

Pinniped Predation in the Lower Columbia River

Lower Columbia Fish Recovery Board
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Washington
Department of
**FISH and
WILDLIFE**



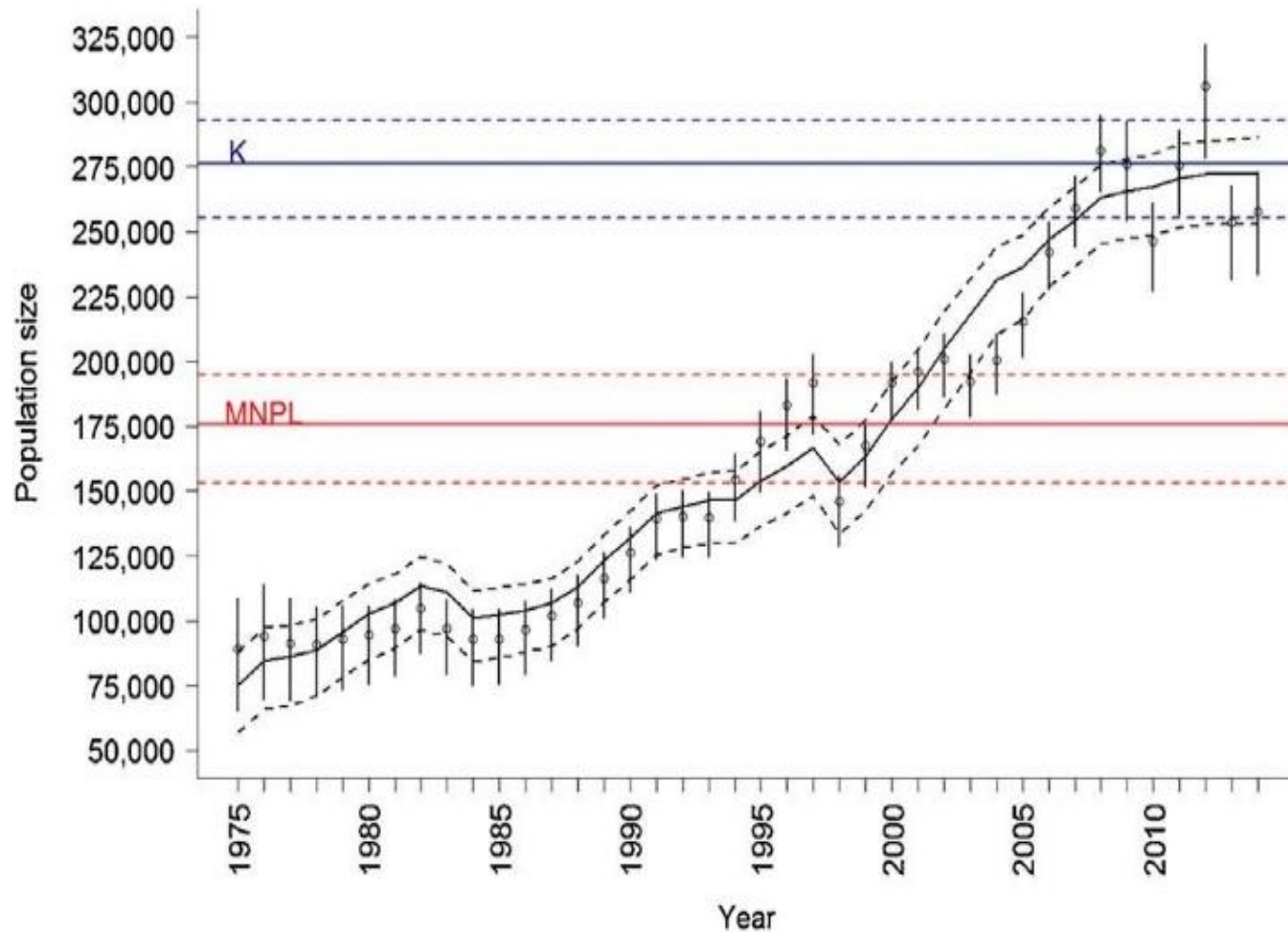
Columbia River Sea Lions



California Sea Lion

- Primarily present in Washington waters in Sept – May
- A single US stock



