

Pinniped Predation in the Bonneville Dam Tailrace, 2008-2010

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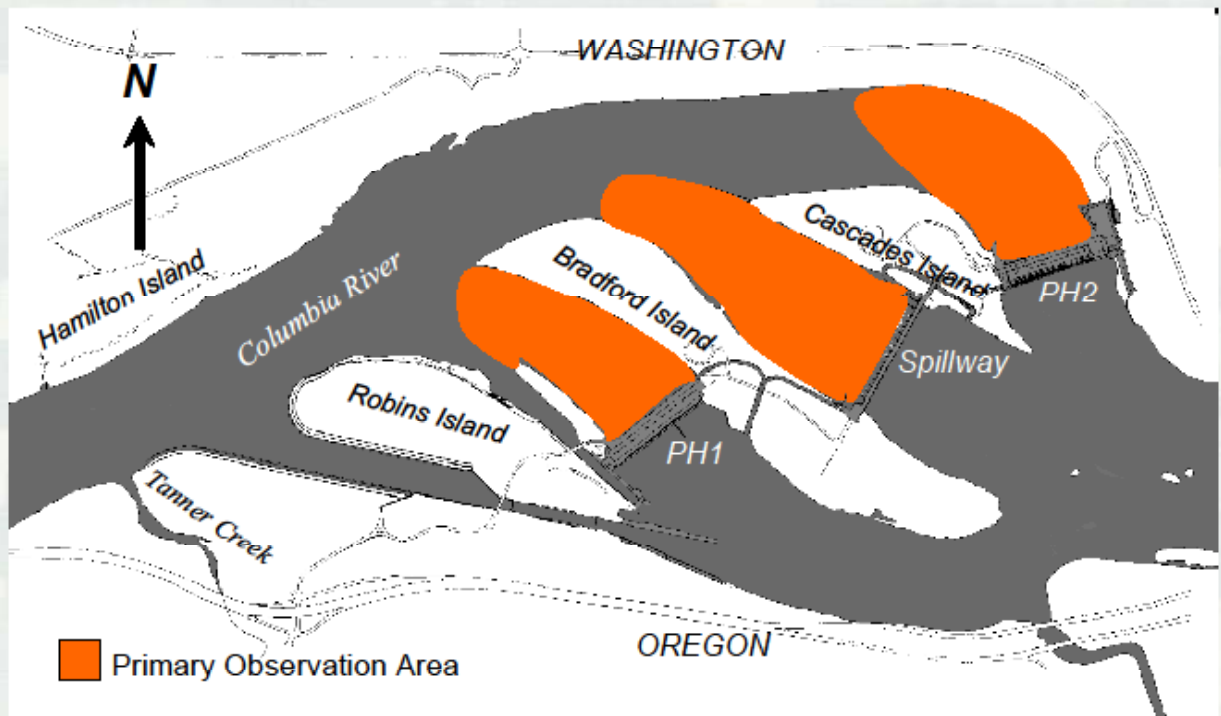
Fisheries Field Unit
USACE-Portland District



Topics Covered

- Objectives:
 - Monitor Pinniped Abundance
 - Estimate Pinniped Predation
 - Evaluate Effectiveness of Deterrent Actions
- Study Site
- Results
 - Abundance Estimates, Predation Estimates
 - Deterrent Actions, Removal Program
- Pinniped/Fisheries Task Force Recommendations

Observation Area - Bonneville Dam



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Location of Predation Zones at Bonneville Dam, 2010



