March 1, 2016

MEMORANDUM

TO: **Council members**

FROM: **Lynn Palensky**

SUBJECT: **Briefing on Columbia River Basin fish run forecasts for 2016**

BACKGROUND:

Presenters: Tom Rien (ODFW), Brian McIlraith (CRITFC), Bill Tweit (WDFW), Paul Kline (IDFG) and Brian Burke (NOAA NW Fisheries Science Center)

Summary: The Council will be briefed on the 2015 returns and 2016 run forecasts of eulachon, lamprey, and adult salmon and steelhead, as well as the status of lower river white sturgeon.

Tom Rien, (Columbia River Coordination Program Manager at Oregon Department of Fish and Wildlife) will present the 2015-2016 eulachon returns and provide a status update on lower river white sturgeon;

Brian McIlraith (Pacific Lamprey Project Lead at the Columbia River Inter-Tribal Fish Commission) will present information on runs, timing and passage for Pacific lamprey.

Bill Tweit (Special Assistant) the Washington Department of Fish and Wildlife); will present the latest information on the 2016 adult Chinook, coho, sockeye, and chum salmon and steelhead run forecasts for the Columbia and Snake rivers, with a brief summary of expectations for the 2016 fisheries. His presentation will also include a retrospective review of

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the 2015 adult salmon and steelhead returns and fisheries in the Columbia River excluding the Snake Basin.

Paul Kline (Asst. Chief of Fisheries for the Idaho Department of Fish and Game) will then summarize the recent and historical returns of salmon and steelhead to the Snake River Basin, focusing on the species/run groupings of spring, summer and fall Chinook salmon; summer steelhead; and sockeye salmon. For each species/run grouping, counts of fish crossing Lower Granite Dam will be presented. Numbers of fish passing Lower Granite Dam comprise the aggregate count of adult salmon and steelhead destined for eastern Oregon's Grande Ronde and Imnaha river drainages and Idaho's Clearwater and Salmon river drainages.

Brian Burke (Research Fishery Biologist at NOAA's NW Fisheries Science Center), will present the outlook for Chinook and coho returns to the Columbia River based on local and regional ocean conditions. The presentation will also include a summary of Pacific Basin-scale conditions and associated effects on coast-wide trends in salmon size and abundance.

Relevance: This information is relevant to our high-level indicators. It gives the region a preview for what is expected for adult returns in the current year.

Workplan: This task is captured in the work plan under Adaptive Management - Annual Reports.

More Info: Links:
Columbia River Forecasts: http://wdfw.wa.gov/fishing/reports_plants.html
Joint State Staff Reports http://wdfw.wa.gov/fishing/crc/
Columbia River DART: http://www.cbr.washington.edu/dart

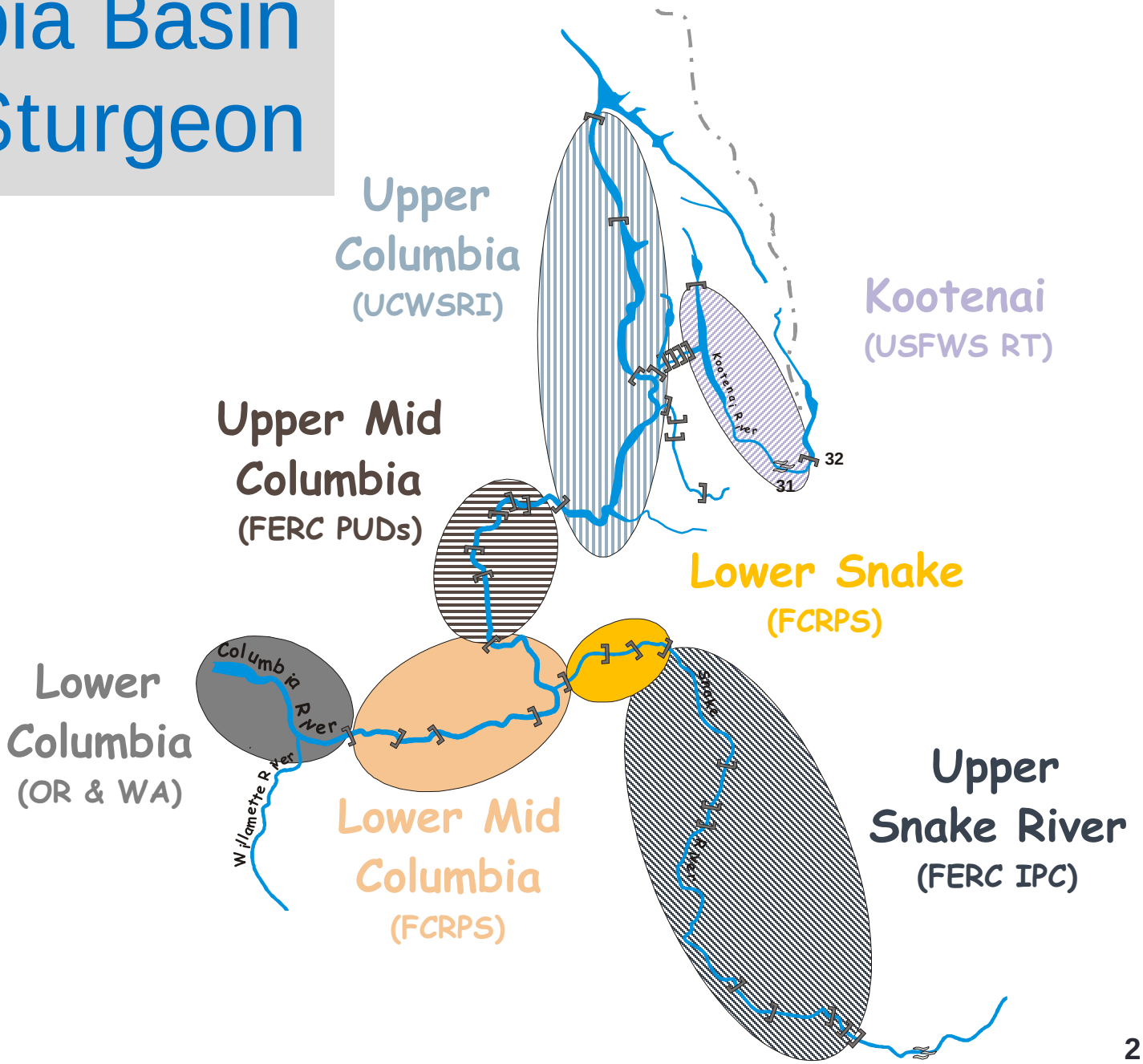
Sturgeon and Eulachon Status

Tom Rien

Oregon Department of
Fish and Wildlife

Presentation to the Northwest Power and
Conservation Council
March 8, 2016
Portland, Oregon

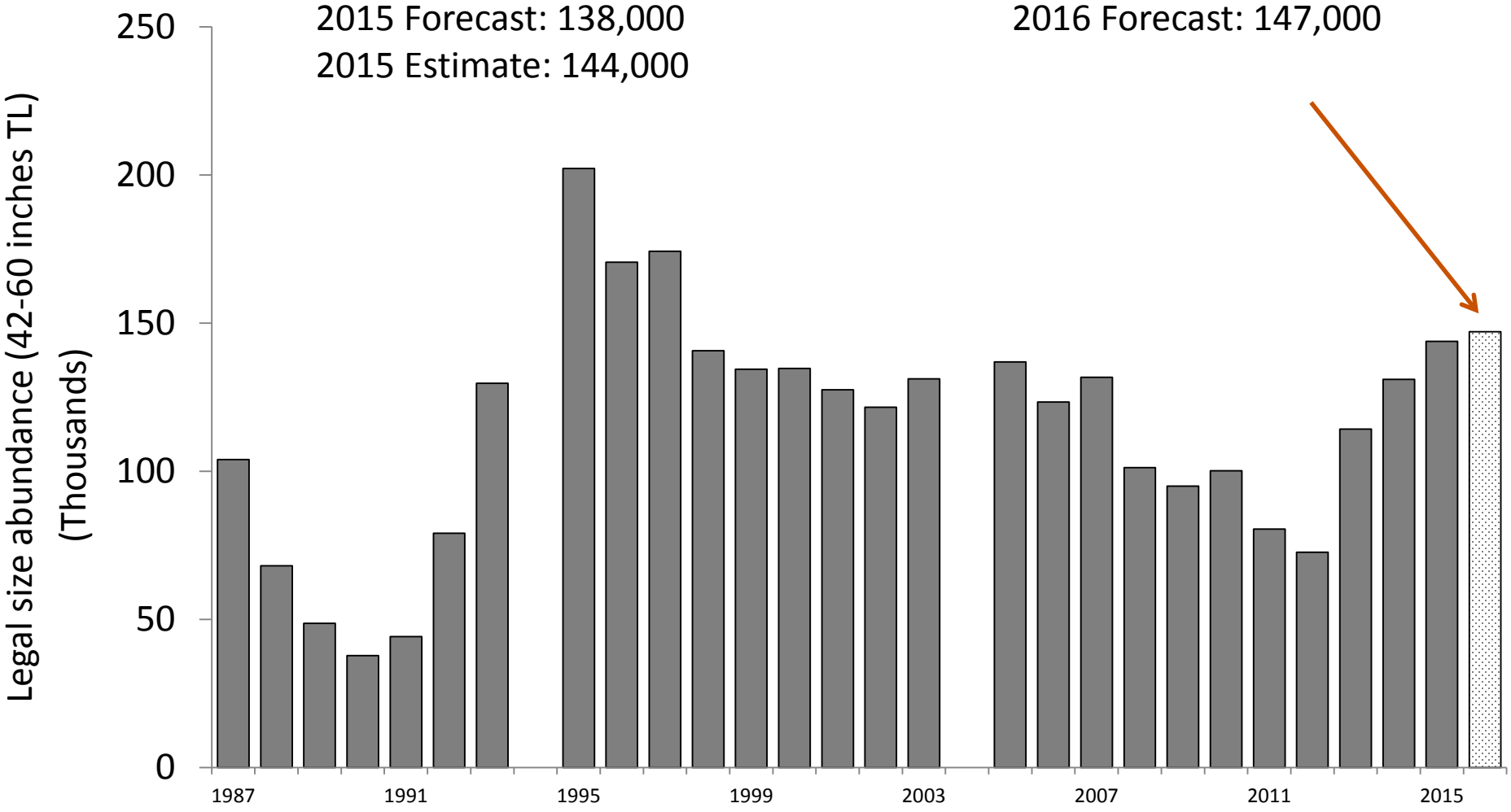
Columbia Basin White Sturgeon



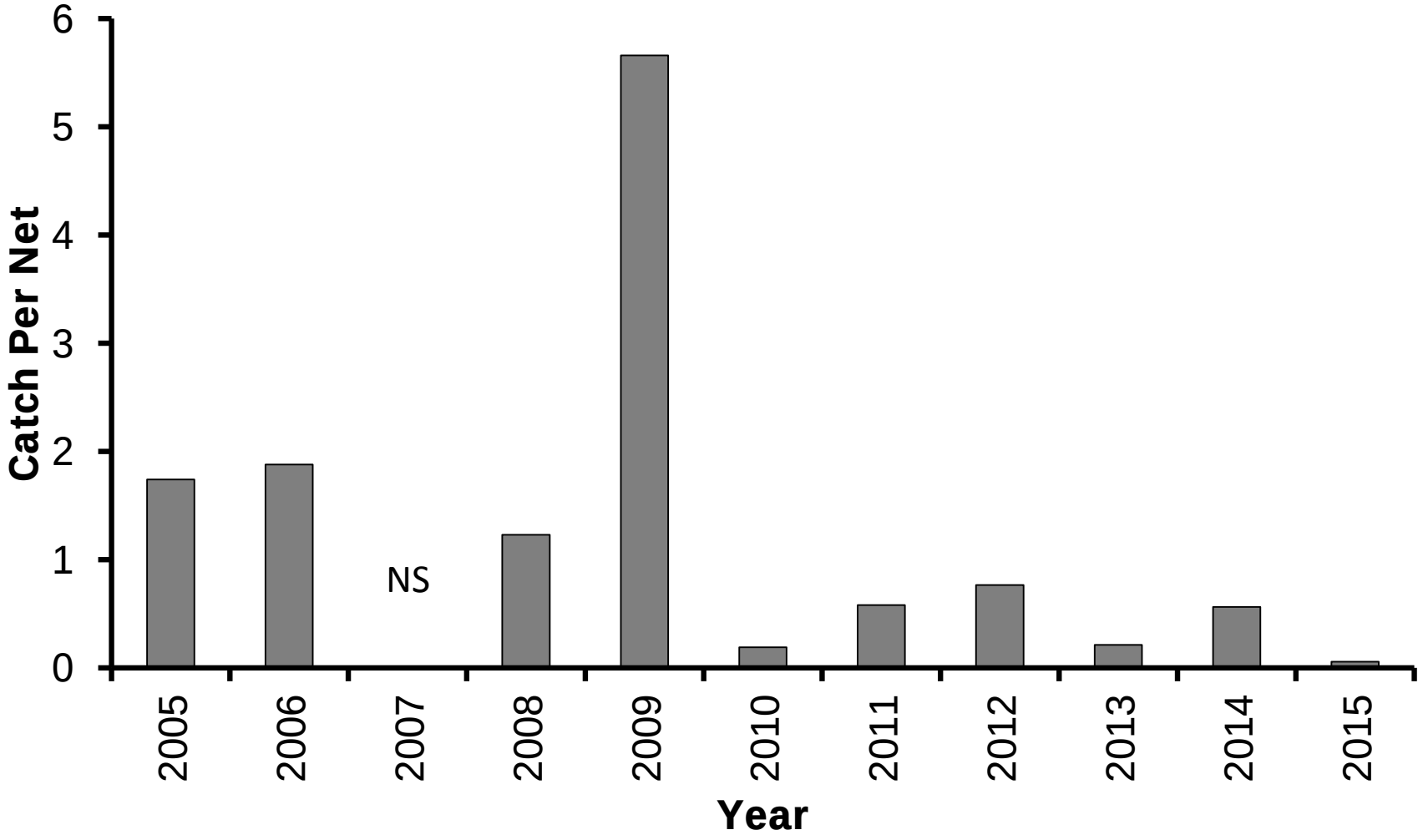
Below Bonneville Dam including Lower Willamette River & Columbia River Estuary

- Legal-sized white sturgeon abundance has increased and is similar to modeled projections.
- Reduced relative abundance of juvenile and sub-legal sized fish over time indicates productivity issues.
- Adult abundance is below Oregon Conservation Plan conservation status threshold (3-year average of 3,900 adults).
- 2015 white sturgeon young-of-year recruitment is low. This continues recent trend.
- Continued increases in sea lion abundance in the LCR are problematic for white sturgeon population growth.
- Stock decline triggered fisheries managers to close this area to retention effective 2014.

