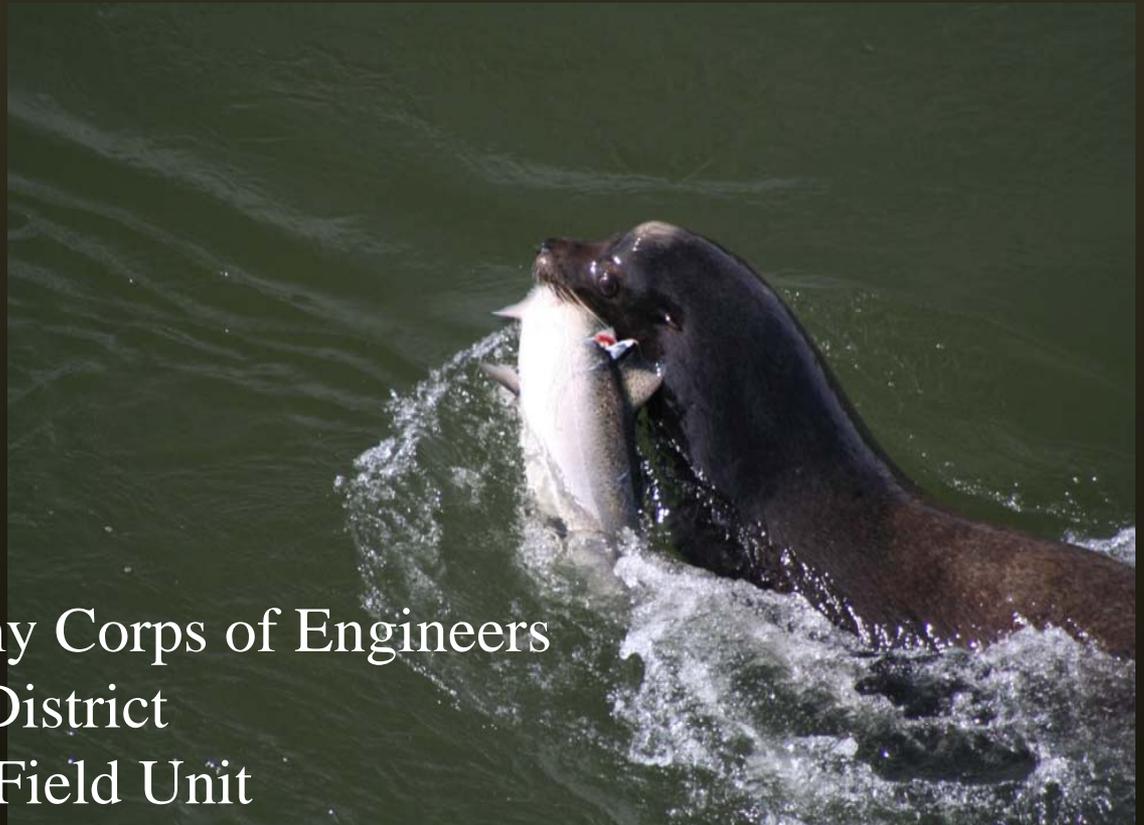


SEA LION PREDATION AT BONNEVILLE DAM

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Contributors and Partners

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

Objectives

- Estimate number of adult salmonids and other fish caught
- Record seasonal timing, abundance of sea lions
- Evaluate effectiveness of measures used to deter sea lion presence and predation on salmon

2007 Activities

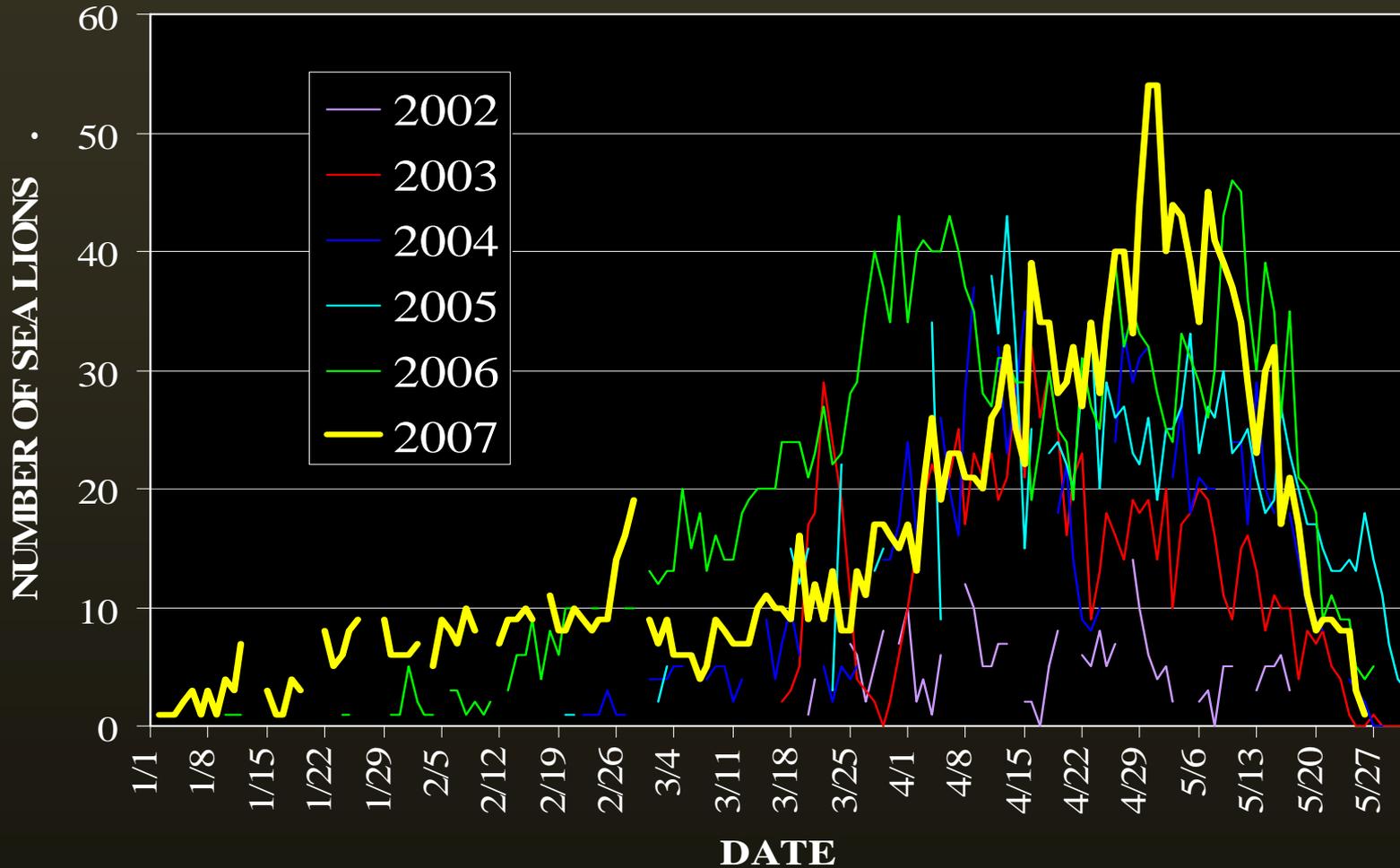
- **Surface observations** during daylight hours
 - One observer per tailrace (PH1, PH2, spillway)
 - Record catches and losses of fish
 - Identify individual sea lions
 - Estimate number of sea lions present at each tailrace
- **Full hazing** by boats and from dam, 7 days/week (maximum effort).
- **SLEDs and ADDs** (acoustic deterrents)
- **Floating sea lion trap** (ODFW, WDFW, NMFS)

