

Sea Lion Impacts and Management in the Columbia River

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Columbia River Inter-Tribal Fish Commission



The sea lion issue in the Columbia River has involved:

Biology – 238 sea lions removed under §120 and 90 sea lions removed under §120(f)

Sea lions eat around 3 to 5 salmon per day so 10s of thousands of salmon have been saved.

Regulation – 5 applications to NMFS for lethal removal; Pinniped Fishery Interaction Task Force has met 7 times

Litigation – Four lawsuits filed; twice to 9th Circuit

Legislation – HR 1769 introduced in 2007 110th Congress. PL 115-329 signed in Dec 2018 115th Congress.

Teamwork – Northwest Congressional Delegation, USACE, BPA, NMFS, NPCC, IDFG, ODFW, WDFW, Nez Perce Tribe, Umatilla Tribe, Yakama Nation, Warm Springs Tribe, and CRITFC.



Steller Sea Lion

- rounded head
- lighter brown color
- males 800-2000 lbs



California Sea Lion

- point on head
- darker brown color
- males 500-1200 lbs

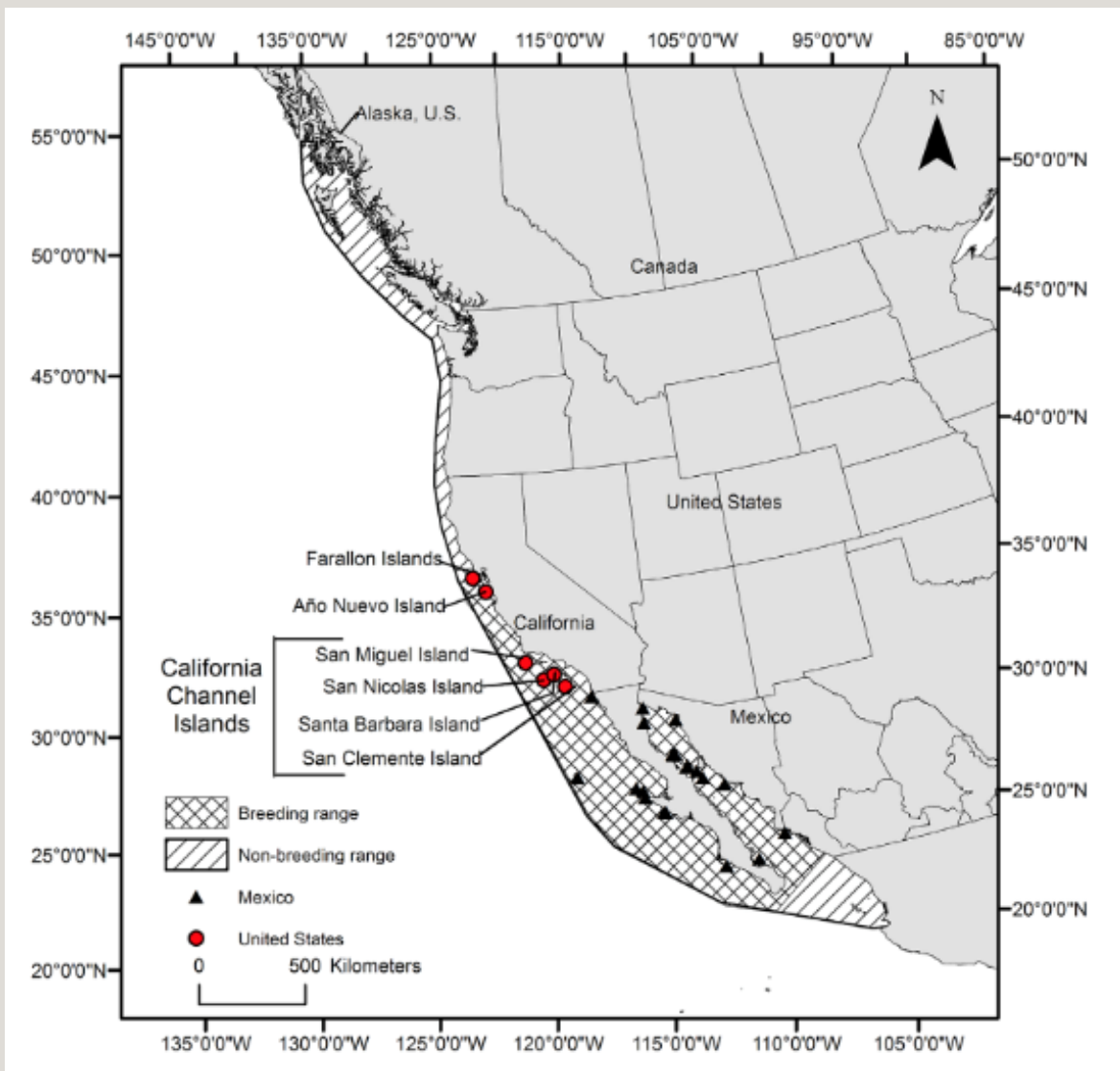


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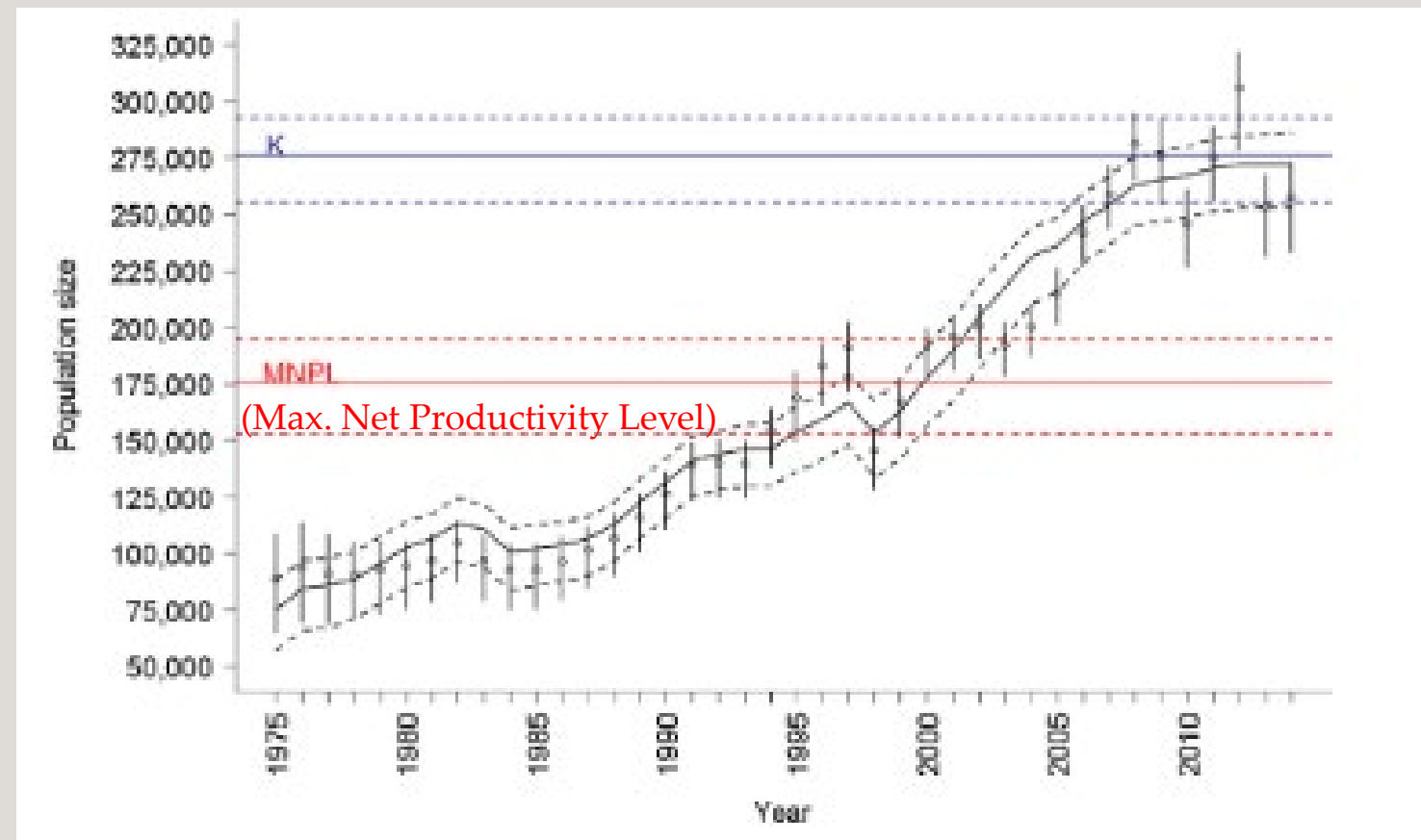




