USACE PINNIPED MONITORING AT BONNEVILLE DAM: LESSONS LEARNED

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US Army Corps of Engineers®

2000	2002	← →	2008	2008 - 2013	2016	2018	2020
• Bonneville CSL increase	• BiOp - monitoring program	• CSL abundance and fish predation increase	• NOAA issues LOA for CSL removal	• Litigation and removals ongoing	• CSL LOA renewed • SSL increase	• Endangered Salmon Predation Prevention Act signed	• New permit for States and Tribes to remove CSL & SSL • BiOp flexibility

BiOp Requirement Since 2002: Pinniped Monitoring Program

- Determine pinniped abundance at Bonneville
- Estimate pinniped-fish predation in the tailrace
- Fund annual hazing on the dam and evaluate the effectiveness of deterrent actions

https://pweb.crohms.org/tmt/documents/FPOM/2010/Task%20Groups/Task%20Group%20Pinnipeds/

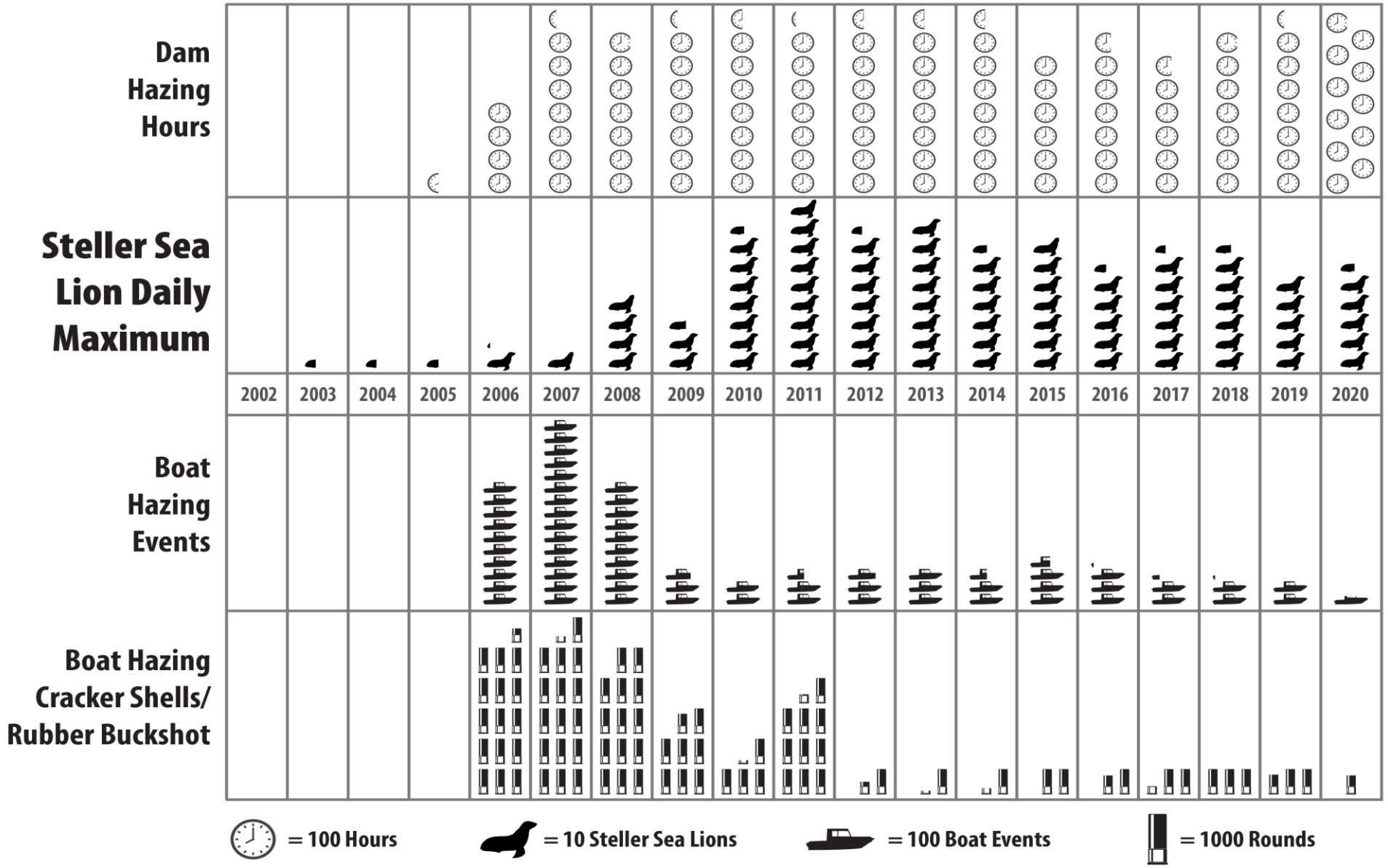
NMFS 2020 CRS Biological Opinion 1.3.2.3 Predator Management and Monitoring Actions

