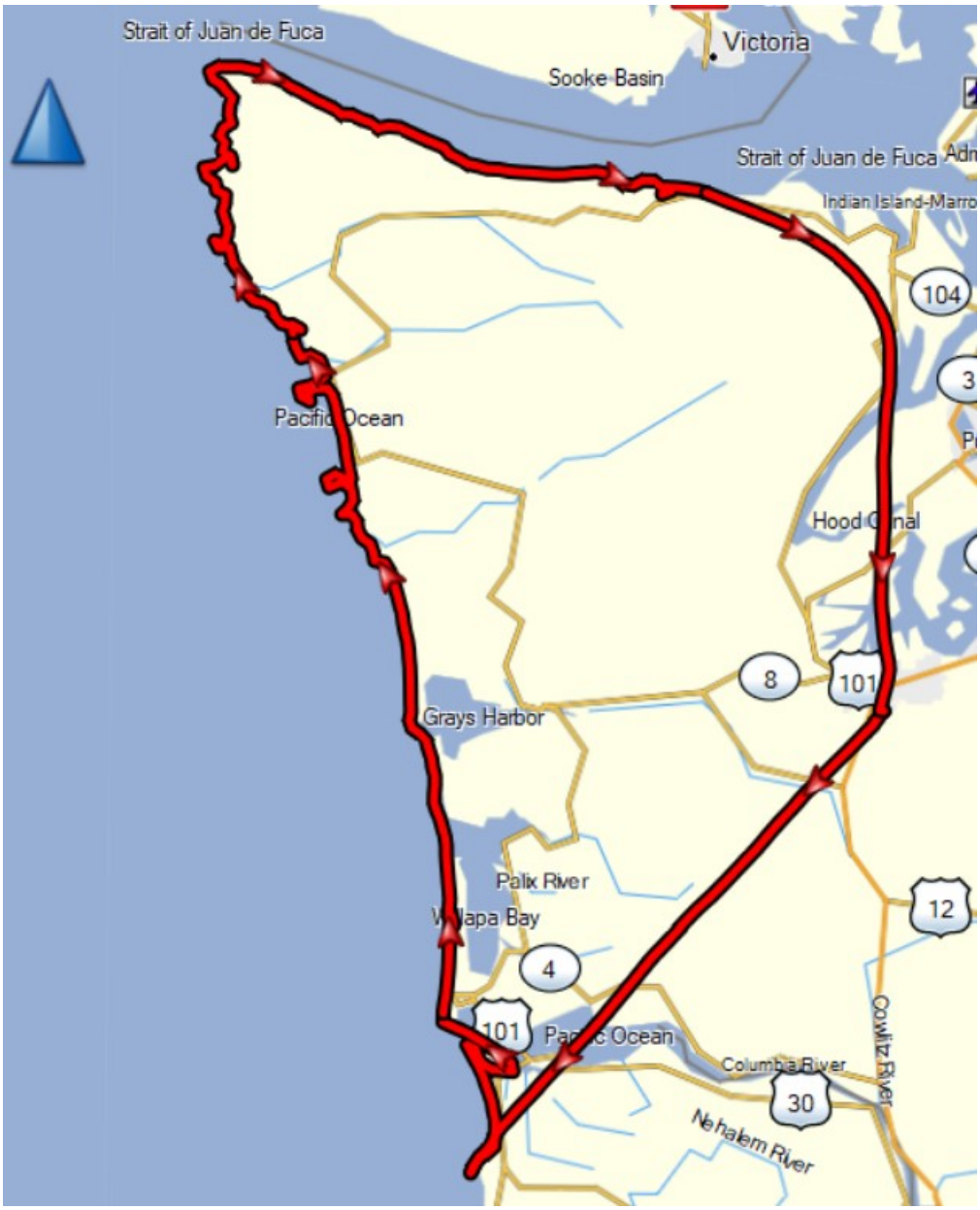


Figure 1. Garmin GPSmap76Cx mapping GPS track line from Washington sea otter aerial survey on July 28, 2025.

