

**Aerial Surveys for Pinnipeds and
Sea Otters on the Washington Coast**

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Cover photo: Harbor seals hauled out on Desdemona Sands (west of the Astoria/Megler bridge) in lower Columbia River (Steve Jeffries, WDFW).

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Overview of Aerial Survey Project

Goals and Objectives

As part of the Marine Spatial planning project, WDFW conducted aerial surveys for pinnipeds (harbor seals, California and Steller sea lions) and sea otters (Figures 1-6) on the Washington coast (Columbia River to Tatoosh Island). This information will be useful in marine spatial planning to:

1. Identify seasonal use patterns for pinnipeds and sea otters at haulout sites and rafting areas.
2. Track patterns in spatial use of the marine environment by pinnipeds and sea otters.
3. Updated data to address oil spill planning, alternative energy placement and fishery interactions.
4. Identify potential areas for potential impacts of sea otters in coastal shellfish resources. For example, are there a spatial overlap between expanding sea otter population and razor clam and Dungeness crab fisheries?
5. Address goals and objective in WDFW's sea otter recovery plan.
6. Address goals and recommendations in Steller sea lion recovery plan and post delisting.
7. Address MMPA stock assessment requirements.

Aerial surveys were conducted to include the following elements:

1. Seasonal abundance at pinniped haulouts and sea otter concentration areas
 - a. Collect seasonal use data for coastal haulouts and sea otter concentration areas
2. Seasonal distribution patterns for coastal haulouts and sea otter concentration areas
 - a. Documents summer, fall and spring use patterns for coastal haulouts and sea otter concentration areas.
3. Update oil spill risks areas for pinnipeds and sea otter.
 - a. Provide updated information for WDFW marine wildlife geospatial database.

Aerial Survey Methods

WDFW conducted aerial surveys of the outer Washington coast from the Columbia River to Cape Flattery. Aerial surveys for harbor seals were conducted during the summer pupping season. Aerial surveys for sea lions and sea otters were conducted during fall, winter and spring surveys. Surveys were flown at 600-

800 feet at a speed of 90 knots to minimize disturbance. Each survey was flown in a chartered plane (Cessna 206) from Rite Bros. Aviation in Port Angeles. Flight crew included pilot in left front, primary observer/photographer in right front and secondary observer/recorder in right rear. After surveys were flown, digital images were subsequently counted and results entered into the WDFW/NMML harbor seal survey database.

As appropriate, WDFW coordinated this effort with other resource management partners (NOAA, OCNMS, USFWS, ONP, and tribes) for permitting and scheduling.

WDFW conducted aerial surveys under Marine Mammal Protection Act Scientific Research Permit 13430 issued to John Bengtson at the National Marine Mammal Laboratory in Seattle.

Summary of Aerial Surveys

WDFW conducted 11 aerial surveys (57.8 flight hours) with flight duration ranging from 3.1 hours to 7.6 hours (Table 1). Target species included harbor seals, California sea lions, Steller sea lions and sea otters. Results have been entered into the WDFW pinniped aerial survey database. Results by survey area are summarized in Table 2.

Harbor seal surveys were conducted during the annual pupping season and covered haulout sites in lower Columbia River, Willapa Bay, Grays Harbor (Figure 5) and Olympic Peninsula coast. In the future these counts will be combined with results from ODFW's 2014 Oregon harbor seal surveys for estimating the Washington-Oregon Coastal Harbor Seal Stock.

Steller sea lion and California sea lions were surveyed during summer, fall and winter flights. California sea lions recorded in Grays Harbor were all on docks in the Westport Marina. Results have been entered into the WDFW pinniped aerial survey database.

Sea otter surveys were surveyed during fall and winter flights, covering the area from Columbia River to Neah Bay (Figure 6). Results will be useful for oil spill planning and identifying areas of sea otter range overlap with valuable razor clam and Dungeness crab fisheries.

Table 1. Summary of aerial surveys conducted by WDFW.

