



EVALUATION OF SEA LION PREDATION IN THE BONNEVILLE DAM TAILRACE

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Presentation outline

1. Review our primary objectives
2. Methods and deterrents used by the Corps and partnering agencies
3. Results:
 - Sea lion abundance, timing, trends, etc
 - Predation estimates and trends
 - Deterrents and management actions in 2008
4. Summary and 2009 plans



Objectives

Per 2008 FCRPS BiOp – RPA 49 and RPA 69...

1. Estimate number of adult salmonids and other fish caught immediately below BON
2. Document sea lion presence and trends:
 - 2a. Daily and seasonal abundance estimates
 - 2b. Presence and predation by individual sea lions
3. Evaluate effectiveness of measures used to deter sea lion presence and predation on salmon

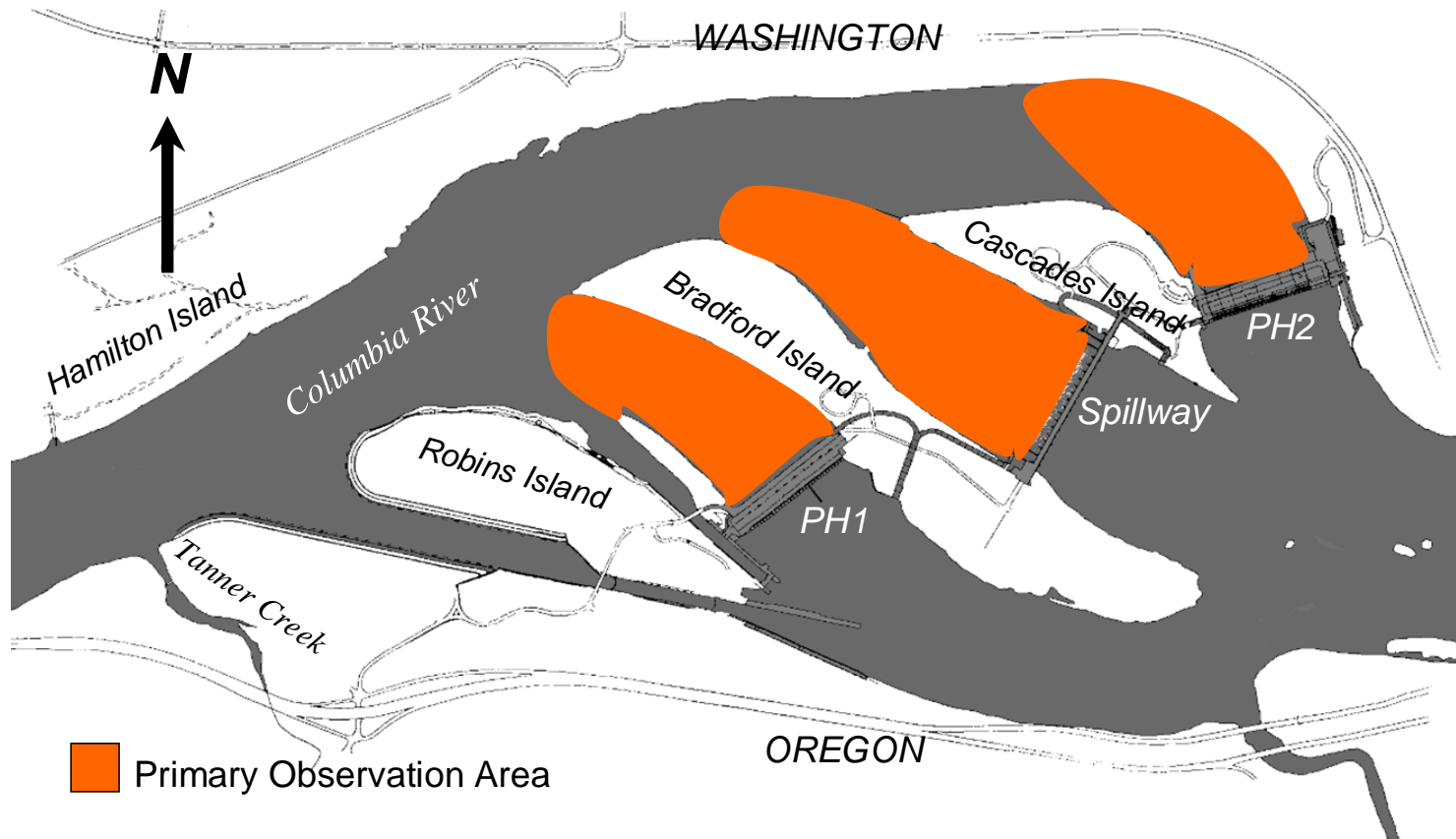


Observations

- Surface observations during daylight hours
 - One observer per tailrace (PH1, PH2, spillway) in 2 shifts (AM and PM)
 - Document catches and losses of fish
 - Identify individual sea lions
 - Estimate number of sea lions present at each tailrace
 - Document hazing activity within observ. area
- Daily haul-out counts/re-sights