Results: Pinniped Abundance



California sea lion
(CSL)
Zalophus californianus

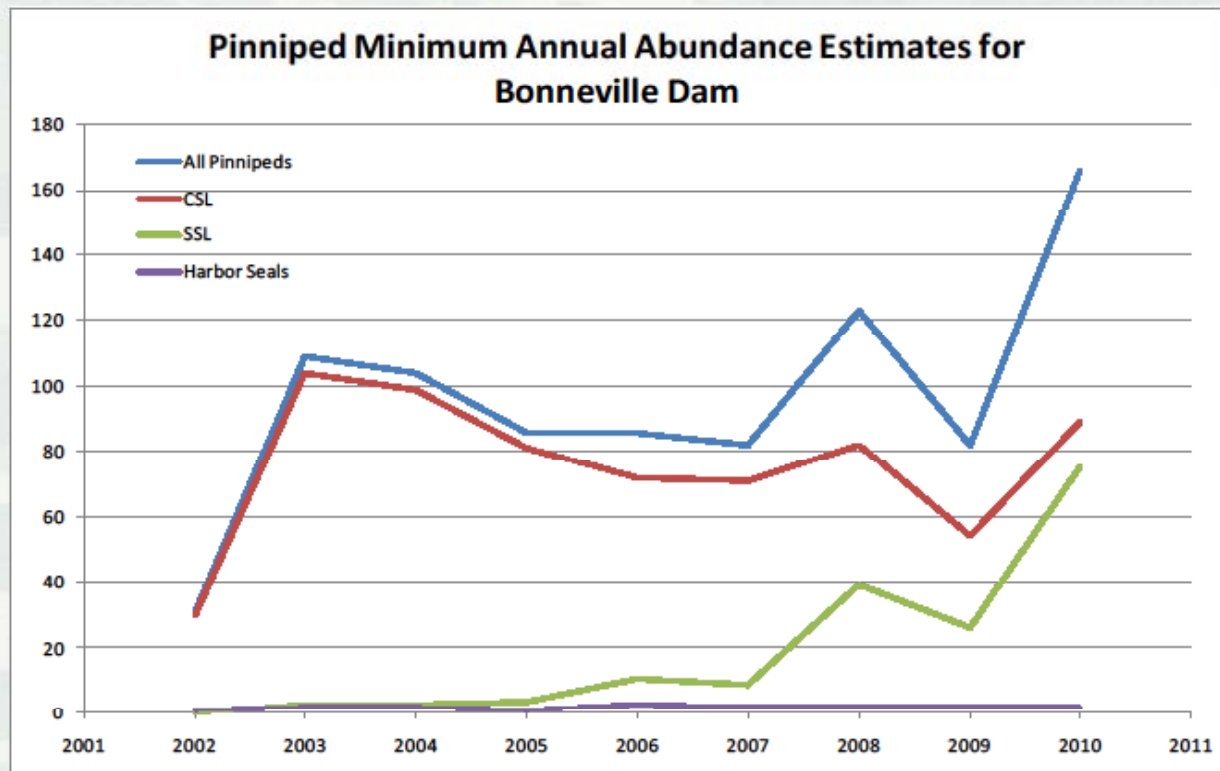


Steller's sea lion
(SSL)
Eumetopias jubatus

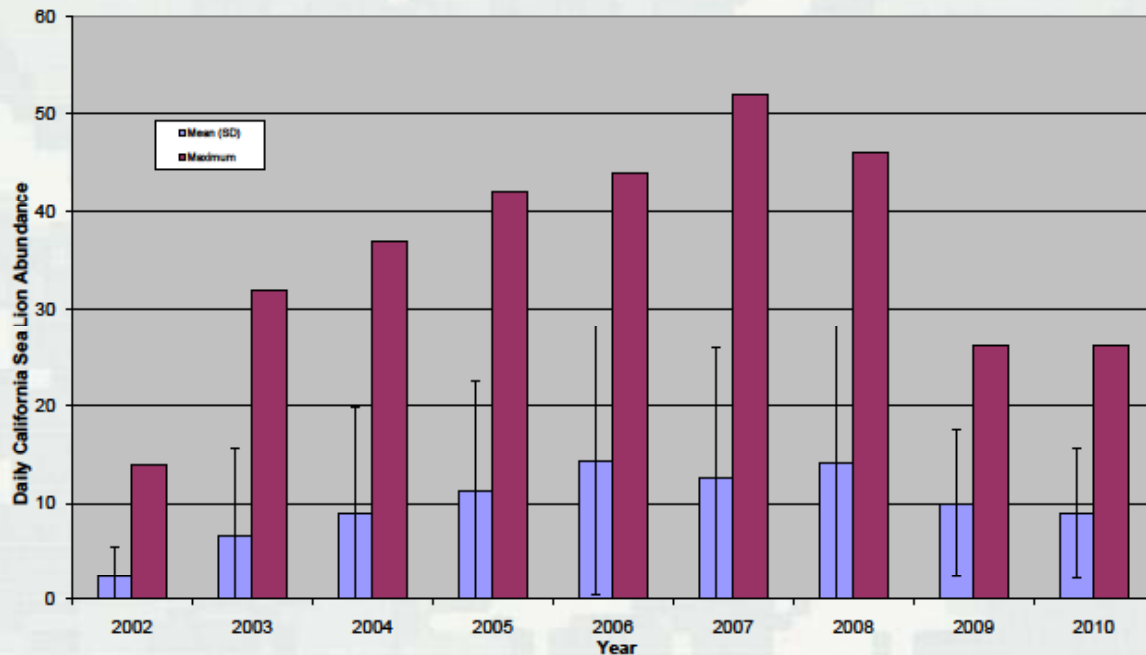


Harbor seal
Phoca vitulina

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Daily Average and Maximum CSL Abundance, 2002-2010

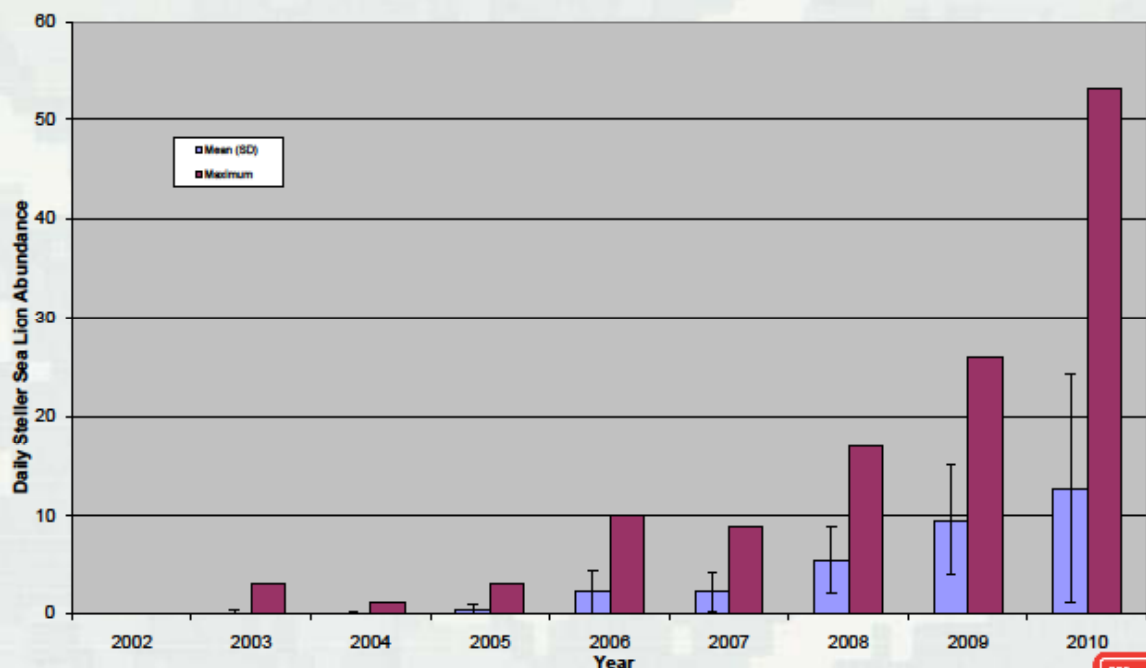


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Daily Average and Maximum SSL Abundance, 2002-2010