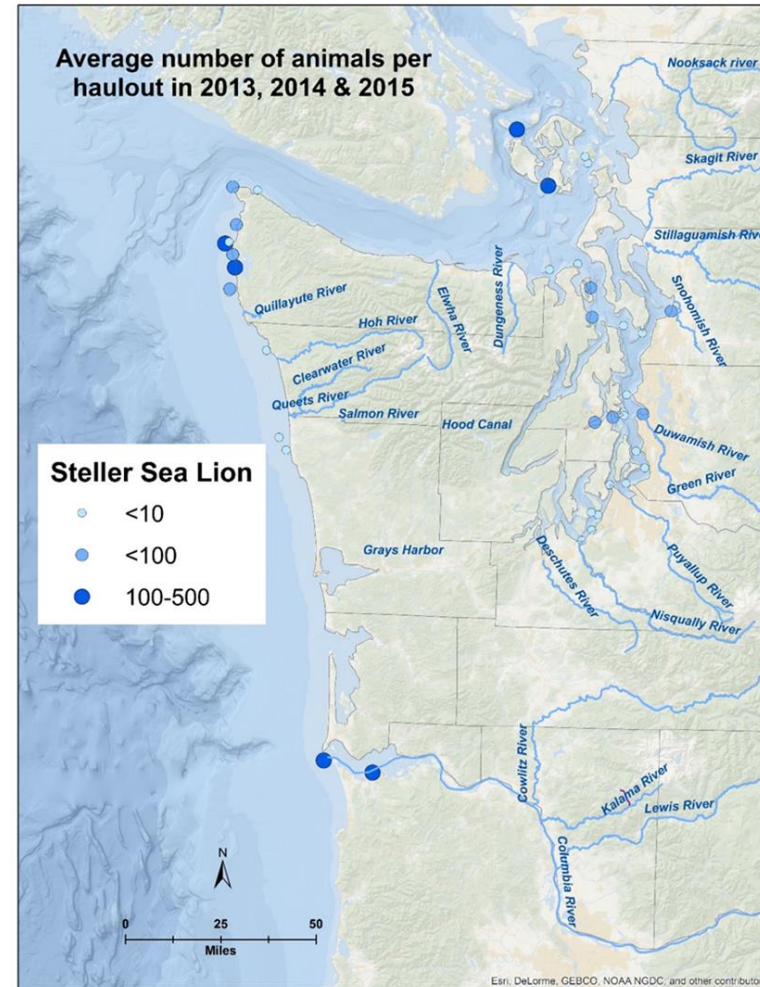


Source: Laake et al. 2018



Steller Sea Lion

- Primarily present in Washington waters between Sept. and April
- Washington SSLs belong to the eastern distinct population segment
- West coast of North America from SE Alaska to central California
- Delisted in 2013
- Washington: ~2500 animals
- Oregon: ~9600 animals