Status of California Sea Lions



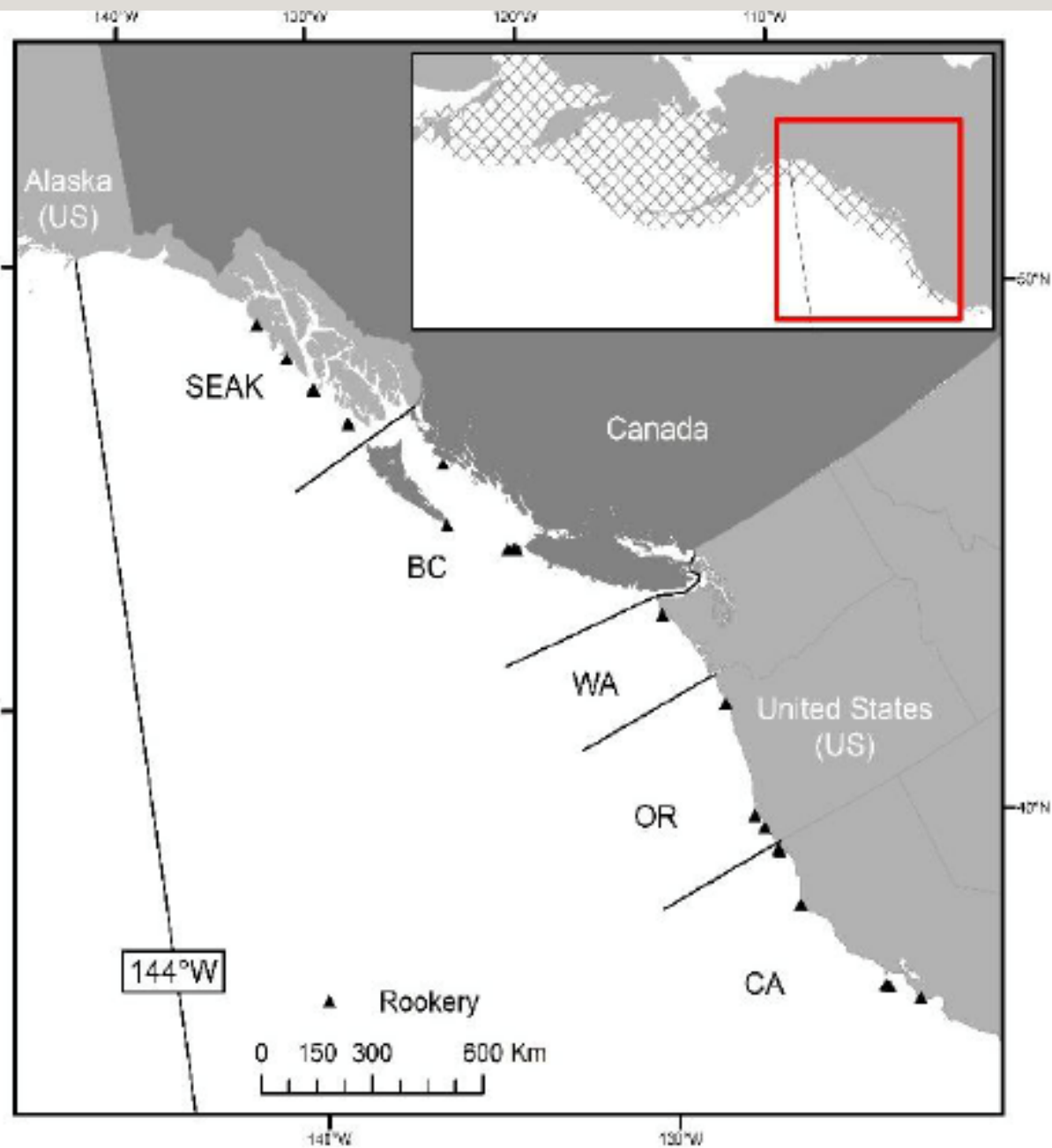
From Laake et al. 2017



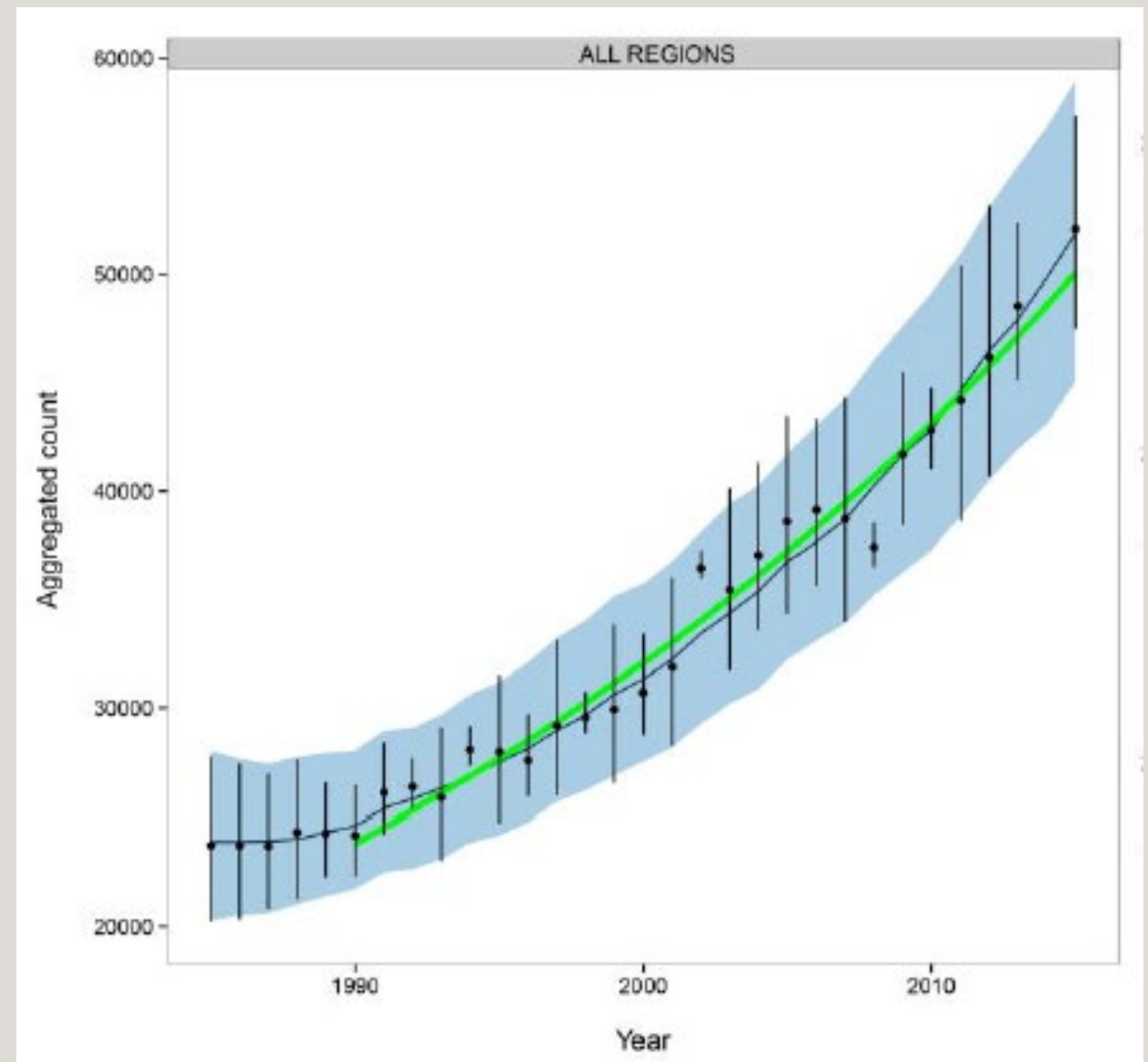
PBR (Potential Biological Removal)

9,200

Status of Steller Sea Lions



From NOAA 2017



PBR (Potential Biological Removal)

2,378

Columbia River Inter-Tribal Fish Commission



Timeline of the Pinniped Issue

- Federal Columbia River Power System BiOp calls for evaluation of sea lion predation in the tailrace of Bonneville Dam

2000

- 0.4% of the spring run taken by pinnipeds in the Bonneville tailrace

2002

2001

- USACE begins documenting sea lion abundance and predation in the Bonneville Dam tailrace

2003

- 1.1% of the spring run taken by pinnipeds in the Bonneville tailrace



Timeline of the Pinniped Issue

- 1.9% of the spring run taken by pinnipeds in the Bonneville tailrace

2004

- 2.8% of the spring run taken by pinnipeds in the Bonneville tailrace
- Expand non-lethal deterrence; CRITFC begins hazing
- *Washington, Oregon, & Idaho submit request for lethal removal §120*

2006

2005

- 3.4% of the spring run taken by pinnipeds in the Bonneville tailrace
- *C404 spotted in the fish ladders*
- Oregon, Washington, & CRITFC test non-lethal deterrence



2007

- 4.7% of the spring run taken by pinnipeds in the Bonneville tailrace
- NMFS accepts the states' lethal take application
- *Pinniped-Fishery Interaction Task Force meets; recommends approval of lethal take under §120.*
- *Rep. Brian Baird introduces HR 1769*