Survey Date	Survey Areas	Survey Window	Flight Duration	Target Species
4/1/2014	Columbia River Olympic Peninsula	12:17-16:43	4.9 hours	Steller sea lions California sea lions Sea otters
6/2/2014	Columbia River Olympic Peninsula	10:41-15:22	4.7 hours	Steller sea lions California sea lions Harbor seals
6/3/2014	Willapa Bay Grays Harbor Olympic Peninsula	10:24- 16:36	6.2 hours	Steller sea lions California sea lions Harbor seals
6/4/2014	Olympic Peninsula	10:31-13:37	3.1 hours	Harbor seals Steller sea lions
6/16/2014	Columbia River Olympic Peninsula	14:16-18:04	3.8 hours	Harbor seals Steller sea lions California sea lions
6/17/2014	Columbia River Willapa Bay Grays Harbor Olympic Peninsula	09:00-15:17	5.3 hours	Harbor seals Steller sea lions California sea lions
6/18/2014	Olympic Peninsula	10:03-13:25	3.5 hours	Harbor seals Steller sea lions California sea lions
11/7/2014	Columbia River Olympic Peninsula	10:14-16:03	5.8 hours	Steller sea lions California sea lions Sea otters
2/11/2015	Columbia River Olympic Peninsula	11:22-16:55	5.6 hours	Harbor seals Steller sea lions California sea lions Sea otters
2/20/2015	Columbia River Olympic Peninsula	10:55-18:33	7.6 hours	Steller sea lions California sea lions Sea otters
3/2/2015	Columbia River Olympic Peninsula	10:44-18:02	7.3 hours	Steller sea lions California sea lions Sea otters

Table 2. Aerial survey counts of pinnipeds and sea otters by survey area.

Survey Date	Survey Area	Harbor Seals	California Sea Lions	Steller Sea Lions	Sea Otters
4/1/2014	Columbia River	NS*	1250	23	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor	NS	NS	NS	NS
	Olympic Coast	935	1006	3163	135
6/2/2014	Columbia River	1987 (534)**	97	704	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor	NS	NS	NS	NS
	Olympic Coast	NS	526	1630	NS
6/3/2014	Columbia River	NS	31	565	NS
	Willapa Bay	5370 (1926)**	NS	NS	NS
	Grays Harbor	5674 (2176)**	NS	NS	NS
	Olympic Coast	NS	465	1614	NS
6/4/2014	Columbia River	NS	NS	NS	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor	NS	NS	NS	NS
	Olympic Coast	2965 (484)**	0	426	NS
6/16/2014	Columbia River	NS	32	285	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor***	NS	0	NS	NS
	Olympic Coast	NS	29	1633	NS
6/17/2014	Columbia River	1776 (340)**	8	510	NS
	Willapa Bay	5384 (1491)**	NS	NS	NS
	Grays Harbor***	4994 (1522)**	0	NS	NS
	Olympic Coast	NS	28	1690	NS

*NS=No Survey ** number in parenthesis=pups in total ***GH sea lions on Westport docks

Table 2 (continued). Counts of pinnipeds and sea otters by survey region.

Survey Date	Survey Area	Harbor Seals	California Sea Lions	Steller Sea Lions	Sea Otters
6/18/2014	Columbia River	NS*	NS	NS	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor	NS	NS	NS	NS
	Olympic Coast	3305 (814)**	0	680	NS
11/7/2014	Columbia River	NS	1068	953	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor***	NS	44	NS	NS
	Olympic Coast	NS	3736	1833	576
2/11/2015	Columbia River	6422	1668	362	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor***	NS	27	NS	NS
	Olympic Coast	NS	592	2298	560
2/20/2015	Columbia River	NS	2286	96	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor***	NS	15	NS	NS
	Olympic Coast	NS	377	1447	765
3/2/2015	Columbia River	NS	2611	498	NS
	Willapa Bay	NS	NS	NS	NS
	Grays Harbor***	NS	27	NS	NS
	Olympic Coast	NS	471	2611	1412

*NS=No Survey ** number in parenthesis=pups in total ***GH sea lions on Westport docks



Figure 1. Harbor seals hauled out on Desdemona Sands (west of the Astoria/Megler bridge) in lower Columbia River (Steven Jeffries, WDFW).



Figure 2. California sea lions on marine docks in the East Mooring Basin, Astoria Oregon (Steven Jeffries, WDFW).