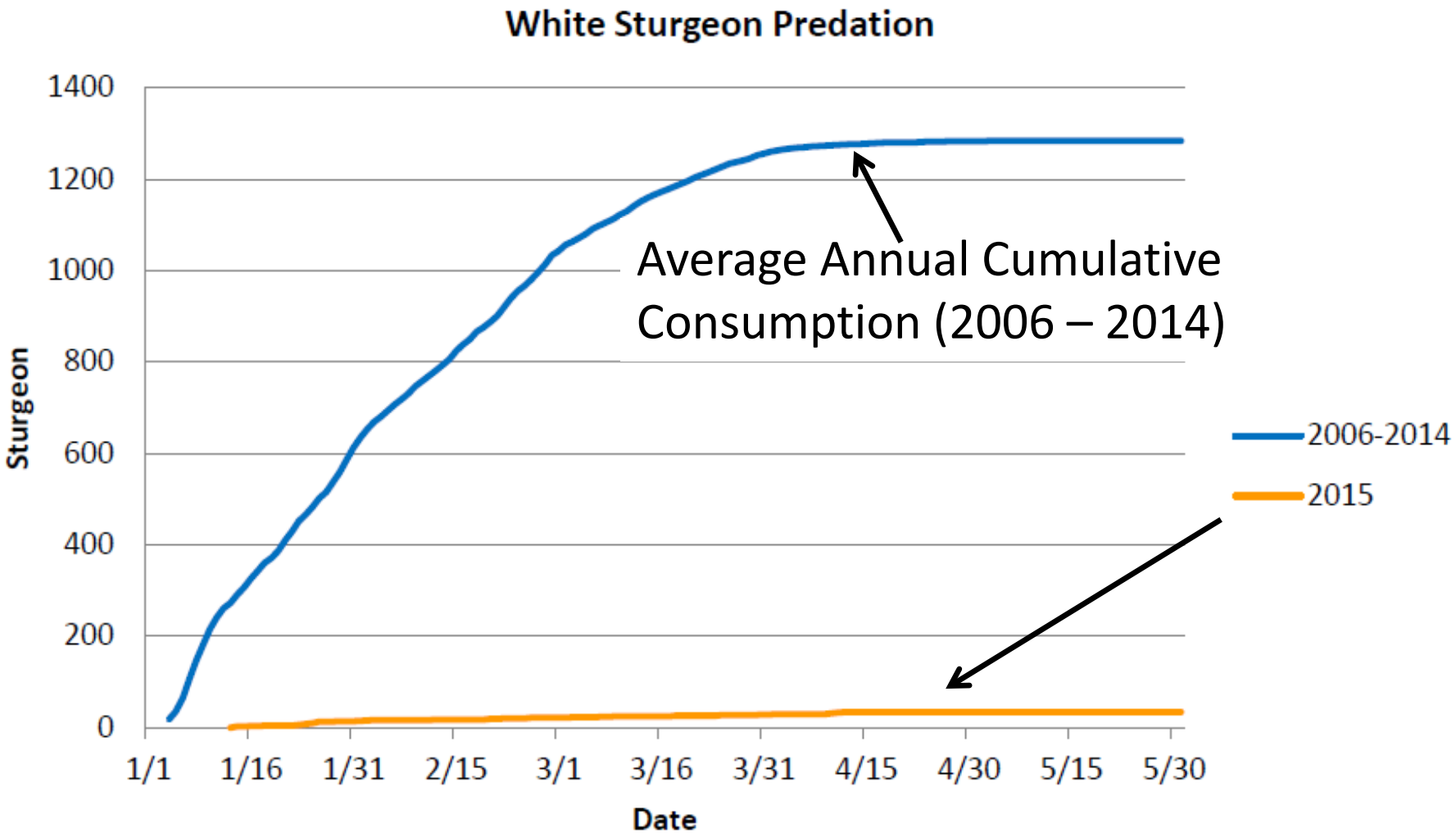
Columbia River Sturgeon
Below Bonneville Dam



LCR white sturgeon productivity



Sea lion predation – Bonneville Dam



Bonneville Reservoir

- Recruitment: No young-of-year in 2001 and 2015.
- Legal-sized abundance declined ~14,000 in 2012 to ~6,000 in 2015.
- Over legal-sized abundance declined >2,000 fish in 2012 to ~1,000 in 2015.
- Length Distribution: Juvenile percentages 2009 = 91%, 2012 = 92%; 2015 = 96% … Slow growth
- Harvest guideline down from 2,000 fish to 650 fish.

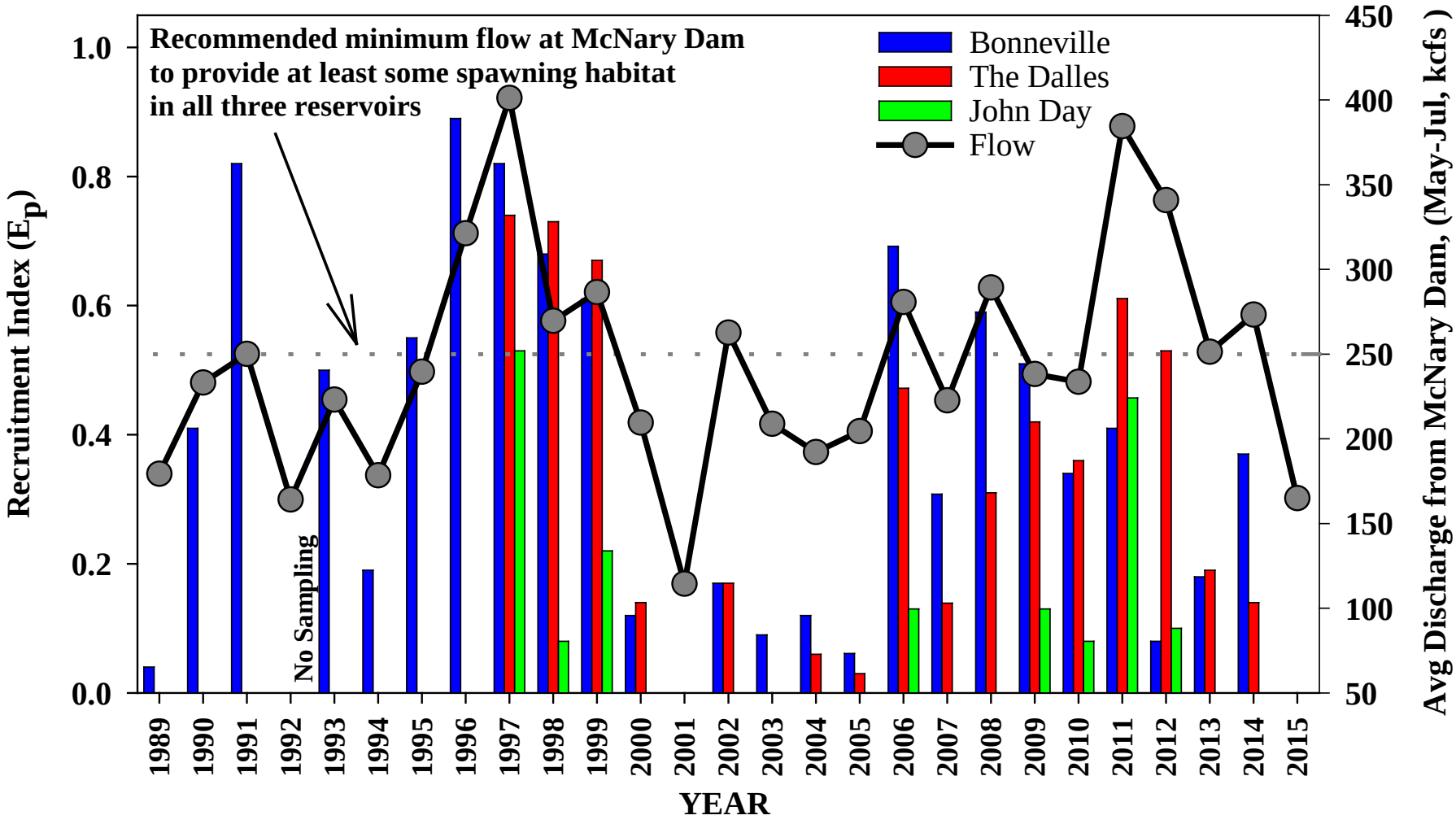
The Dalles Reservoir

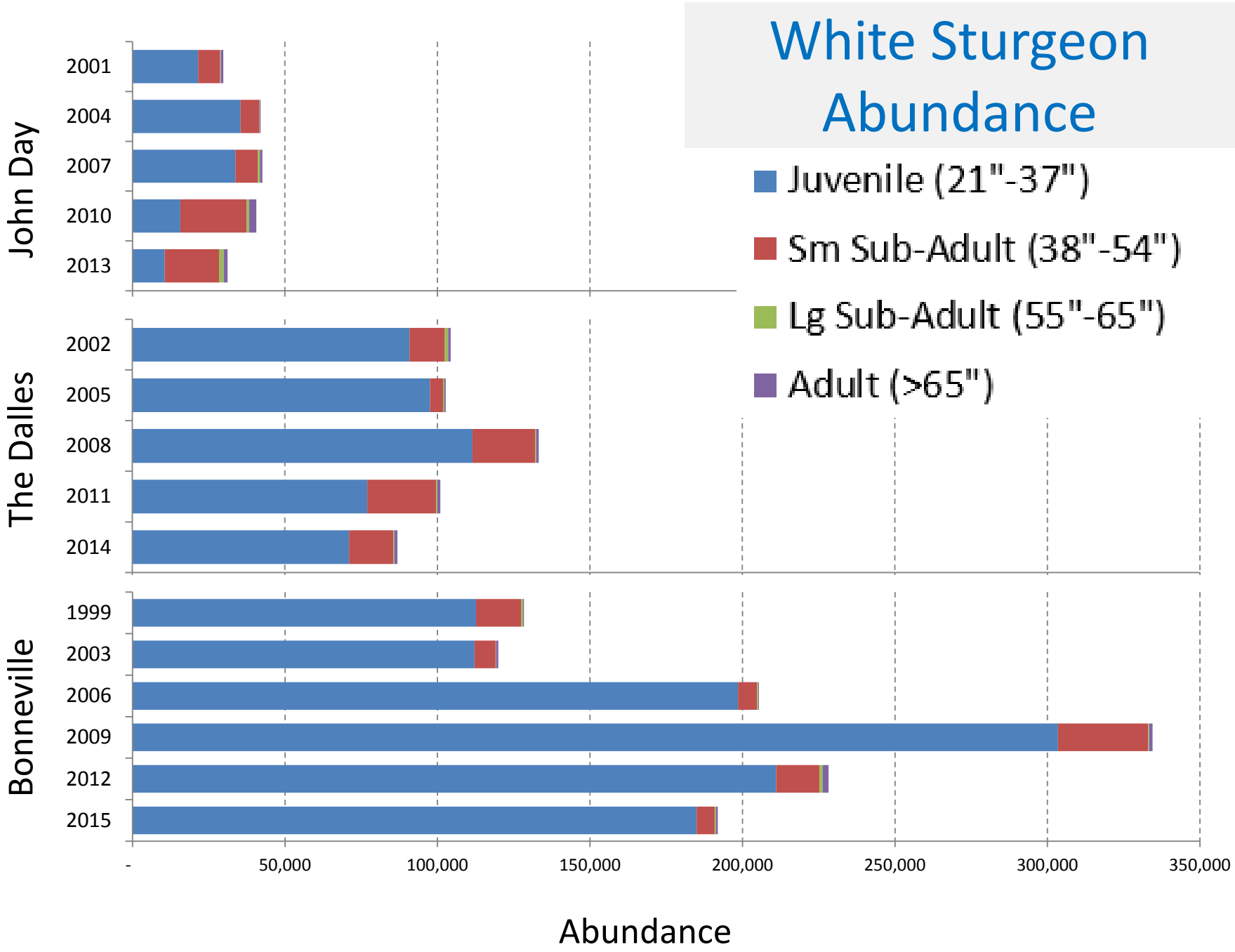
- Recruitment: No young-of-year in 2001, 2013 and 2015.
- Declines in sublegal and legal-sized abundance between 2011 and 2014.
- Adult abundance stable 2008, 2011 and 2014.
- Length Distribution. Juvenile percentages:
  2008 = 98%; in 2011 and 2014 it was 96% … Slow growth
- Heat-stress related die-off of 31 adult fish during July 2015
- Harvest guideline down from 1,300 fish to 425 fish.

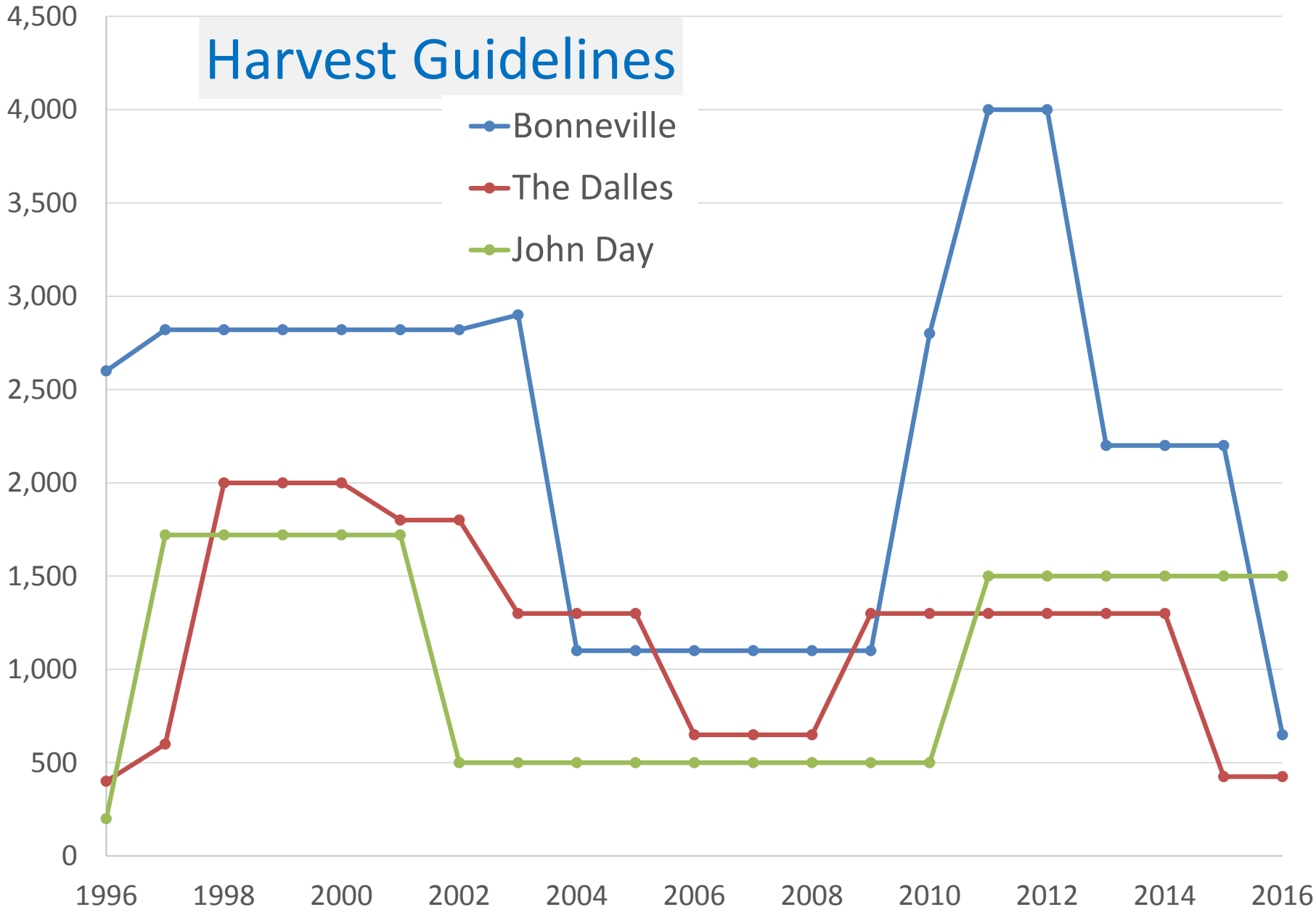
John Day Reservoir

- Recruitment: 11 of 19 years with no measurable recruitment.
- Legal-sized abundance increased 1,600 fish to 9,600 fish
- Over-legal abundance increased since 2007
  2007 = 1,500, 2010 = 3,200 and 2013 = 2,800.
- Length Distribution: Juvenile percentages
  2007 = 93%; 2010 = 81%; 2013 = 60%
- Heat-stress related die-off of 57 adult fish during July 2015
- Since 2011 harvest guidelines = 1,500 fish.