Bonneville Dam



California sea lions

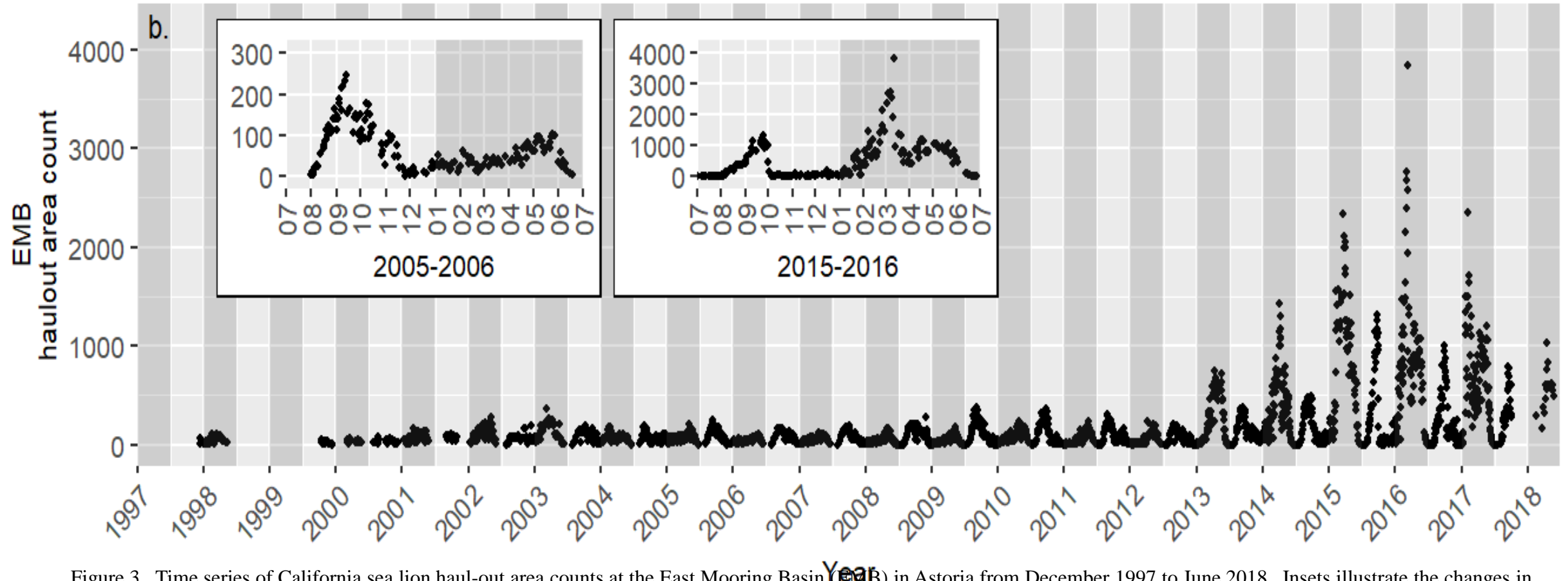


Figure 3. Time series of California sea lion haul-out area counts at the East Mooring Basin (EMB) in Astoria from December 1997 to June 2018. Insets illustrate the changes in magnitude and seasonality of California sea lion occurrence over the study period (x-axis denotes month; note difference in magnitude of counts on the y-axis scale between the two inset figures).



California sea lion presence in other tributaries

- Recruitment of CSL at Bonneville Dam and Willamette Falls has been consistently occurring over a period of 15-20 years.
- More recently CSL have been observed expanding their distribution into smaller tributaries of the Columbia River.
- In Oregon, CSL have been observed frequently feeding on salmonids in the Sandy River and Clackamas Rivers since 2010, typically 1-2 animals making daily foraging migrations into the lower reaches of these rivers.
- However in 2017, 6 CSL were observed feeding on salmonids at RM 19 on the Clackamas River.

Tributary	Source of Observation
Grays River, WA	WDFW staff
Skamokawa, WA	WDFW staff
Elochoman River, WA	WDFW staff
Abernathy Creek, WA	WDFW staff
Cowlitz River, WA	WDFW staff and public
Coweeman River, WA	WDFW staff
Kalama River, WA	WDFW staff and public
Lewis River, WA	WDFW staff and public
Washougal River, WA	WDFW staff
Duncan Creek, WA	WDFW staff
Hamilton Creek, WA	WDFW staff
Sandy River, OR	ODFW Staff, Public, Guides
Clackamas River, OR	ODFW Staff, Public, Guides
Scappoose River, OR	ODFW Staff
Clatskanie River, OR	ODFW Staff

Table 4. Confirmed observations of CSL in Washington and Oregon tributaries. The upstream distance of CSL presence in these rivers and creeks varies, but they have at least been observed in the lower reaches and/or at the mouths of these systems.