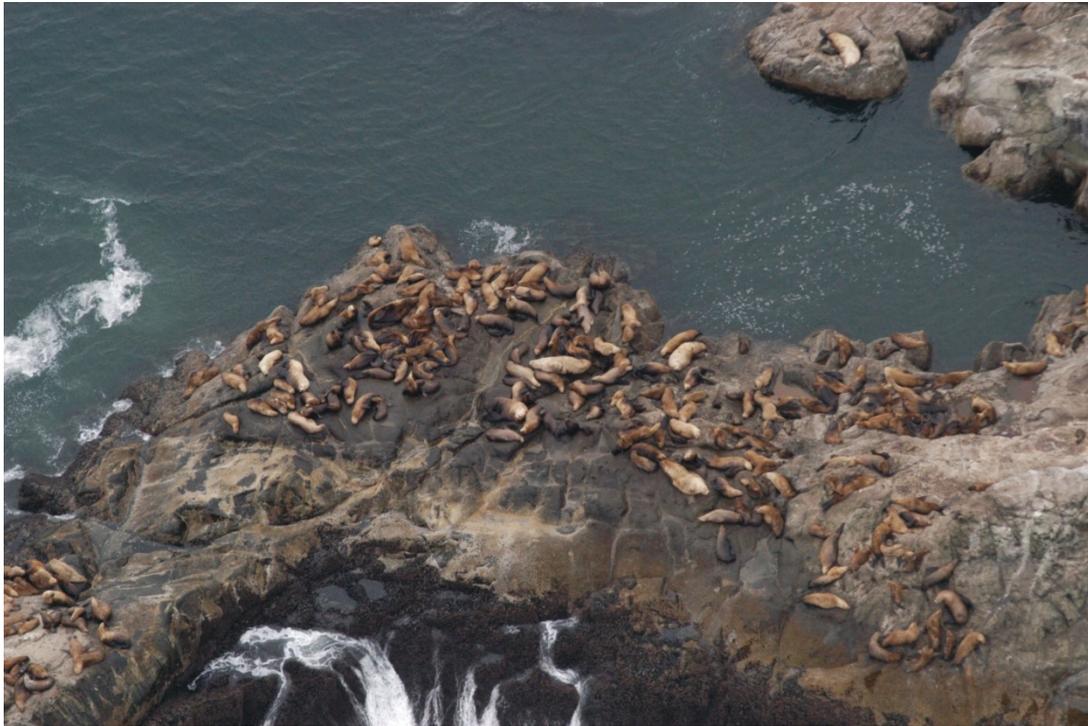


Figure 3. Steller sea lions hauled out on Sea Lion Rock (north of LaPush near Carroll Island) (Steven Jeffries, WDFW).

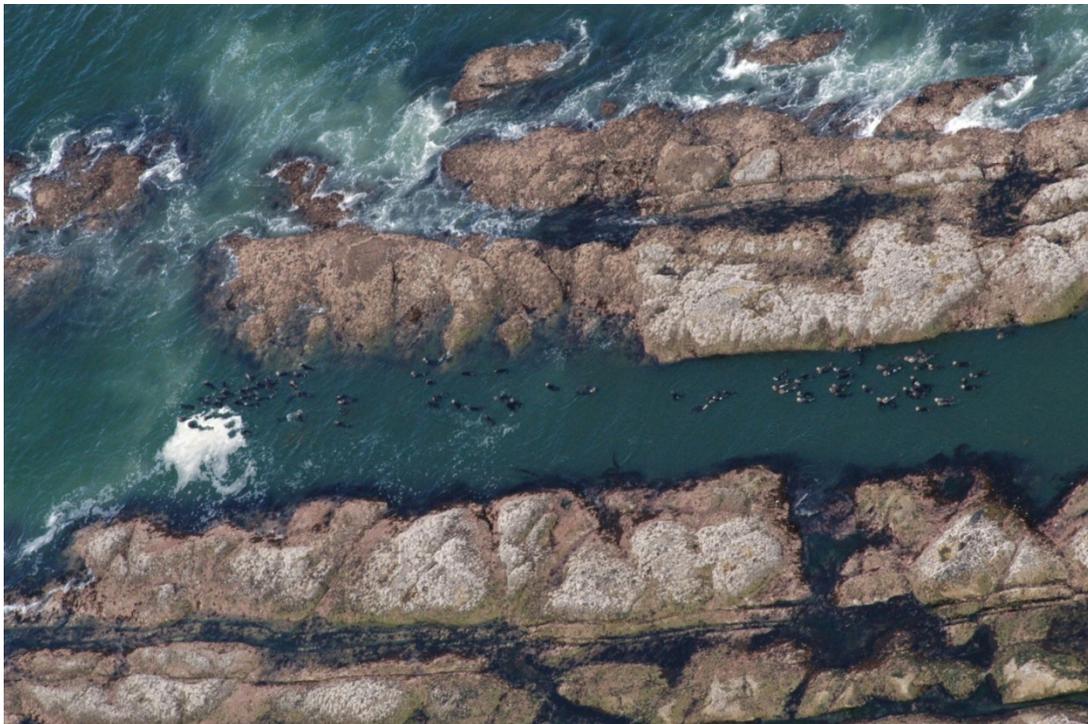


Figure 4. Sea otters rafted on west end of Destruction Island (Steven Jeffries, WDFW).