RESULTS:
PINNIPEDS

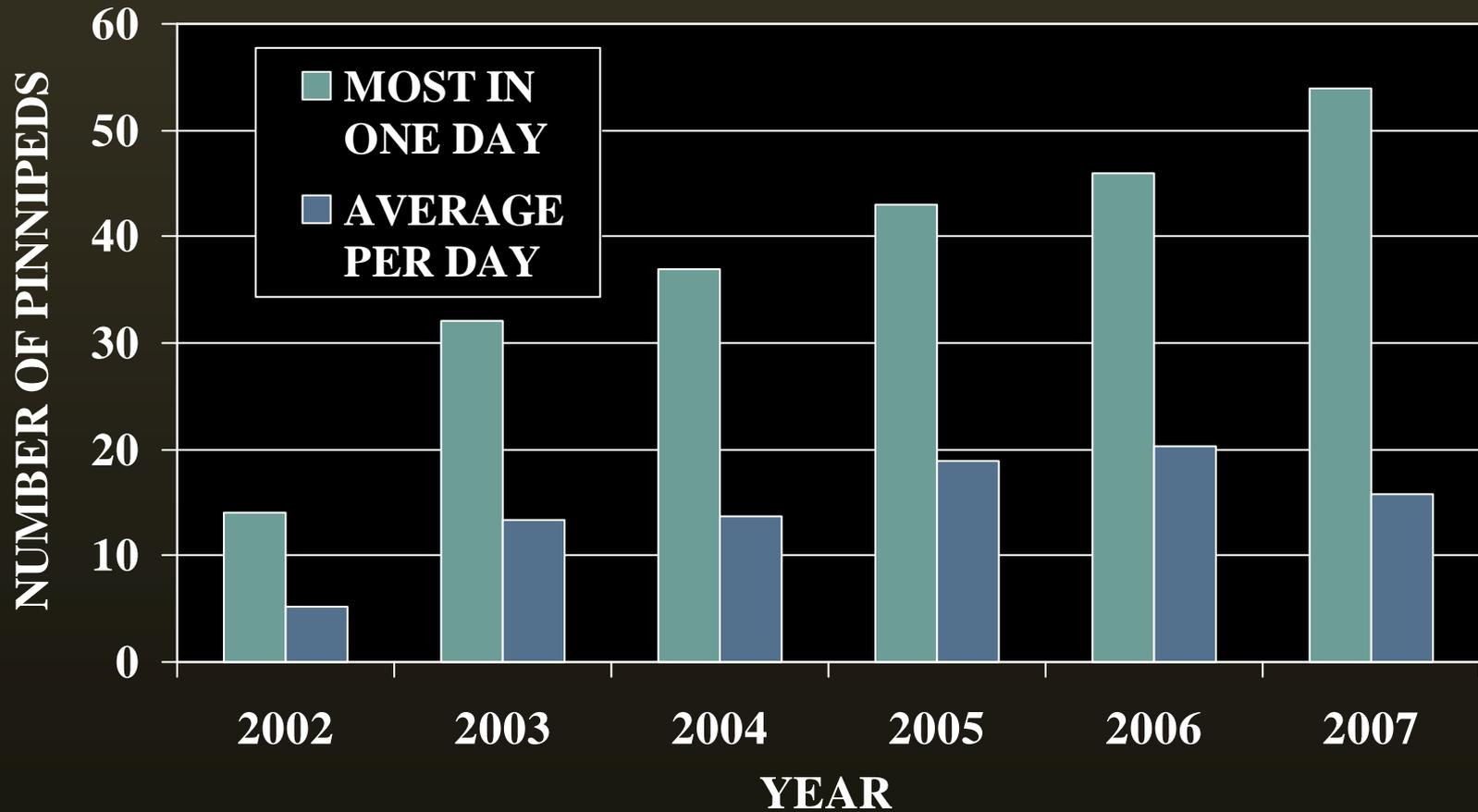
Estimated Pinniped Abundance at Bonneville Dam (Season Total), 2002-2007