Sturgeon Recruitment




White Sturgeon Abundance
Juvenile (21"-37")
Sm Sub-Adult (38"-54")
Lg Sub-Adult (55"-65")
Adult (>65")
John Day
2001
2004
2007
2010
2013
The Dalles
2002
2005
2008
2011
2014
Bonneville
1999
2003
2006
2009
2012
2015
-
50,000
100,000
150,000
200,000
250,000
300,000
350,000
Abundance


Harvest Guidelines
Bonneville
The Dalles
John Day
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016

McNary Reservoir

- Not much change in overall abundance, but now only half (??) comprised of wild fish, The other half stocked hatchery fish entrained from further upstream.
- Heat-stress related die-off of 49 adult fish during July 2015

→ Open to recreational harvest Feb - July

Lower Snake River Reservoirs

Ice Harbor, Lower Monumental, Little Goose

- Substantial population declines between initial assessments in 1996-97 and follow-ups in 2012-14.
- Monitoring of natural production from 1997-2005 showed infrequent and low success, likely from poor spawning and early rearing conditions.
- Pool specific population abundance in the low 1,000's of fish.
- Stock decline triggered fisheries managers to close all three pools to retention effective 2015.
- This reach in need of much greater attention to understand and address status decline.

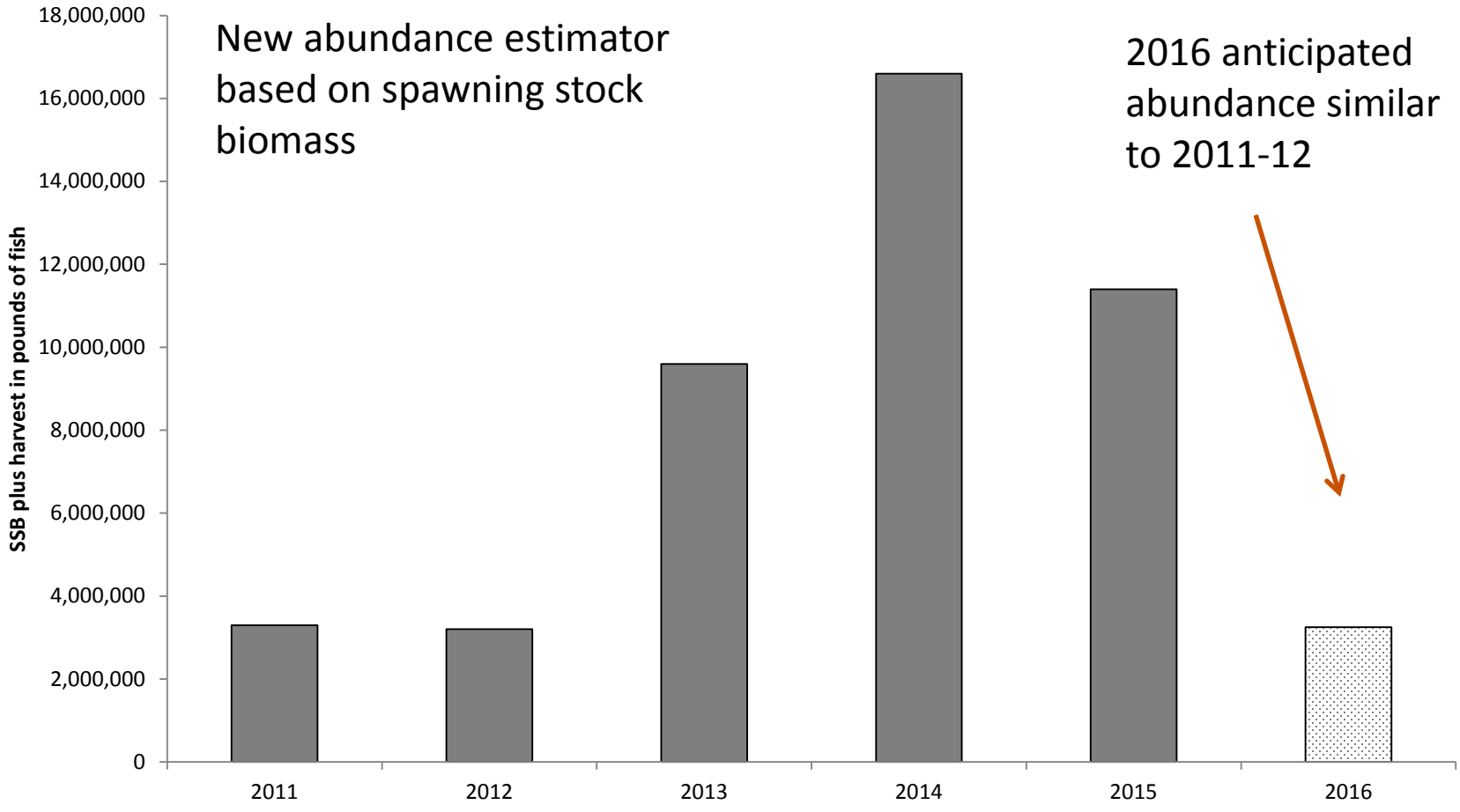
Sturgeon Status Summary

	Below Bonneville	Bonneville Reservoir	The Dalles Reservoir	John Day Reservoir	McNary/ Hanford	Lower Snake Reservoirs
	2015	2015	2014	2013	1995	2014
Size Class (inches FL)						
21" – 38"	347,000	184,960	83,739	10,578		
38" – 54"	144,000	5,890	1,854	17,812	7,000	
54" – 65"	9,200	433	280	1,545		
>65"	3,000	610	1,022	1,272	1,250	
Sum	503,200	191,893	86,895	31,207	8,250	

Recruitment						
Juvenile Abundance						
Subadult Abundance						
Adult Abundance						
Predation						
Heat-Stress						
Fishery						
Harvest Guideline	0	650	425	1,500	Season	0

Eulachon
Columbia River Smelt

Columbia River Smelt



Abundance and passage estimates of Pacific Lamprey in the Columbia River Basin

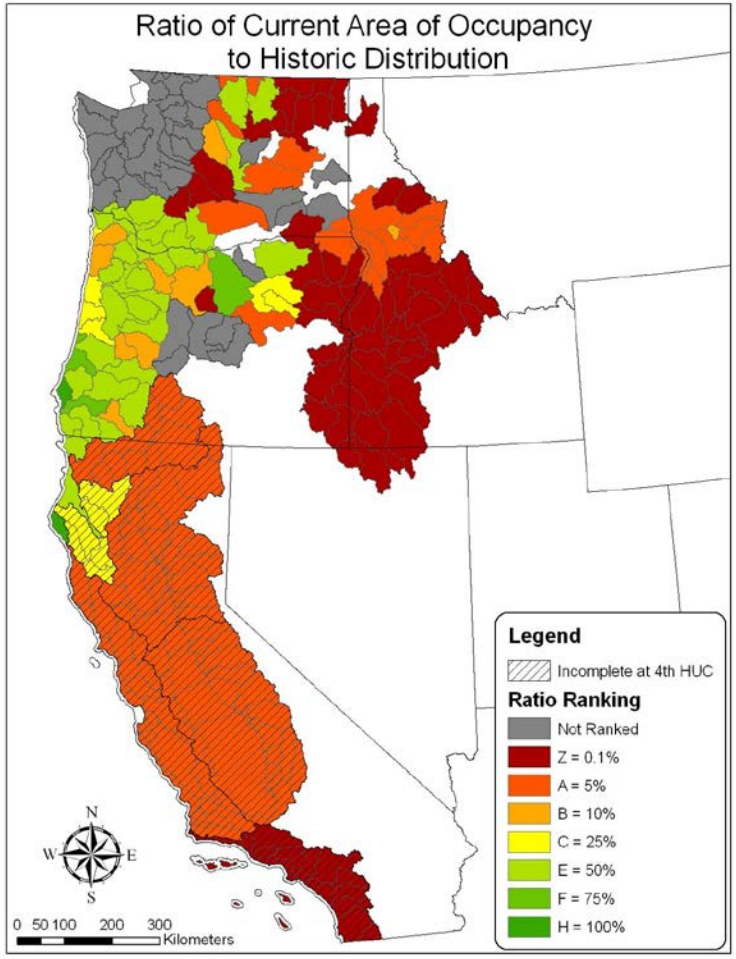
Brian McIlraith

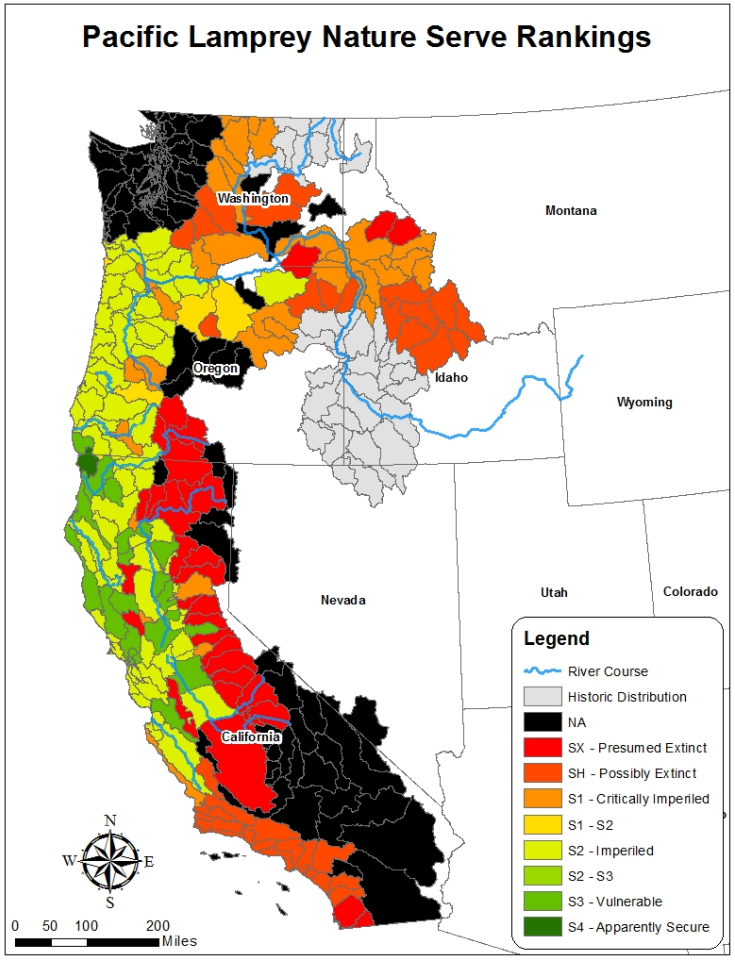
Columbia River Inter-Tribal Fish Commission

Pacific Lamprey Project Leader

Presentation to NPCC – March 8, 2016

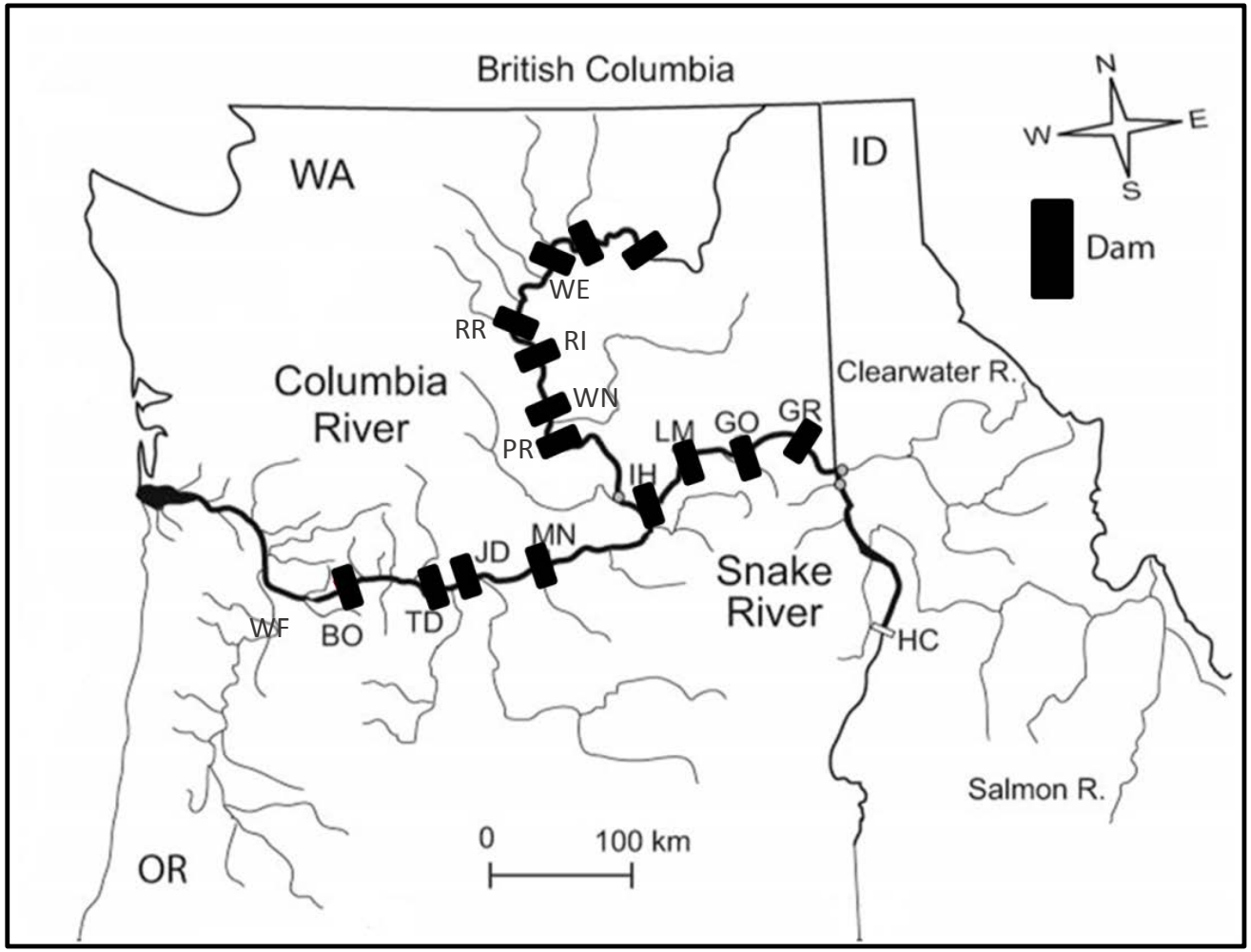
Rangewide distribution of Pacific Lamprey