Timeline of the Pinniped Issue

- 3.2% of spring run taken by pinnipeds in the tailrace
- *NOAA issues §120 take permit.*
- trap malfunction results in the death of 6 sea lions, removals suspended
- *litigation – District Court upholds the lethal removal program; plaintiffs appeal.*
- *Steller sea lions begin to appear in significant numbers*
- *BPA Project 2008-004-00 Sea Lion Hazing & Monitoring starts*

2008

- 2.4% of spring run taken by pinnipeds in the tailrace.
- Pinniped-Fishery Interaction Task Force meets (third season review)
- *9th Circuit decides that authorization for removal must be revised: procedural errors*
- States request new letter of authorization

2010

2009

- 2.7% of spring run taken by pinnipeds in the tailrace

2011

- 1.8% of spring run taken by pinnipeds in the tailrace
- *Steller sea lion abundance exceeds CSL abundance*
- *NOAA fixes flaws and issues removal permit to the states under §120*
- HSUS files lawsuit; court dismisses legal case.
- States submit new application for lethal removal
- Pinniped-Fishery Interaction Task Force meets and recommends approval of the application



Timeline of the Pinniped Issue

- 1.4% of spring run taken by pinnipeds in the tailrace.
- HSUS files lawsuit

2012

- 2.1% of spring run taken by pinnipeds in the tailrace

2014

2013

- 2.4% of spring run taken by pinnipeds in the tailrace.
- *District Court rules in favor of NOAA Fisheries*
- *9th Circuit rules in favor of NOAA Fisheries*