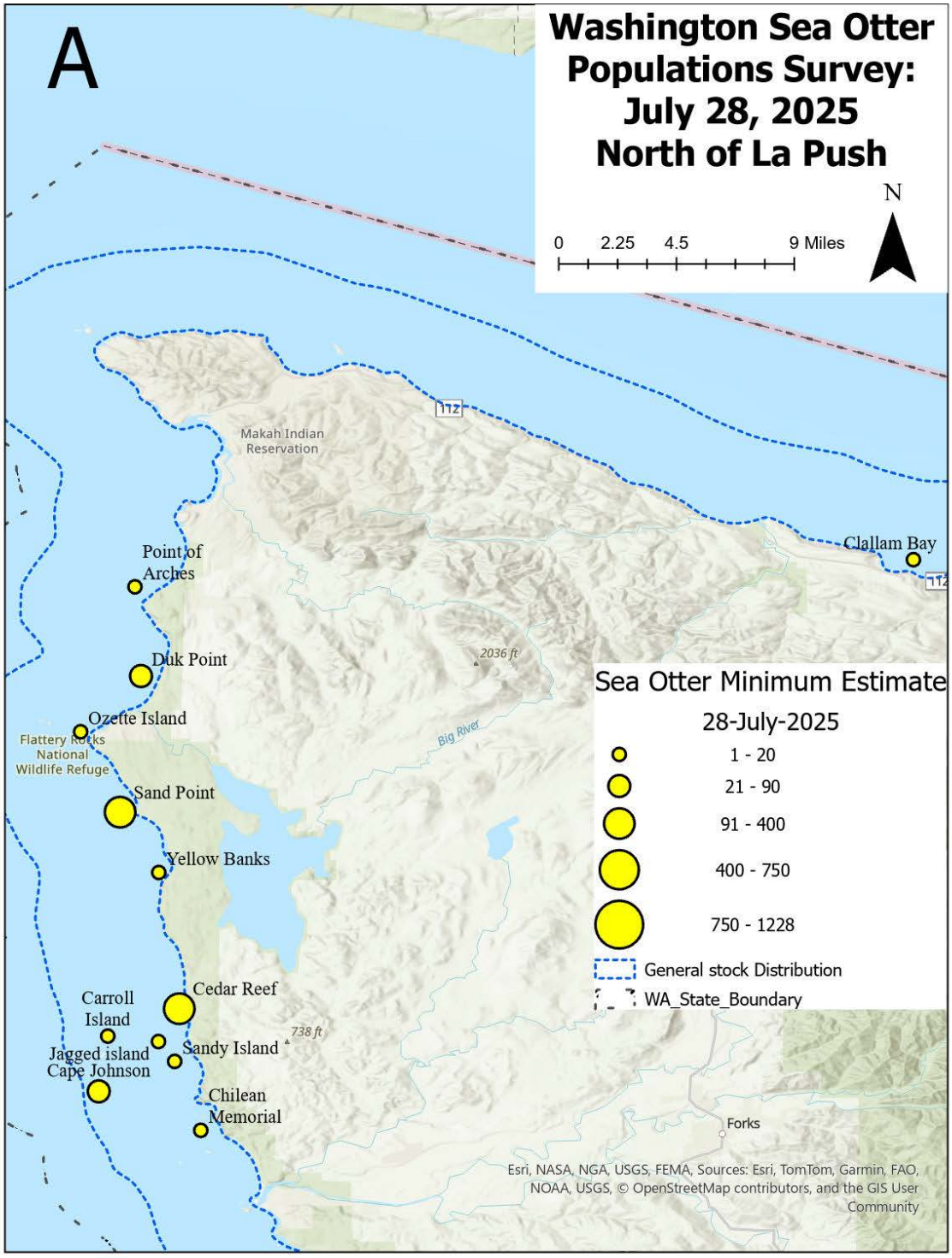


Figure 2A. Washington sea otter population distribution in the northern segment of the range during the survey on July 28, 2025. Sizes of circles correspond to the number of otters counted at that location.