Steller sea lions at Bonneville Dam

Year	Total Hours Observed	California Sea Lions	Steller Sea Lions	Harbor Seals	Total Pinnipeds
2002	662	30	0	1	31
2003	1,356	104	3	2	109
2004	516	99	3	2	104
2005*	1,109	81	4	1	86
2006	3,650	72	11	3	86
2007	4,433	71	9	2	82
2008	5,131	82	39	2	123
2009	3,455	54	26	2	82
2010	3,609	89	75	2	166
2011	3,315	54	89	1	144
2012	3,404	39	73	0	112
2013	3,247	56	80	0	136
2014	2,947	71	65	1	137
2015	2,995	195	69†	0	264
2016	1,974	149	54†	0	203
2017	1,142	92	63†	1	156
2018	1,410	67	66†	1	134

Table 1. Reprinted from Tidwell et al. (2019). Minimum estimated number of individual pinnipeds observed at Bonneville Dam tailrace areas and the hours of observation during the spring sampling period, 2002 to 2018.



COLUMBIA BASIN

THE RISE OF STELLER SEA LIONS



Steller Sea lions
Increasing impact

California Sea lions



Months
10
Present



Months
7
Present



Share of
76%
Total predation



Share of
24%
Total predation



% Steelhead
4.4%
Run Eaten



% Steelhead
0.9%
Run Eaten

% Spring Chinook
2.0%
Run Eaten

% Spring Chinook
0.7%
Run Eaten



A pattern of habituation

The increasing abundance of California and Steller sea lions in the Columbia River basin has followed a similar pattern:

A small number of animals habituate to a location;



Recruitment of additional animals is initially low, but increases (sometimes rapidly);






Habituated animals generally arrive earlier and remain at sites longer;



These animals appear to habituate easily and return to these sites year after year.



Columbia River—Deterrents

Deterrent Type	Effective	Ineffective	The Bottom Line
Physical Barriers for Fishways (SLEDs, FOGs)			No animals in <u>fishways</u> in 2008, but C404 was absent this year.
Acoustic Deterrents at Fishways			No visible effects on sea lion behavior near fishways.
Hazing Calif. Sea Lions			Effects seem temporary; Usual avoidance noted.
Hazing Steller Sea Lions			Not as effective as in 2006 and 2007.
Relocation (Trap & Release)			Most animals return to BON after release. <i>Does help individual ID efforts!</i>



Summary of non-lethal deterrents

Conducted non-lethal hazing (boat-based and dam-based) at Bonneville Dam since 2005 using approximately 100,000 munitions.

SSL became habituated at Bonneville Dam during periods of intense hazing.

Hazing generally has an immediate effect of moving animals but these animals move back to their pre-haze locations within hours of the action.

Managers remain open to future developments in non-lethal deterrent technology but lack resources to test such technology.

Goal of doing removals quickly will be better for salmon and for sea lions, with less recruitment necessitating fewer removals over time.

Challenges of hazing in tributaries—smaller areas where hazing could be harmful to fish, populated areas could introduce a public safety concern.



Timeline

- 2000-2005 – Evaluation of seal and sea lion (pinniped) predation in the tailrace of Bonneville Dam; Oregon, Washington, NOAA Fisheries test non-lethal deterrence measures to reduce predation.
- 2006 – Washington, Oregon, and Idaho request authorization to lethally remove CSL at Bonneville that are having significant negative impact on the decline or recovery of ESA-listed salmonids.
- 2008-2016 – Authorization granted, with conditions, in 2008. Lawsuits filed in U.S. District Court. Litigation, appeals, reapplication, and reauthorization take place over the next eight years.
- 2018 – NOAA authorizes ODFW to lethally remove predatory sea lions at Willamette Falls.



