Results of the 2015 Survey of the Reintroduced Sea Otter Population in Washington State

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The 2015 Washington sea otter survey was conducted from 22-25 June 2015 and included the inshore waters of Washington from the South Jetty at the mouth of the Columbia River, northward along the outer Washington coast and into the Strait of Juan de Fuca to Freshwater Bay. This year's survey was a collaboration between biologists and volunteers from the Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Olympic Coast National Marine Sanctuary, University of Washington, Quinault Indian Nation, The Seattle Aquarium and the Point Defiance Zoo and Aquarium. Counting conditions were variable ranging from good to excellent for both the aerial and ground components. Patchy areas of fog were encountered on the outer coast during the 25 June flight and prevented complete coverage of coastal sites during that survey.

Methods

In 2015, the Washington sea otter surveys were scheduled over the 22-25 June window. Typically, two south to north aerial surveys are scheduled each day over the 3-4 day survey window, weather permitting.

All of the known sea otter range in Washington was surveyed from the air in a Cessna 206 aircraft and included coverage of coastal waters from the mouth of the Columbia River, north to Point Grenville and along the outer Olympic Peninsula coast to Cape Flattery then east into the Strait of Juan de Fuca past Pillar Point to Freshwater Bay (just west of Port Angeles). Additionally, ground observers conducted surveys and made counts using binoculars and spotting scopes from locations near Hogsback, Giants Graveyard, Bluff Point, Cedar Creek, Sand Point, Cannonball, and Duk Point (near Seafield Creek).

Aerial observations were recorded throughout the survey in a flight log, as well as marked on a map. Large groups (>20) observed from the air were generally estimated and photographed with a digital camera. Ground observations were also recorded on a ground location map throughout the day, with a full scan of the viewable area completed within approximately 30 minutes of the aerial observations of the same location.

Digital images were downloaded into MS Paint and ImageJ to be counted. Multiple counts of each image were made by separate individuals and compared for consistency. Pups are distinguished from adults visually and classified as dependent based on their small size, wooly light brown pelage and close association (generally resting on the chest)/orientation with an adult. The adult and pup counts resulting from the digital images were used when 1) image quality of groups was good and ground counts were not available or 2) the aerial count from the digital image was deemed to be more accurate than the coinciding ground count of the same group of otters which was consensus of the counter when counts were reviewed.

The survey total is the single high count from a single pass on a single day, which is calculated by summing the highest daily counts from the aerial, ground, or combo of aerial/ground components. As a single count, this total does not have an associated variance or confidence limits. This estimate represents the minimum count over the potential sea otter range in Washington because a correction factor has not been calculated as is needed to account for animals outside of the range surveyed, underwater, or just missed by aerial or ground observers.

An average rate of population change and a 3-year running average were calculated for the period 1989 to 2015. The average rate of population change was calculated by finding the annual % change using (year2-year1)/year 1 and then calculating the average annual % change. The 3-year running average uses the following formula: example to calculate year 3: (year 2+year 3+year 4)/3.

Results and Discussion

For the aerial surveys, we conducted an initial reconnaissance flight on 22 June covering the area from the Columbia River to Port Angeles. Following this initial survey, we flew two aerial surveys of the south and north segments on 23 June; two aerial surveys of the north and south segment on 24 June; and only one aerial survey of the south and north segments on 25 June due to patchy fog. Conditions for aerial surveys were fair to excellent with light winds and calm seas. Ground surveys were conducted under fair to excellent conditions on all days with some light drizzle and fog.

The highest survey count for the 2015 Washington sea otter survey was 1,394 obtained from the second pass on 24 June which included 455 otters in the north segment and 939 otters in the south segment (Table 1). The count includes 58 pups, 43 in the north segment and 15 in the south segment (Table 1). For comparative purposes, the estimates for the Washington sea otter population in 2012, 2013 and 2014 1,105, 1,272 and 1,573 otters respectively.

While the estimated population for 2015 (1,394) is lower than 2014 (1,573) we think this may be due in part to using new methods of image interpretation that were

employed to develop this year's estimate. We cannot be certain that interpretation methods were equivalent to those used in previous methods for developing the population estimate but believe they are comparable due to using the same aerial and ground observers in all recent surveys.

