Expanding Pinniped Populations and Impacts on At-Risk Salmonid Fishery Stocks

NOAA FISHERIES

West Coast Region

Photo Credit: L.E. Baskow

Marine Mammal Commission Annual Meeting May 30, 2018

Robert Anderson
NOAA Fisheries
West Coast Region

MMPA Section 120-Pinniped Removal Authority

Pacific Coast Task Force; Gulf of Maine
16 U.S.C. 1389

Sec. 120. (a) PINNIPED REMOVAL AUTHORITY. — Notwithstanding any other provision of this title, the Secretary may permit the intentional lethal taking of pinnipeds in accordance with this section.

(b) APPLICATION. —

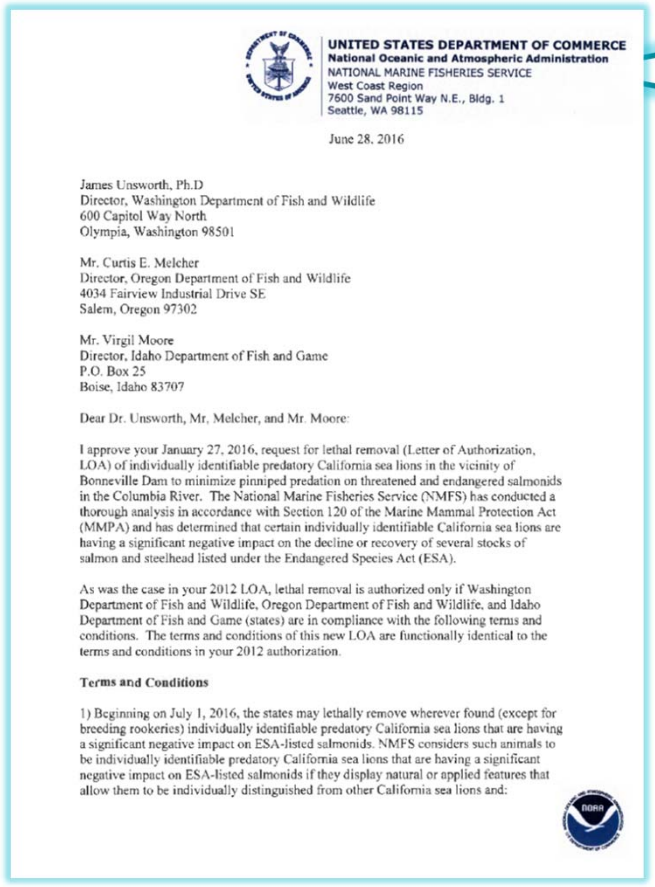
(1) A State may apply to the Secretary to authorize the intentional lethal taking of individually identifiable pinnipeds which are having a significant negative impact on the decline or recovery of salmonid fishery stocks which—

(A) have been listed as threatened species or endangered species under the Endangered Species Act of 1973 (16 U. S.C. 1531 et seq.);

(B) the Secretary finds are approaching threatened species or endangered species status (as those terms are defined in that Act); or

(C) migrate through the Ballard Locks at Seattle, Washington.

2016 Letter of Authorization Terms and Conditions (16)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

June 28, 2016

James Unsworth, Ph.D
Director, Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, Washington 98501

Mr. Curtis E. Melcher
Director, Oregon Department of Fish and Wildlife
4034 Fairview Industrial Drive SE
Salem, Oregon 97302

Mr. Virgil Moore
Director, Idaho Department of Fish and Game
P.O. Box 25
Boise, Idaho 83707

Dear Dr. Unsworth, Mr. Melcher, and Mr. Moore:

I approve your January 27, 2016, request for lethal removal (Letter of Authorization, LOA) of individually identifiable predatory California sea lions in the vicinity of Bonneville Dam to minimize pinniped predation on threatened and endangered salmonids in the Columbia River. The National Marine Fisheries Service (NMFS) has conducted a thorough analysis in accordance with Section 120 of the Marine Mammal Protection Act (MMPA) and has determined that certain individually identifiable California sea lions are having a significant negative impact on the decline or recovery of several stocks of salmon and steelhead listed under the Endangered Species Act (ESA).

As was the case in your 2012 LOA, lethal removal is authorized only if Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and Idaho Department of Fish and Game (states) are in compliance with the following terms and conditions. The terms and conditions of this new LOA are functionally identical to the terms and conditions in your 2012 authorization.

Terms and Conditions

1) Beginning on July 1, 2016, the states may lethally remove wherever found (except for breeding rookeries) individually identifiable predatory California sea lions that are having a significant negative impact on ESA-listed salmonids. NMFS considers such animals to be individually identifiable predatory California sea lions that are having a significant negative impact on ESA-listed salmonids if they display natural or applied features that allow them to be individually distinguished from other California sea lions and:

"This letter serves as authorization under the MMPA section 120 for the lethal removal of individually identifiable predatory California sea lions that are having a significant negative impact on the decline or recovery of ESA listed salmonids in the vicinity of Bonneville Dam."