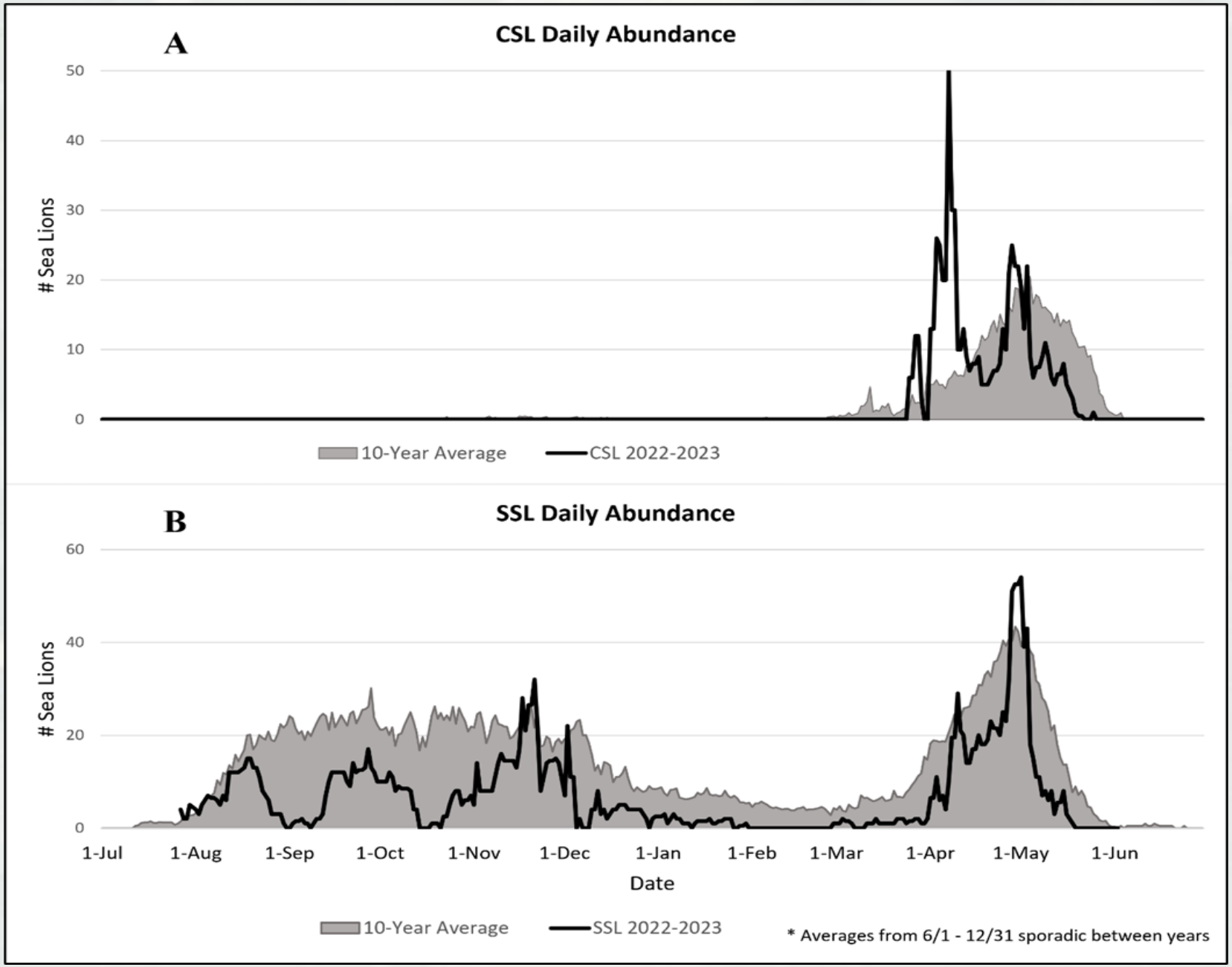
- Install and potentially improve sea-lion exclusion devices in ladder entrances at Bonneville Dam