This year, the southernmost sea otters were observed near Cape Elizabeth (1) and Willoughby Rock (134 independents and 9 pups) and the northernmost were observed at Tatoosh Island (7 independents). One sea otter was recorded east of Cape Flattery near Mushroom Rock. No otters were sighted east of Neah Bay to Freshwater Bay.

During the 2015 survey, pups were observed at Willoughby Rock (Figure 1), Destruction Island (Figure 2), Diamond Rock, North Rock, Giant's Graveyard, Cape Johnson, Bluff Point reef, Cedar Creek, Yellowbanks, Sand Point (Figure 3), Cape Alava, south of the Ozette River and Duk Point (near Seafield Creek).

Survey results for 2015 indicate growth of the Washington sea otter populations continues to remain positive (Figure 5). Overall, the average population rate of growth for the Washington population is 8.6% ($R^2 = 0.97$).

In 2015, the majority of Washington's sea otter population was located in the south segment with 939 (68%) in the south segment and 451 (32%) in the north segment which is similar to the distribution pattern recorded in 2014. A large raft of several hundred otters was observed in open water about 1 mile west of Hoh Head on 24 June Figure 4). This year's survey count of 134 independent and 9 dependent sea otters near Willoughby Island on the 24 June flight is the largest number of otters ever recorded south of Destruction Island and represents an expansion southward on the outer coast. A small group of 8-10 otters continues to be present at Tatoosh Island. As with recent surveys, no large groups were recorded in the Strait of Juan de Fuca to Freshwater Bay.

As in past annual surveys, we did not cover inland waters east of Freshwater Bay, although we are aware of credible sightings of scattered individual sea otters in the San Juan Islands and Puget Sound in recent years. Most of these sightings have been of one or two animals, with the most recent reports from 2015 of a lone individual in south Puget Sound. The small number of sea otters frequenting the inland waters would not add significantly to the population total.

Acknowledgements

Without the help from the following individuals and agencies the 2015 Washington sea otter survey would not have been possible. Thanks to: Pilot Jeff Well from Rite Bros. Aviation in Port Angeles; Anita McMillan and Shelley Ament from the Washington Department of Fish and Wildlife; Deanna Lynch, Karen Reagan and Sue Thomas from the U.S. Fish and Wildlife Service; Liam Antrim with Olympic Coast National Marine Sanctuary; Shawn Larson, Caroline Hempstead and Amy from The Seattle Aquarium; Terre Zorman from the Point Defiance Zoo and Aquarium; Jessica Rhian Hale from University of Washington; Julia Wengler and Hannah Claussenius-Kalman with Pacific University; Virginia Molenaar, Karen Allston and Carolyn Kelly from Quinault Indian Nation; and volunteers Ed Bowlby and Mary Sue Brancato.

Josh Oliver with Washington Department of Fish and Wildlife assisted with image counting and data entry.

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The Olympic National Park provided Scientific Research and Collecting Permit (OLYM-2014-SCI-0161) for access to ONP locations used by ground observers. The Makah Nation provided the special use permit for access to Cannonball for ground observations.

Cover photograph of sea otters hauled out at Destruction Island taken by Joseph Evenson, Washington Department of Fish and Wildlife.

Aerial photos of sea otters were taken by Steven Jeffries, Washington Department of Fish and Wildlife.

Table 1. Results of the 24 June 2015 survey of the Washington sea otter population.

Location	*Independent*	*Dependent*	*Total*
SOUTH SURVEY SEGMENT			
WILLOUGHBY ROCK	134	9	143
HOGSBACK	3	0	3
DESTRUCTION ISLAND WEST END	144	2	146
DESTRUCTION I. EAST END	240	0	240
DIAMOND ROCK	4	1	5
NORTH ROCK	2	0	2
1 MILE W. OF HOH HEAD (IN OPEN WATER)	364	0	364
PERKINS REEF	15	1	16
ROCK 443 COMPLEX	9	1	10
N. OF HOH HEAD	1	0	1
ALEXANDER ISLAND	4	0	4
GOODMAN CREEK	1	0	1
GIANT'S GRAVEYARD*	3	1	4
NORTH SURVEY SEGMENT			
S. OF CHILEAN MEMORIAL	3	1	4
N. OF CAPE JOHNSON	14	2	16
BLUFF POINT REEF*	86	0	86
SANDY ISLET/JAGGED ISLAND AREA	18	0	18
CEDAR CREEK/NORWEGIAN MEMORIAL*	29	0	29
YELLOWBANKS AREA	40	6	46
SAND POINT AREA*	86	9	95
INSHORE KELP BED EAST OF WHITE ROCK	8	4	12
WEDDING ROCKS/SE OZETTE ISLAND	27	5	32
OZETTE/CAPE ALAVA/BODELTEH*	48	4	52
S. OF OZETTE RIVER	1	0	1
DUK POINT*	43	12	55
INSHORE OF FATHER AND SON	1	0	1
N. OF ANDERSON POINT	1	0	1
TATOOSH ISLAND	6	0	6
MUSHROOM ROCK	1	0	1
Total	1336	58	1394