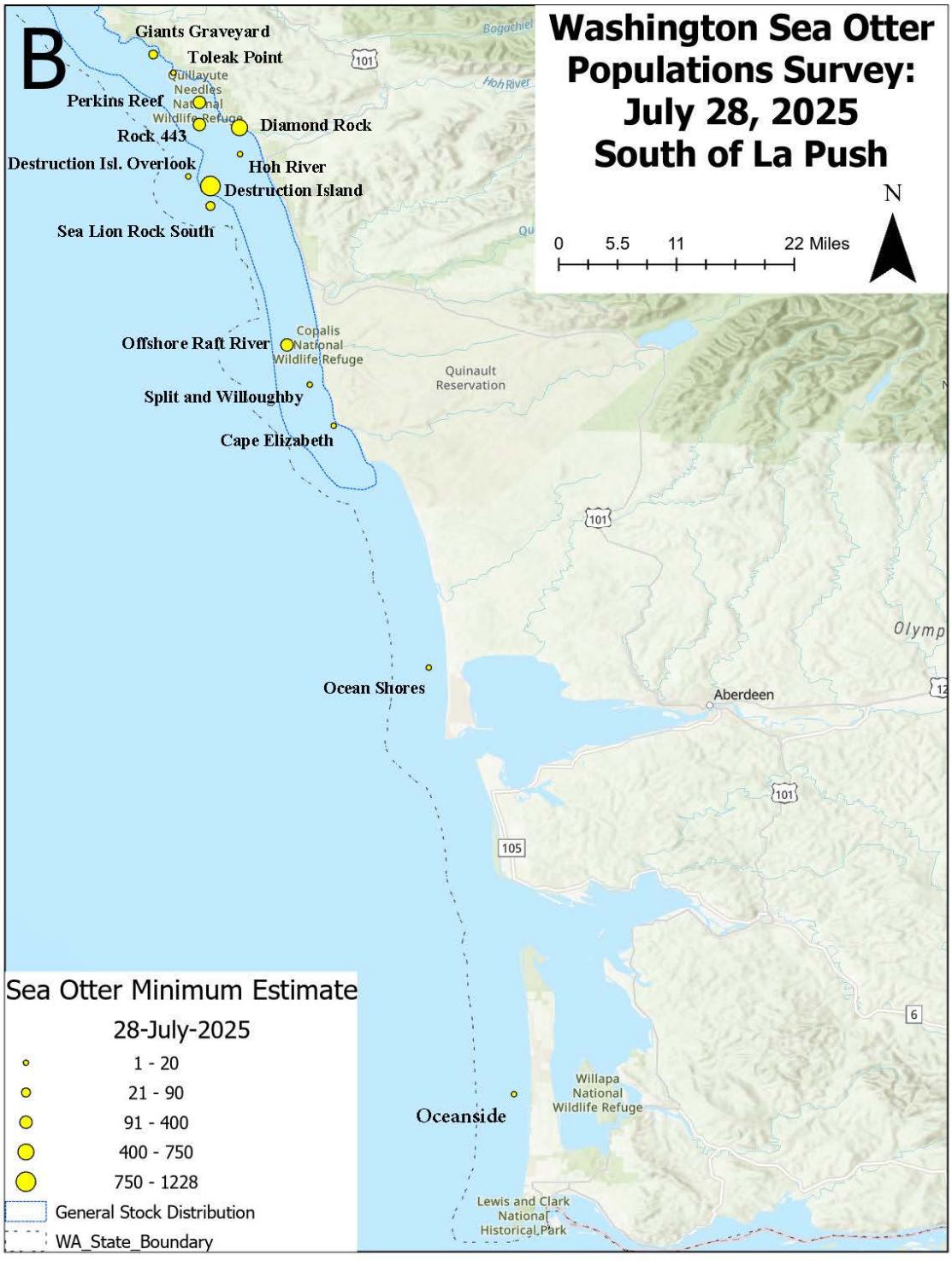


Figure 2B. Washington sea otter population distribution in the southern segment of the range during the surveys on July 28, 2025. Sizes of circles correspond to the number of otters counted at that location.