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

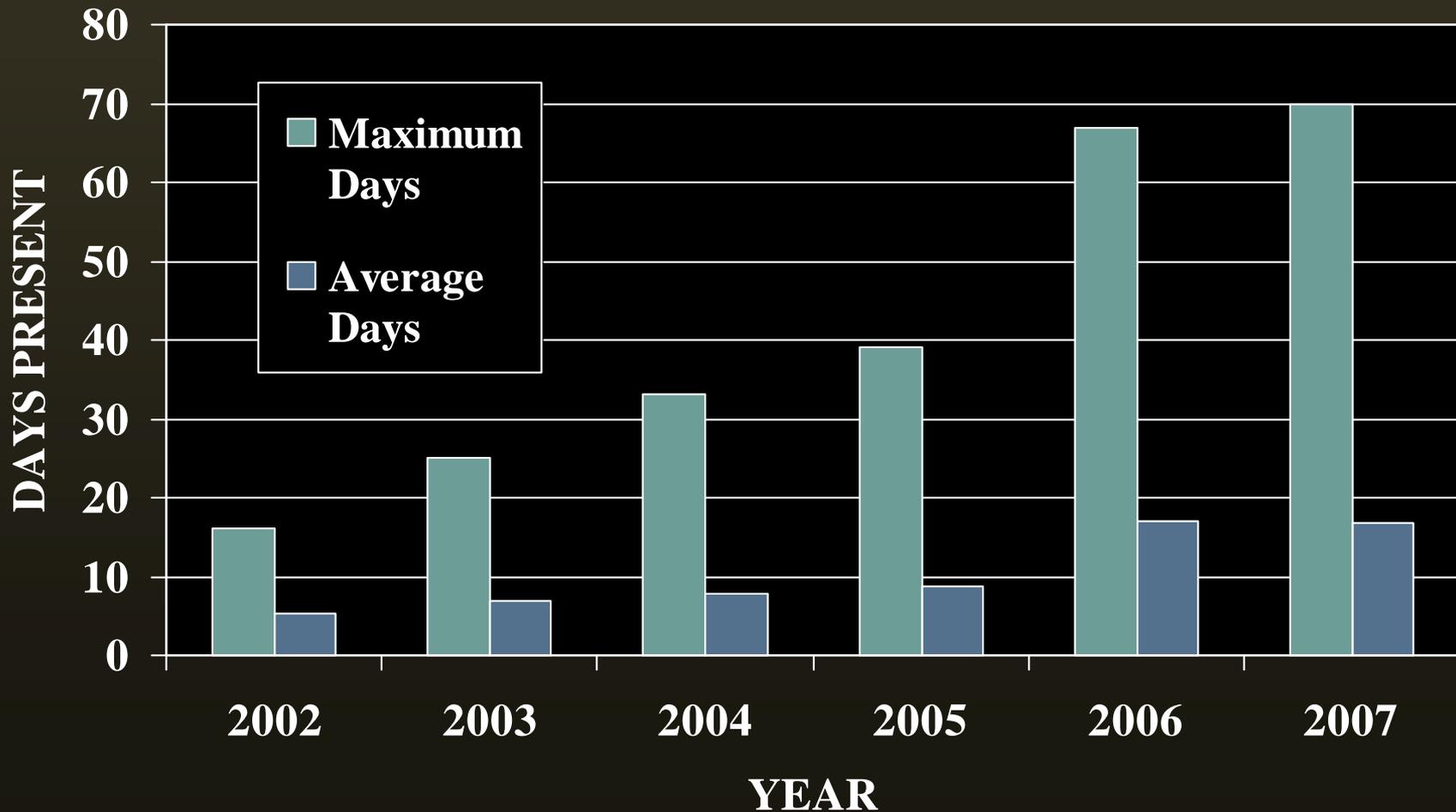
Daily Number of Pinnipeds Present at Bonneville Dam, 2002-2007



Daily Maximum and Mean daily Number of Pinnipeds Observed at Bonneville Dam, 2002-2007