- Provide dam access and, as practicable, other support (e.g., crane support) for land and water-based harassment and trapping efforts by state and tribal agencies;

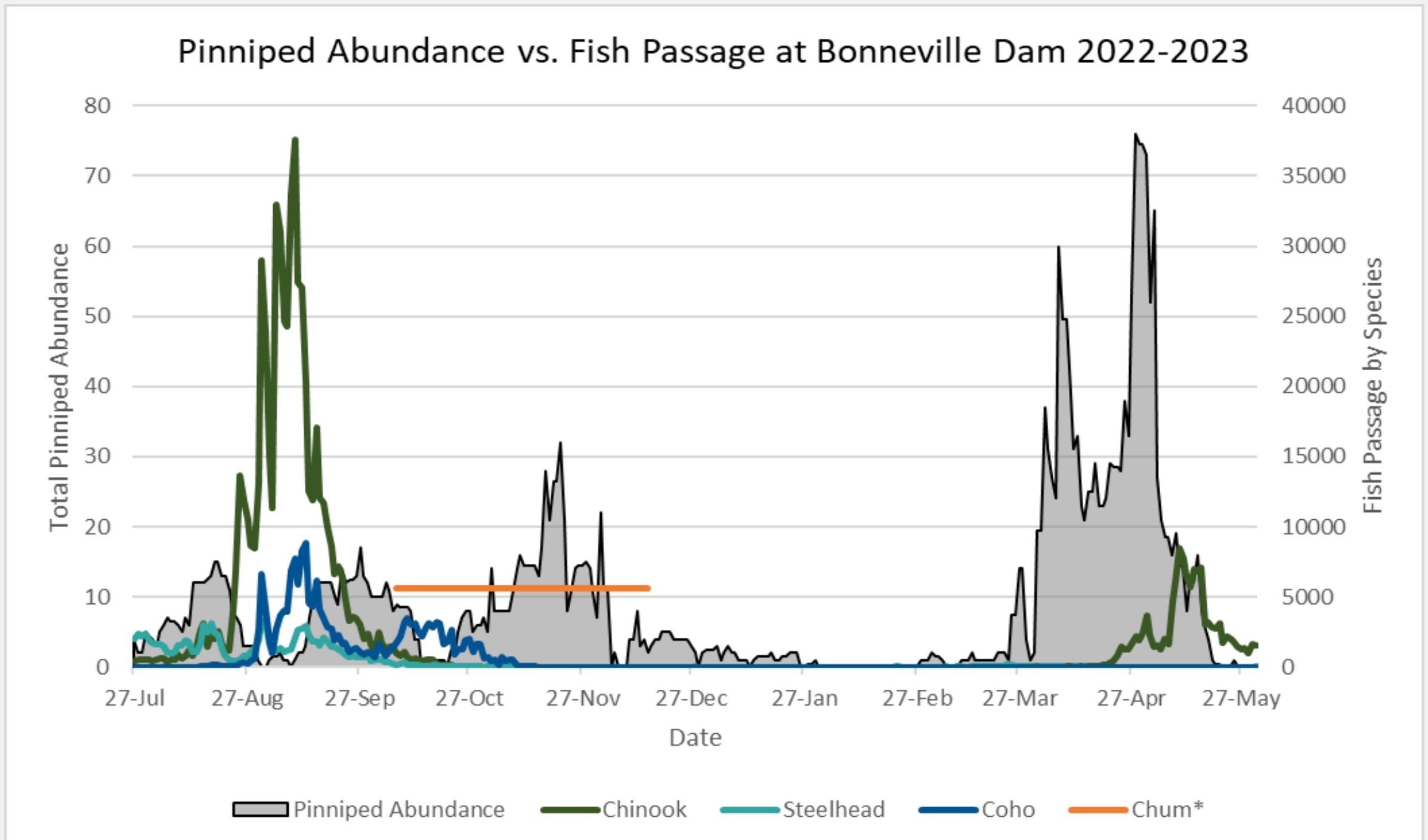
- The Corps will fund dam-based hazing (focusing on deterrence from fishway entrances) and haul out dissuasion of pinnipeds from March 31 through May 31 and from August 15 through October 31 at Bonneville Dam. Hazing season start and end dates may be adjusted, in coordination with NMFS, based on factors such as the number of animals present and hazing effectiveness (i.e. Study).