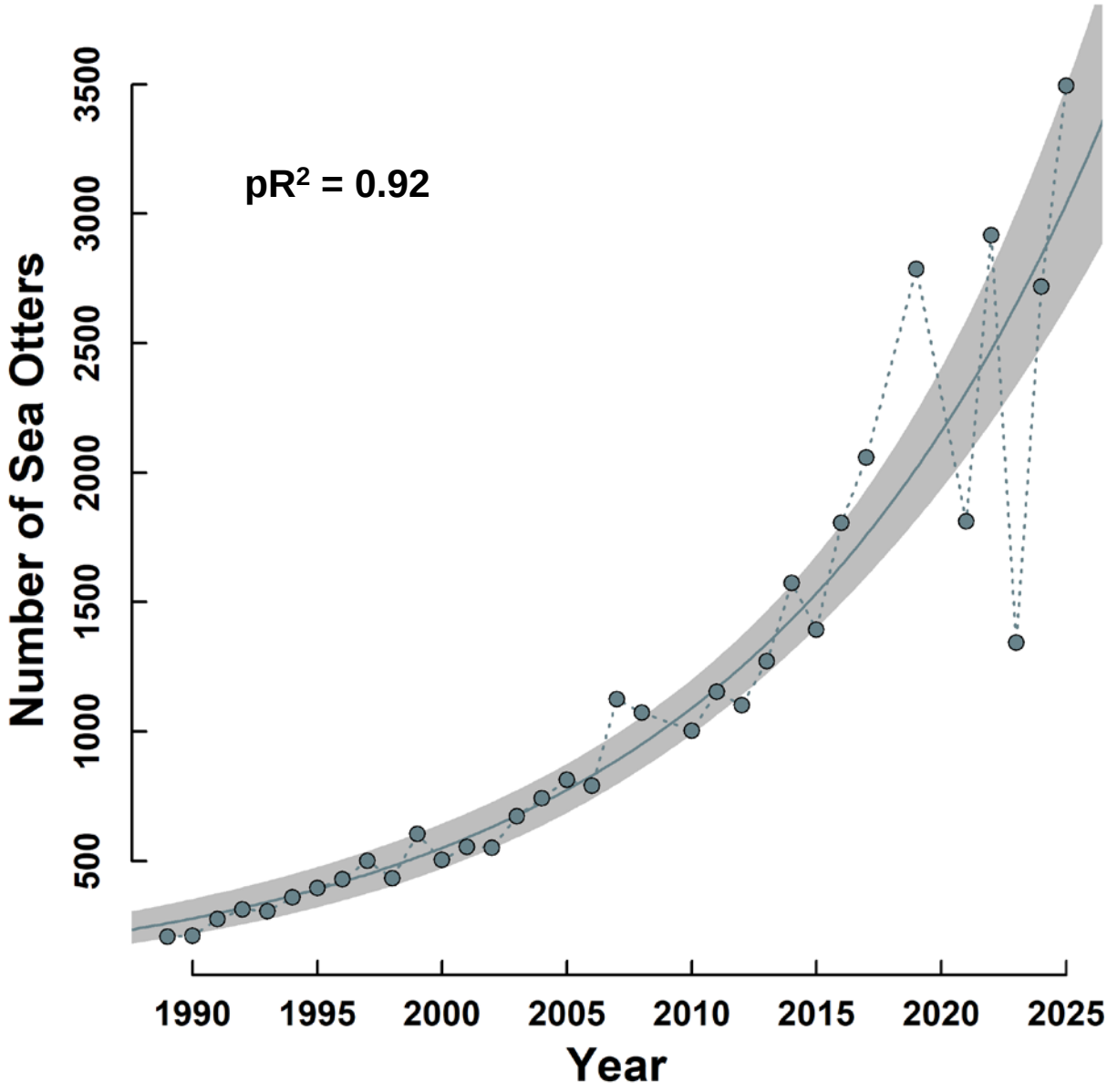


Figure 3. Sea otter counts for Washington State 1989 – 2025. The solid line depicts a the fit of a generalized linear model (GLM) with a quasipoisson distribution and a log link for all data 1989 – 2025. The percent deviance explained by this mode (pR^2) is in the top left corner.