Section 120 Permit Removal Criteria Prior to 2020

Each CA sea lion must be individually identifiable – this requires trapping, marking, and releasing the animal,

AND

individual sea lions must be observed at Bonneville Dam for 5 days,

AND

individual sea lions must be observed eating a salmon at Bonneville Dam,

AND

individual sea lions must be subjected to hazing while at Bonneville Dam.



Section 120 Implementation

Year	CA Sea Lion Euthanized
2008	0
2009	11
2010	14
2011	0
2012	12
2013	2
2014	15
2015	30
2016	59
2017	24
2018	29
2019	19
TOTAL	215

Timeline, continued

- December 2018 – Congress passed the Endangered Salmon Predation Prevention Act of 2018, amending the MMPA with a new section 120(f) Temporary Marine Mammal Removal Authority on the Waters of the Columbia River or its Tributaries.
- June 2019 – Eligible entities—ODFW, IDFG, WDFW, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Willamette Committee (ODFW, CTUIR, CTWSR, Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz Indians of Oregon) submit application under amended MMPA. Tribal entities may delegate authority to Columbia River Inter-Tribal Fish Commission.
- August 2020 – NOAA Fisheries authorizes the eligible entities' permit.
- October 2020 – Eligible entities commence fall removal operations at Bonneville.



2018 Amendments to MMPA

Modifies Section 120 to provide:

- Place-based 'Safe Zones' for salmon
- Protection for sturgeon and lamprey
- Allowance for proactive action





Permit Conditions Under Amended MMPA


- Includes California sea lions and Steller sea lions. No more than 540 CSL and 176 SSL over the 5-year period of the permit.
- Mainstem Columbia River from river mile 112 (I-205 bridge in Portland) to river mile 292 (McNary Dam).
- Any tributary to the CR that includes spawning habitat of ESA-listed salmon or steelhead.
- Sea lions in these areas are deemed to have a significant negative impact and are subject to removal.
- Approved plan for humane methods for capture and removal, to be reevaluated annually by a committee of veterinarians, marine mammal biologists, and a non-affiliated member who represents the community.