2015

- 4.3% of spring run taken by pinnipeds in the tailrace



al Fish Commission



Timeline of the Pinniped Issue

- *5.8% of spring run taken by pinnipeds in the tailrace.*
- *States submit new application for lethal removal*
- *Pinniped-Fishery Interaction Task Force meets and recommends approval of the application*
- *NOAA issues new permit*

2016

- *3.0 % of spring run taken by pinnipeds in the tailrace.*
- *Pinniped Fishery Interaction Task Force for Willamette Falls is convened.*
- *NOAA issues removal permit for Willamette Falls*
- *PL 115-329 signed into law; amends MMPA with §120(f) allows area-based mgt in Columbia R.*

2018

2017

- *4.7% of spring run taken by pinnipeds in the tailrace.*
- *Oregon submits §120 application for lethal removal at Willamette Falls*

2019

- *3.3 % of spring run taken by pinnipeds in the tailrace.*
- *Tribes and States submit joint application for sea lion removal under 120(f)*



Columbia River Inter-Tribal Fish Commission



Timeline of the Pinniped Issue

- Pinniped Fishery Interaction Task Force convenes and recommends approval of §120(f) application
 - NOAA issues §120(f) permit
- 2020

§ 120(f) is a Game Changer

- Includes the tribes as eligible entities
- Allows removal of Steller sea lions
- Area-based management instead of individual sea lion-based management



Removal Program was Regulated by *Individual* from 2008 through 2020

- Must be individually identifiable CSL – must trap and brand.
- Individual must be observed at Bonneville 5 days.
- Individual must be observed eating a salmonid.
- Individual must be subjected to hazing.
- Once criteria is met, NMFS is notified and a request to add that individual to the removal list is made.
- If the individual is recaptured it can be removed.
- Up to 92 CSL could be removed per year.



Removal Program now Regulated by *Area* from 2020 through now

- CSL and SSL residing in the Columbia River between the I205 Bridge and McNary Dam and any salmon bearing tributary are deemed individually identifiable and having a significant negative impact on listed salmon, sturgeon, and lamprey and are eligible for removal under §120(f).



Sea Lion Impacts at Bonneville



Predation loss at Bonneville and the lower river

| Year | Bonneville Dam salmonids passage (Jan 1 – May 31) | Adjusted salmonids consumption estimate in Bonneville tailrace | % of run (Jan 1 – May 31) | Predation of spring chinook between estuary and Bonneville | % of run (Jan 1 – May 31) |
|---------------------|---|--|---------------------------|--|---------------------------|
| 2010 | 267,194 | 6,542 | 2.39% | 77,560 | 22% |
| 2011 | 223,380 | 4,007 | 1.76% | 59,480 | 21% |
| 2012 | 171,665 | 2,382 | 1.37% | 51,750 | 23% |
| 2013 | 120,619 | 2,954 | 2.39% | 35,210 | 23% |
| 2014 | 219,929 | 4,746 | 2.11% | 98,470 | 31% |
| 2015 | 239,326 | 10,859 | 4.34% | 224,450 | 48% |
| Bonneville Tailrace | | | + lower River | | |

From Tidwell et al. 2018 and Wargo Rub et al. 2019



How many sea lions are around?

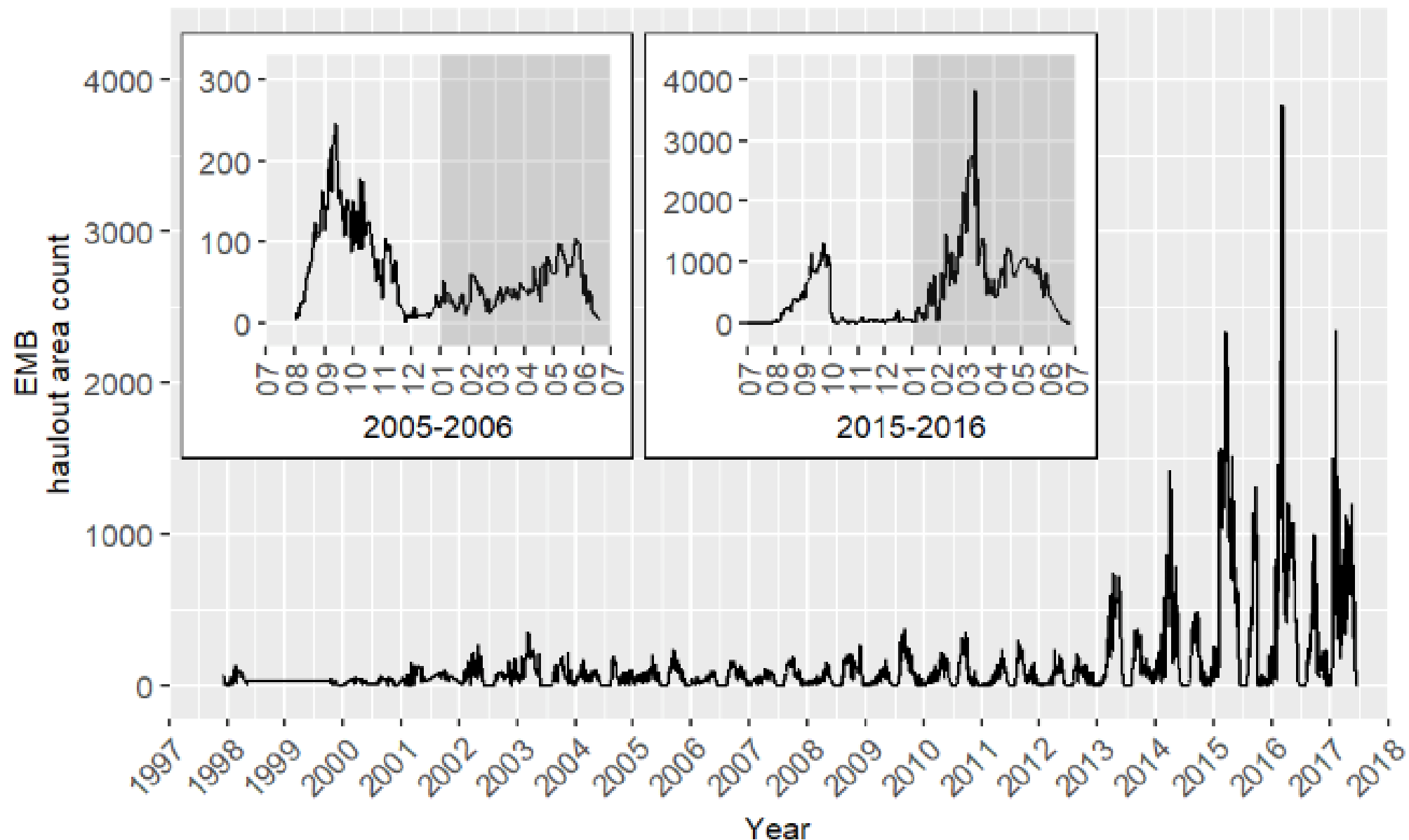


Figure 2. Time series of California sea lion haul-out area counts at the East Mooring Basin (EMB) in Astoria from December 1997 to June 2017. Insets illustrate the changes in magnitude and seasonality of California sea lion occurrence over the study period (x-axis denotes month; note difference in magnitude of counts on the y-axis scale between the two inset figures).