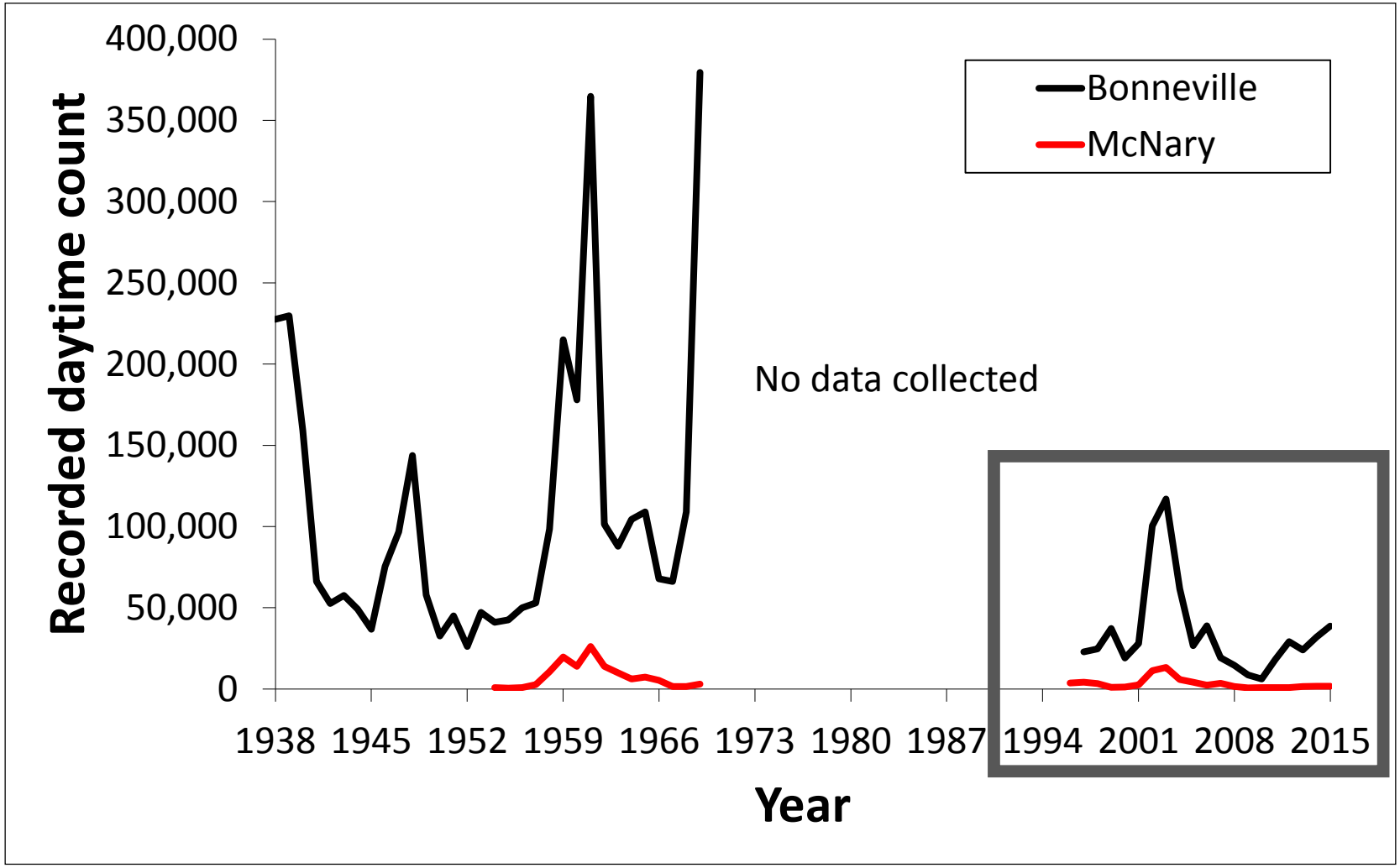


Luzier et al. 2011, USFWS Lamprey Assessment

Pacific Lamprey in the Columbia River Basin

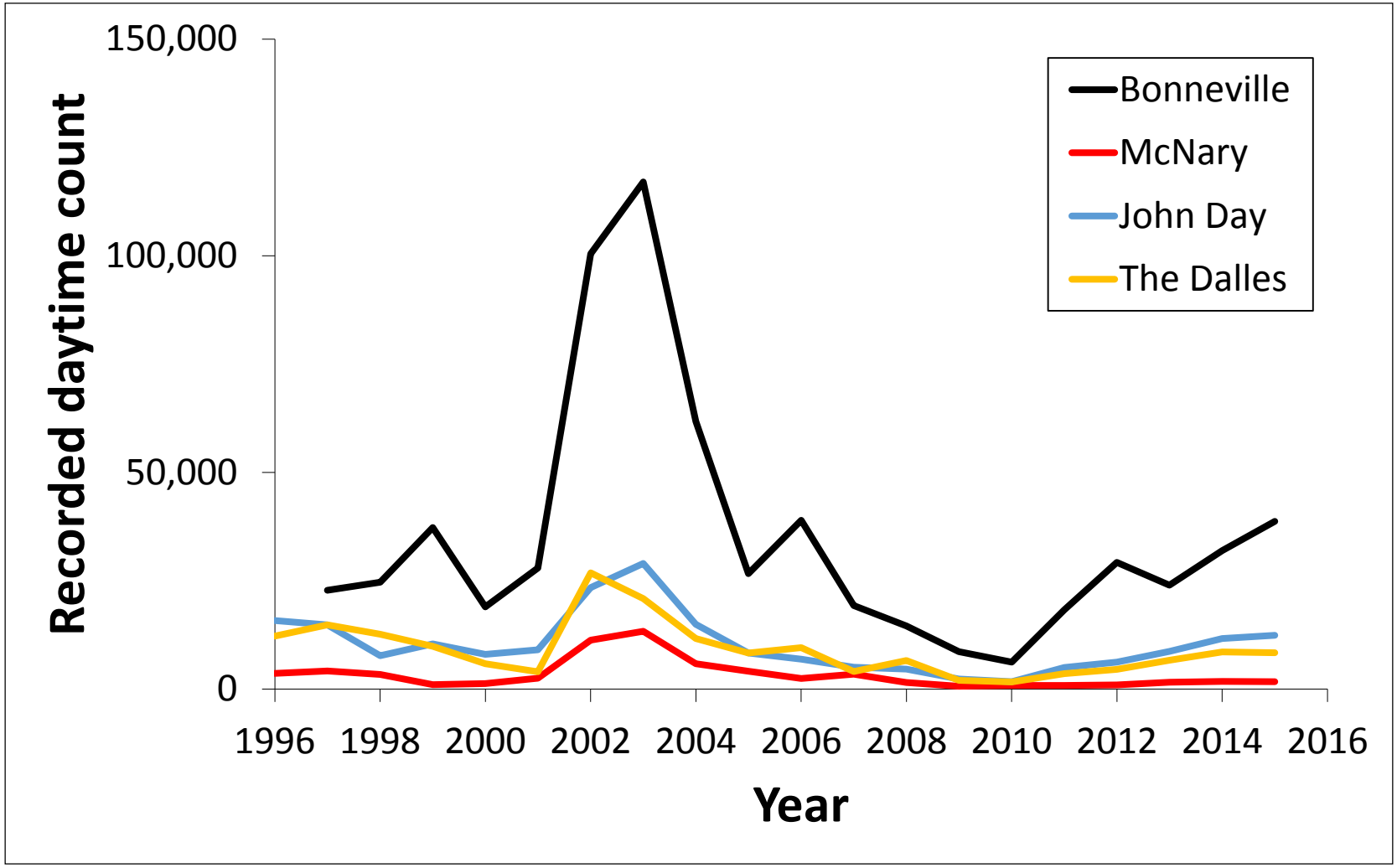


Index of abundance within the Columbia River basin



UW Data Access Realtime, March 2, 2016

Index of abundance within the Columbia River basin

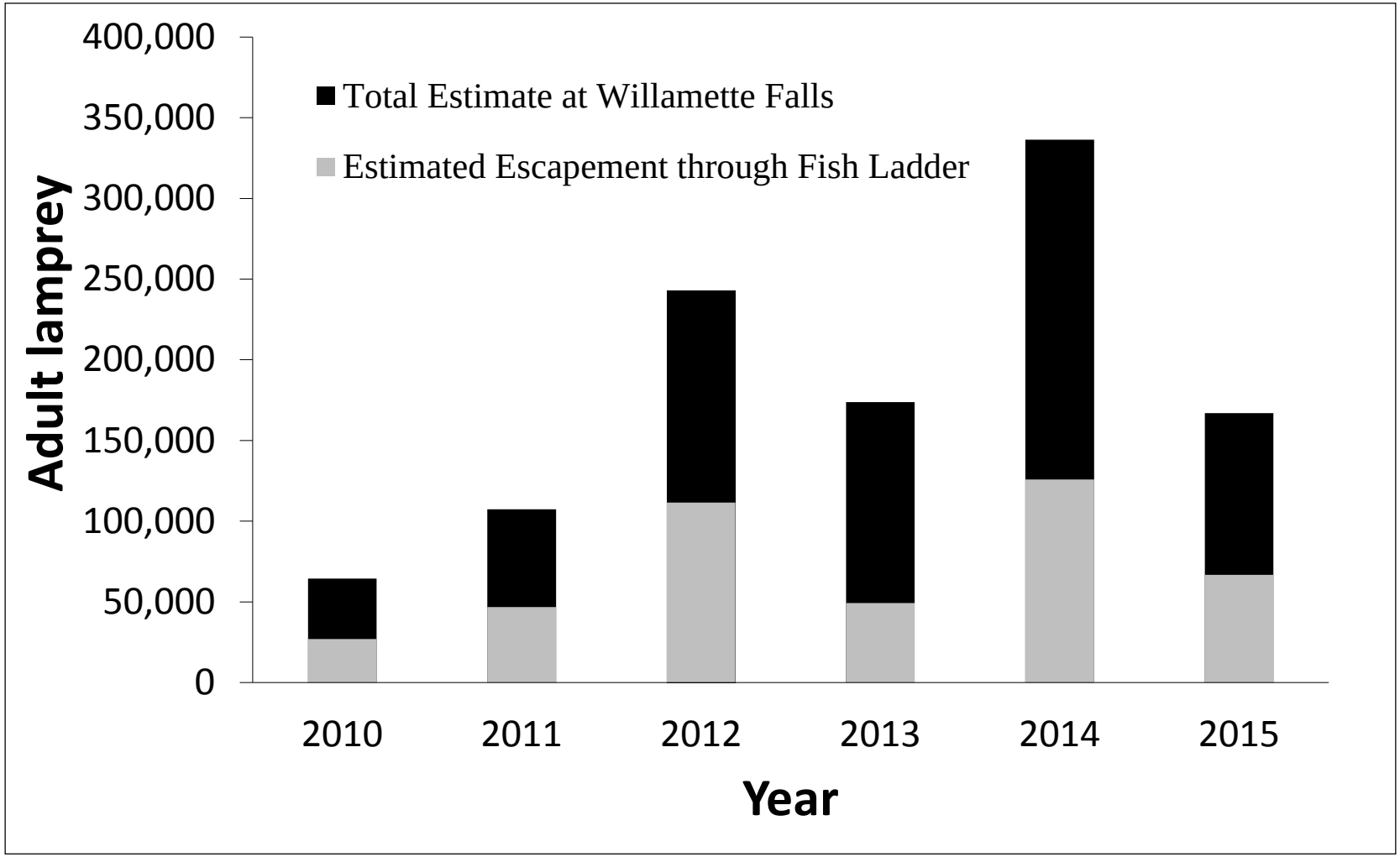


UW Data Access Realtime, March 2, 2016

Index of abundance within the Columbia River basin

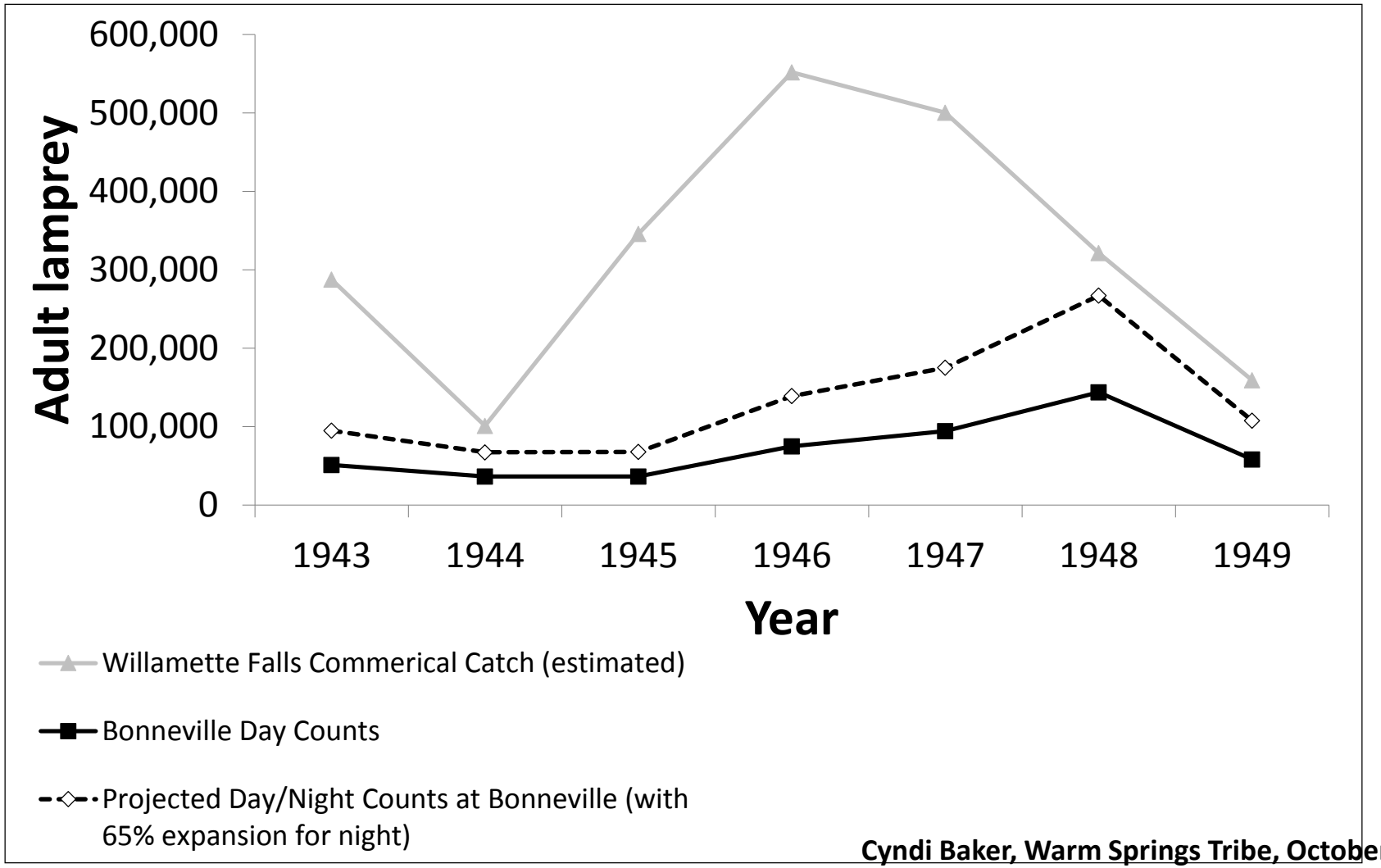
Year	Lower Columbia River		Snake River		Mid-Columbia River	
	Bonneville	McNary	Ice Harbor	Lower Granite	Priest Rapids	Wells
2000	19,002	1,281	315	28	822	155
2000	27,947	2,539	203	27	1,460	262
2002	100,476	11,282	1,127	128	4,007	338
2003	117,029	13,325	1,702	282	4,339	261
2004	61,780	5,888	805	117	2,647	1,408
2005	26,664	4,158	461	40	2,598	291
2006	38,938	2,456	277	35	4,381	212
2007	19,313	3,454	290	34	6,593	21
2008	14,562	1,530	264	61	5,083	7
2009	8,622	676	57	12	2,714	9
2010	11,183	825	114	15	1,114	2
2011	18,305	868	269	48	3,868	1
2012	29,224	970	484	48	4,025	3
2013	23,970	1570	328	19	5968	21
2014	31,953	1783	721	82	7579	7
2015	38,502	1739	760	51	6692	0

Abundance and escapement at Willamette Falls, OR



Cyndi Baker, Warm Springs Tribe, October 2015

Historical abundance within Willamette and Columbia rivers



Cyndi Baker, Warm Springs Tribe, October 2015

Adult passage rates within the Columbia River basin

- **Mainstem Columbia** – 45-60% at Bonneville, The Dalles, and John Day
- **Willamette River** – 22-34% at Willamette Falls
- **Clackamas River** – > 90% on River Mill Dam
- **Mid-Columbia** – > 70% in most years at Priest, Wanapum, Rocky Reach
- **Lower Snake** – 47-100%* in 2014-2015