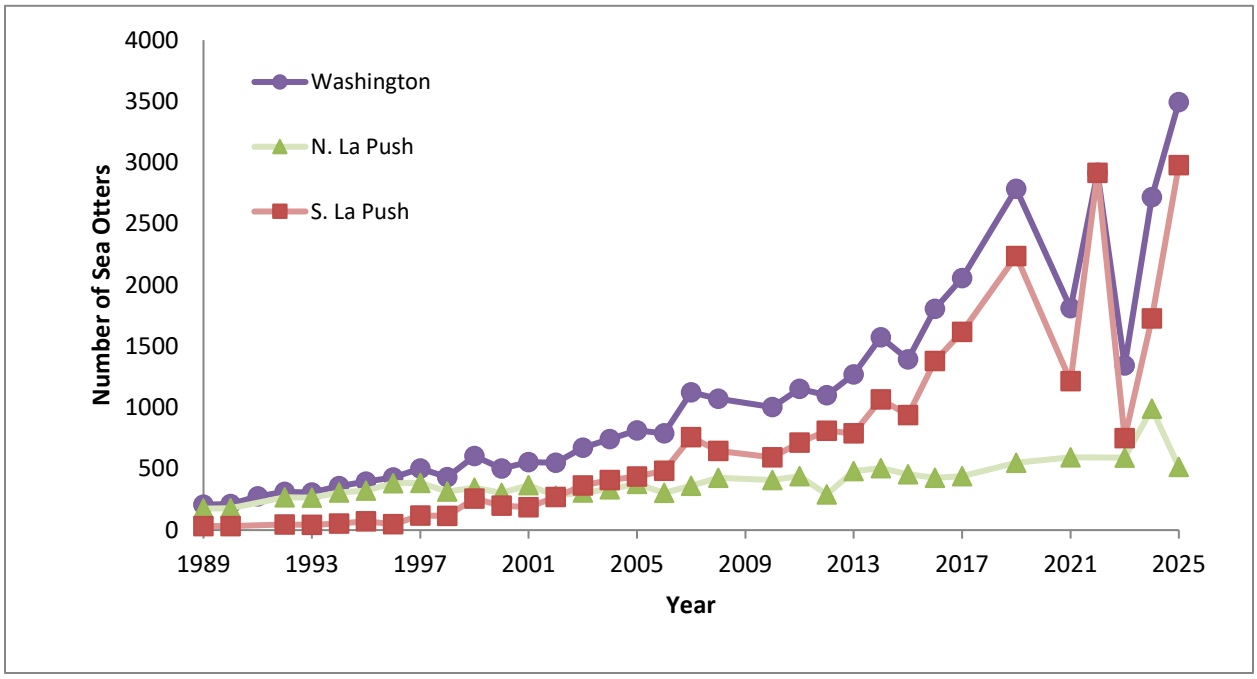


Figure 4. Growth patterns for Washington's sea otter population from 1989 and 2025. Purple circles depict the overall count for Washington State. Red squares represent counts for the southern segment (south of La Push) and green triangles depict counts for the northern segment (north of La Push).