Implementation & Future Plans

Casey Clark

WDFW Lead Marine Mammal Researcher

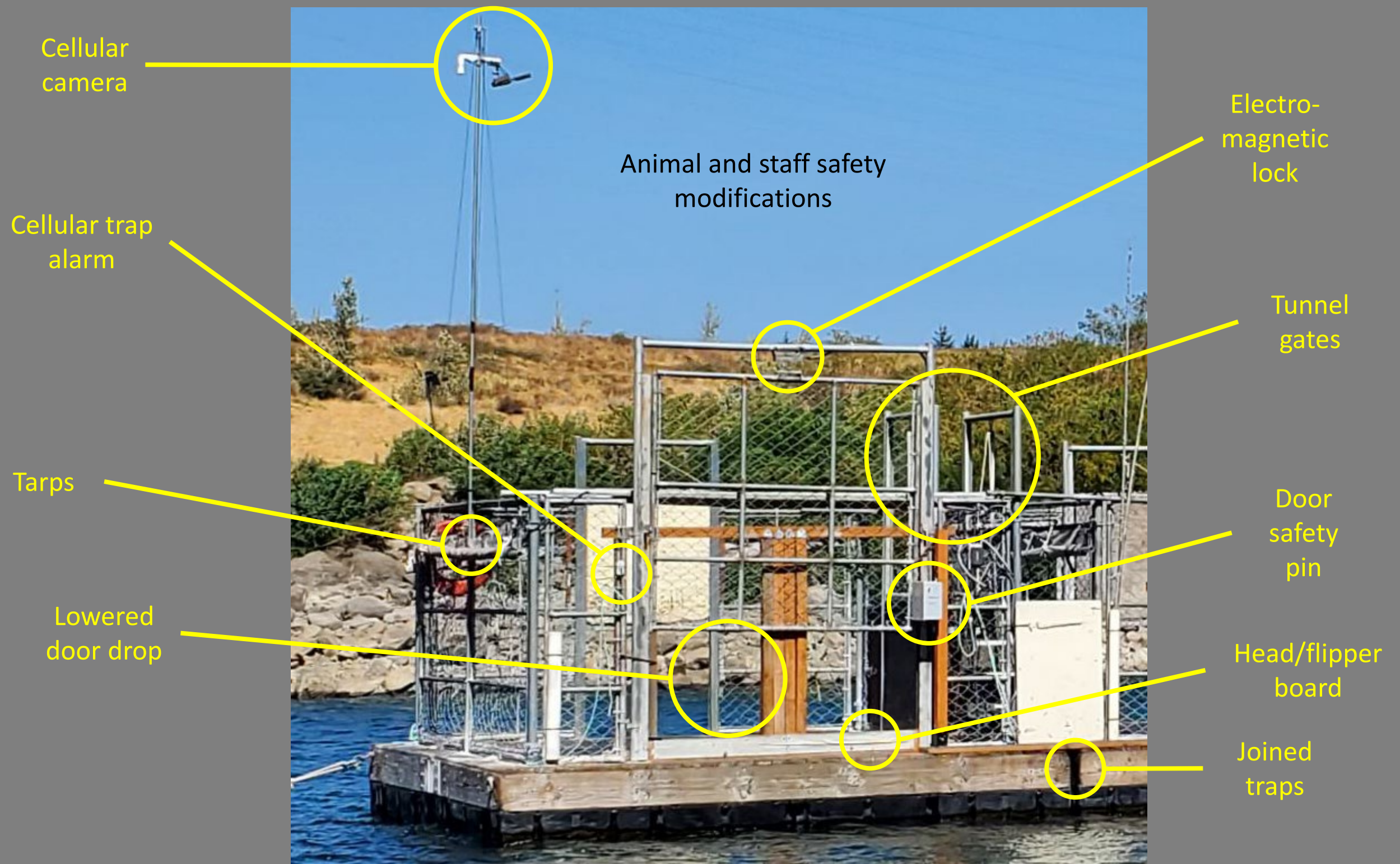


2007



2021



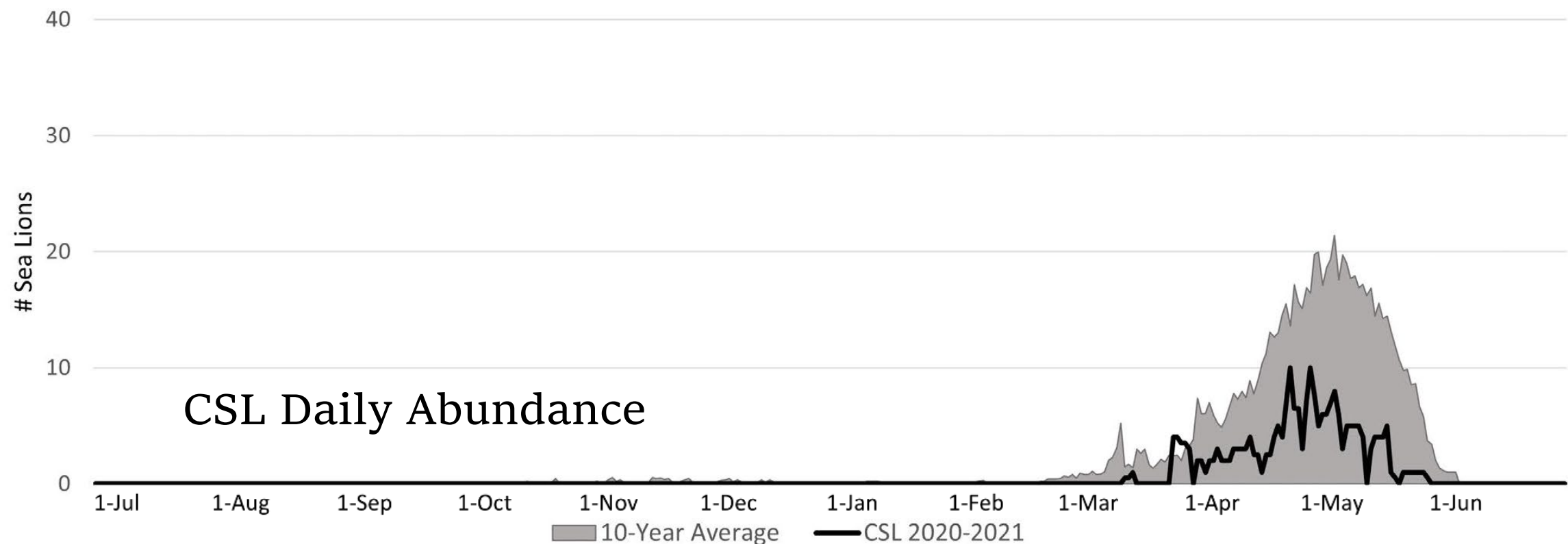


History of Section 120 and 120(f) Pinniped Removals in the Columbia Basin (Bonneville and Willamette Falls)

| Year | CA Sea Lions Removed | Steller Sea Lions Removed | Total |
|--------------|----------------------------|---------------------------------|------------|
| 2008 | 11 | 2* | 13 |