(Keefer et al. 2012, Moser et al. 2002, Keefer et al. 2013), (Mesa et al. 2010, Clemens et al. 2012), (Ackerman et al. 2015), (Le et al. 20014), (Stevens et al. 2015)


?'S

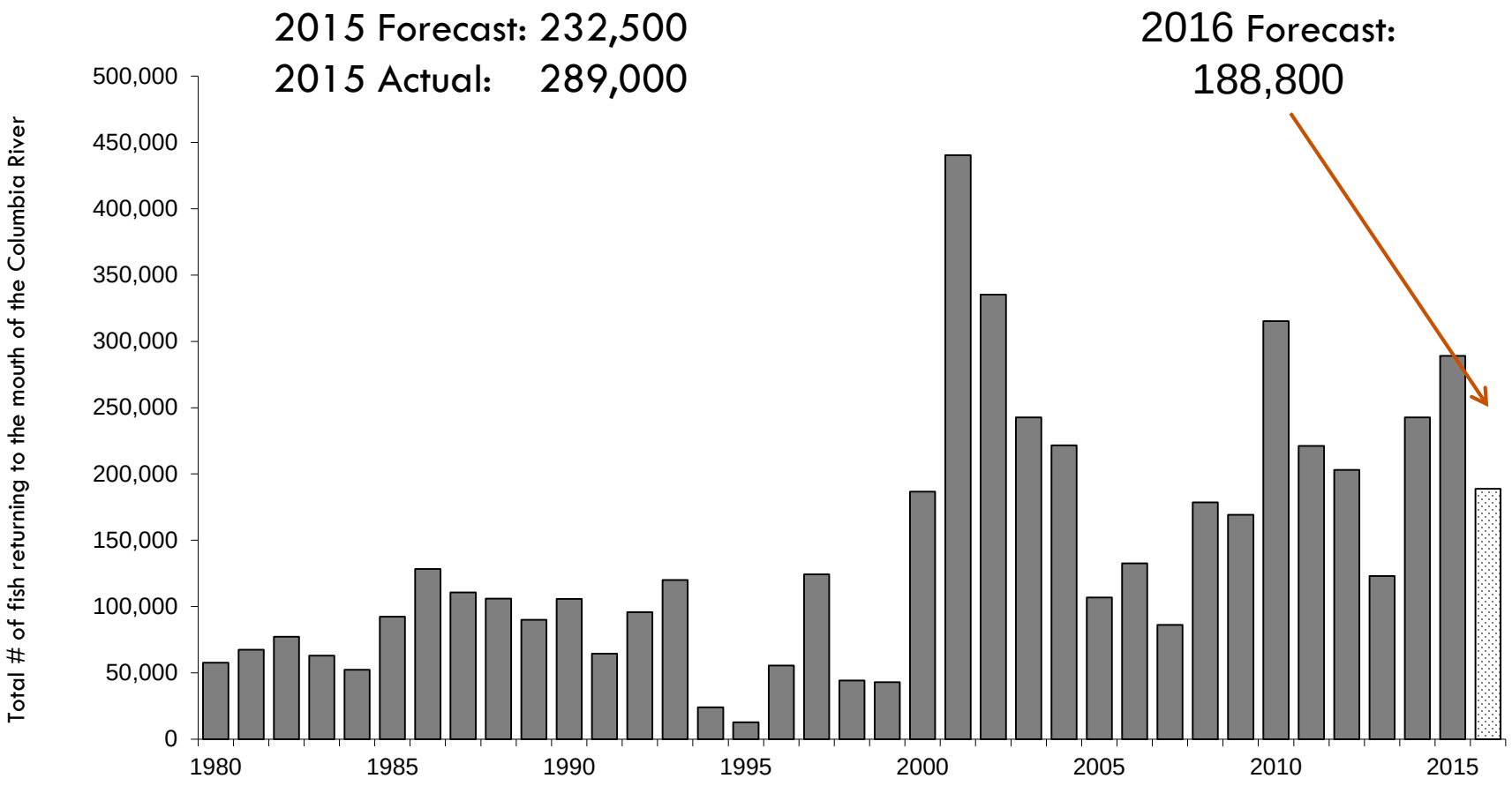
COLUMBIA RIVER SALMON AND STEELHEAD RETURNS

NPCC – March 2016
Presented by: Washington Department of Fish and Wildlife

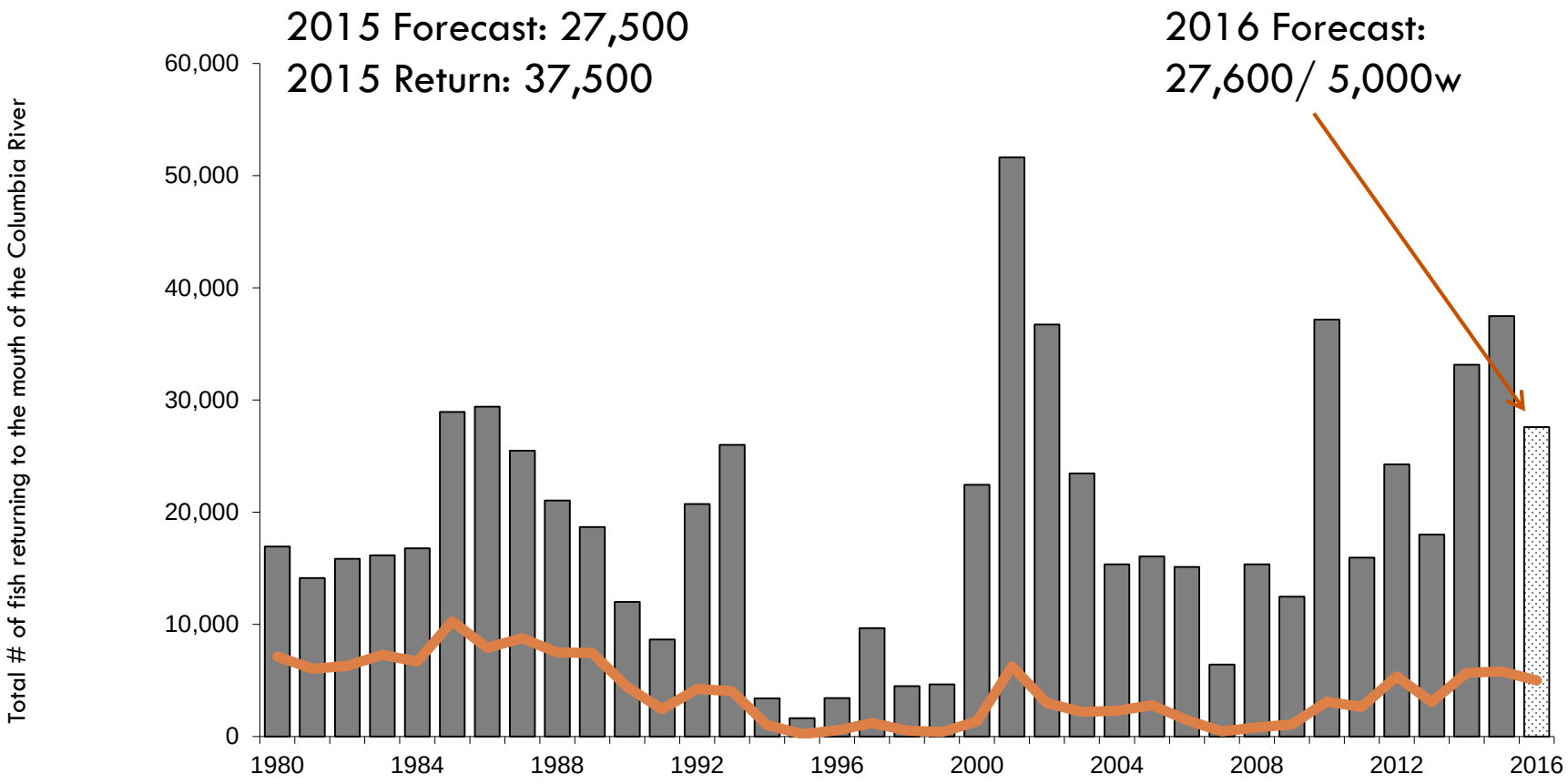
U.S. v Oregon
Technical Advisory Committee

- Consists of staff from federal, tribal and state entities.
- TAC 'reconstructs' Columbia River salmon and steelhead returns post season and develops preseason forecasts.
- TAC reviews salmon and steelhead stock status as the runs progress and provides inseason run size updates.
- In 2015, TAC met 20 times between April and October to provide inseason run size updates on upriver salmon and steelhead.
- These inseason updates allow fishery managers to adjust fisheries as necessary in order to remain within ESA limits and management guidelines.