Terms and Conditions

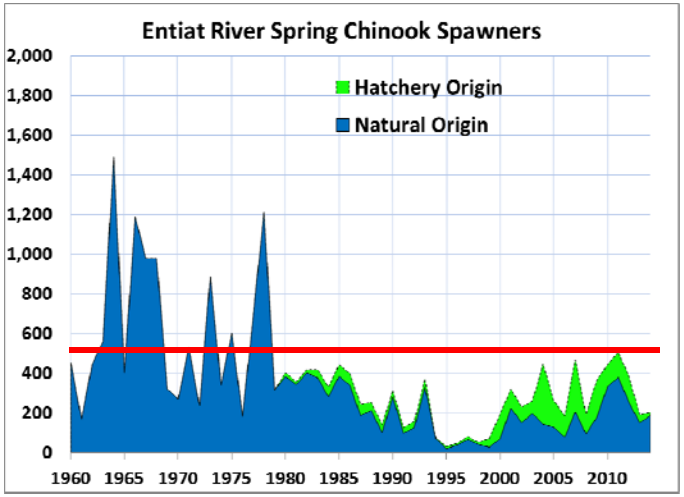
1) Beginning on July 1, 2016, the states may lethally remove wherever found (except for breeding rookeries) individually identifiable predatory California sea lions that are having a significant negative impact on ESA-listed salmonids. NMFS considers such animals to be individually identifiable predatory California sea lions that are having a significant negative impact on ESA-listed salmonids if they display natural or applied features that allow them to be individually distinguished from other California sea lions and:

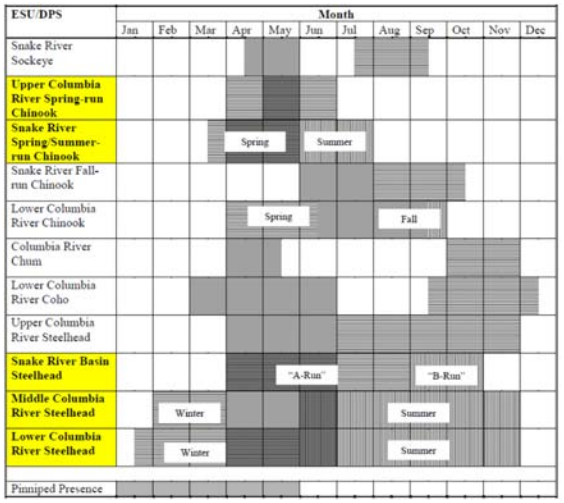
a) have been observed eating salmonids at Bonneville Dam, in the "observation area" below the dam, in the fish ladders, or above the dam, between January 1 and May 31 of any year;
b) have been observed at Bonneville Dam on a total of any 5 days (consecutive days, days within a single season, or days over multiple years) between January 1 and May 31 of any year; and
c) are sighted at Bonneville Dam after they have been subjected to active nonlethal deterrence.

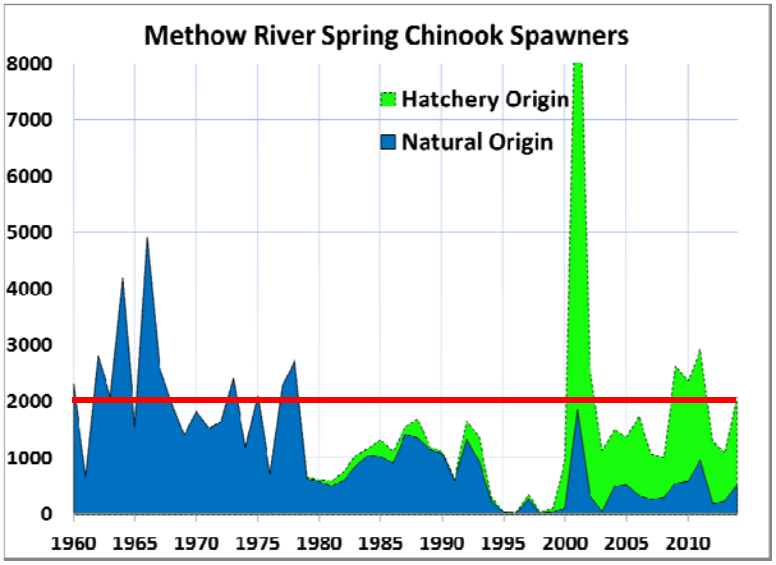
Three previous LOAs have been issued to the states: 2008, 2011, 2012