Observation area, 2002-2008



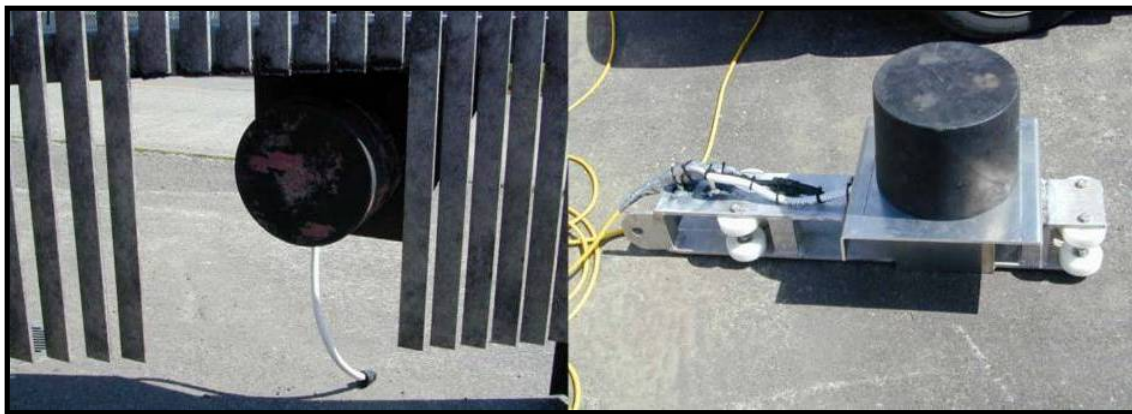
Physical barriers

- Sea lion exclusion devices (SLEDs) installed at main fishway entrances (15 3/8" gaps)
- FOG barriers/plates prevent access to PH2 collection channel
- Designed to allow salmon passage



Acoustic deterrent devices (ADDs)

- 205 decibel, 15 kHz frequency acoustic projectors installed at main fishway entrances
- January – May
- ADDs on 24 hours per day, 7 days per week
- No significant effects on salmon passage



Hazing

- December – May 2008
- USDA, WDFW, ODFW, CRITFC, PSMFC
- Cracker shells, rubber bullets, bean bags, and screamer shells, “seal bombs” in some areas
- Dawn to dusk, 7 days/week
- Started early this year to deter Steller sea lion predation on sturgeon



Trapping (ODFW and WDFW)

- March 14 – May 4
- 4 floating traps, operated by ODFW and WDFW
- Located near corner collector outfall
- 2 Objectives:
 - Remove Calif. sea lions that meet permit criteria
 - Brand and release Calif. sea lions not on “the list”