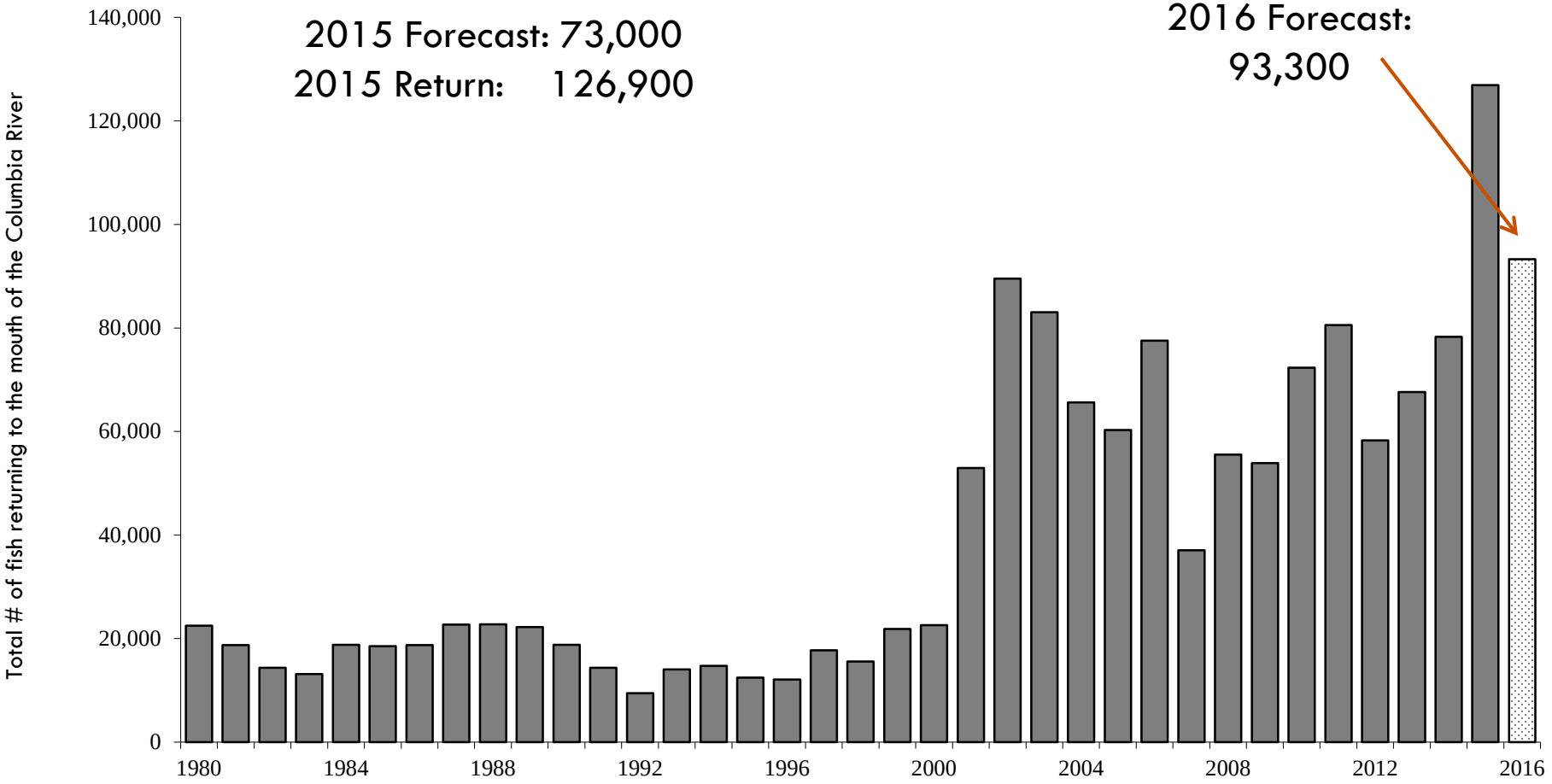
Upriver Spring Chinook



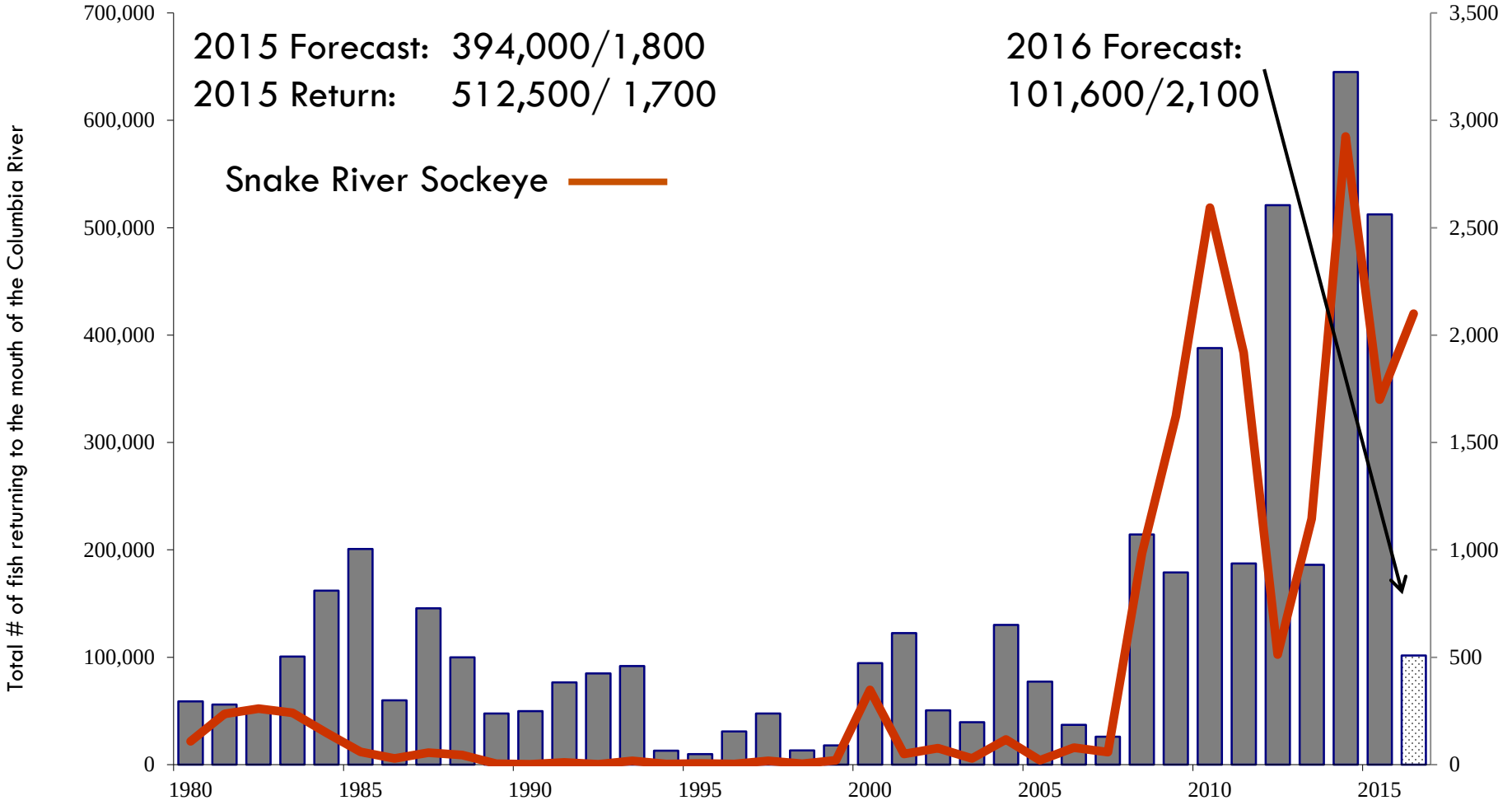
Upper Columbia Spring Chinook



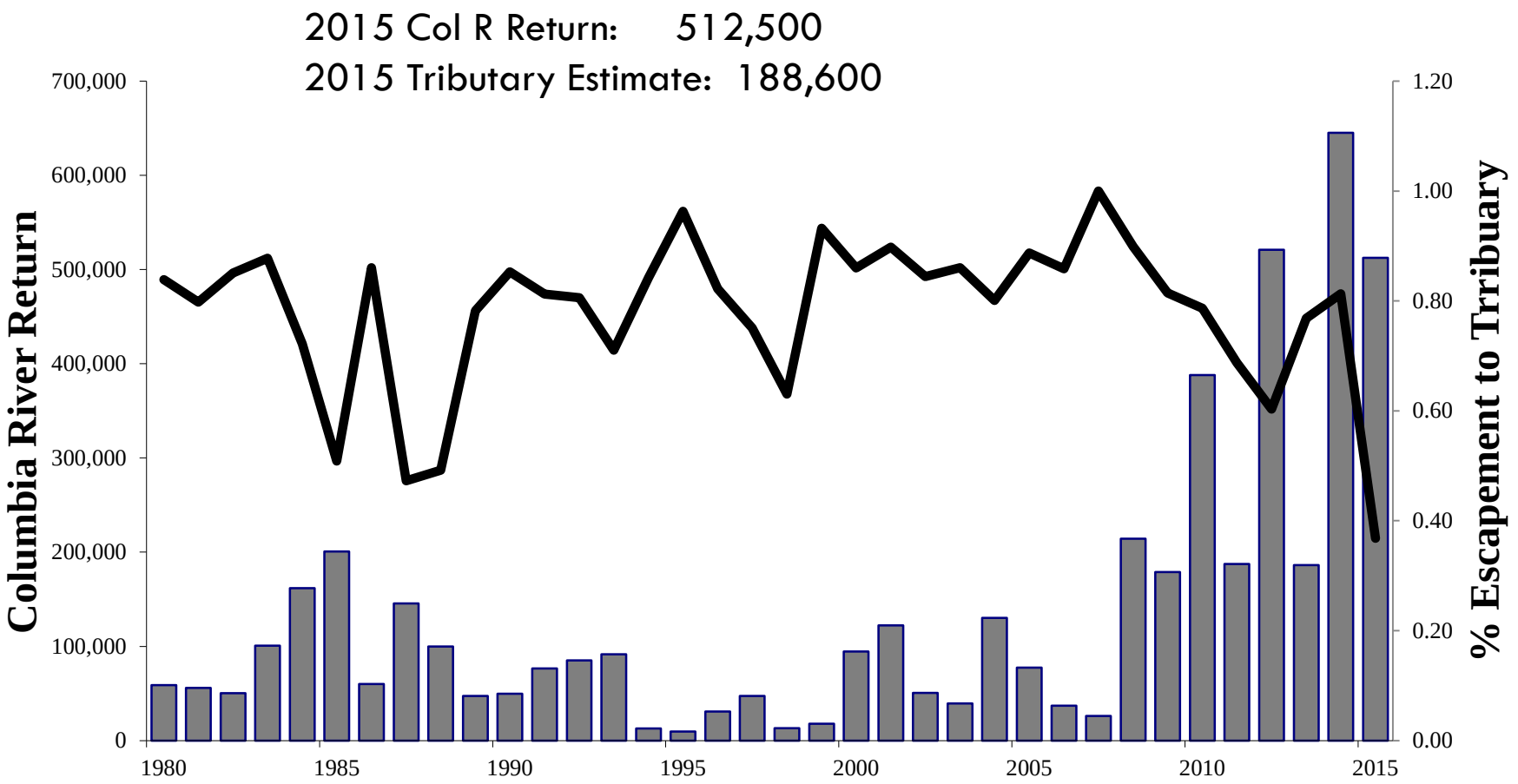
Upper Columbia Summer Chinook



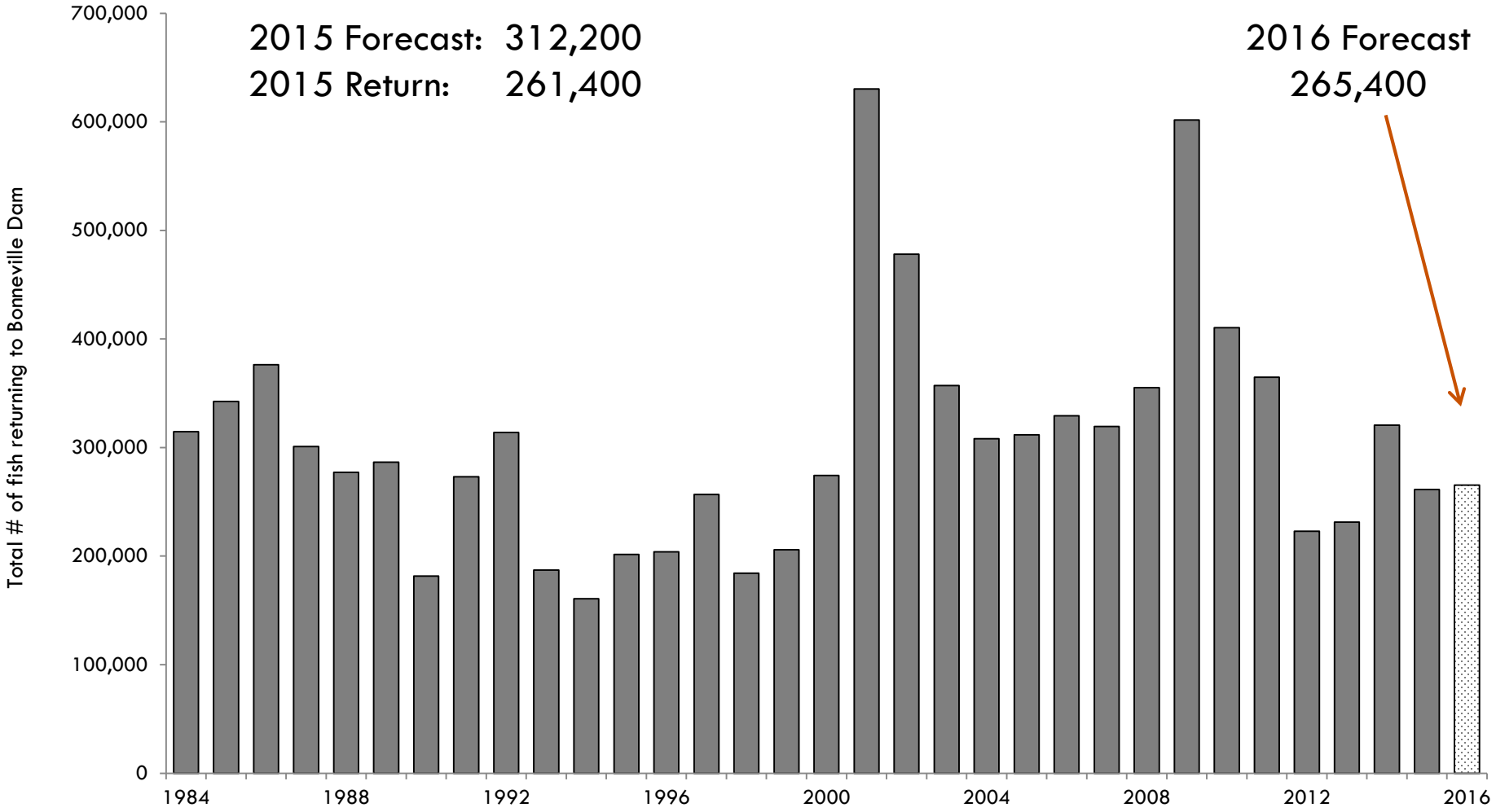
Columbia River Sockeye



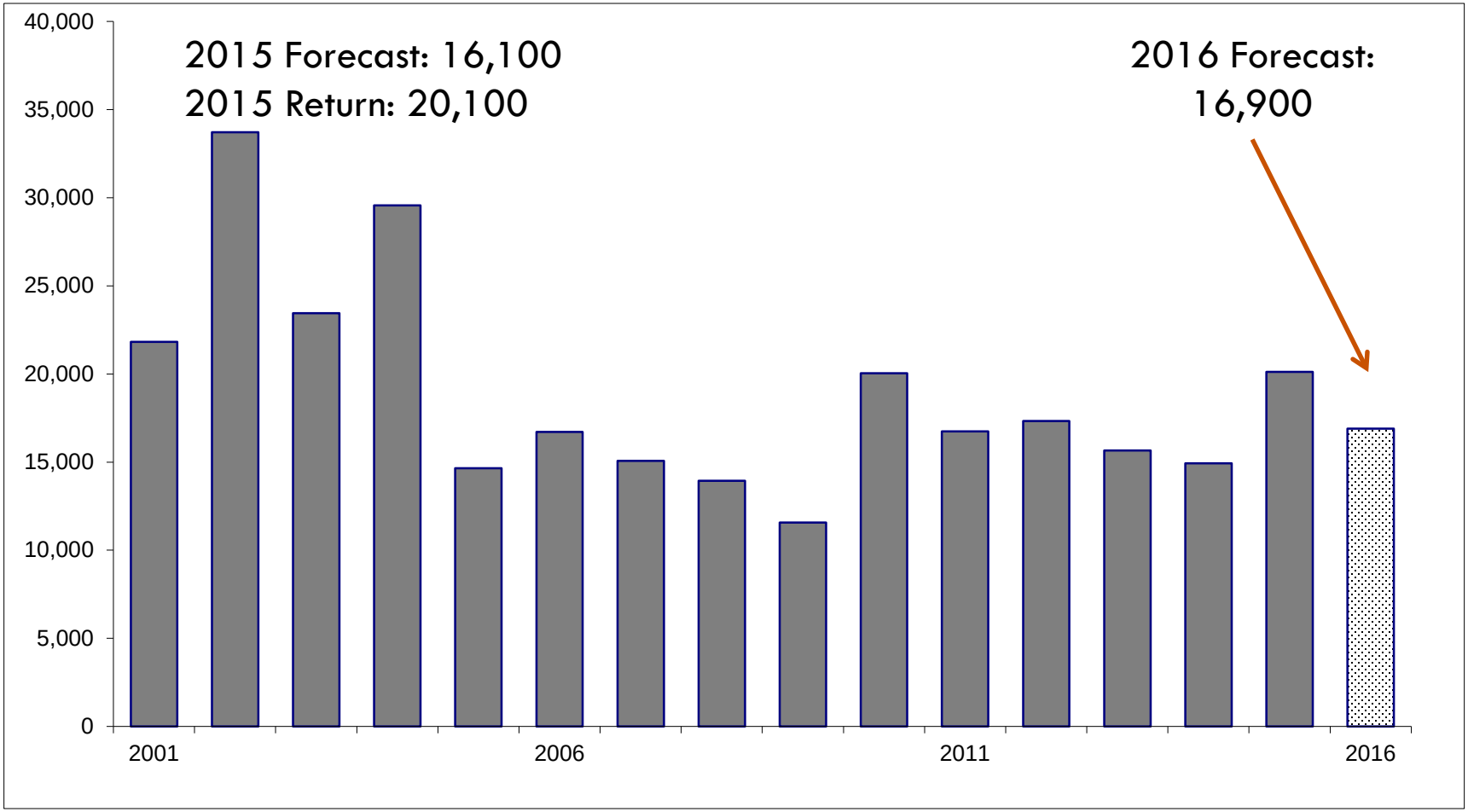
Columbia River Sockeye



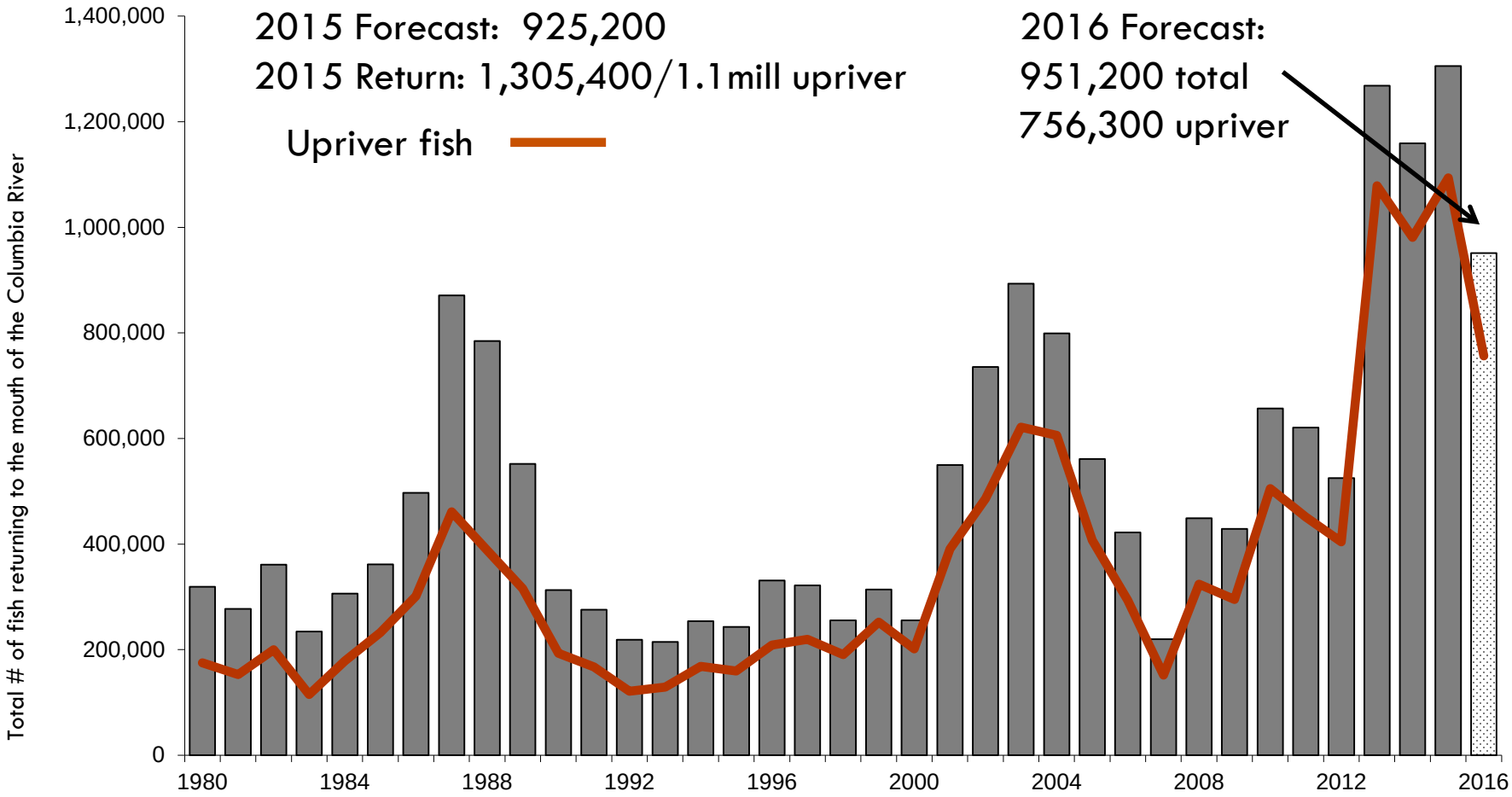
Upriver Summer Steelhead



Wild Winter Steelhead



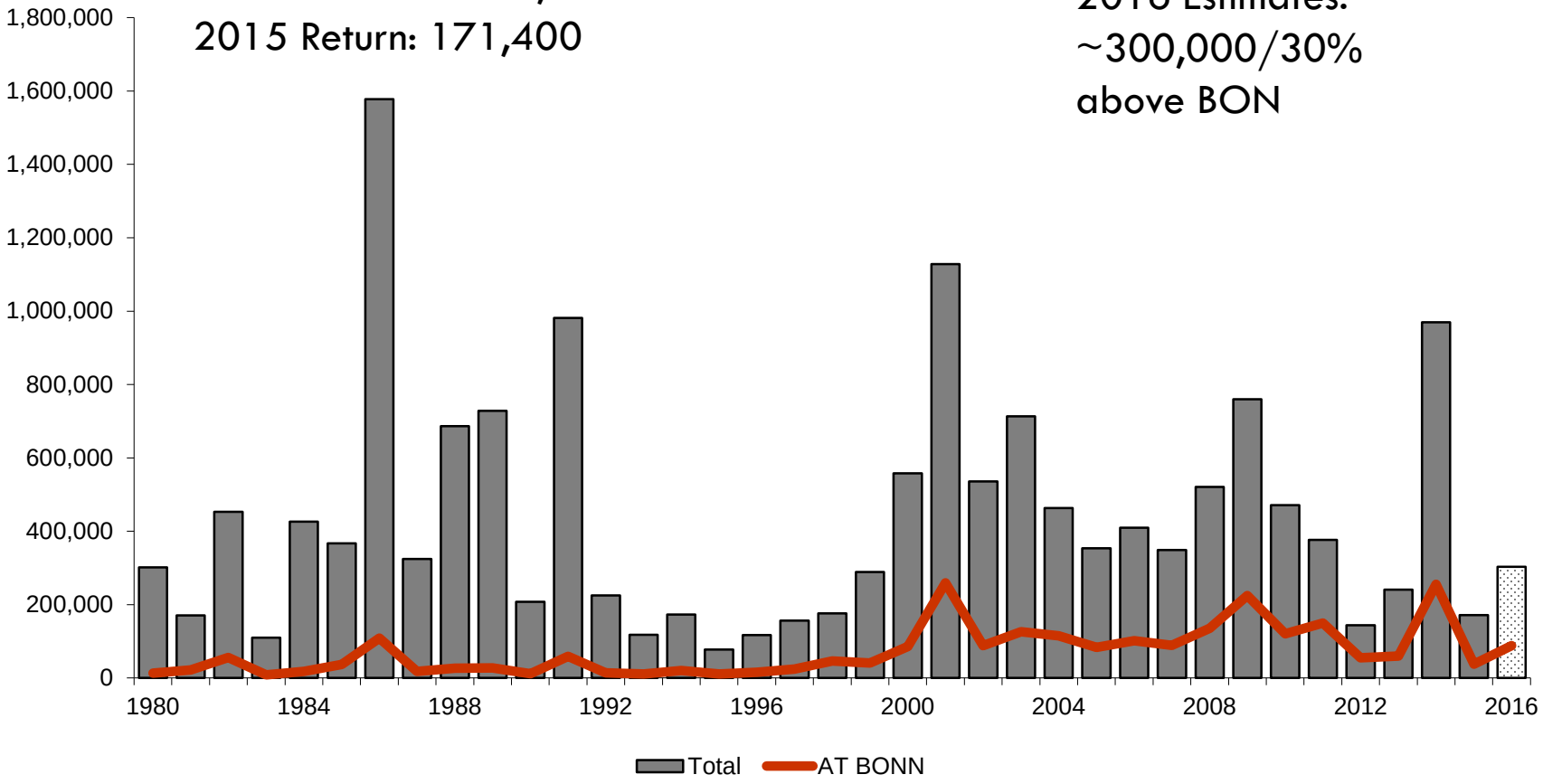
Total Fall Chinook



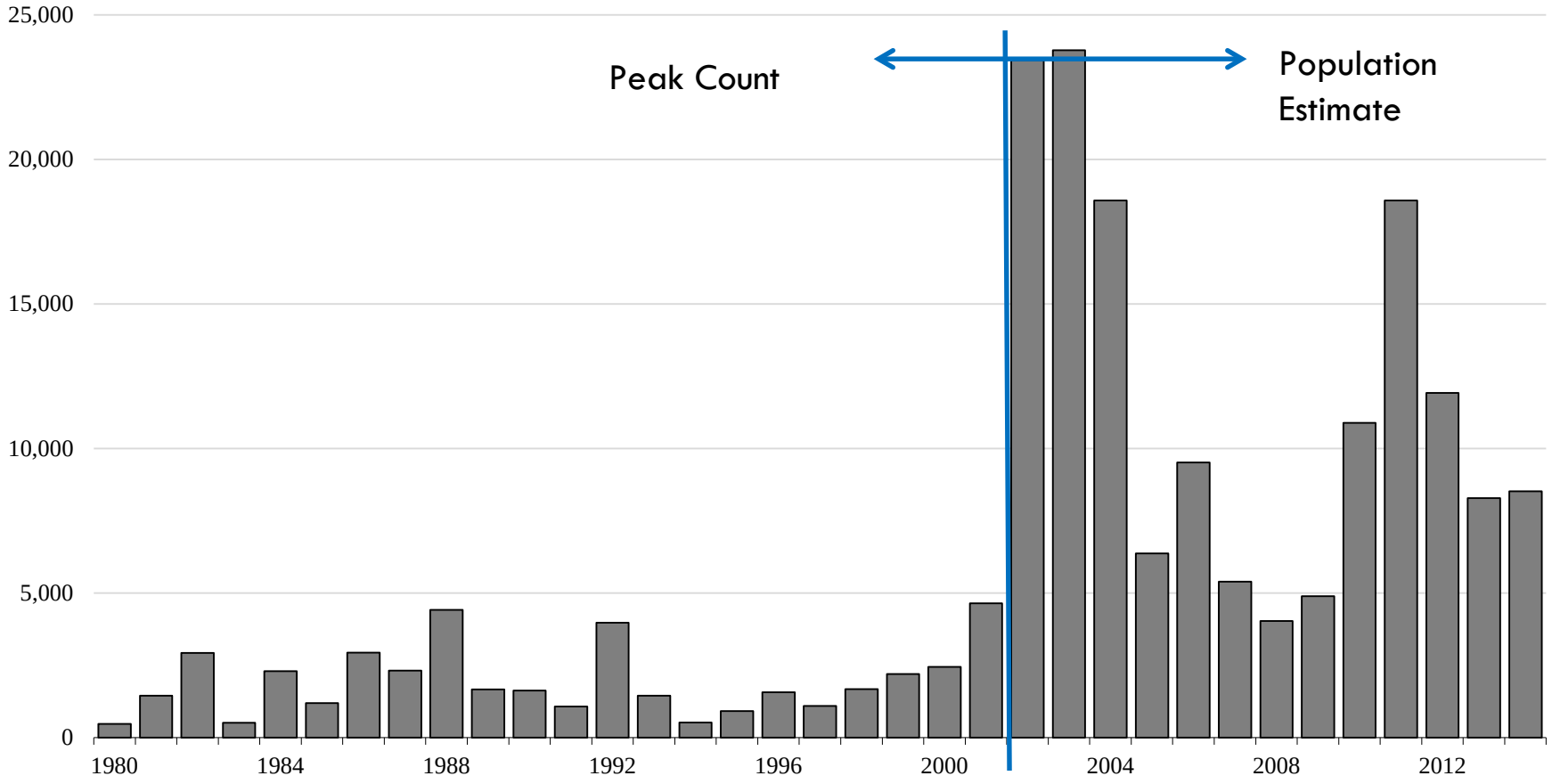
Columbia River Coho Returns

2015 Forecast: 539,600
2015 Return: 171,400

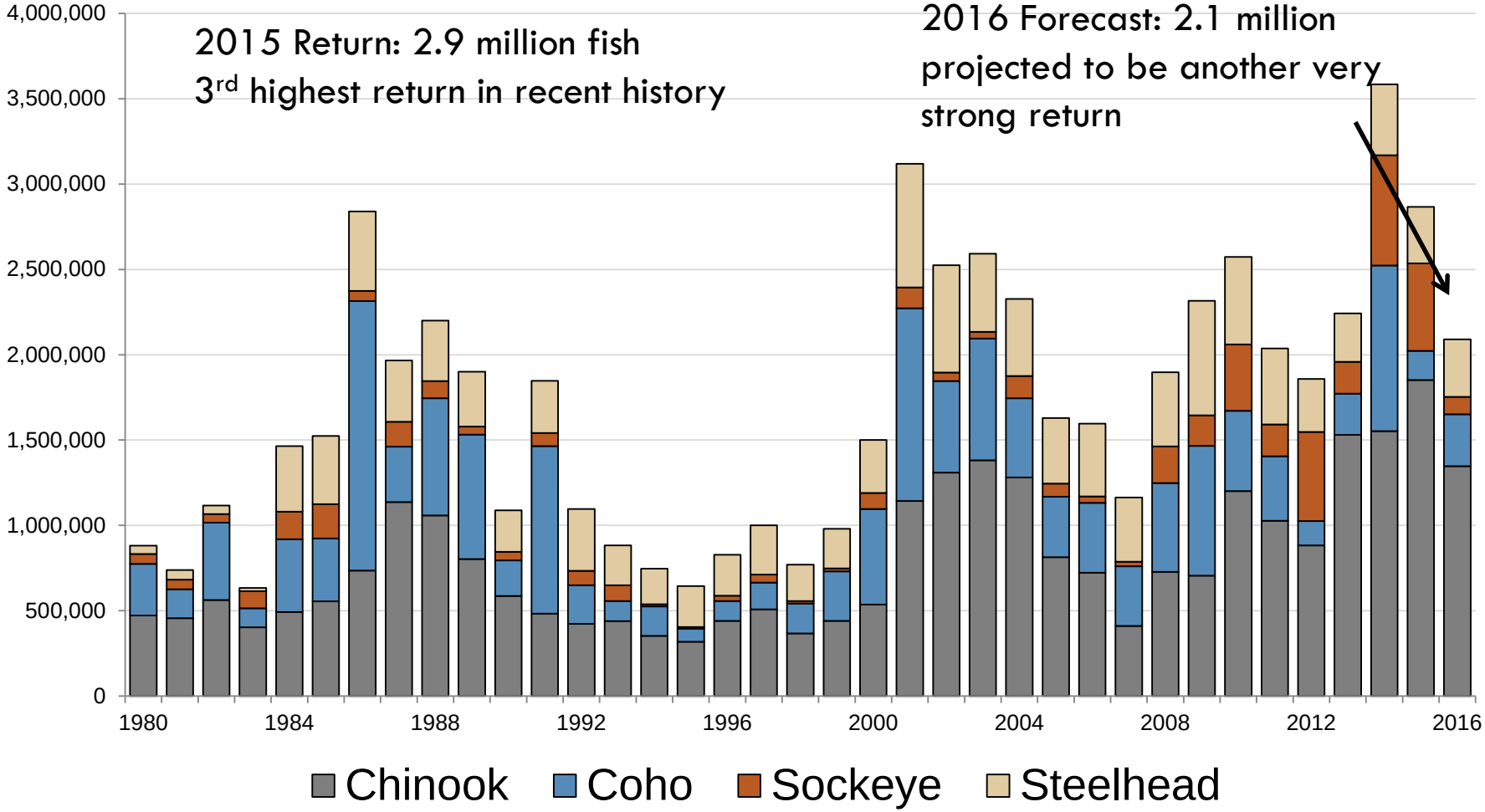
2016 Estimates:
~300,000/30%
above BON



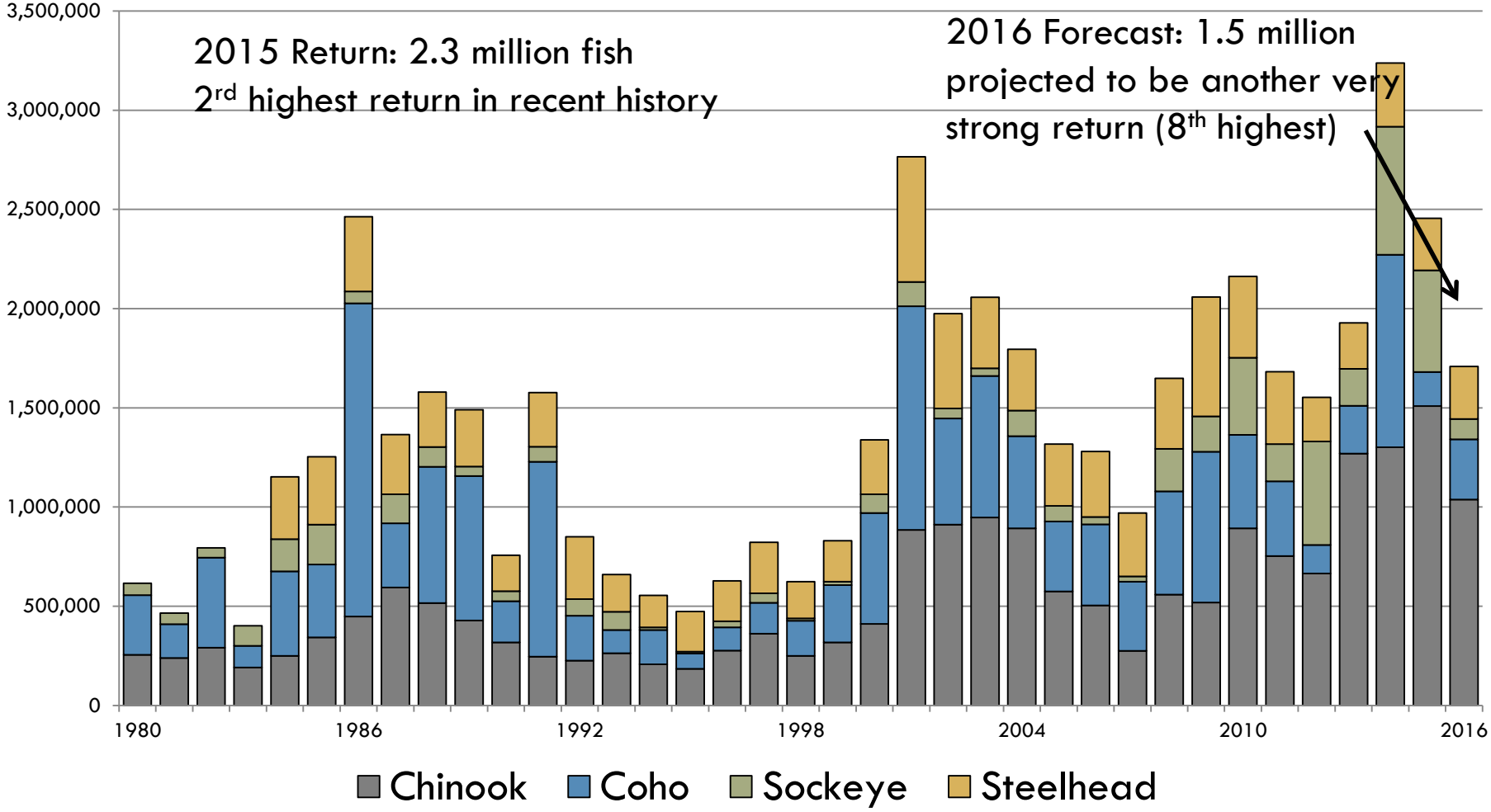
Columbia River Chum



TOTAL Return of Salmonids to the Columbia River



UPRIVER Salmonids Returning to the Columbia River



2015 Non-Indian Sport Fisheries

- Spring Chinook
  - Below Bonneville:
    - 151,200 angler trips
    - 19,600 hatchery fish kept
  - Bonneville to WA/OR border:
    - 1,600 hatchery fish kept
  - Snake River (WA waters):
    - 1,900 hatchery fish kept
- Summer Season
  - Below Bonneville:
    - 50,600 angler trips
    - 5,900 hatchery Chinook
    - 4,600 hatchery steelhead
    - 1,000 sockeye
  - Bonneville - Priest Rapids:
    - 700 hatchery Chinook
    - 70 sockeye
  - Priest Rapids – Chief Joseph:
    - 4,800 hatchery Chinook
    - 27,400 sockeye
- Fall Season
  - Buoy 10:
    - 108,300 angler trips
    - 36,500 Chinook kept
    - 36,900 hatchery coho kept
  - Below Bonneville:
    - 131,400 angler trips
    - 41,500 Chinook kept
    - 1,000 hatchery coho kept
    - 4,200 hatchery steelhead kept
  - Hanford Reach:
    - 48,500 angler trips
    - 33,900 Chinook kept