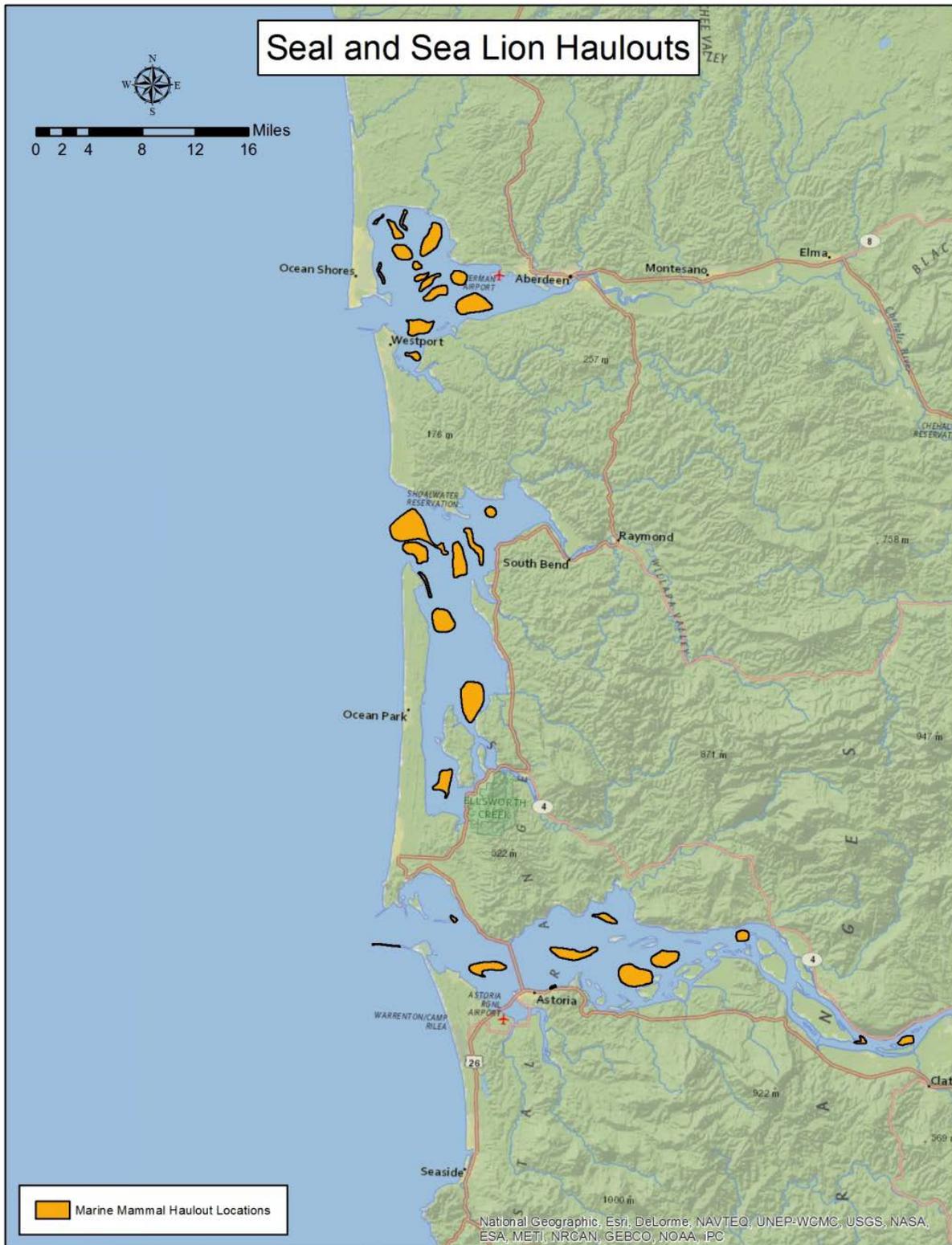


Figure 5. Seal and sea lion haulout areas in Columbia River, Willapa Bay and Grays Harbor.