Number of Days Individual Pinnipeds Present, 1 January – 31 May

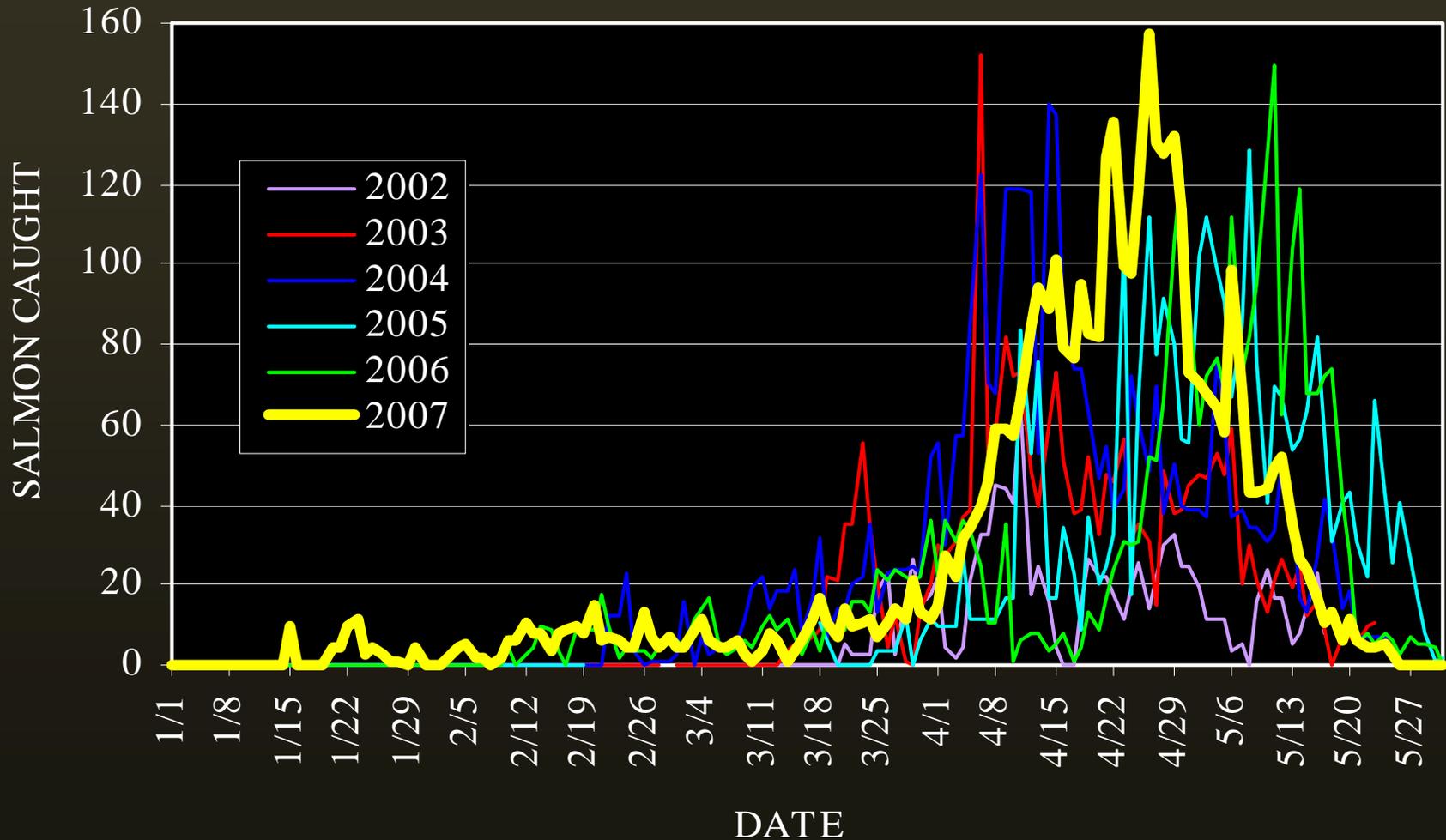


RESULTS: PREDATION

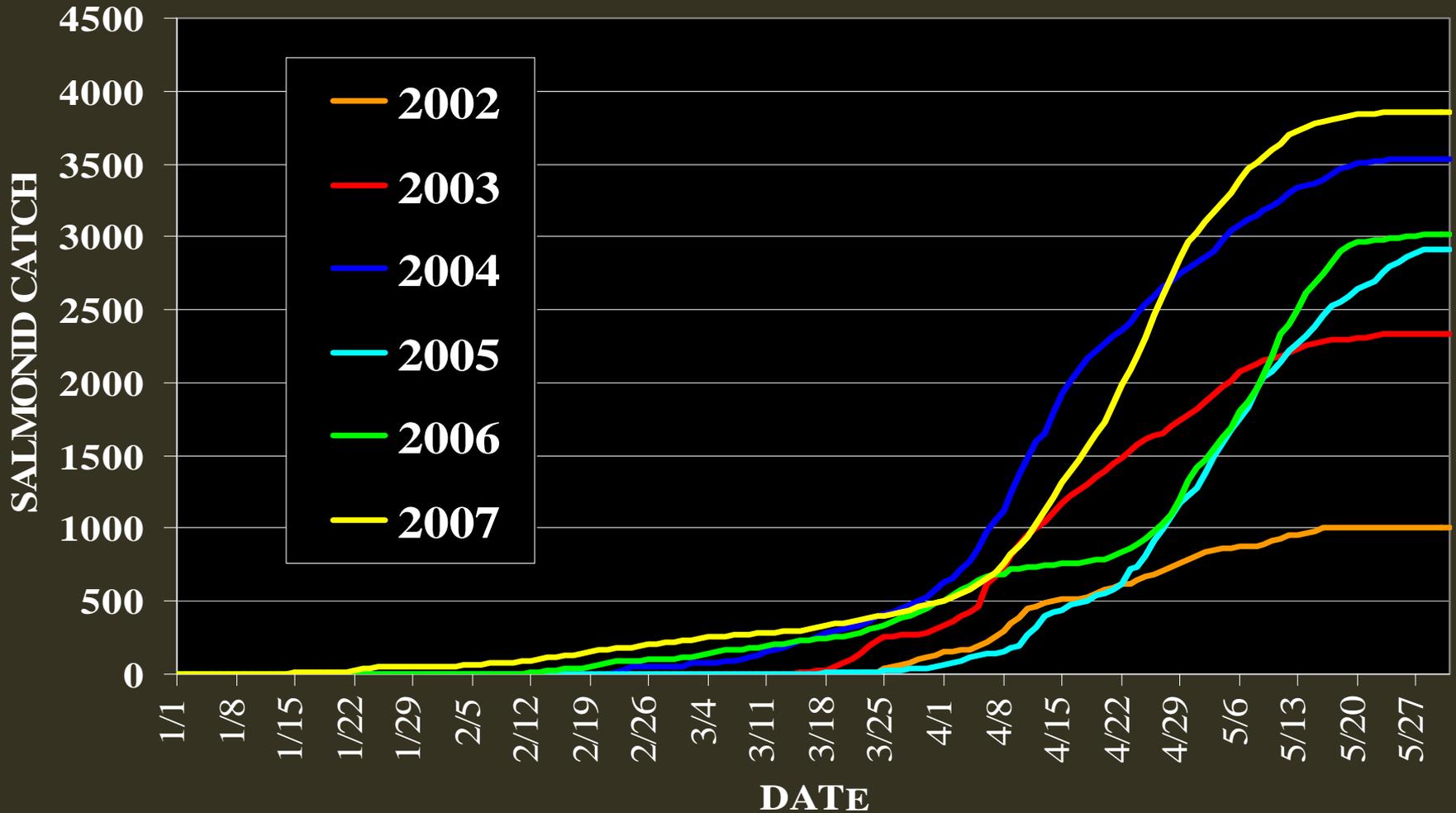
Estimated Salmonid Catch by Pinnipeds at Bonneville Dam, 1 January – 31 May

YEAR	Estimate of Salmonids Caught	Total Salmonid Passage at Bonneville	% of Salmonid Run Taken 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%
2007	3,859	88,474	4.2%