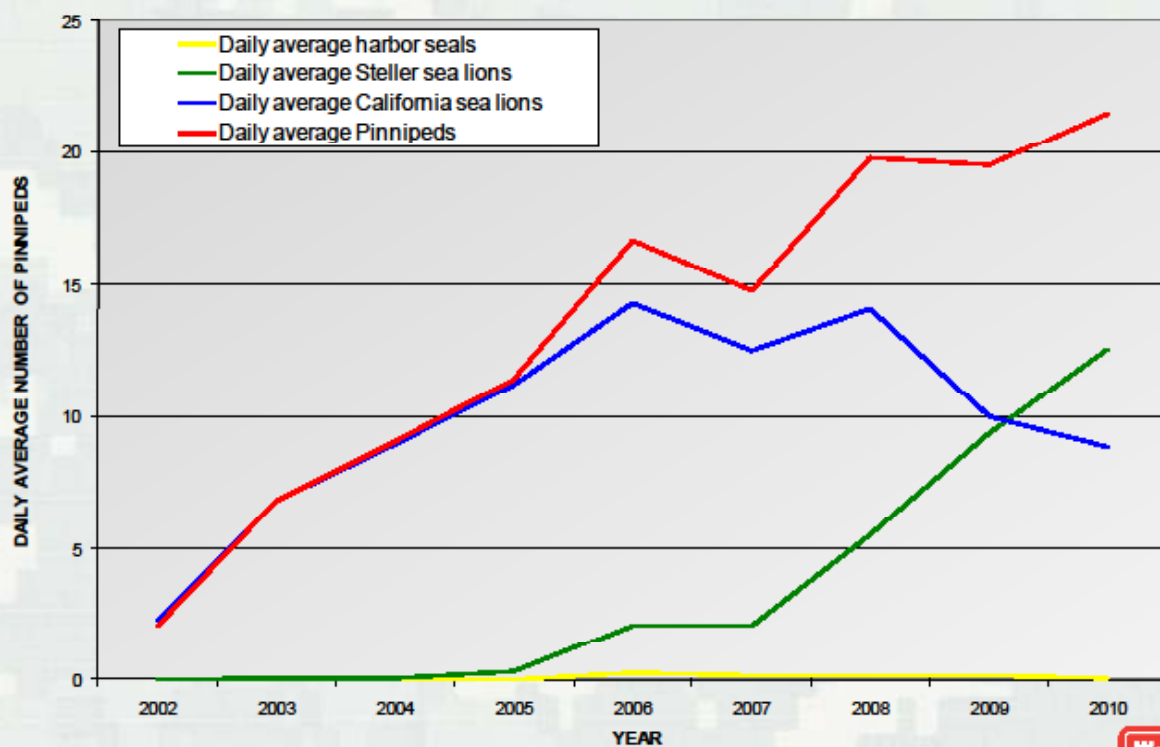
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DAILY AVERAGE OF PINNIPEDS AT BONNEVILLE DAM, 2002-2010