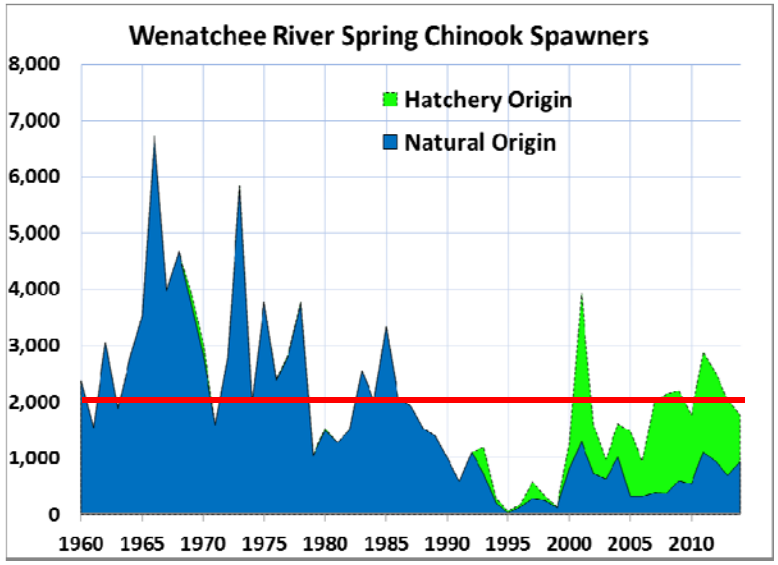
Status of Salmon and Steelhead

ESU/DPS
UCR Spring-run Chinook (E)
SRB Spring/Summer Chinook (T)
SRB Steelhead (T)
MCR Steelhead (T)
LCR Steelhead (T)

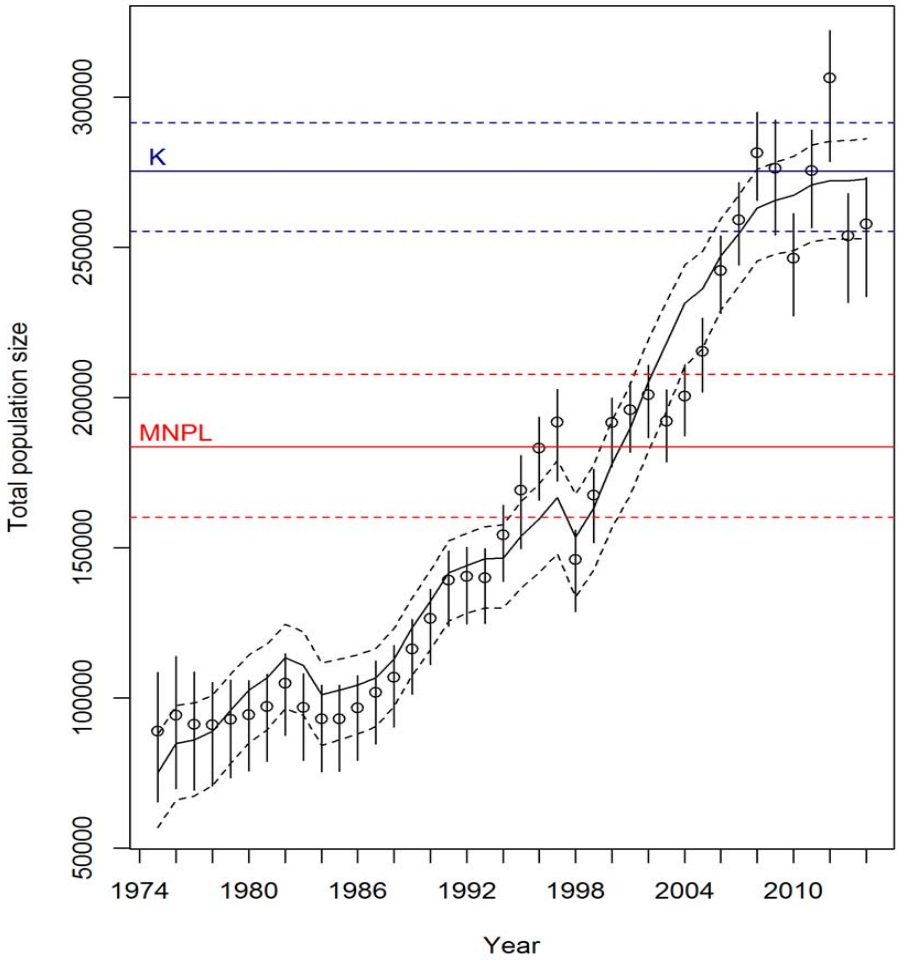








Status of California Sea Lions



US population of CSLs - steady increase since mid-1970s.