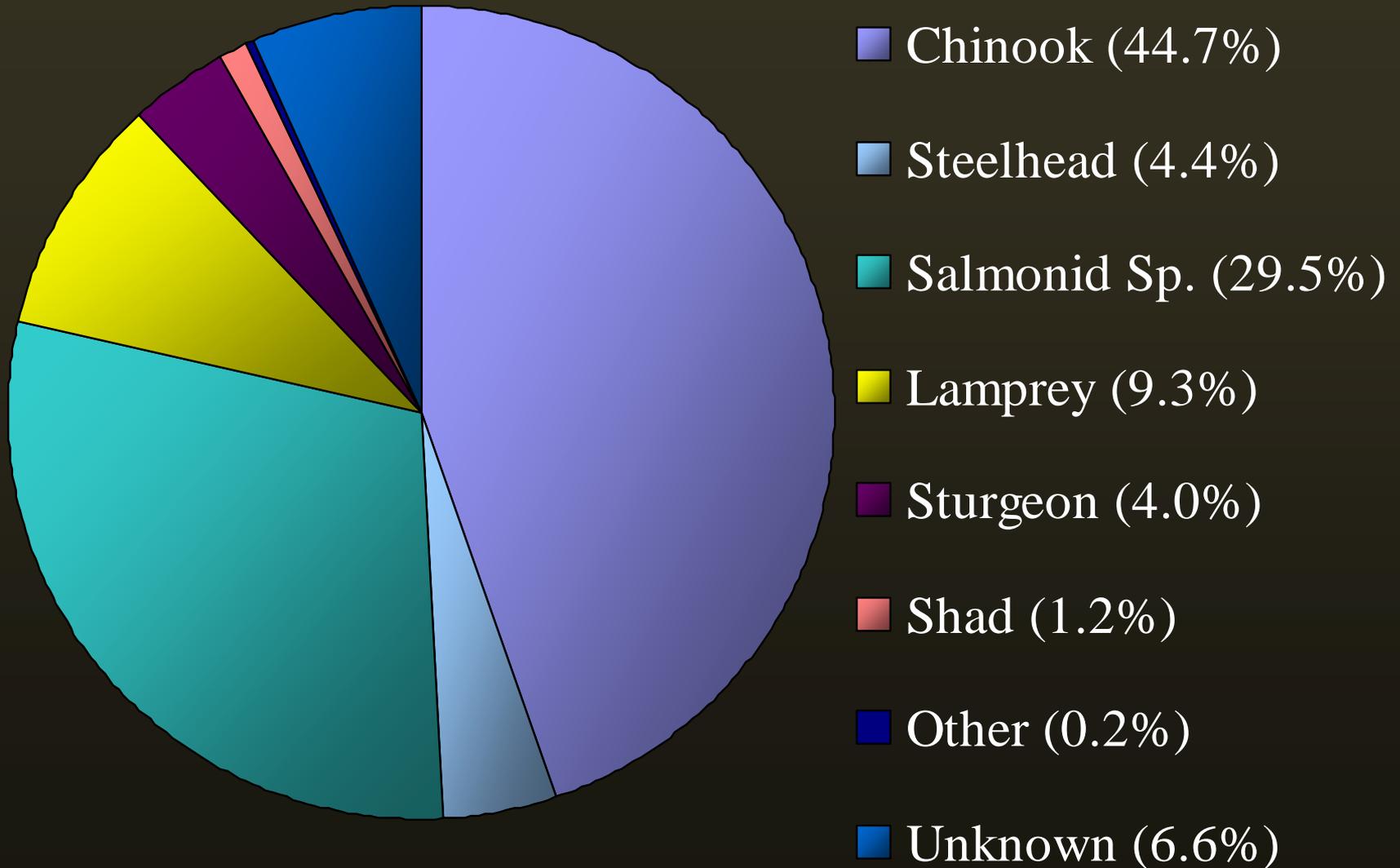
Daily expanded estimate of salmonids caught at Bonneville Dam, 2002-2007