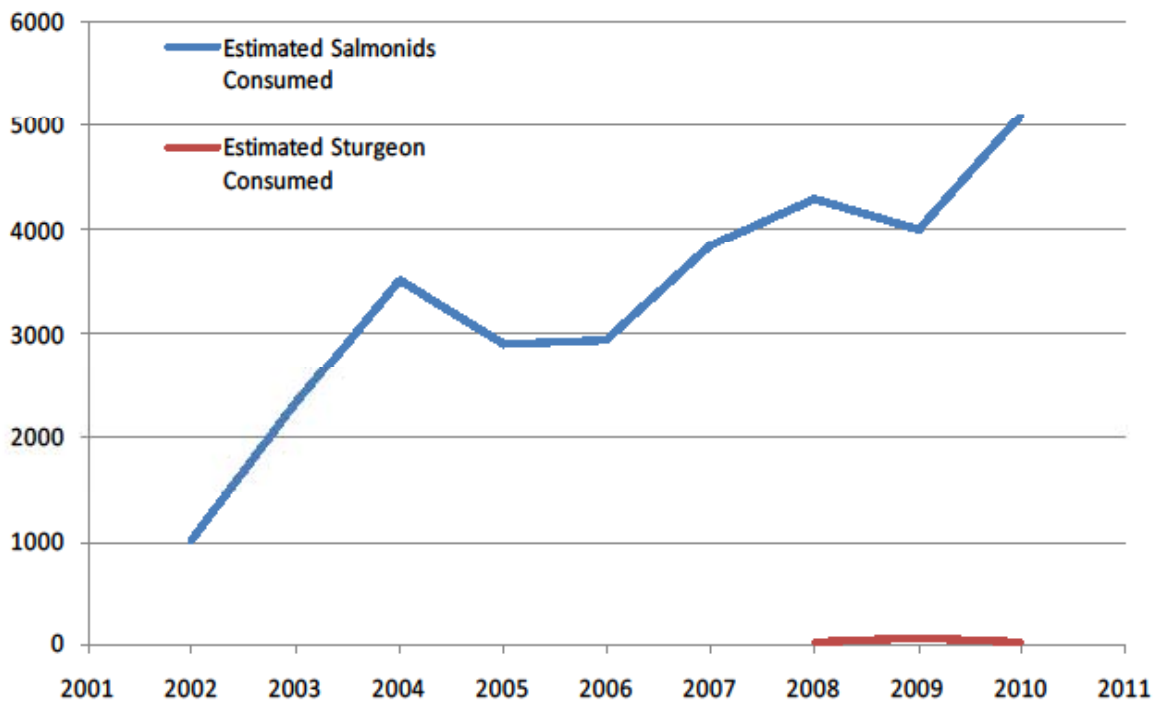
Pinniped Predation Results



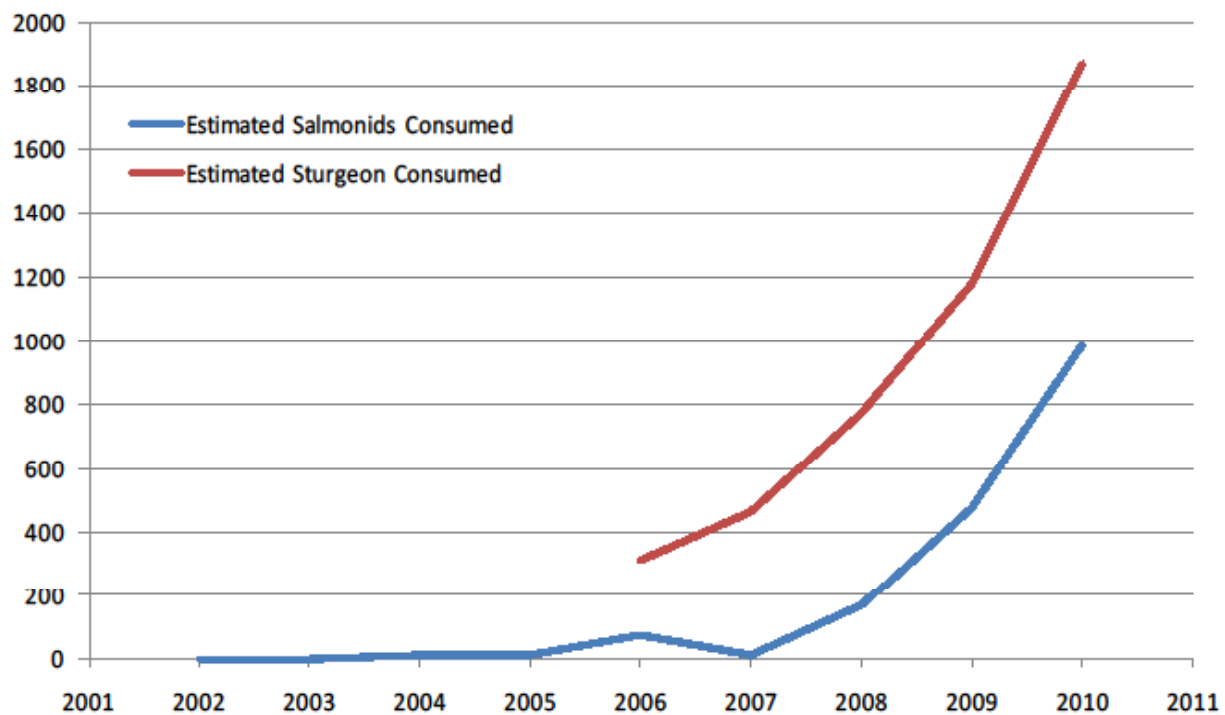
Annual Salmonid Passage and Estimated Consumption by Pinnipeds

Year	Bonneville Dam Salmonid Passage	Expanded Salmonid Estimated Consumption	% of Run (Jan 1-May31)
2002	284,733	1,010	0.4%
2003	217,185	2,329	1.1%
2004	186,804	3,533	1.9%
2005	82,006	2,920	3.4%
2006	105,063	3,023	2.8%
2007	88,474	3,859	4.2%
2008	147,543	4,446	2.9%
2009	186,060	4,489	2.4%
2010	267,194	6,081	2.2 %

CSL Estimated Salmonid and Sturgeon Predation



SSL Estimated Salmonid and Sturgeon Predation

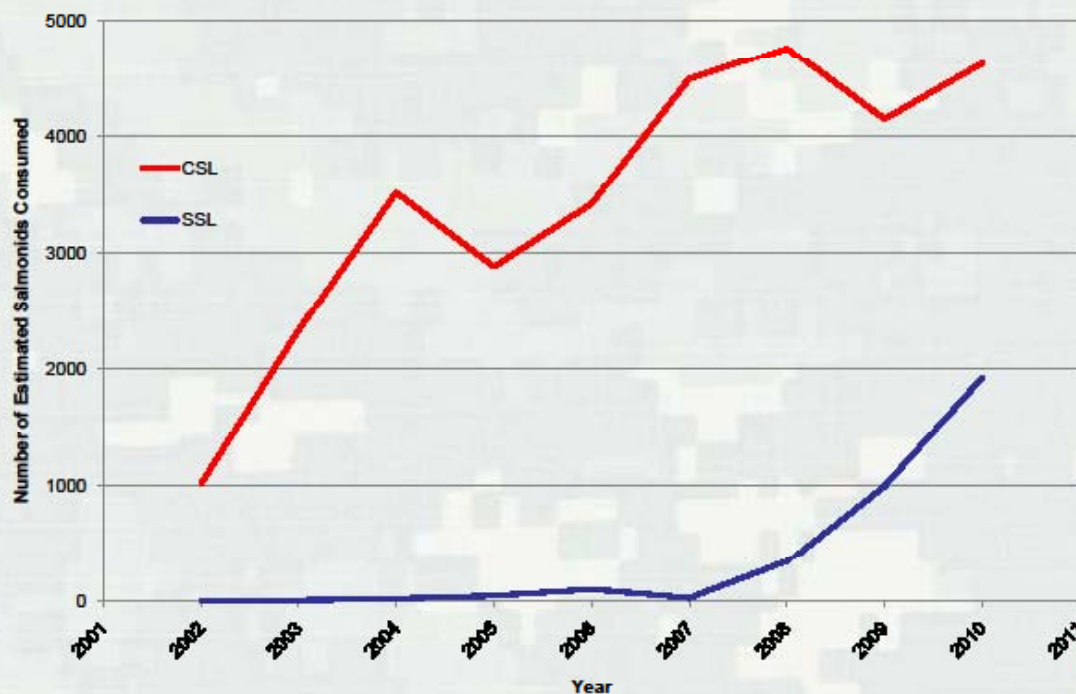


Cleptoparasitism (Stealing Prey)