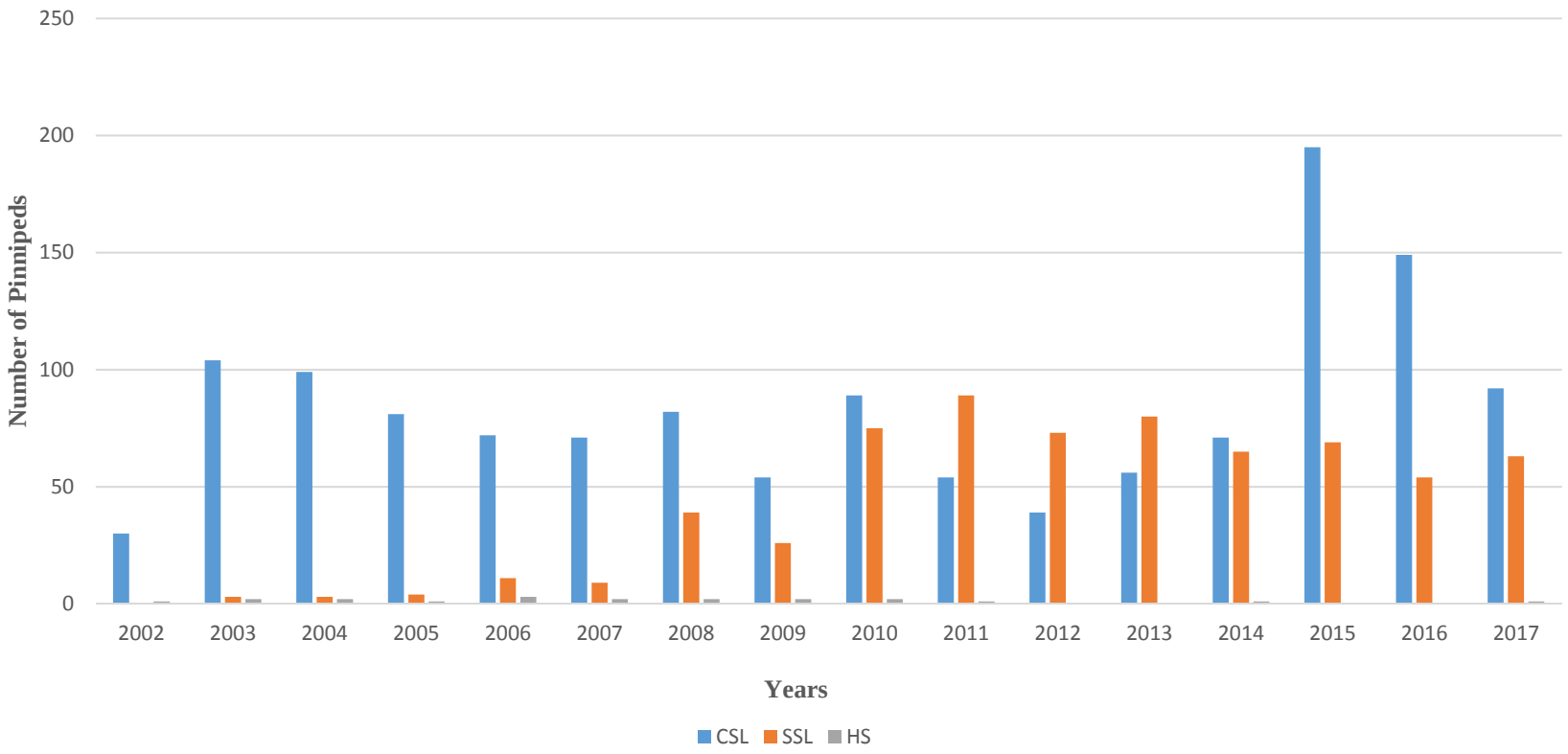
MMPA (1972) established optimal sustainable population (OSP) criteria for marine mammal management. OSP is an abundance range from maximum net productivity level (MNPL) to carrying capacity (K).

Recent declines in CSL pup production and survival suggest population may have stopped growing. Population size in 2014 was above MNPL and within OSP range.

Population estimated at 257,631 in 2014 with a population high of 306,220 in 2012

Source: Lakke, Jeffrey et al. 2018. Population growth and status of California sea lions. The Journal of Wildlife Management, DOI: 10.1002/jwmg.21405

Minimum Estimated Number of Individual Pinnipeds Observed at Bonneville Dam, 2002 to 2017



Source: Tidwell, K.S., B.K. van der Leeuw, L.N. Magill, B.A. Carrothers, and R. H. Wertheimer. 2018. Evaluation of pinniped predation on adult salmonids and other fish in the Bonneville Dam tailrace, 2017. U.S. Army Corps of Engineers, Portland District Fisheries Field Unit. Cascade Locks, OR. 54pp.

Snapshot of Pinniped Predation in the Pacific Northwest

- Between 1986 and 1992, California sea lions consumed between 42-65% of the total Lake Washington winter steelhead run – the Lake Washington winter steelhead run is now considered functionally extinct.