* = locations where ground observers were stationed during survey flights.

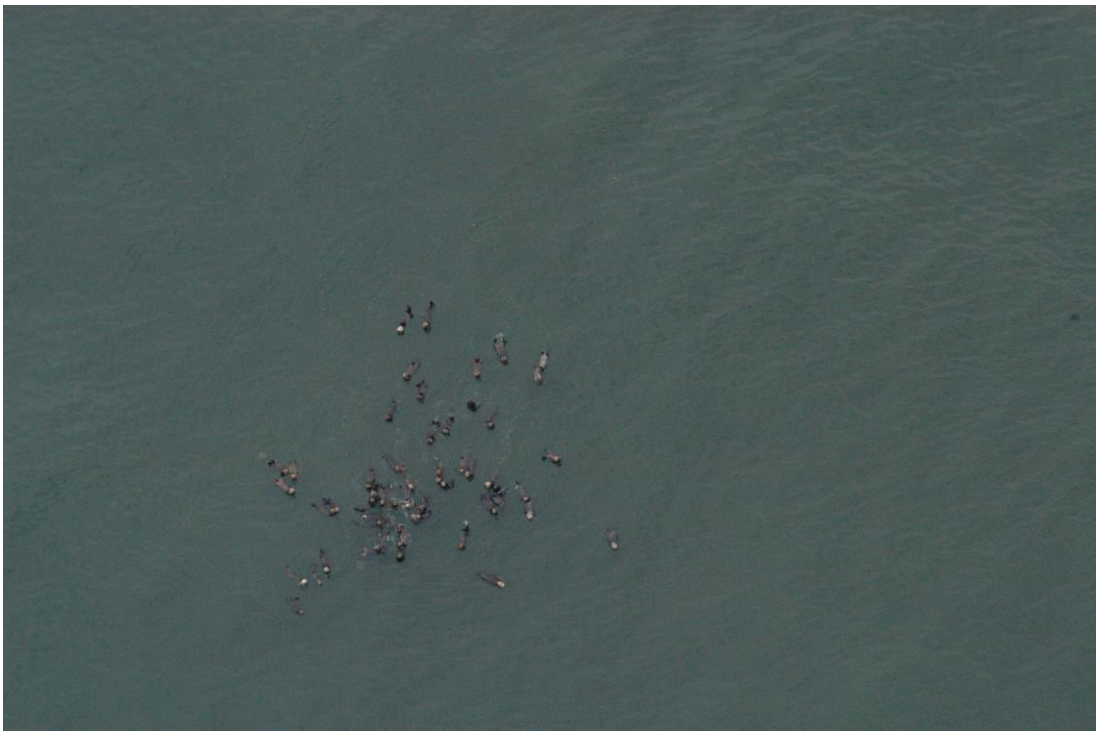

Figure 1. Sea otter raft in open water near Willoughby Rock on 24 June 2015.