Year	CSL from CSL	SSL from CSL
2002	0	0
2003	14	0
2004	366	0
2005	22	22
2006	12	5
2007	33	4
2008	161	135
2009	152	324
2010	58	801



**Expanded Estimated of Salmonids Consumed by
Pinnipeds at Bonneville Dam, Adjusted for Unknown
Catch, Night-time Catch, and Clepto-parasitism Events,
2002-2010**



Timing of Salmonid Predation by Pinnipeds and Salmon Passage at Bonneville Dam (Averaged Over 2002-2010)

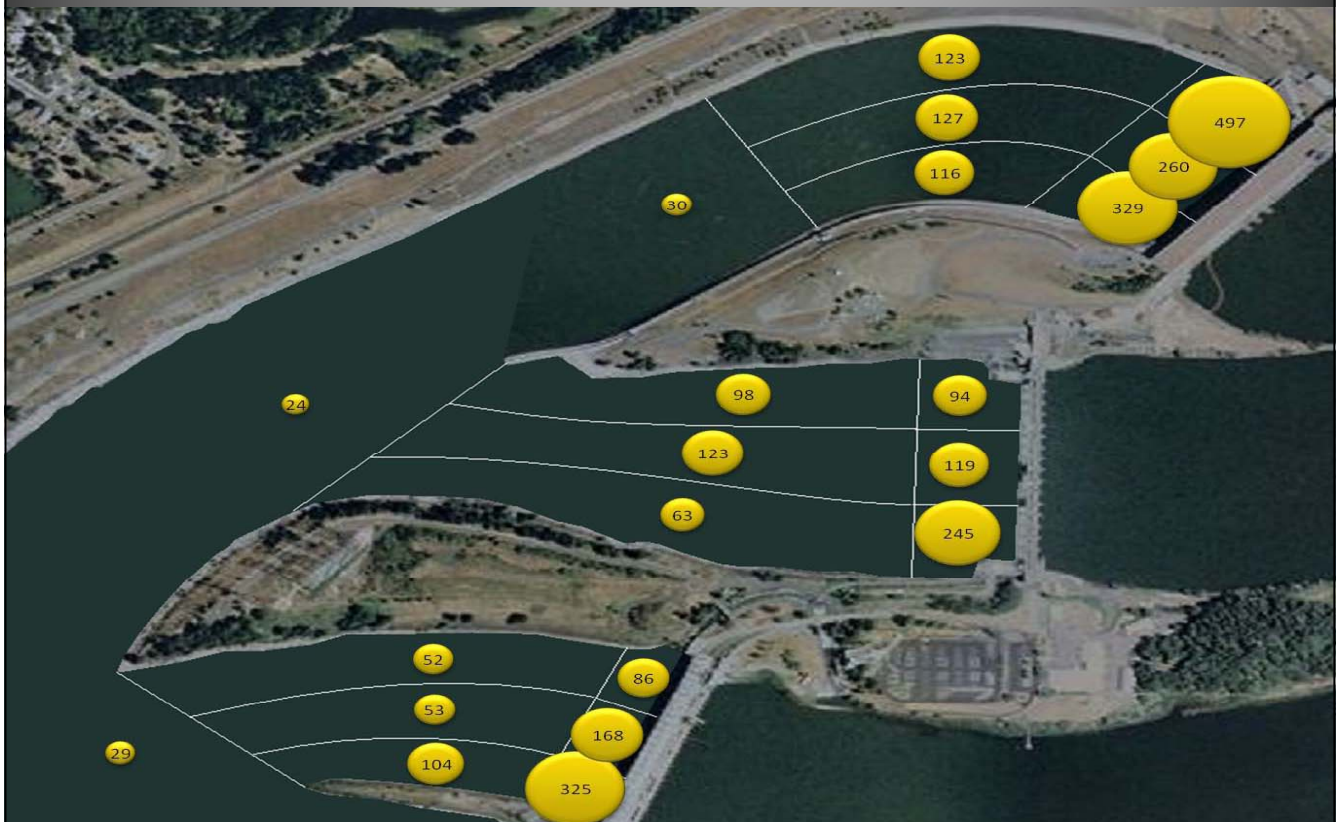


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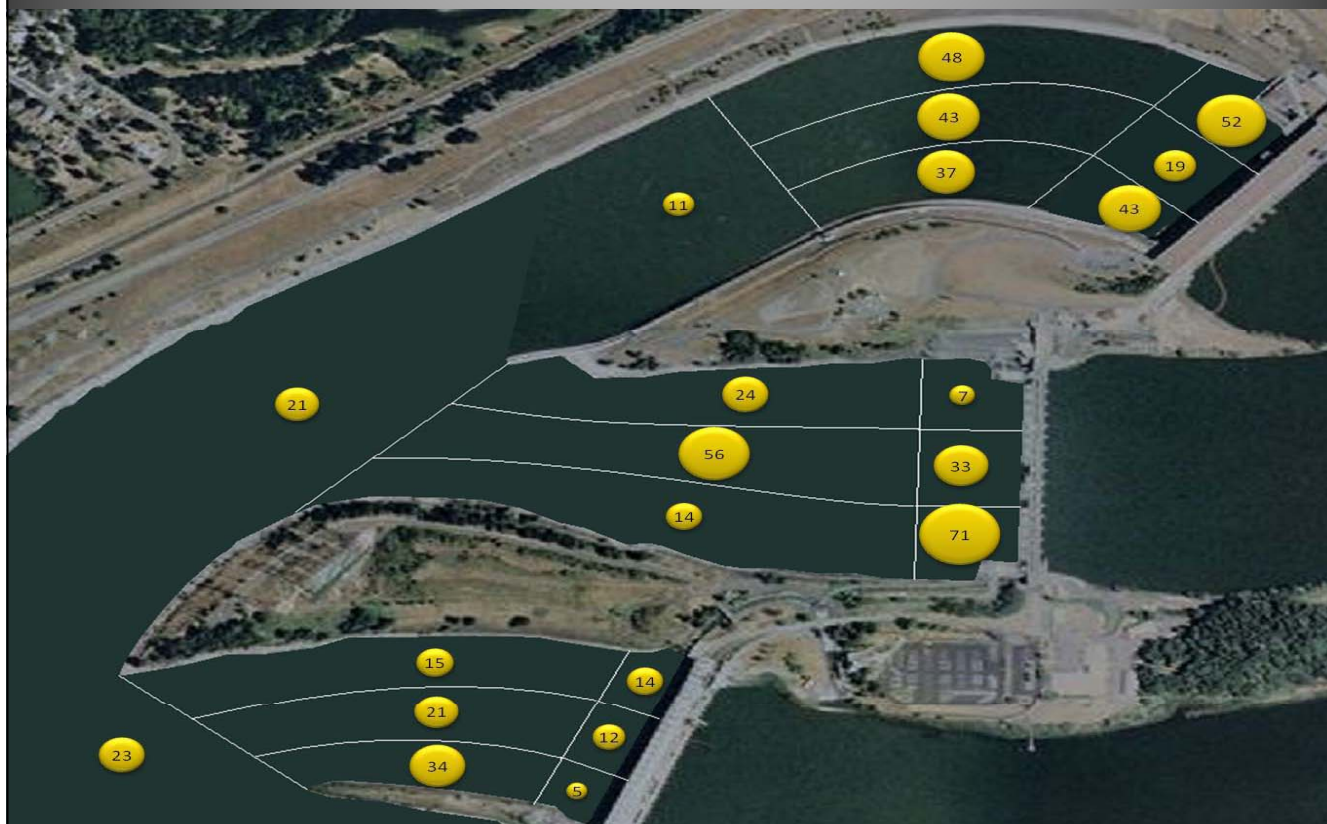
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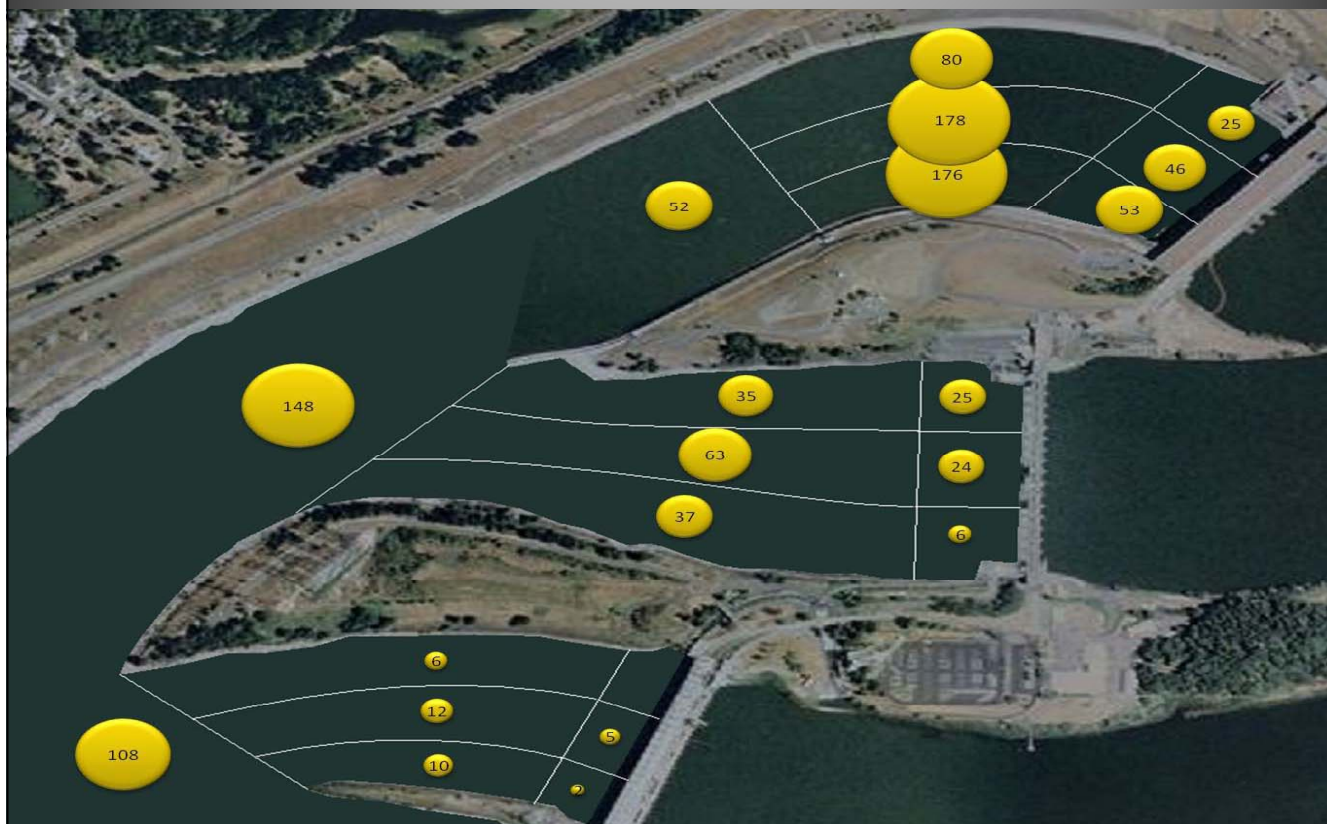
CSL Chinook Catch by Location, 2010