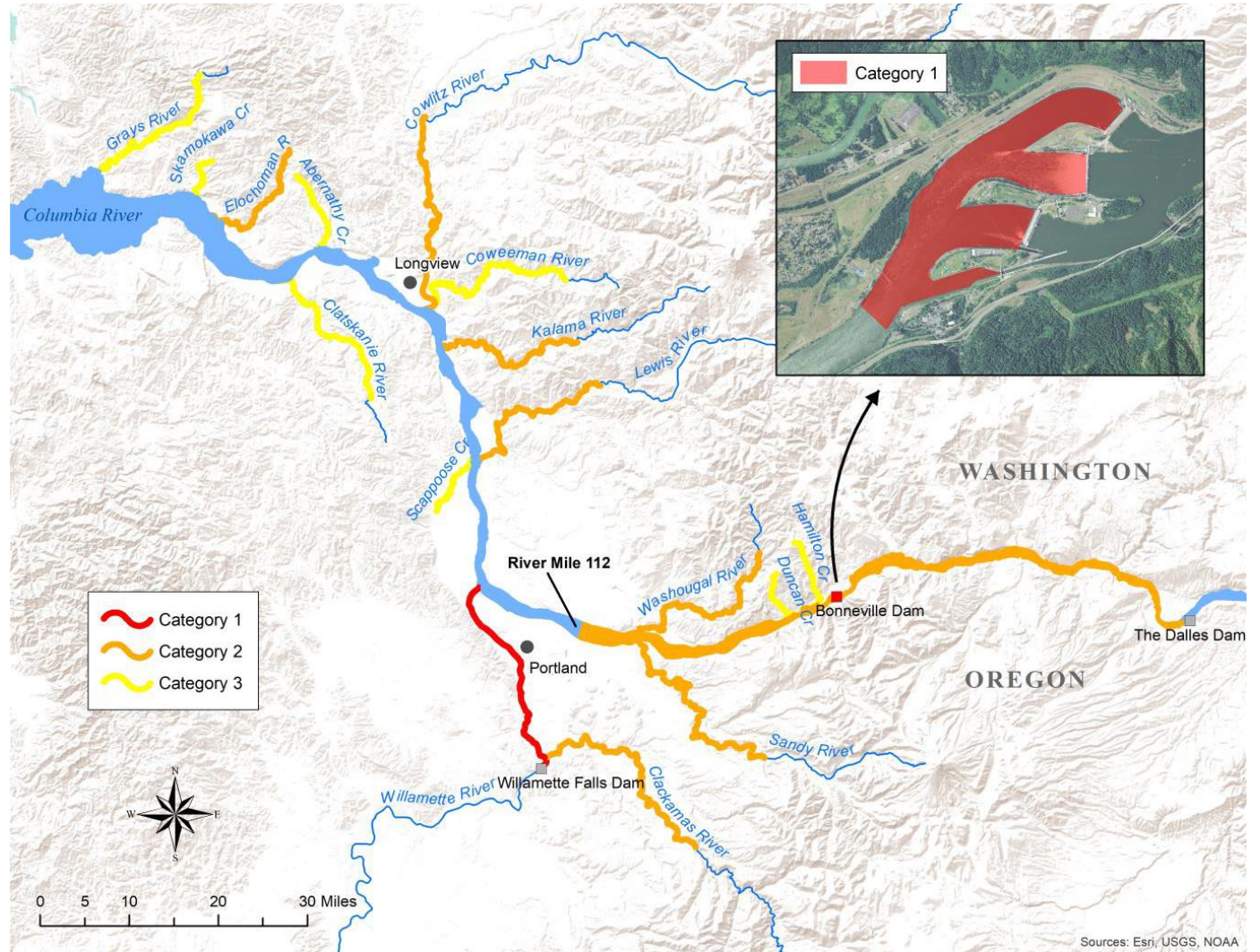


Spatial categorization of the problem interaction

 Category 1: High numbers (>20) of CSL and SSL present for majority of the year. Immediate and ongoing conservation risk for fish stocks.

 Category 2: Low to moderate numbers present periodically. Conservation concern for fish stocks if left unmanaged.

 Category 3: CSL and SSL have not been documented but contain ESA spawning habitat.



Expected Benefit of Expanded Authorization

- Allow the eligible entities to reduce predation on ESA listed salmon/steelhead and sturgeon by Steller sea lions.
- Improve the efficiency of the currently authorized removal programs by eliminating the need to mark and repeatedly handle animals and document their repeated presence in the area.
- Prevent sea lions from self- or socially-habituating to tributary locations, leading to decrease in sea lion removals over time.



Expected Benefit of Expanded Authorization

- Benefit can be quantified based on reduction in the number and length of time sea lions are at pinch points and by a reduction in the number of salmon they eat.
- Example: At Willamette Falls ODFW removed 33 CSL in 2019 in an effort to save a winter steelhead run on the brink of extinction (~512 fish in 2017).
- No CSL at the falls from Aug. 2019 to Mar. 2020 for first time in a decade.
- Predation dropped from 21-25% of the run in 2017/18 to 7% in 2019, ~1-2% in 2020.
- In 2020 this translates to ~377 steelhead saved out of a total run of 5510.
- Extinction probability: ~89% in 2017 → 11% in 2019



Fall 2020 Implementation

- 8/14/2020: NMFS approved the permit authorizing eligible entities to remove CSL and SSL.
- 10/10/2020: IACUC approves Assurance of Animal Care and Use form for lethal removal

- Week of 10/12: Two SSL removed
- Week of 10/19: One SSL removed
- Week of 11/2: Three SSL removed



Next Steps

Internal WDFW Avian and Pinniped Predation Team

- Inter-Disciplinary
- Inventory of Policy Forums WDFW is engaged in
- Predator/Prey Principles
- Develop recommendations to secure budget and authorities to conduct work

2021 Legislative Session

- Operating Budget
- Capital Budget



Questions?

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