RESULTS: PINNIPEDS

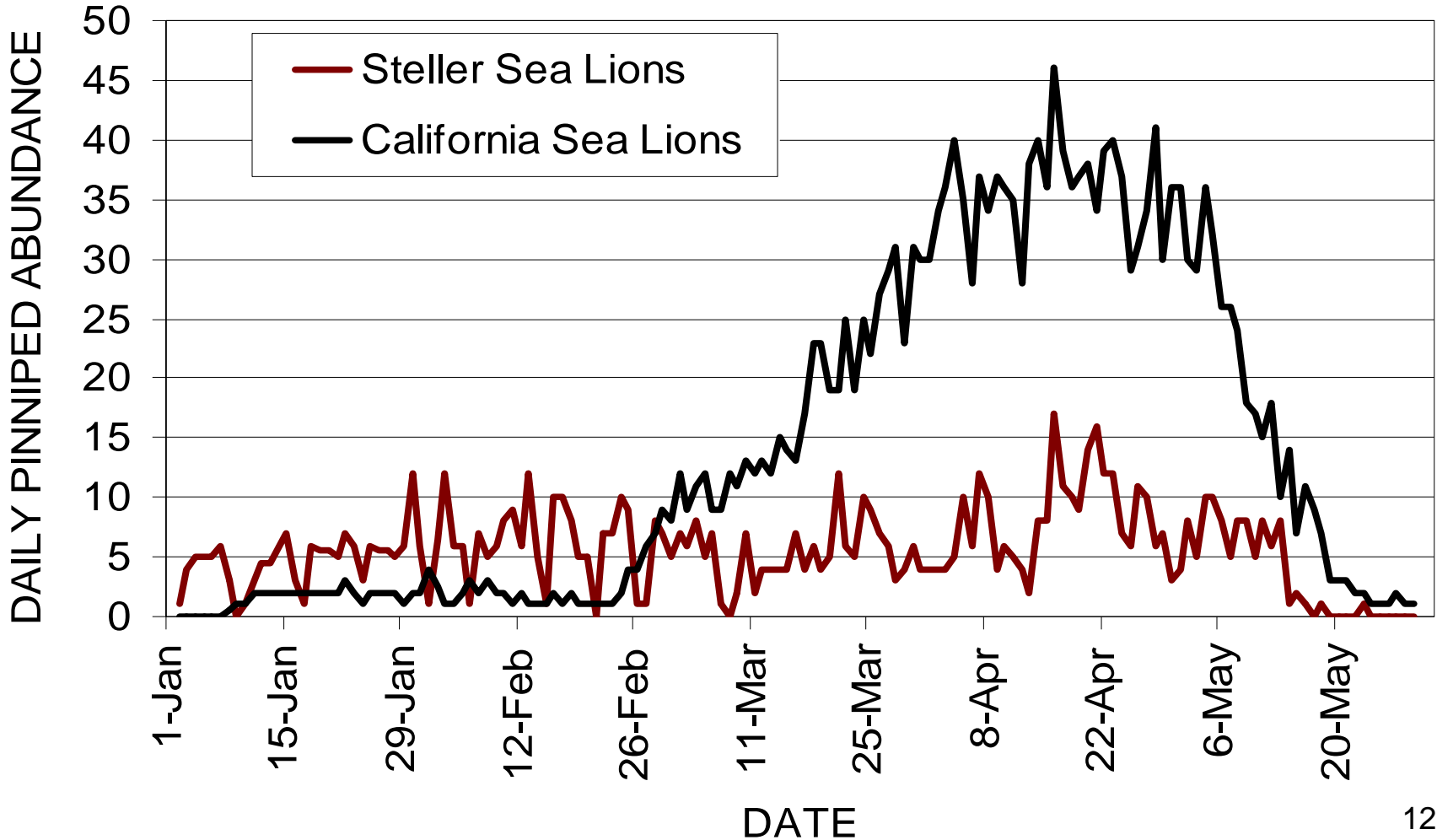


Estimated pinniped abundance at Bonneville Dam (season total), 2002-2008

	2002	2003	2004	2005	2006	2007	2008
California Sea Lions	30	106	101	80+	72	69	84
Steller Sea Lions	0	3	2	4	10	9	17
Harbor Seals	1	2	2	1	3	2	2
TOTAL	31	111	105	85+	85	80	103