- Develop and implement, in coordination with NMFS, a revised Bonneville Dam pinniped predation monitoring plan that reflects current and near-future management needs. The Corps will continue to provide monthly and annual reports to NMFS and FPOM.


Dam Hazing Hours
Steller Sea Lion Daily Maximum
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Boat Hazing Events
Boat Hazing Cracker Shells/ Rubber Buckshot
= 100 Hours
= 10 Steller Sea Lions
= 100 Boat Events
= 1000 Rounds


A
CSL Daily Abundance
50
40
30
20
10
0
Sea Lions
10-Year Average
CSL 2022-2023
B
SSL Daily Abundance
60
40
20
0
Sea Lions
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
Date
10-Year Average
SSL 2022-2023
* Averages from 6/1 - 12/31 sporadic between years

Year	Hours observed	California Sea Lions			Steller Sea Lions			All Pinnipeds	
		# of Individuals	% Run	# CSL Removed	# of Individuals	% Run	# SSL Removed	# of Individuals	% Run
2002	662	30	0.4%		0	0.0%		31	0.4%
2003	1,356	104	1.1%		3	0.0%		109	1.1%
2004	516	99	1.9%		3	0.0%		104	1.9%
2005*	1,109	81	3.5%		4	0.0%		86	3.4%
2006	3,650	72	3.1%		11	0.1%		86	3.1%
2007	4,433	71	4.7%		9	0.0%		82	4.7%
2008	5,131	82	3.1%	7	39	0.1%		123	3.2%
2009	3,455	54	2.3%	15	26	0.3%		82	2.7%
2010	3,609	89	1.9%	14	75	0.4%		166	2.4%
2011	3,315	54	1.2%	1	89	0.6%		144	1.8%
2012	3,404	39	0.6%	13	73	0.7%		112	1.4%
2013	3,247	56	1.2%	4	80	1.2%		136	2.4%
2014	2,947	71	1.2%	15	65	0.8%		137	2.1%
2015	2,995	195	3.3%	32	69†	1.0%		264	4.3%
2016	1,974	149	4.1%	59	54†	1.7%		203	5.8%
2017	1,142	92	1.9%	24	63†	2.8%		156	4.7%
2018	1,410	67	0.7%	28	66†	2.3%		134	3.0%
2019	836	26	0.3%	19	50†	3.1%		76	3.3%
2020^	331	34	0.8%	0	45†	1.7%	6	81	2.5%
2021^	132	24	1.1%	21	62†	2.2%	37	86	3.3%
2022^	205	25	1.5%	14	62†	1.6%	9	82	3.1%
2023^	228	50†	1.5%	22	54†	0.7%	25	104	2.2%


Pinniped Abundance vs. Fish Passage at Bonneville Dam 2022-2023
Total Pinniped Abundance
Fish Passage by Species
80
70
60
50
40
30
20
10
0
40000
35000
30000
25000
20000
15000
10000
5000
0
27-Jul
27-Aug
27-Sep
27-Oct
27-Nov
27-Dec
27-Jan
27-Feb
27-Mar
27-Apr
27-May
Date
Pinniped Abundance
Chinook
Steelhead
Coho
Chum*

Fall Predation Monitoring

Year	Hours Observed	Number of Steller Sea Lion	% Run Chinook Salmon	% Run Coho Salmon	% Run steelhead	Number of White Sturgeon
2017	139	36	0.7	3.1	1.5	238
2018	369	47	0.6	1.4	1.6	359
2019	341	54	0.7	0.3	1.0	762
2020	234	68	0.2	0.3	0.2	589
2021	188	51	0.4	0.1	0.2	1119
2022	11	32	0.0	0.0	145.8	10

Management Authority Effected Change…. in turn, Monitoring Efforts and Pinniped Impacts Have Changed.

- Sec. 120 (f) CSL + SSL Removal = ⬆CSL Impact? & ⬇SSL impact?

- Season monitoring = Better evaluation of realized impact
- Don’t see the whole story… Fall = 20 animal trigger, single tailrace
- SSL removal = deceased impact to spring, fall, and winter species.
- CSL removal = contracted the duration of spring impact.