| 2009 | 15 | N/A | 15 |
| 2010 | 14 | N/A | 14 |
| 2011 | 1 | N/A | 1 |
| 2012 | 13 | N/A | 13 |
| 2013 | 4 | N/A | 4 |
| 2014 | 15 | N/A | 15 |
| 2015 | 35 | 1* | 36 |
| 2016 | 59 | N/A | 59 |
| 2017 | 24 | N/A | 24 |
| 2018 | 33 | N/A | 33 |
| 2019 | 50 | N/A | 50 |
| 2020 | 0 | 6 | 6 |
| 2021 | 29 | 38 | 67 |
| 2022 | 17 | 9 | 26 |
| TOTAL | 320 | 56 | 376 |



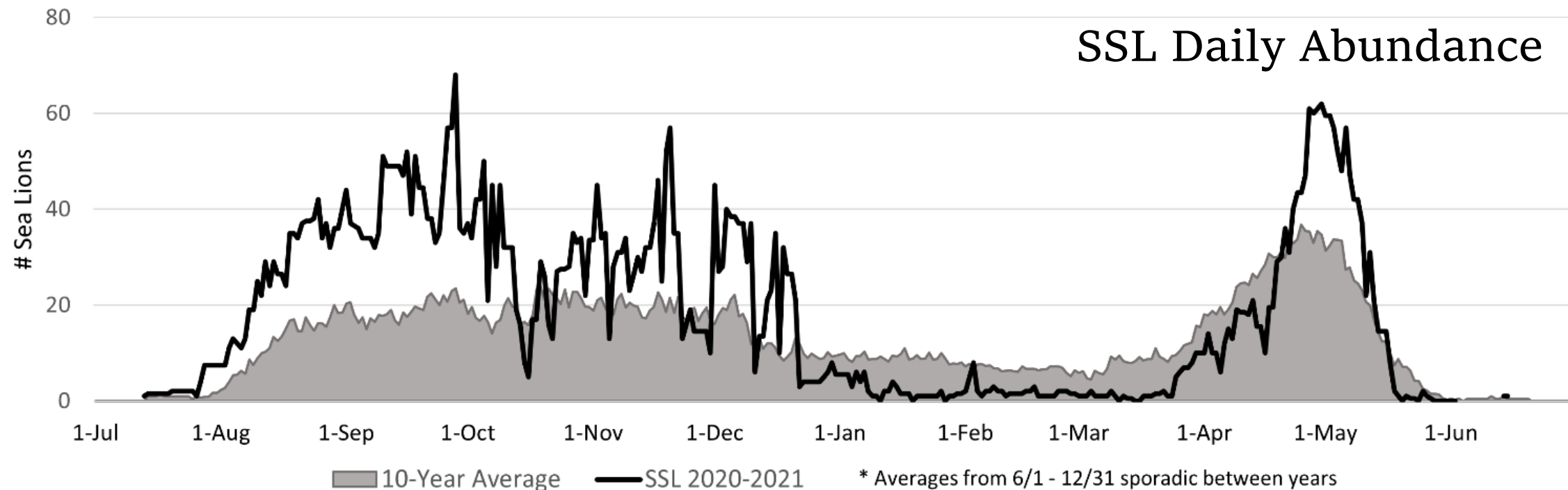
CA sea lion abundance at Bonneville Dam is on the decline



(van der Leeuw et al. 2021)