- Bonneville Dam, Washington and Oregon: Estimates of California sea lions' consumption of five at-risk salmonid fish stocks at Bonneville Dam has ranged from a low of 0.35% in 2002, to a high of 4.17% in 2007, with 1.86% in 2017. Consumption of at-risk salmonids at Bonneville Dam by all pinnipeds (California sea lions and Steller sea lions) has ranged from a low of 0.35% in 2002, to a high of 5.5% in 2016, with 4.54% in 2017.

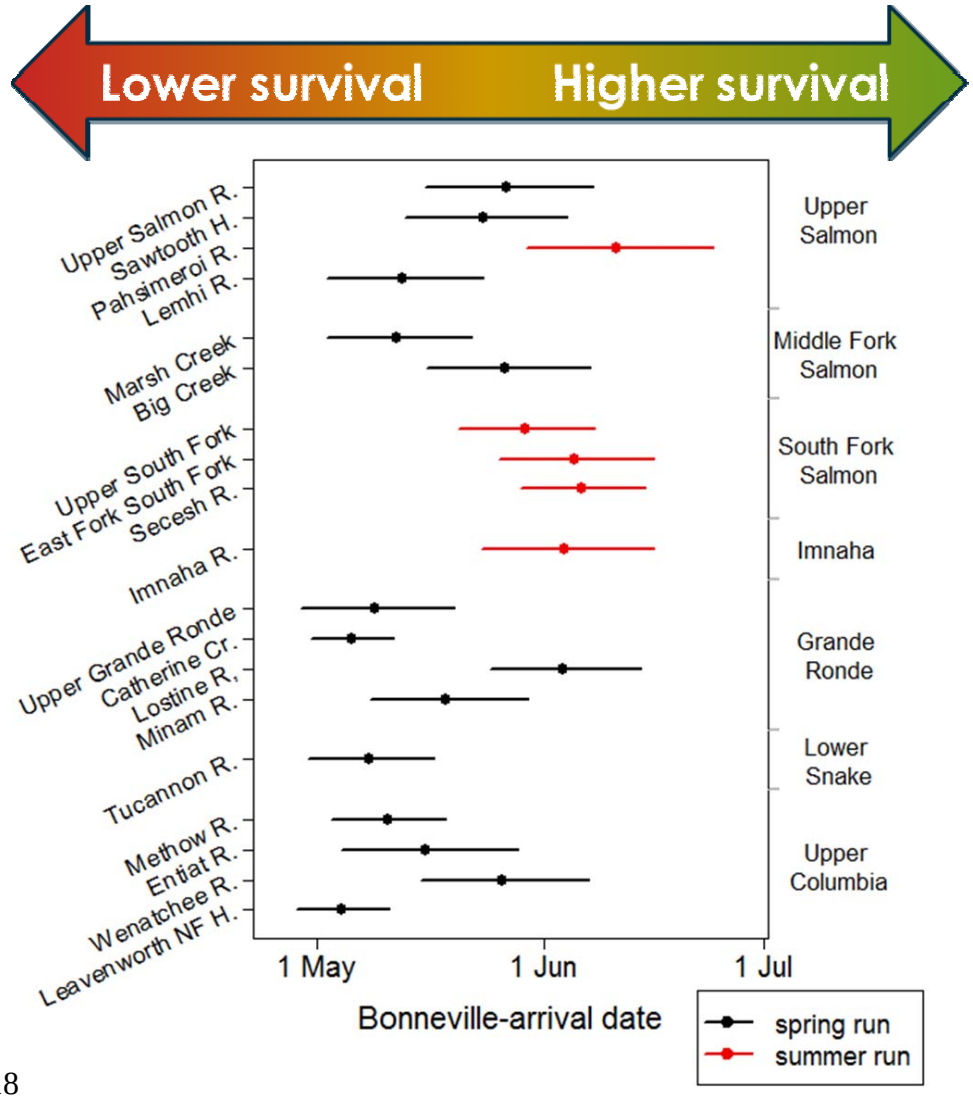
- Willamette Falls, Oregon: Consumption estimates by California sea lions of two at-risk salmonid fish stocks at Willamette Falls has ranged from a low of 7% in 2014 to a high of 25% in 2017.