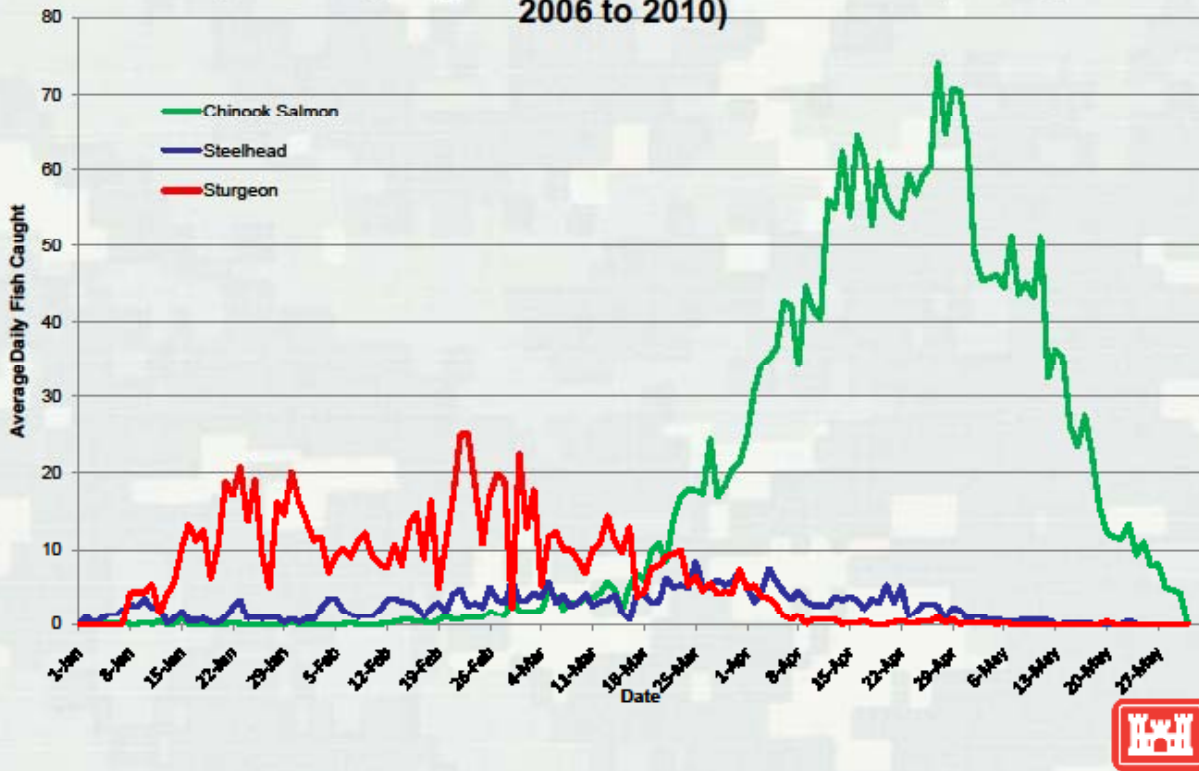
SSL Chinook Catch by Location, 2010



SSL Sturgeon Catch by Location, 2010



Daily Average Estimated Chinook Salmon, Steelhead, and Sturgeon Caught by Pinnipeds at Bonneville Dam (Averaged 2006 to 2010)



Lamprey Predation at Bonneville Dam Tailrace, 2002-2010

Year	Expanded Pacific Lamprey Consumption Estimate	Percent of Total Observed Fish Catch
2002	47	5.6%
2003	317	11.3%
2004	816	12.8%
2005	810	25.1%
2006	424	9.8%
2007	143	2.6%
2008	145	2.0%
2009	102	1.4%
2010	39	0.7%

Results of Non-Lethal Deterrents



Deterrent Measures at Bonneville Dam, 2008-2010

- SLED's and FOG's installed and still effective (no entry into fishways observed after installation).
- Acoustic Deterrent Devices installed near ladder entrances and activated, no effect noticed.
- Hazing by USDA (land) and States/CRITFC (boat) has continued, but with limited effectiveness.
- Concrete blocks appear successful in preventing sea lions from hauling out on concrete apron, but not resting nearby.