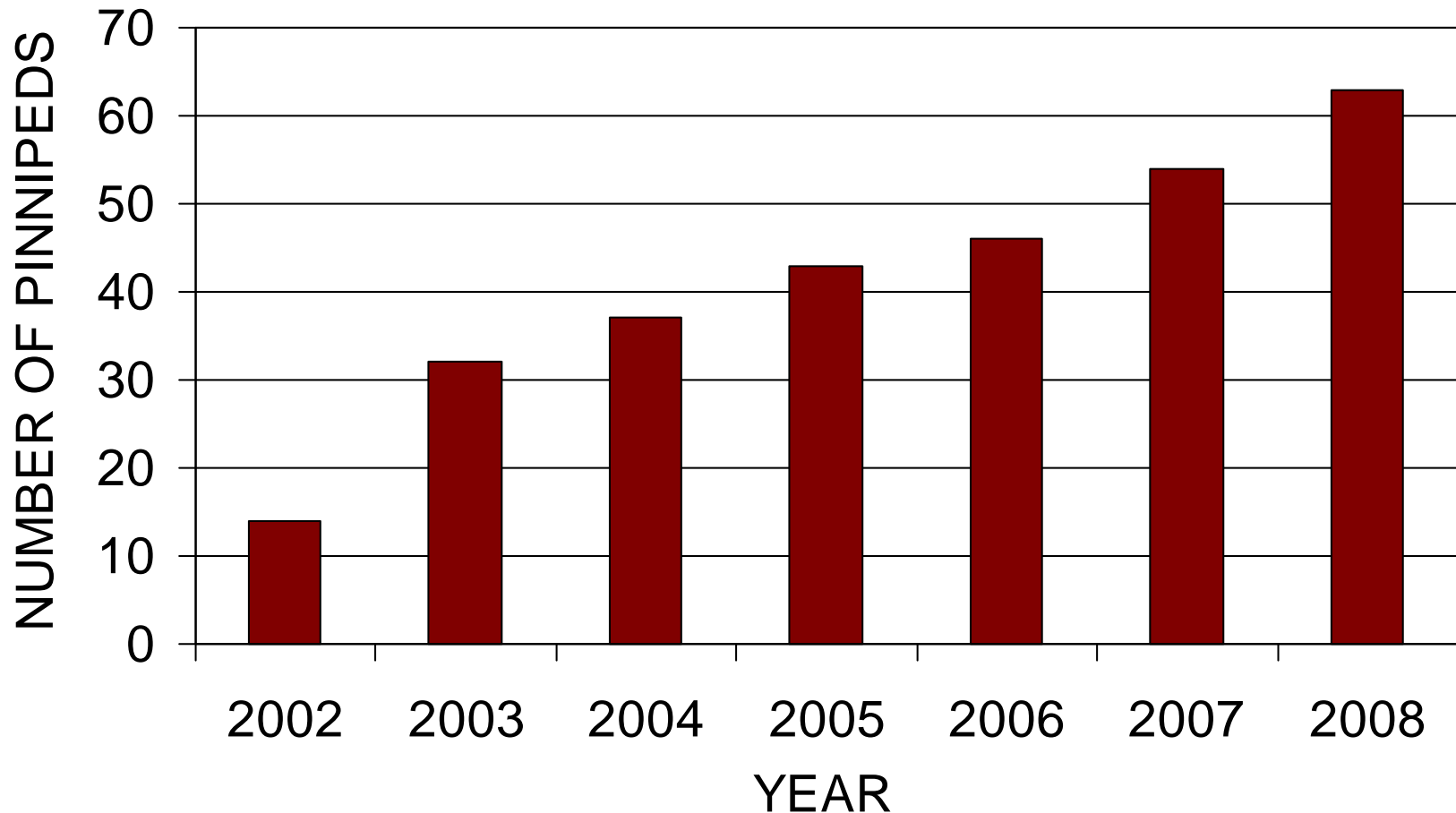


Estimated daily pinniped abundance at Bonneville Dam, 2008



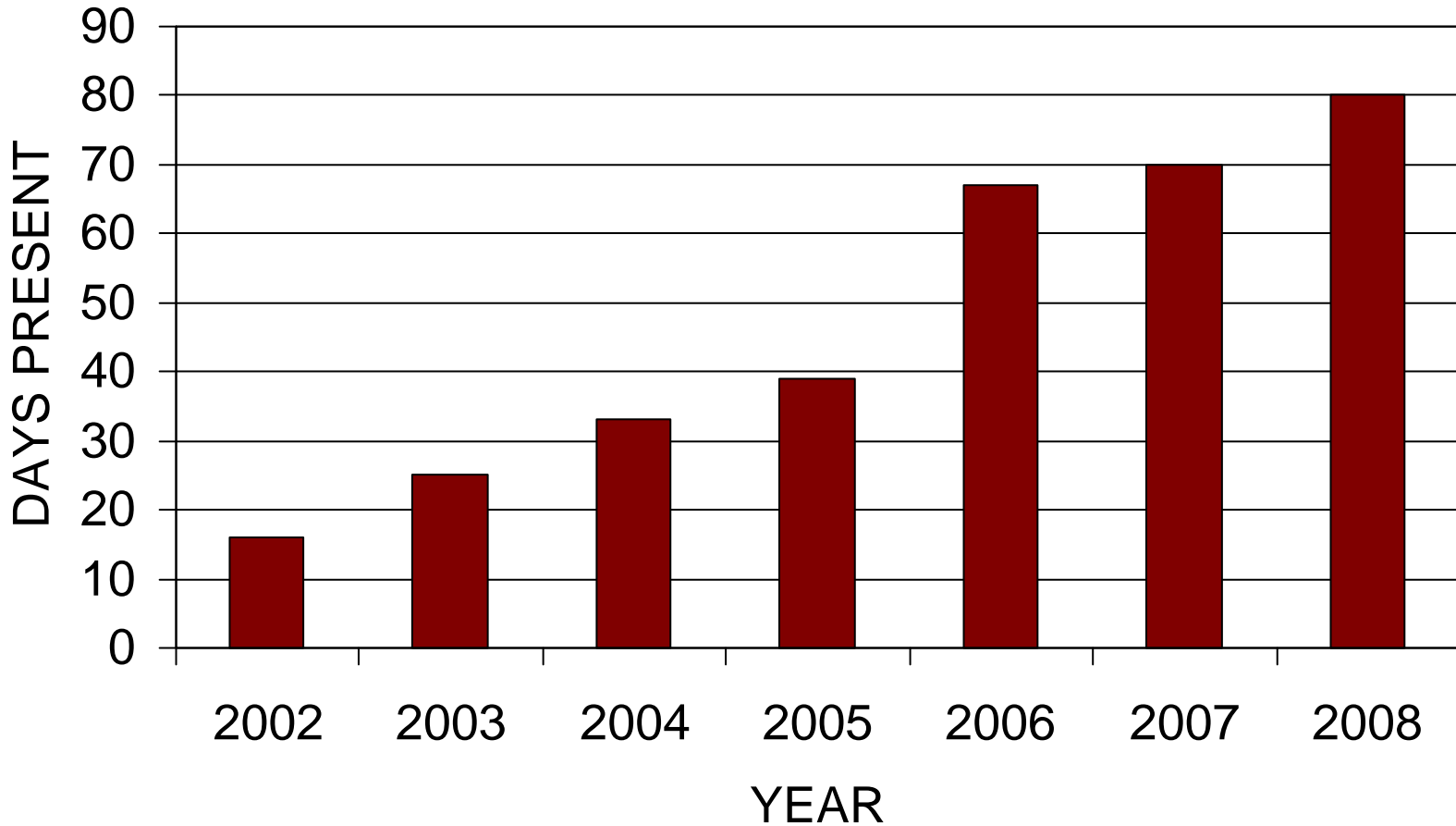


Estimated peak daily pinniped abundance at Bonneville Dam, 2002-2008





Maximum observed number of days individual sea lions present, 2002-2008