Adjusted Estimates of Salmonid Consumption by California and Steller Sea Lions at Bonneville Dam, January 1 to June 2nd, 2002 to 2017

		All Pinnipeds		CSL		SSL	
Year	Total Salmonid Passage	Estimated Salmonid Catch	% Run Taken	Estimated Salmonid Catch	% Run Taken	Estimated Salmonid Catch	% Run Taken
2002	284,732	1,010	0.35%	1,010	0.35%	0	0.00%
2003	217,934	2,329	1.06%	2,329	1.06%	0	0.00%
2004	186,771	3,533	1.86%	3,516	1.85%	7	0.00%
2005	81,252	2,920	3.47%	2,904	3.45%	16	0.02%
2006	105,063	3,023	2.80%	2,944	2.72%	76	0.07%
2007	88,474	3,859	4.18%	3,846	4.17%	13	0.01%
2008	147,558	4,466	2.94%	4,292	2.82%	174	0.11%
2009	186,056	4,489	2.36%	4,037	2.12%	452	0.24%
2010	267,167	6,081	2.23%	5,095	1.86%	986	0.36%
2011	223,380	3,557	1.57%	2,527	1.11%	1,030	0.45%
2012	171,665	2,107	1.21%	998	0.57%	1,109	0.64%
2013	120,619	2,714	2.20%	1,402	1.14%	1,312	1.06%
2014	219,929	4,314	1.92%	2,615	1.17%	1,699	0.76%
2015	239,326	9,981	4.00%	7,779	3.12%	2,202	0.88%
2016	154,074	8,969	5.50%	6,371	3.90%	2,598	1.60%
2017	109,040	4,949	4.54%	2,024	1.86%	2,925	2.68%

Source: Tidwell, K.S., B.K. van der Leeuw, L.N. Magill, B.A. Carrothers, and R. H. Wertheimer. 2018. Evaluation of pinniped predation on adult salmonids and other fish in the Bonneville Dam tailrace, 2017. U.S. Army Corps of Engineers, Portland District Fisheries Field Unit. Cascade Locks, OR. 54pp.

Arrival timing of spring and summer run Chinook salmon at Bonneville Dam and survival risks



Source. Mark Sorel, NWFSC 2018

Summary of CSL Removal Activity Since the Start of the MMPA Section 120 Removal Program

Year	Bonneville Dam					Astoria		Total
	Captivity	Accident – on list	Accident – qualified	Accident – not yet qualified	Euthanized	Euthanized (spring)	Euthanized (fall)	
2008	6	2	1	2				11
2009	4				10		1	15
2010					12		2	14
2011						1		1
2012	1				11		1	13
2013	2				2			4
2014					15			15
2015	2			2	30			34
2016					59			59
2017					24			24
Total	15	2	1	4	163	1	4	190*

*Includes 7 accidental mortalities; intentional removals = 183.

Source: Brown, R., Jeffries, S., Hatch. D, and Wright, B. 2017. Field Report: 2017 Pinniped Research and Management Activities at Bonneville Dam.

Impacts on Salmonid Fishery Stocks

Minimum consumption estimates of salmon and steelhead at Bonneville Dam by CSLs 2002 through 2017
53,689 fish

Minimum consumption estimates of salmon and steelhead at Bonneville Dam by CSLs and SSLs 2002 through 2017
68,288 fish

Source: Tidwell, K.S., B.K. van der Leeuw, L.N. Magill, B.A. Carrothers, and R. H. Wertheimer. 2018. Evaluation of pinniped predation on adult salmonids and other fish in the Bonneville Dam tailrace, 2017. U.S. Army Corps of Engineers, Portland District Fisheries Field Unit. Cascade Locks, OR. 54pp.

Expected Benefits: Potential increases in salmonids.

Alt.	Estimated Number of Pinnipeds Removed annually	Potential Increase in Number of Salmonids Passing Bonneville Dam (salmonids/ year)[2]	Potential Increase in Total Number of Spring Chinook[3]	Potential Increase in Number of Listed Spring Chinook[4]	Potential Increase in Number of Unlisted Spring Chinook[4]	Potential Increase in Total Number of Steelhead[5]	Potential Increase in Number of Listed Steelhead[6]	Potential Increase in Number of Unlisted Steelhead[6]	Maximum Potential Percent Improvement in the Return of Listed Spring Chinook and Steelhead[7]	Maximum Potential Percent Improvement in the Return of Unlisted Spring Chinook and Steelhead[8]
3	30	901 – 6,090	848 – 5,983 0.5 – 3.3 %	212 – 2,094 0.3 – 4.4 %	551 – 3,889 0.4 – 3.4 %	16 – 357 0.3 – 5.6 %	4 – 213 0.2 – 9.5 %	6 – 256 0.2 – 8.6 %	0.3 – 4.4 %	0.4 – 3.6 %

Minimum and maximum estimates of the potential increase in the numbers and percentages of spring-run Chinook and steelhead passing Bonneville Dam resulting from the estimated removal of pinnipeds under Alternative 3.

Source: NMFS. 2008. Final EA. Reducing the Impact on At-risk Salmon and Steelhead by California Sea Lions in the Area Downstream of Bonneville Dam on the Columbia River, Oregon and Washington.