Steller sea lion abundance at Bonneville Dam has increased

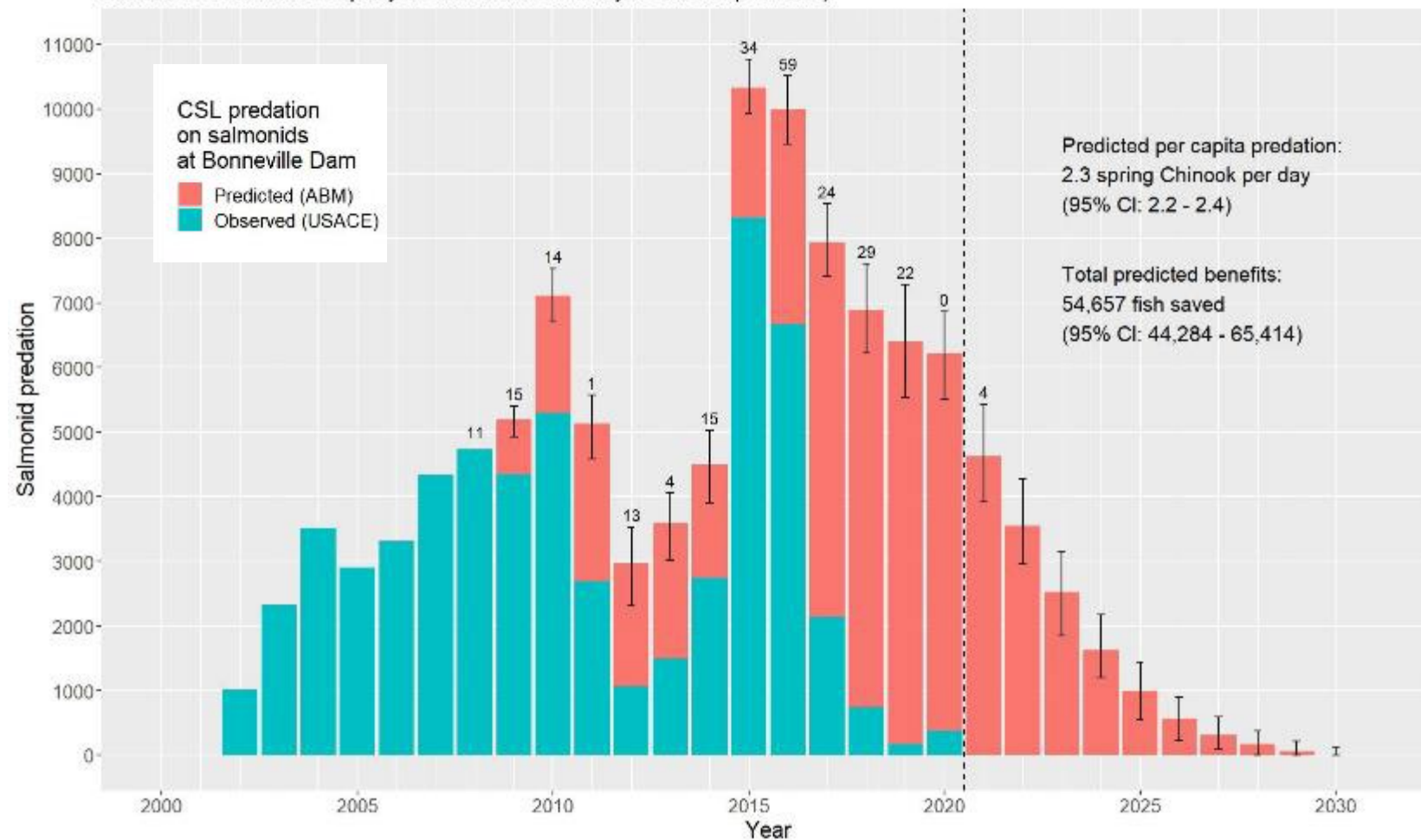


(van der Leeuw et al. 2021)



Demonstrating success

Predicted benefits from 245 CSL removals at Bonneville Dam under MMPA Section 120
(Benefits represented as medians and 95% percentile confidence intervals from 100 repetitions of agent based model;
number of CSL removed per year under this authority noted at top of bars)



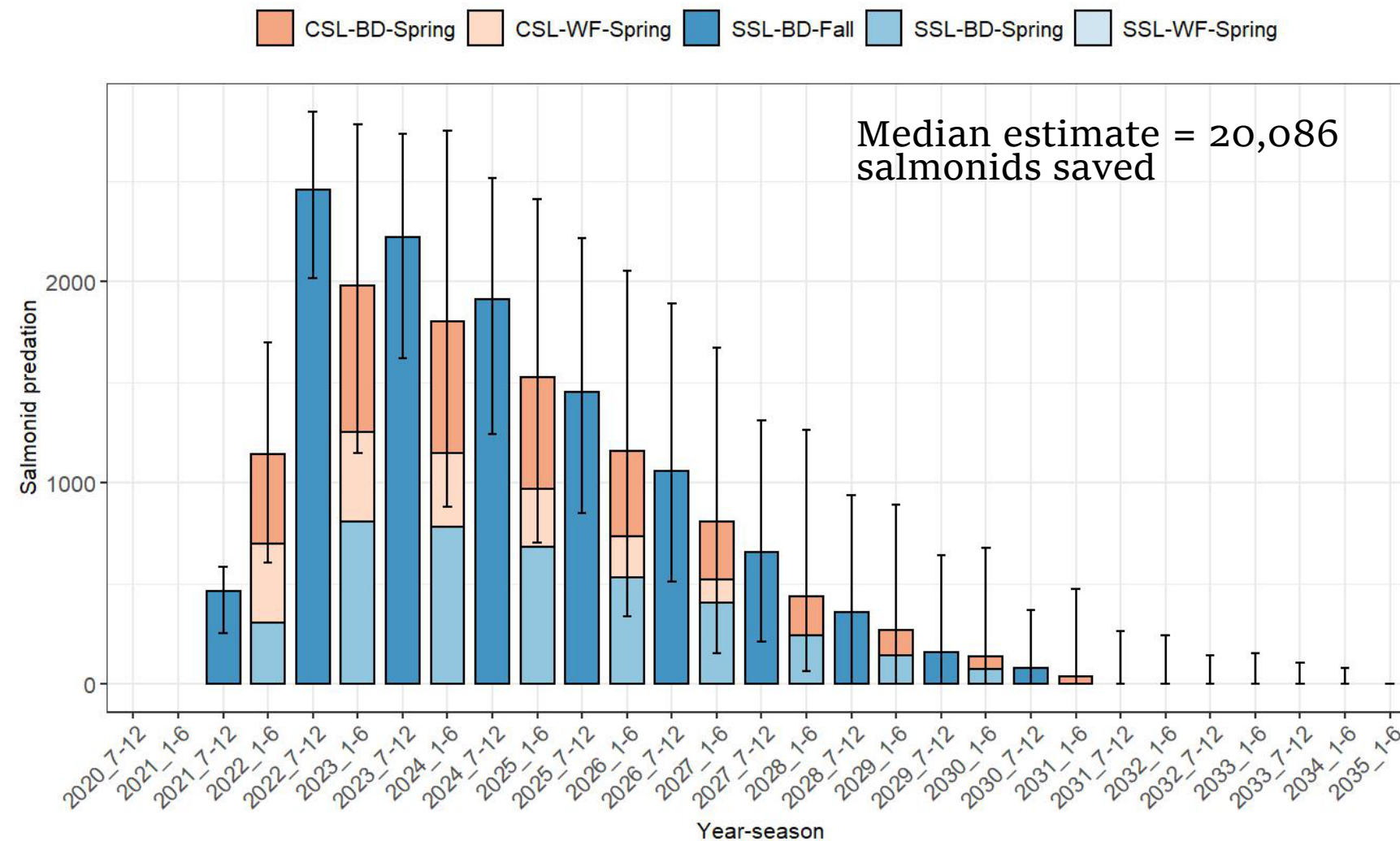
Fish Impacts of 2008-2020 Removal of California Sea Lions under MMPA §120

- 245 CSLs removed
- 54,657 salmon saved
- Conservative estimate of benefits – does not account for recruitment