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RESULTS: PREDATION

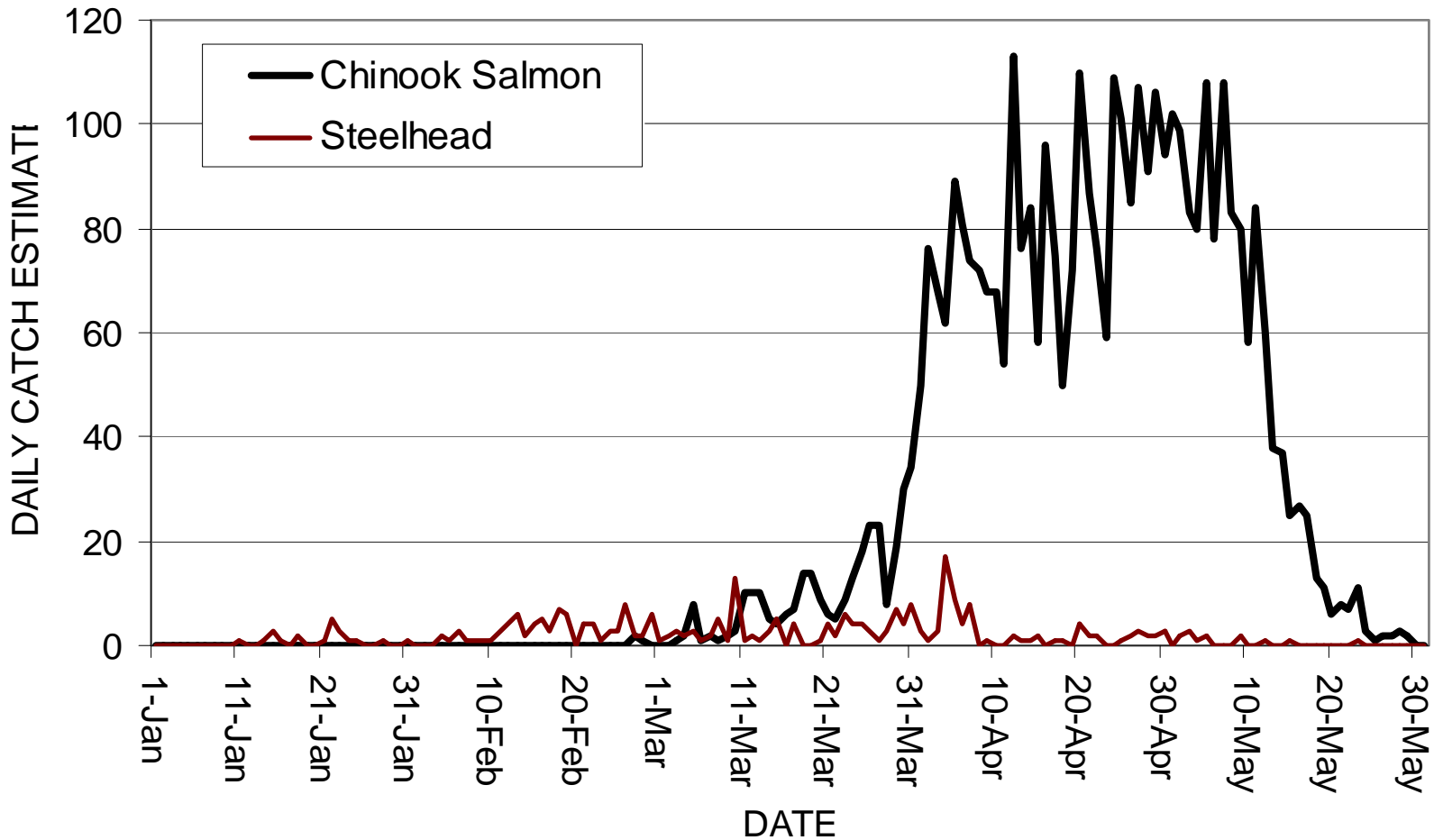


Estimated salmonid catch by pinnipeds at Bonneville Dam, January 1 – May 31

Year (Jan. 1- May 31)	Salmonid Catch Estimate	Total Salmonid Passage at Bonneville	% of Run Caught by Sea Lions	Adjusted % of Run Caught by Sea Lions
2002	1,010	284,733	0.4%	-
2003	2,329	217,185	1.1%	-
2004	3,533	186,804	1.9%	-
2005	2,920+	82,006	3.4%+	-
2006	3,023	105,063	2.8%	3.1%
2007	3,859	88,474	4.2%	4.7%
2008	4,466	147,543	2.9%	3.2%