Expected Benefits: Predicted numbers of salmonids that would have been required by California sea lions had they not been removed from the lower Columbia River, 2008-2017.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total	Total salmonids "saved"
Spring removals	11	14	12	1	12	4	15	34	59	24	186	4,787 - 6,609*
Fall removals		1	2		1						4	
Hypothetical return cohort		2008	2008-2009	2008-2010	2008-2011	2008-2012	2009-2013	2010-2014	2011-2015	2012-2016		
Hypothetical return cohort abundance		11	26	40	41	54	47	47	67	125	458	18,634 - 22,715**
Total												23,421 - 29,324***

*Estimate based on total spring removals, including accidental mortalties.
**Estimate based on the sum of the 5-year, lag-1 running sum of calendar year removals. The total for each year represents the hypothetical population of sea lions that would have returned from the previous five years had they not been euthanized.
***Estimate is the sum of confidence limit endpoints from the two analysis groups.

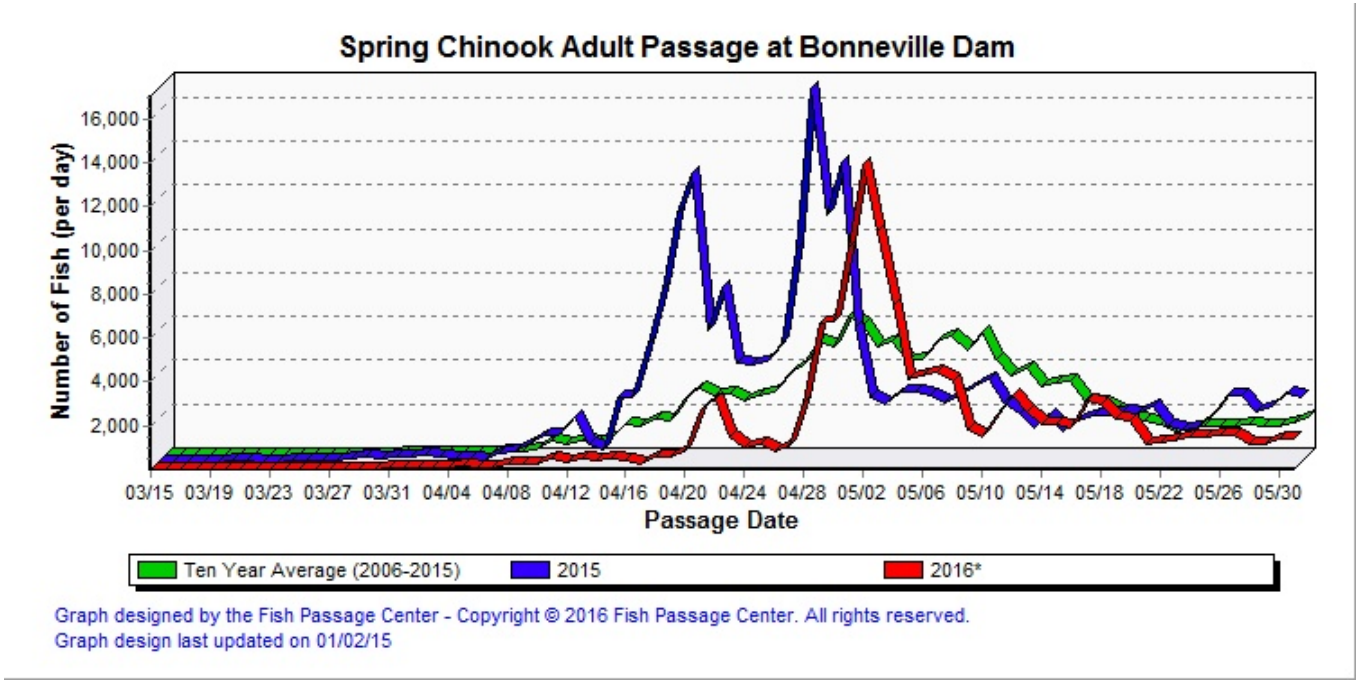
A total of 190 CSLs have been removed since the Section 120 program began in 2008. The predicted number of salmonids that hypothetically would have been required for these 190 CSLs had they not been removed was estimated to be between 23,421 and 29,324 fish. In addition to preventing the loss of future fish, removal of habituated sea lions is believed to reduce opportunities for new, naive animals to be recruited into the Bonneville Dam "population", since at least some naive animals are thought to follow habituated animals upriver from haul-outs near the mouth of the river (Schakner et al. 2016). *The bioenergetic models produce estimates of food requirements, not food consumption.

Source: Brown, R., Jeffries, S., Hatch. D, and Wright, B. 2017. Field Report: 2017 Pinniped Research and Management Activities at Bonneville Dam.