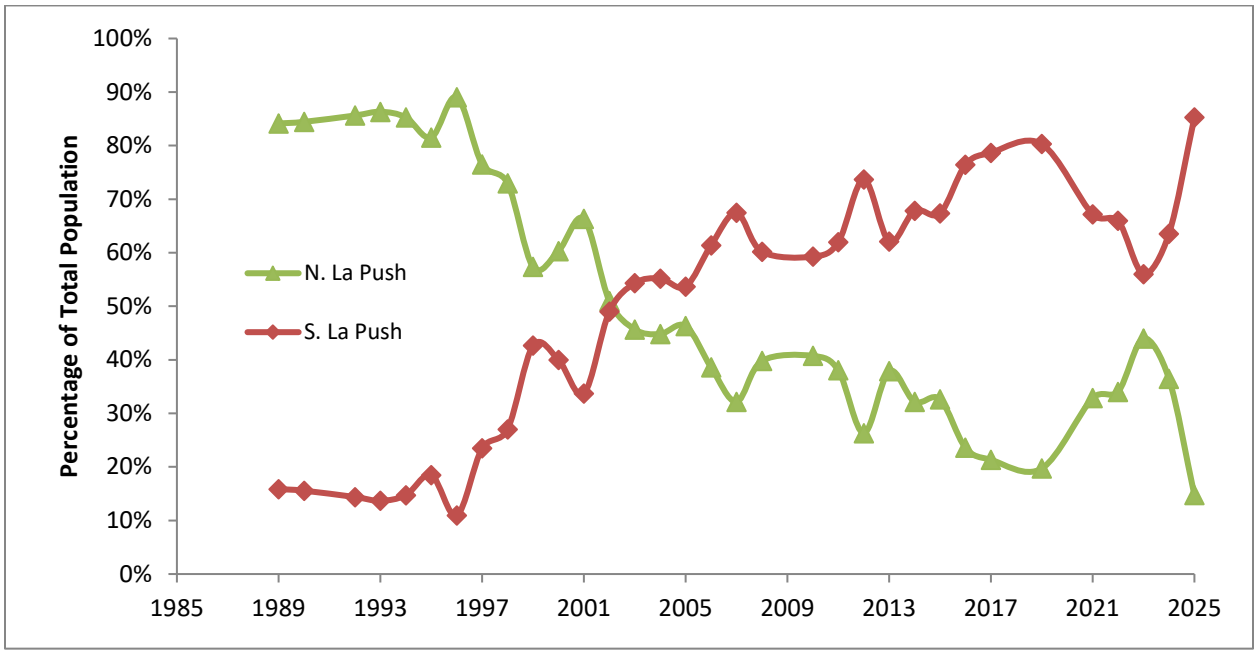
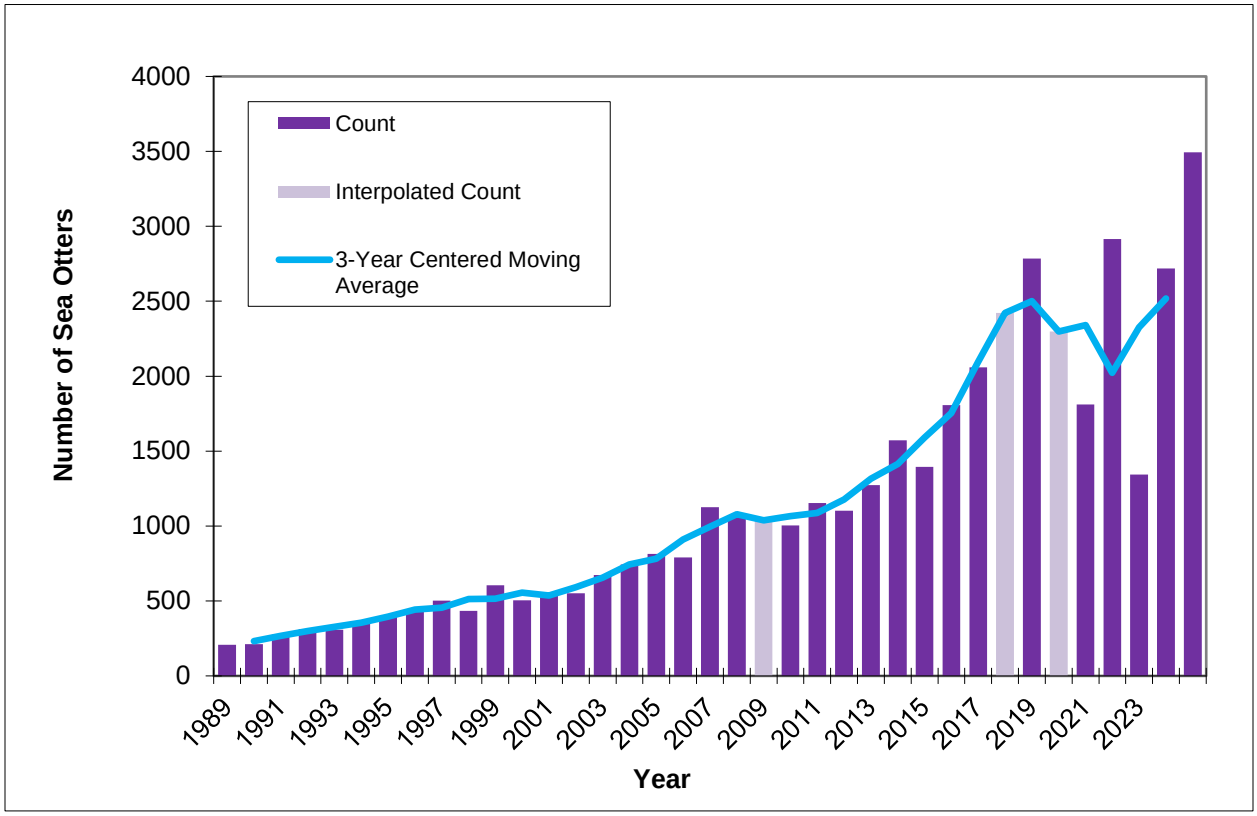


Figure 5. Comparative percentage of Washington sea otter population between the north and south (of La Push, WA) survey segments from 1989 – 2025.

Appendix 1.



Supplemental Figure 1. Three year centered moving average of sea otter counts from 1989 to 2025. The moving average is calculated using interpolated data for the years without counts (2009, 2018, 2020). Actual counts of sea otters are represented by the dark purple. Interpolated counts are presented as a lighter shade of purple.