Demonstrating success

Fish Saved Since MMPA §120(f) Implementation



- Steller removals authorized
- Aug 2020-Jun 2022 removals: 53 SSL and 38 CSL
- 20,086 salmon saved
- Stellers larger, consume more fish per day, longer residency



Why predation in the Columbia is so impactful

- Conservation efforts aimed at producing/protecting smolts important, but they face lots of challenges ahead (compensatory mortality)
- Adult fish passing Bonneville/Willamette have few remaining obstacles
- Saving salmon from predation at these sites equates nearly 1:1 to increasing fish on spawning grounds (additive mortality)



Breaking the pattern of recruitment

California and Steller sea lion increases in Columbia River followed a similar pattern:

Small number of animals habituate to a location



Recruitment of new animals initially low, but increases rapidly



Habituated animals arrive earlier, stay longer, return to sites year after year



Habituated animals recruit new individuals





Success at Willamette Falls

2017: Estimated 89% chance
of extinction for Winter
steelhead

Sea lions consumed ~25% of
some runs

Two seasons of sea lion
removals: steelhead rebound,
extinction risk drops to 11%



Success at Willamette Falls

Winter steelhead at Willamette Falls **before** removals

| Year | 2014 | 2015 | 2016 | 2017 | 2018 |
|---------------------------|------|------|------|------|------|
| Sea lion predation | 780 | 557 | 915 | 270 | 503 |
| % of potential escapement | 13% | 11% | 14% | 25% | 22% |

Winter steelhead at Willamette Falls **after** removals

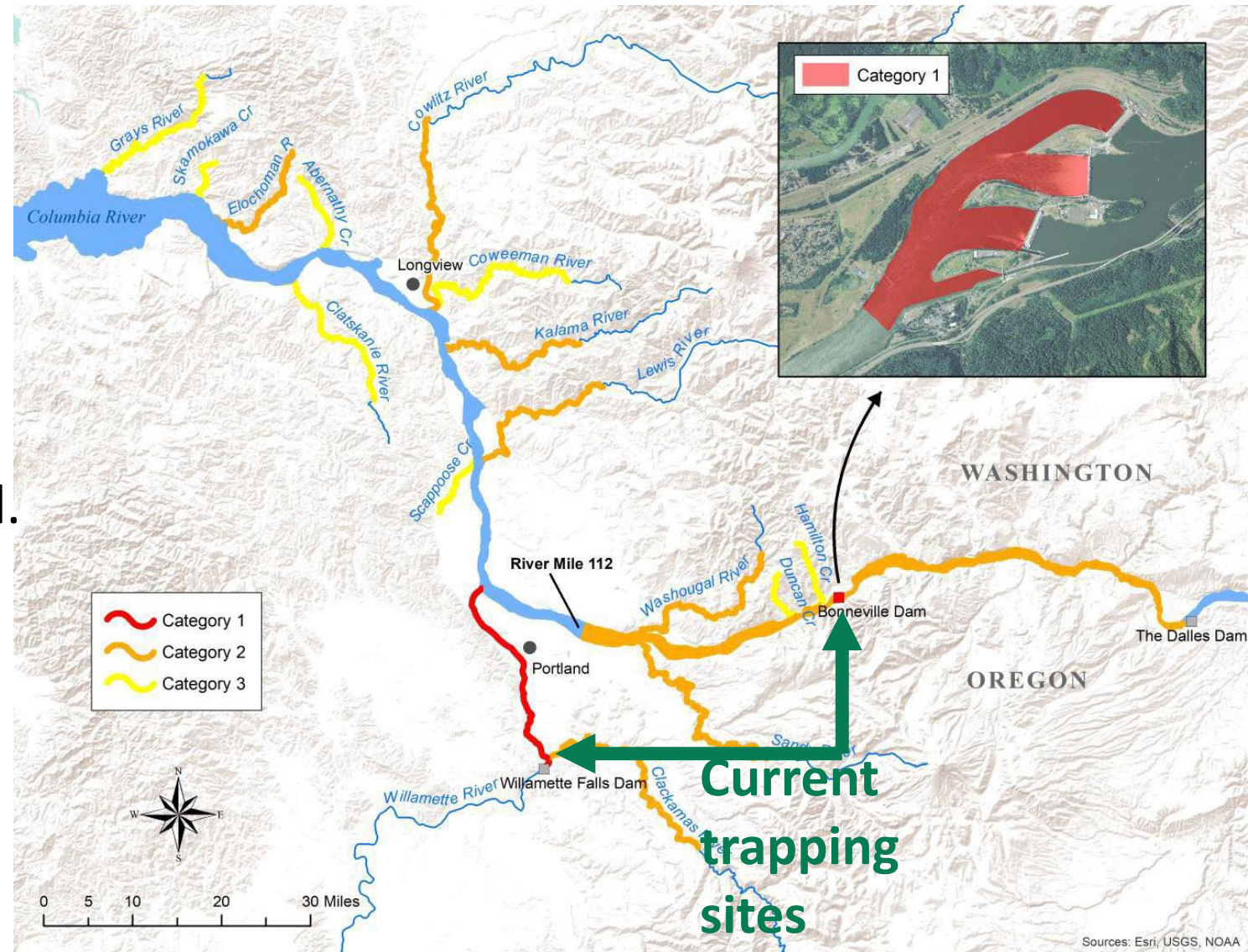
| Year | 2019 | 2020 | 2021 |
|---------------------------|------|------|------|
| Sea lion predation | 280 | 22 | 25 |
| % of potential escapement | 8% | 0.4% | 1.2% |

Data from Wright et al. 2021



Tributary Management

- ▲ Category 1: High CSL and SSL presence much of the year. Immediate and ongoing conservation risk for fish.
- ▲ Category 2: Low to moderate and/or periodic sea lion presence. Conservation concern for fish stocks if left unmanaged.
- ▲ Category 3: CSL and SSL have not been documented, but contain ESA spawning habitat.



Current funding scheme

| | State Funds | Federal Funds |
|--------------|--------------------|------------------|
| WDFW | \$753,000 | |
| ODFW | \$773,938 | |
| IDFG | \$45,000 | |
| CRITFC | | \$254,593 |
| | | |
| Total | \$1,571,938 | \$254,593 |

- Recent changes, and likely to shift in the future as management intensifies and expands in Washington and Oregon tributaries



Acknowledgements

- Highly successful region-wide collaboration, state, tribal, and federal government, other organizations
- Thanks to the NWPCC for years of engagement, support, and facilitation