Results of Trapping and Removal

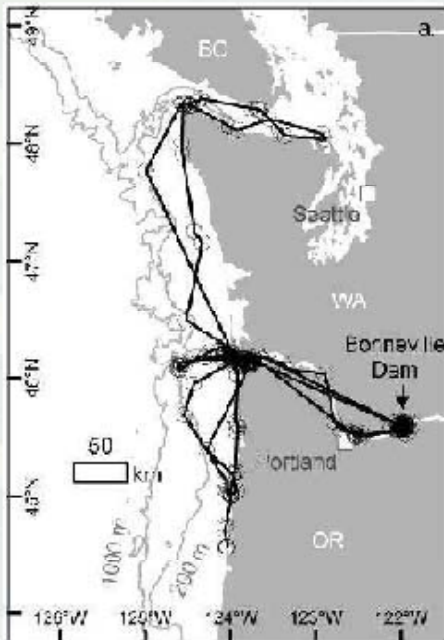


California Sea Lion Removals Columbia River, 2008-2010

Year	Zoo/Aquaria	Accidental Trapping Incident	Euthanized	Trapped in Astoria and Euthanized	Total
2008	6	4	1	0	11
2009	4	0	10	1	15
2010	0	0	12	2	14
Total	10	4	23	3	40



Satellite and Acoustic Tracking Data



- Satellite Track of C265 in 2007.
- 3/6/2007 Trapped in Astoria, weighed 559 lbs.
- 5/21/2007 Trapped in Astoria, weighed 1,043 lbs.
- Weight gain of 484 lbs in 2.5 months.

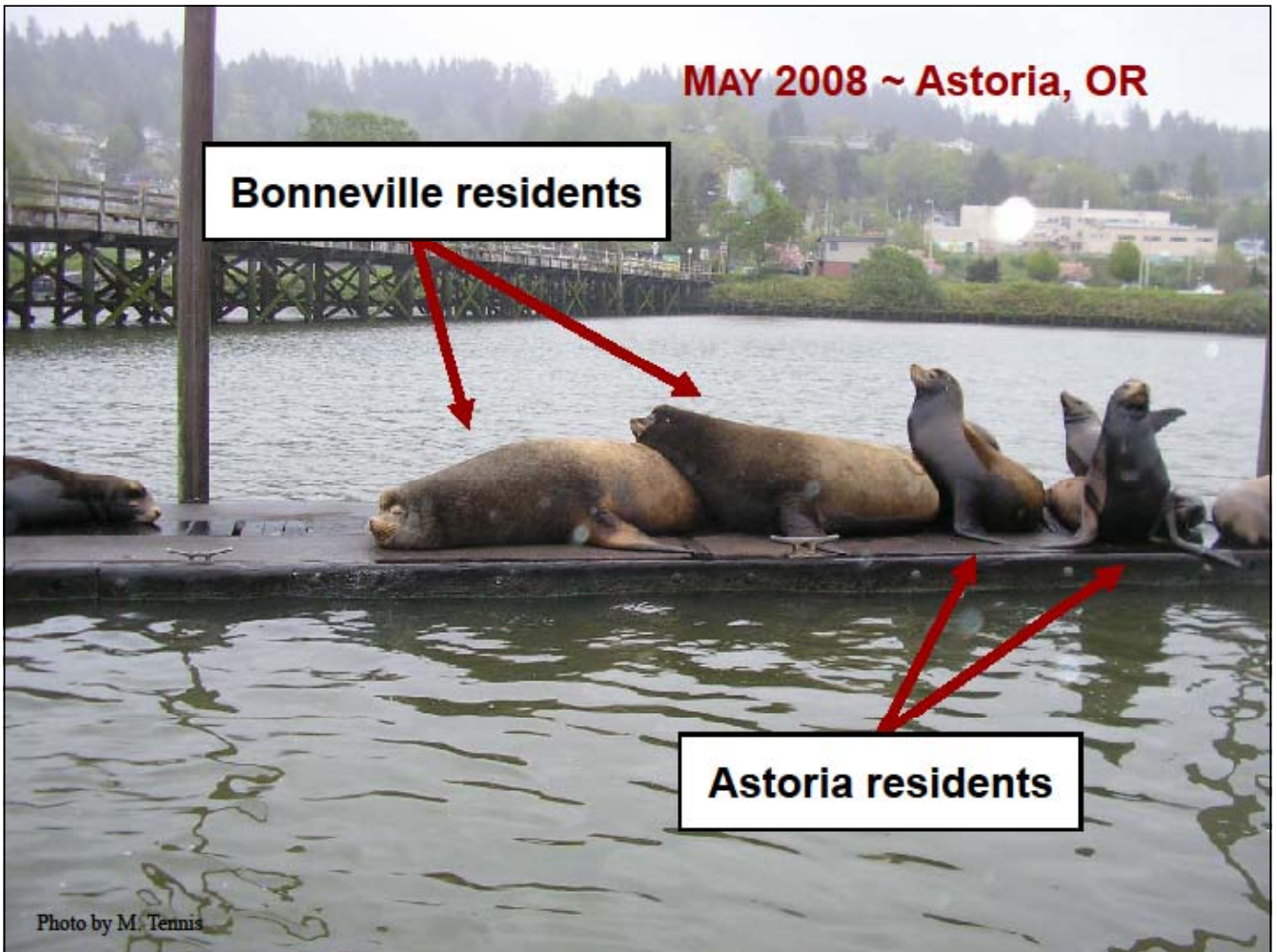
- Figure courtesy Bryan Wright, ODFW



Weight Data for Bonneville Dam Pinnipeds

- 2 Heaviest California sea lions ever weighed on record were Bonneville animals (1,454lbs, 1,151lbs)





Summary – Key Points on Pinniped Predation

- Physical barriers effectively block CSL access to fishways.
- 4 years of active non-lethal deterrence efforts have failed to reduce predation on salmonids and sturgeon at the dam.
- Trapping and removal program is working for CSL abundance, but full benefits not be known until after 5 years. Without 40 removals, salmonid predation would have been higher.
- Salmonid catch totals continue to increase (6,081; 2.2% of run in 2010). Higher if unidentified fish, night catch are included.
- Steller sea lions beginning to become more of a problem with increasing abundance and more predation on both white sturgeon and salmon species and stealing prey from CSLs.
- California sea lions coming earlier each year (some in fall), and having impact on early spring Chinook stocks.