Cumulative daily estimated salmonid catch by pinnipeds at Bonneville Dam



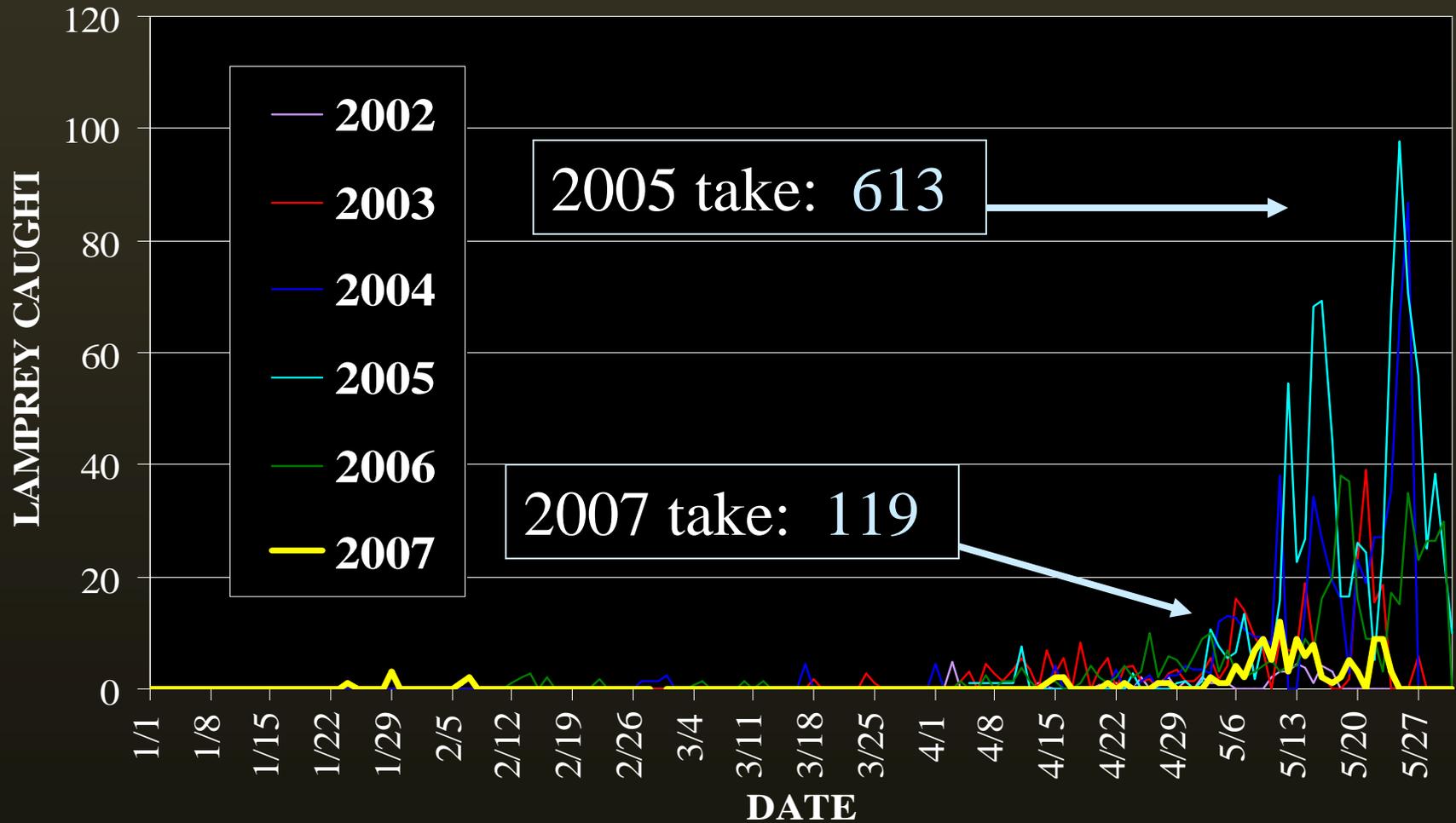
Observed Prey Distribution, 2002-2007



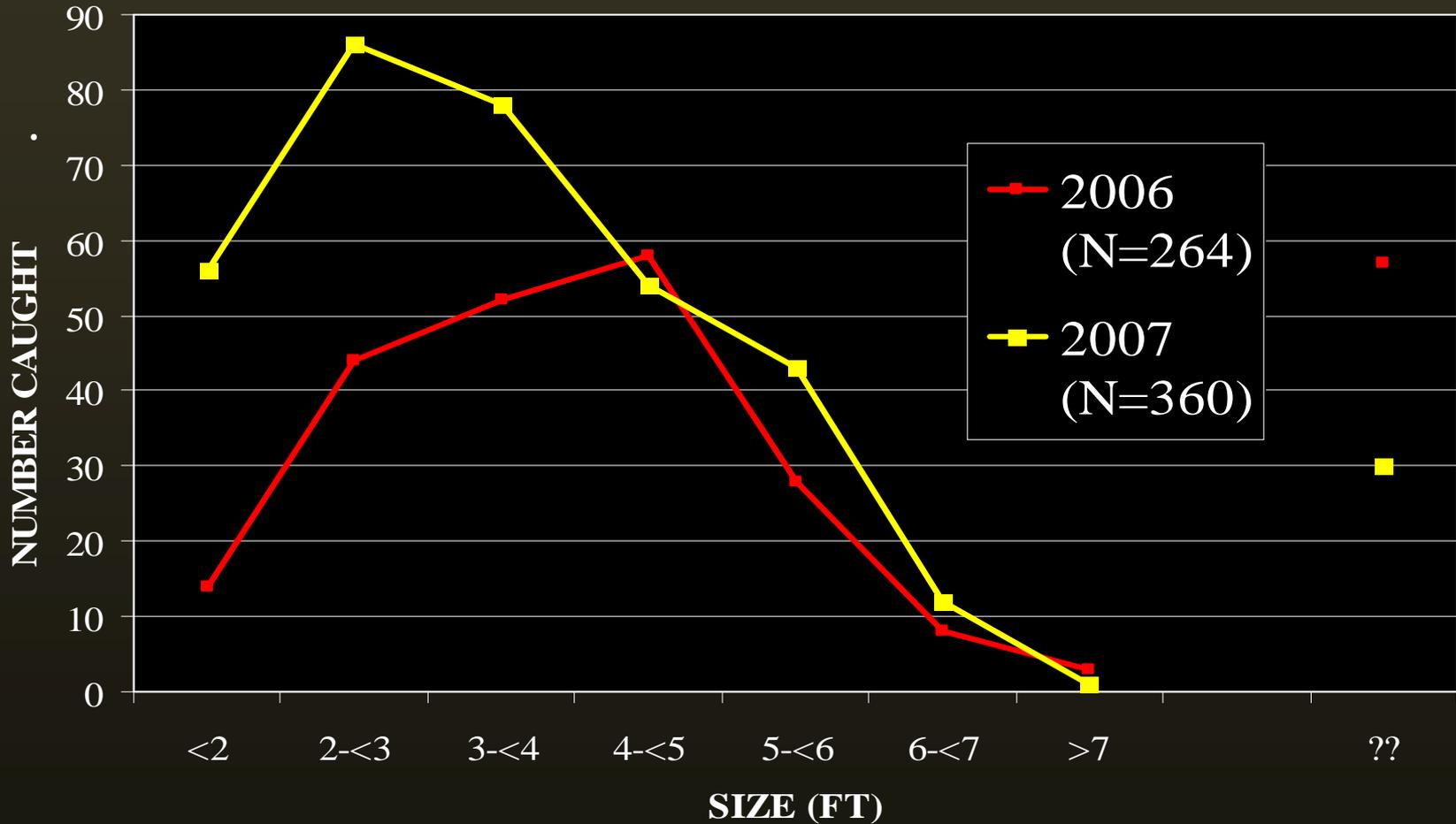
Prey Preference (2002-2007)

- 99.2% of Salmonid takes by California Sea lions (12,163 of 12,256 observed takes)
- 99.2% of Lamprey takes by California Sea Lions (1,446 of 1,457 observed takes)
- 97.8% of Sturgeon takes by Steller Sea Lions (611 of 625 observed takes)
- “Unknown” fish can likely be split accordingly