Expected Benefits of Taking, 2008-2017

EA minimum and maximum estimates
(216 to 2,370 listed salmonids/year): 2,160 – 23,070 salmonids

Bioenergetics food requirement estimates: 23,421 – 29,234 salmonids saved



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Is the problem interaction going away?

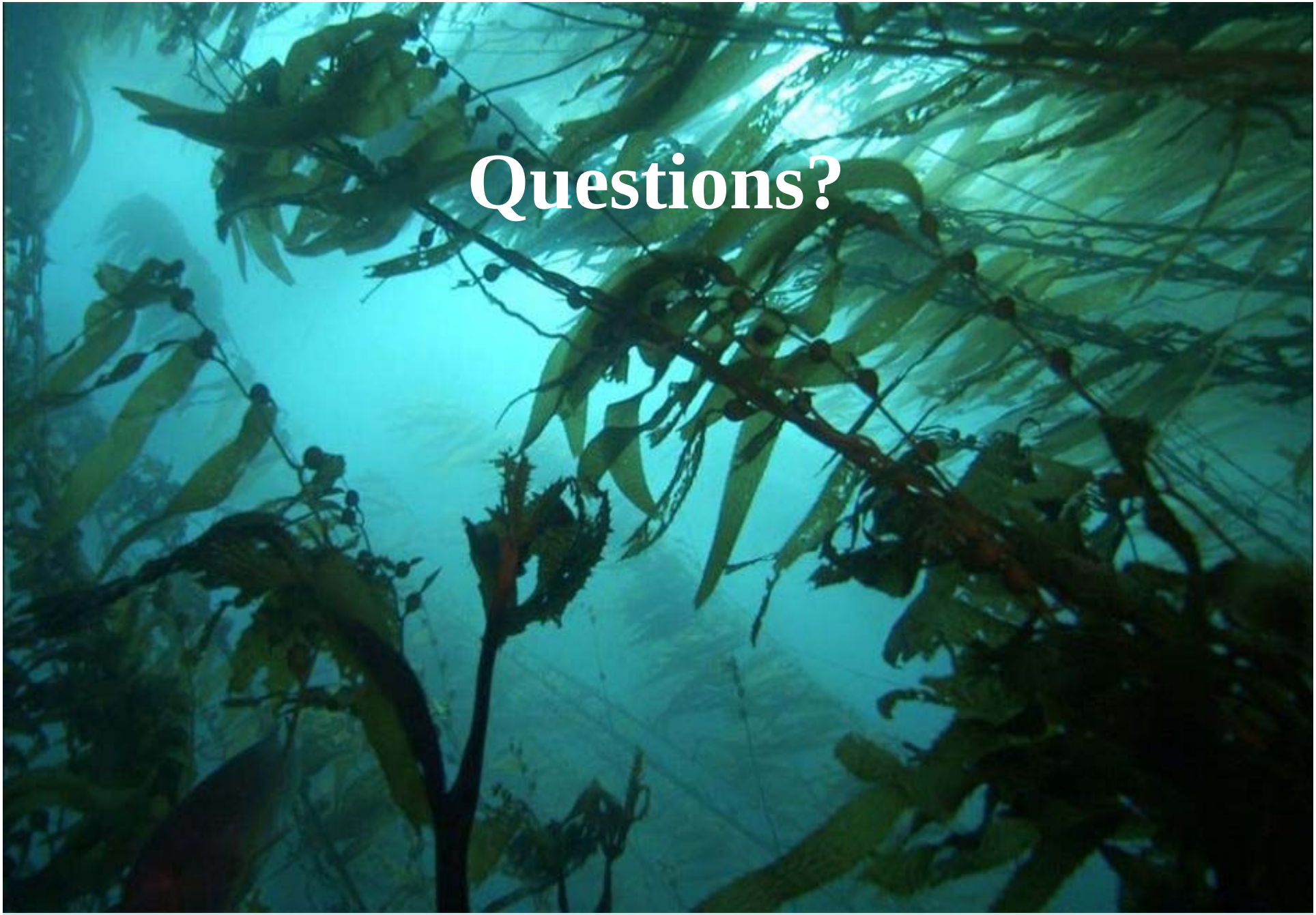
No…in fact it's likely going to get worse (Steller sea lions at Bonneville Dam. Pinniped predation on juvenile Chinook salmon in Puget Sound).

Management Options under the MMPA:

- Section 101(a)(3)(A) (Waiver – Moratorium on Taking of Marine Mammals)
- Section 103 (Regulations on Taking of Marine Mammals)
- Section 109 (Transfer of Management Authority to States)
- Section 120 (Pinniped Removal Authority)

Is the lethal removal program working (expected benefits) to eliminate/minimize the problem interaction of pinniped predation on at-risk salmonid fishery stocks?

Yes, but the program could benefit from some targeted improvements.


Questions?