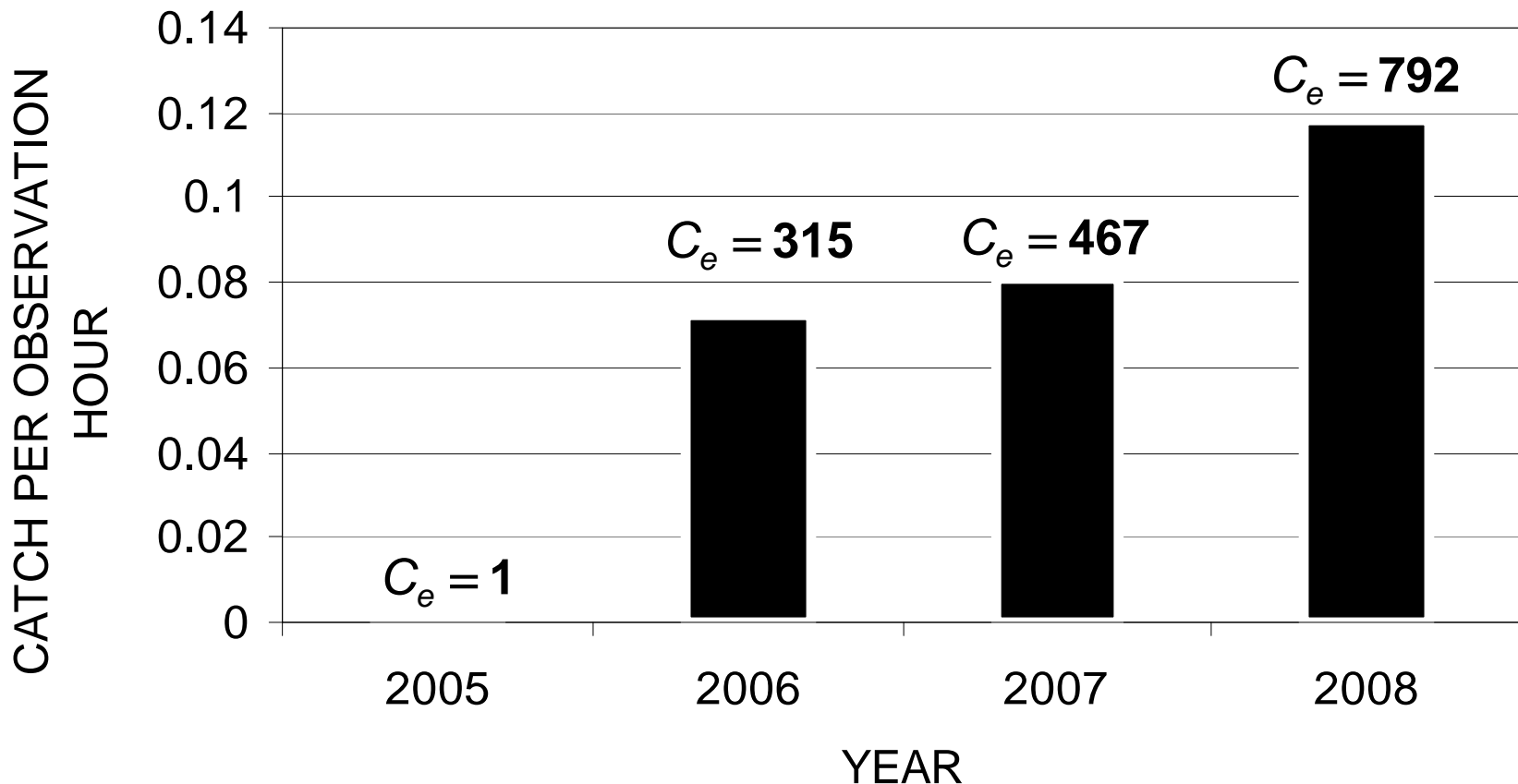


Daily expanded estimate of salmonids caught at Bonneville Dam, 2008





White sturgeon catch per observation hour, with total estimated catch (C_e), 2005-2008





RESULTS: DETERRENTS









US Army Corps of Engineers

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Deterrent Type	Effective	Ineffective	The Bottom Line
Physical Barriers for Fishways (SLEDs, FOGs)			No animals in fishways 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. <i>Record salmonid catch!</i>
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>



Trapping: The short story

- 11 California sea lions intentionally trapped in 2008
 - 7 removed (Section 120)
 - 4 processed and released
- Set new world weight record twice in 2008...
B198 weighed 1,454 lbs!
- 4 California sea lions and 2 Steller sea lions died on traps on 5/4/08, halting operations



Photo by M. Tennis



SUMMARY



2008: Key points

1. Record high salmonid catch estimate (4,466; 2.9% of run) in 2008. Higher if unidentified fish are included.
2. Steller sea lion predation on sturgeon continues to increase
3. Sea lions coming earlier each year, and are staying in BON area longer once they arrive
4. Overall number of California sea lions is not increasing, but peak daily abundance is
5. Physical barriers effectively block access to fishways
6. 3 years of active deterrence efforts failed to reduce predation on salmonids and sturgeon at the dam



2009 Activities

- FFU will continue monitoring predation and sea lion numbers
 - C265 present at BON since Sep. 18, 2008 and at least 2 other California sea lions have visited this fall
 - 1 to 3 Stellers seen regularly since October 2008
- Physical barriers and acoustic deterrents will be deployed, as usual
- Trapping and hazing programs expected to continue; Corps will continue to provide support
- Removal may or may not occur in 2009



Contributors and partners

- FFU staff (Many thanks to all observers!)
- Oregon Department of Fish and Wildlife
- Washington Department of Fish and Wildlife
- Columbia River Inter-Tribal Fish Commission
- NOAA Fisheries
- USDA APHIS Wildlife Services
- University of Idaho - ICFWRU
- Student Conservation Association
- Portland State University students

MAY 2008 ~ Astoria, OR

Bonneville residents

Astoria residents

Salmonid catch per observation hour