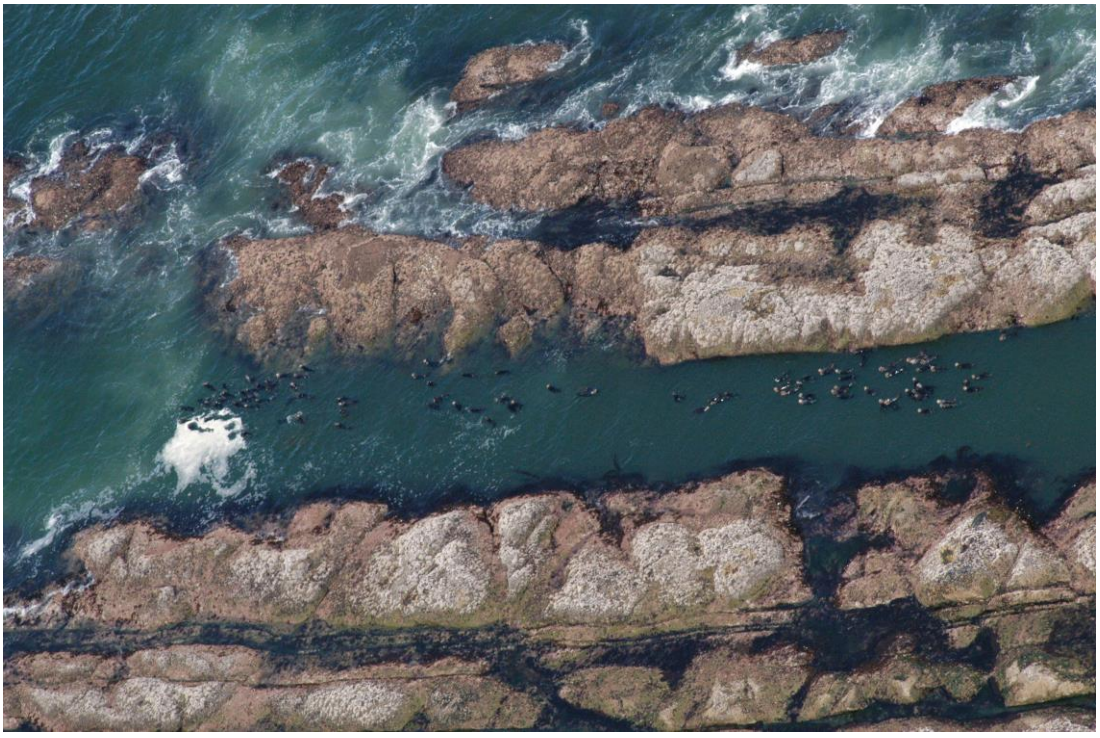

Figure 2. Sea otter raft in finger channels on west side of Destruction Island on 23 June 2015.

Figure 3. Sea otter raft in kelp bed off Sand Point on 24 June 2015.

Figure 4. Large raft of sea otters recorded in open water 1 mile west of Hoh Head on 24 June 2015.

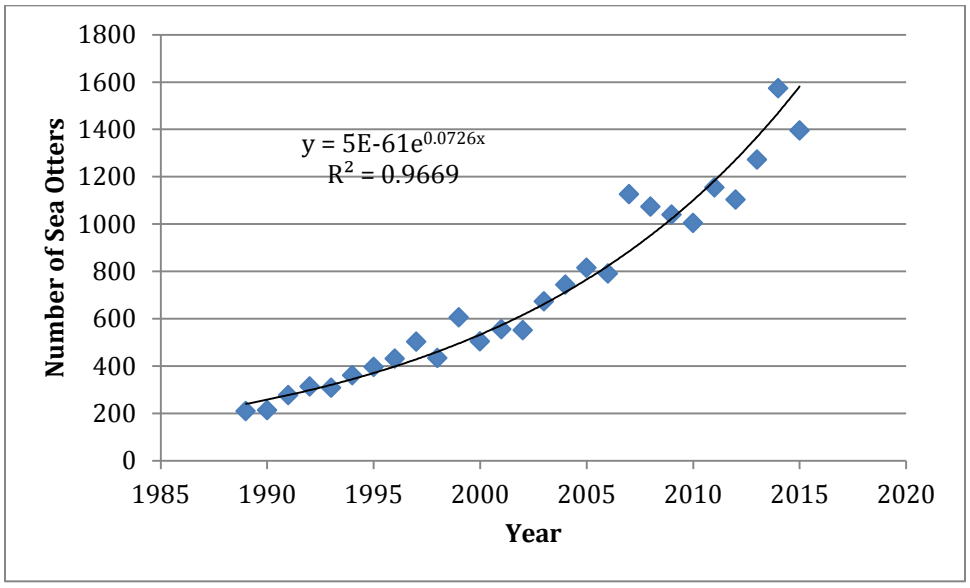

Figure 5. Average population growth of the Washington sea otter population between 1989 and 2015.

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