Daily estimated lamprey catch at Bonneville Dam, 2002-2007



Size distribution of sturgeon taken by sea lions at Bonneville Dam, 2006-2007



DETERRENTS

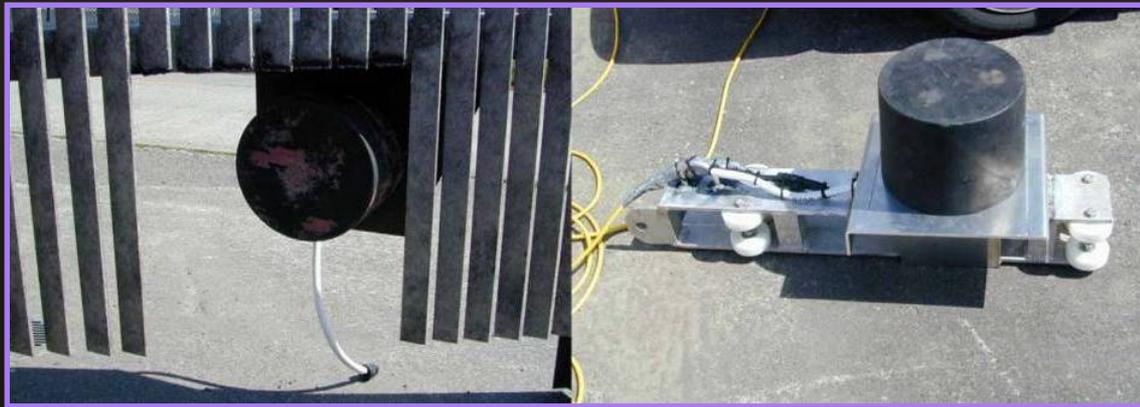
SLEDs

- Sea lion exclusion devices (SLEDs) installed at fishway entrances in 2006 (2005 ten sea lions used lower fishways)
- 12 entrances, 15 3/8" gaps
- Designed to allow salmon passage



Acoustic Deterrent Devices (ADD)

- 205 decibel, 15 kHz frequency acoustic projectors installed at fishway entrances
- March – May (2006-2007)
- ADDs on at all times in 2007
- No significant effects on salmon passage



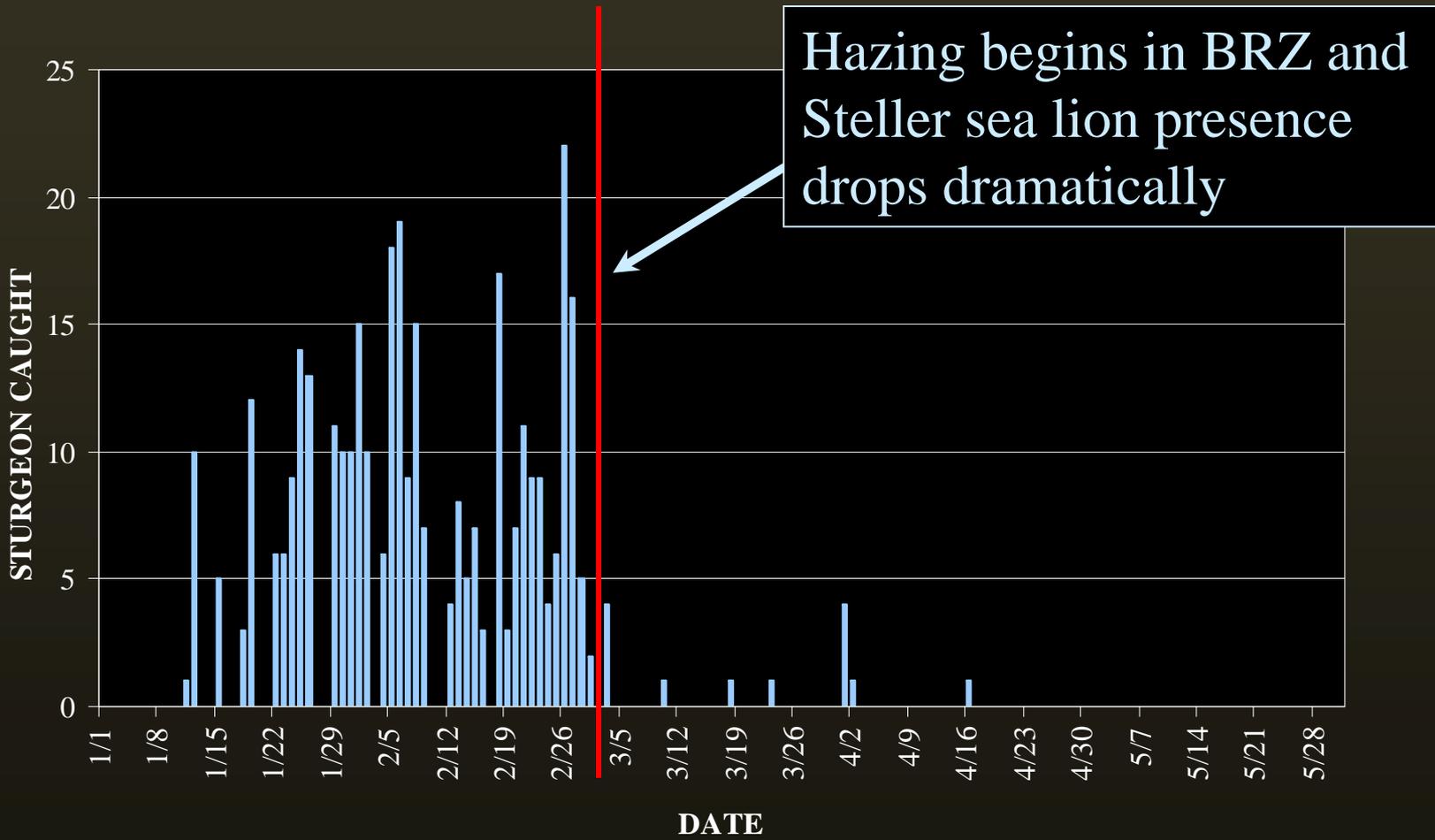
Hazing and Trapping

- March – May 2007
- Federal, state, and tribal agencies
- Cracker shells, rubber bullets, bean bags, and screamer shells, “seal bombs” in some areas
- Hazed sea lions virtually everywhere seen at Bonneville Dam, dawn to dusk, 7 days/week
- Used floating trap to tag and relocate sea lions

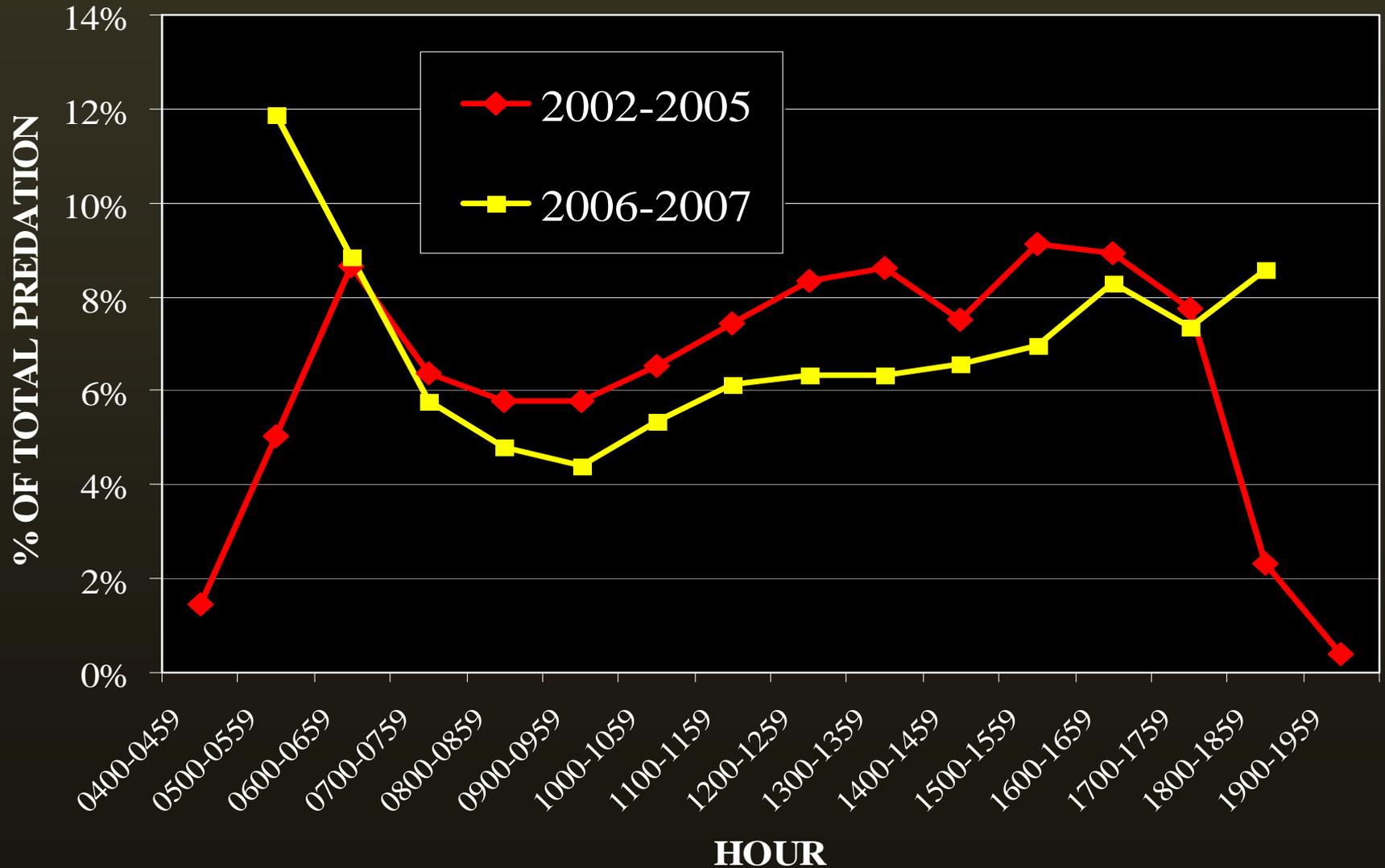


RESULTS: DETERRENTS

Daily estimated sturgeon catch at Bonneville Dam (2007)



Diel Catch Distribution at Bonneville Dam, Pre- and Post-Harassment Years



Catch Distribution by Location

	PH1	PH2	Spillway
2002	32.9%	56.0%	11.1%
2003	39.6%	56.0%	4.4%
2004	37.0%	58.2%	4.8%
2005	33.2%	44.9%	21.9%
2006	55.8%	34.9%	9.3%
2007	41.0%	27.2%	31.8%

Deterrents: The Short Story

- SLEDs 99% effective, ADDs no observed effect
- C404 jumped over FOGs
- Hazing effective with Steller sea lions
- California sea lions were less responsive to hazing
- In 2007, spillway became a sanctuary,
- Many fish eaten before and after boat hazing hours
- Hazing *could* force night feeding behavior
- 9 of 11 trapped and relocated California sea lions returned to Bonneville in 2007

SUMMARY

The Process: MMPA Section 120

- 11/18/06 States (OR, WA, ID) applied for permit for lethal removal of UP TO 83 California Sea lions in Columbia River above mile marker 85
- NMFS reviewed and determined request was valid, required by MMPA to assign Task Force
- Pinniped-Fishery Interaction Task Force
 - 18 Members, tribes, agencies, biologists, fishing groups, humane society
 - Task Force recommended lethal removal
- NMFS will review, public review, create NEPA document, implement (timing depends upon recommendations)

Summary

- ~3,000-4,000 salmonids taken each year
- Steller sea lion predation on sturgeon is a growing issue
- California and Steller sea lions coming earlier each year; staying in Bonneville area longer
 - California documented on Nov. 8, 2007
 - Steller documented on Nov. 6, 2007
- 2 years of active deterrence efforts failed to reduce predation on salmonids at the dam
- Will continue observations in 2008

A photograph of two seals on a concrete pier. A large seal is lying on its side, surrounded by salmon scraps. A smaller seal is in the foreground, looking towards the larger seal. A thought bubble is superimposed over the larger seal's head.

*I couldn't
eat another
salmon....I
feel sick*