2015 Non-Indian Commercial Fisheries

MAINSTEM FISHERIES

- Spring Season –
  - 6,500 hatchery Chinook
    - 8 periods (91hrs total)
- Summer Season –
  - 3,900 Chinook/ 300 sockeye
    - 3 periods (32 hrs total)
- Fall Season –
  - 84,200 Chinook
  - 4,800 Coho
  - includes seine fishery:
    - 3,000 Chinook and 600 Coho

SELECT AREA FISHERIES

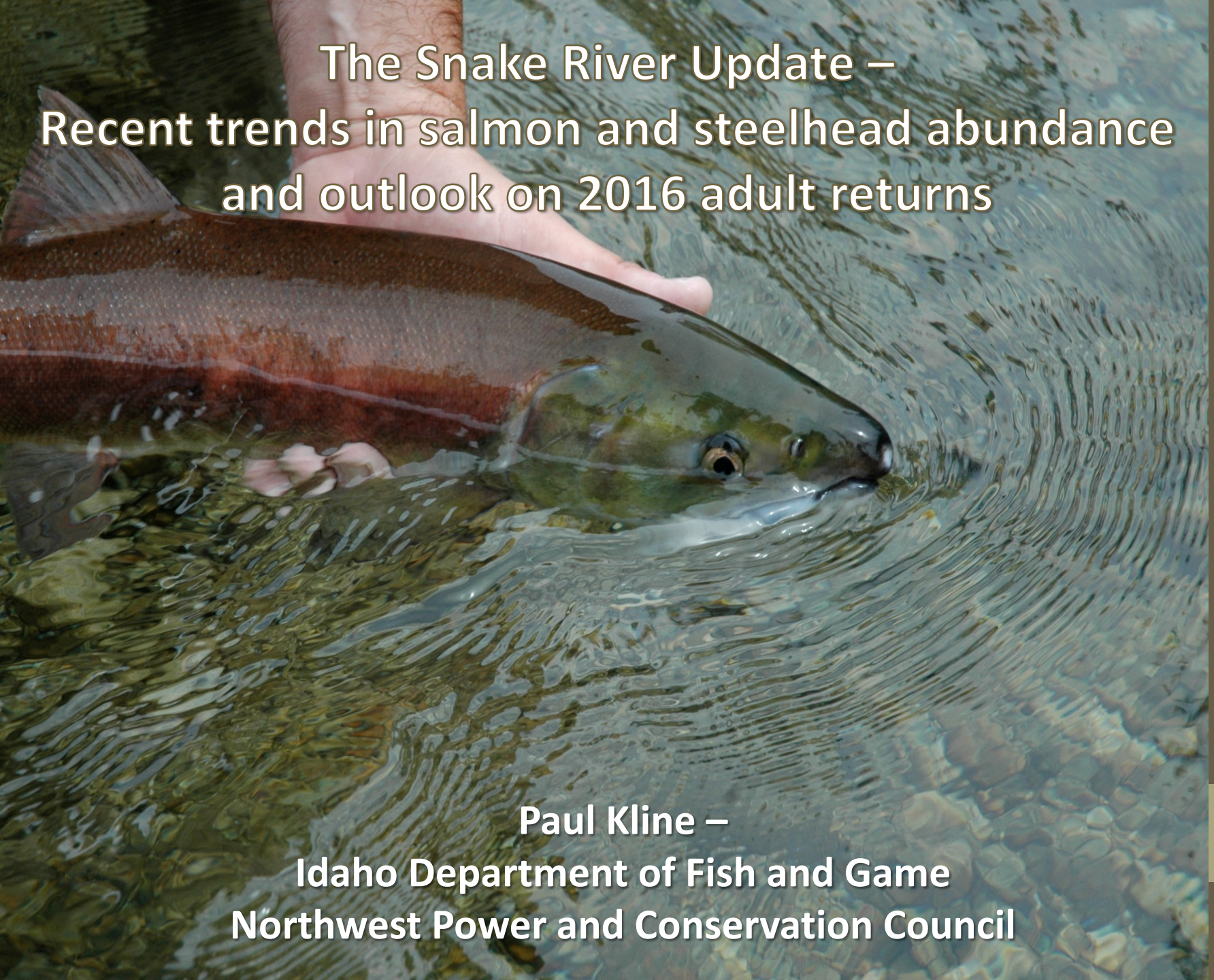
- Spring Season
  - 11,900 Chinook
- Summer Season
  - 1,800 Chinook
- Fall Season
  - 18,100 Fall Chinook
  - 27,400 Coho

2015 Treaty Indian Fisheries

Landed fish are either kept for ceremonial and subsistence (C&S) purposes, or sold commercially.

- Spring Chinook –
  - 31,200 fish
- Summer Chinook –
  - 37,800 fish
- Sockeye –
  - 31,200 fish
- Summer Steelhead –
  - 2,900 in spring/summer
  - 15,400 in fall
  - 18,300 TOTAL
- Fall Chinook –
  - 259,000
- Coho –
  - 2,700

Questions?



The Snake River Update – Recent trends in salmon and steelhead abundance and outlook on 2016 adult returns

Paul Kline –
Idaho Department of Fish and Game
Northwest Power and Conservation Council

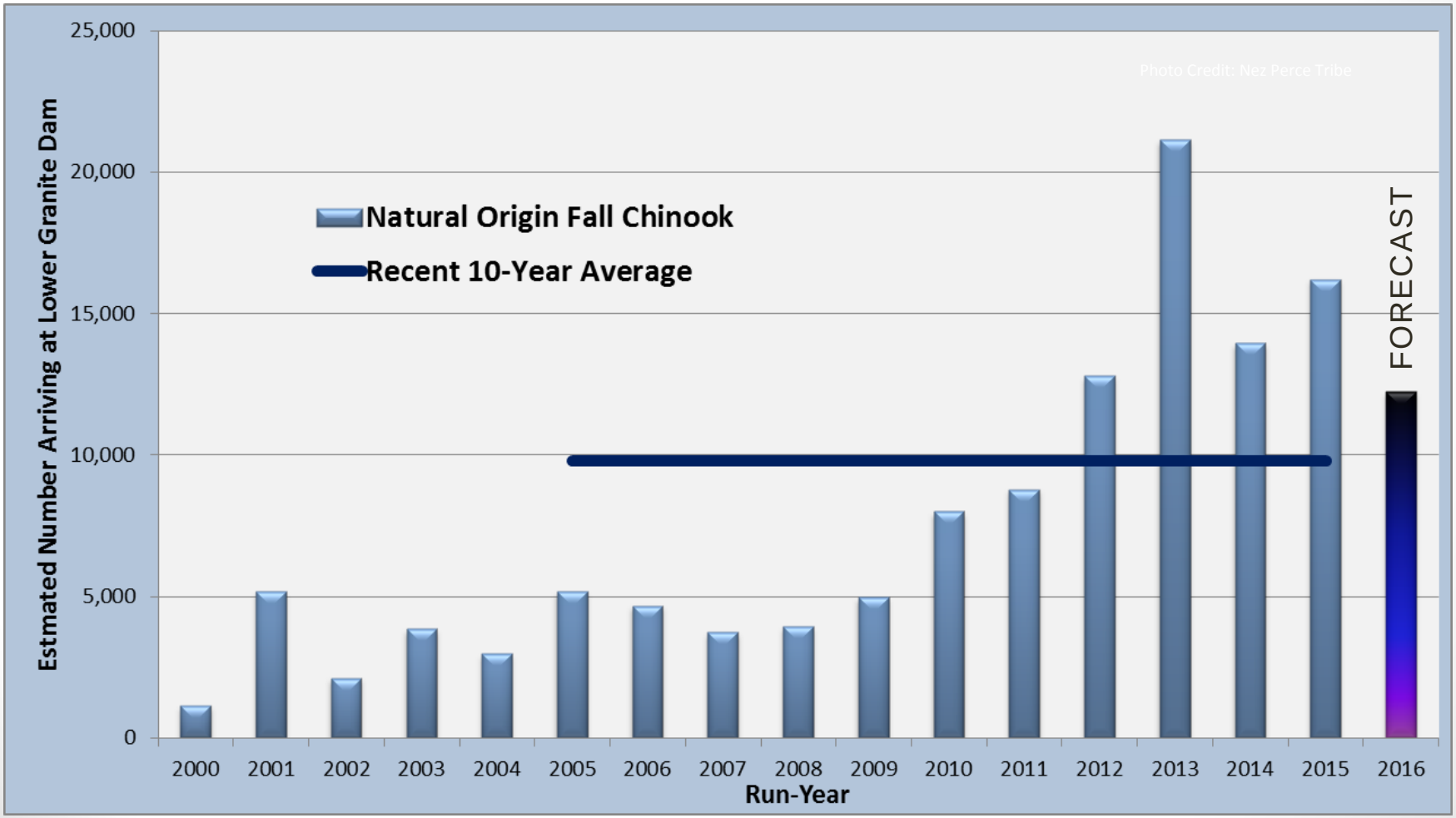
The Snake River Update – Recent trends in salmon and steelhead abundance and outlook on 2016 adult returns

Content:

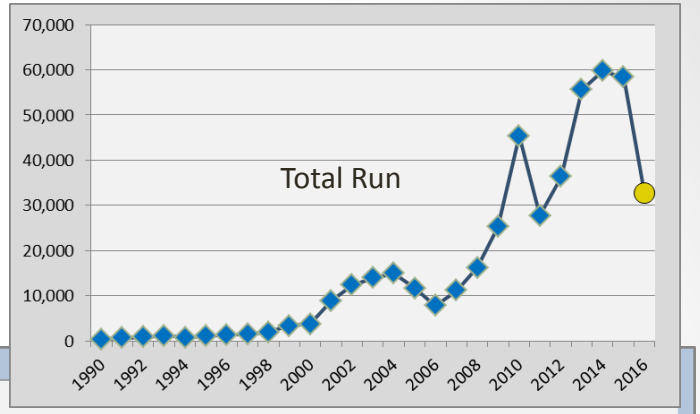
1. 2000-2015 time-series return information:
    a. Fall Chinook Salmon
    b. Sockeye Salmon
    c. Summer Steelhead
    d. Spring/Summer Chinook Salmon

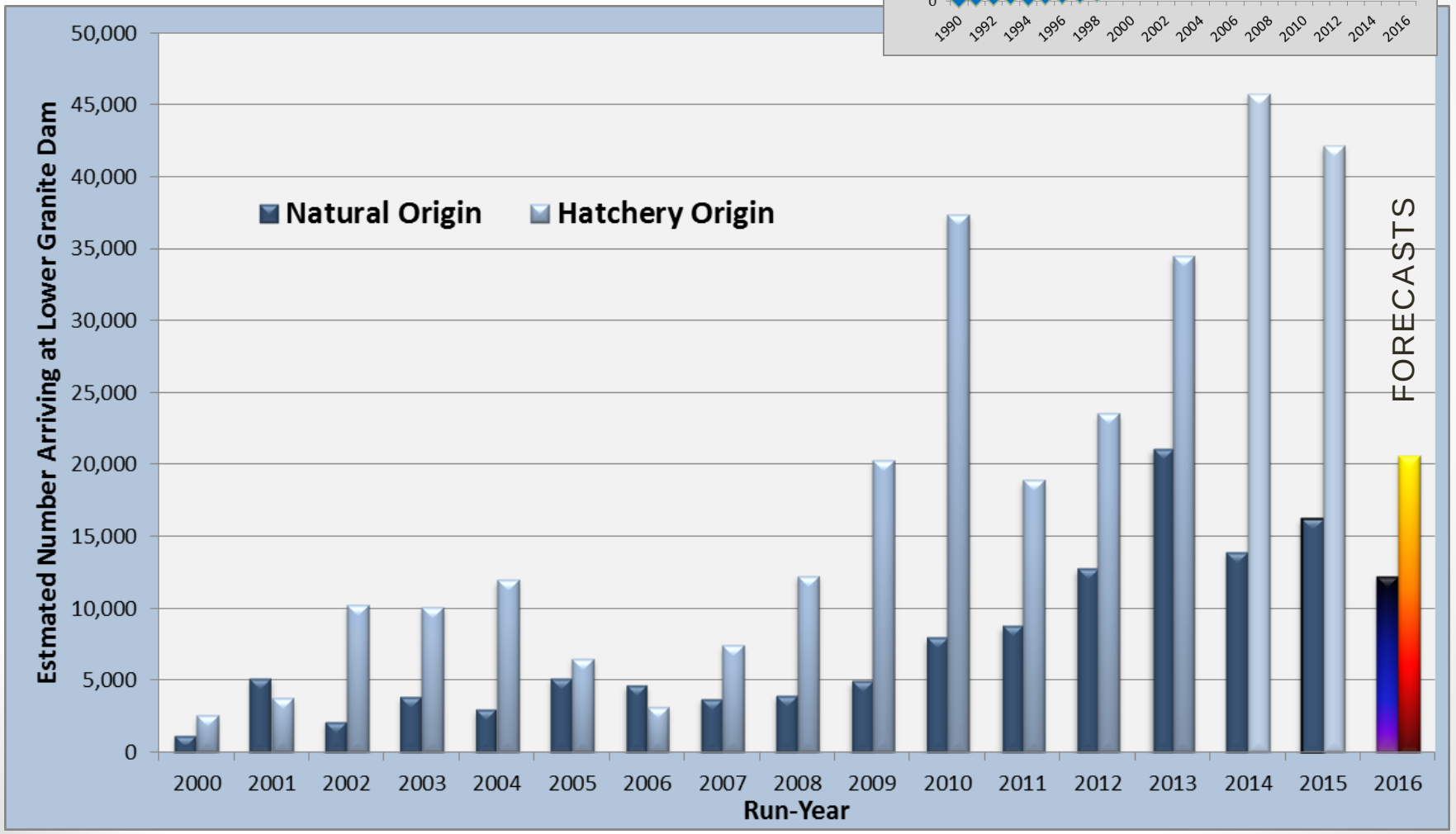
2. 2016 run-size forecasts for:
    a. Fall Chinook Salmon
    b. Sockeye Salmon
    c. Summer Steelhead
    d. Spring/Summer Chinook Salmon

Fall Chinook Salmon

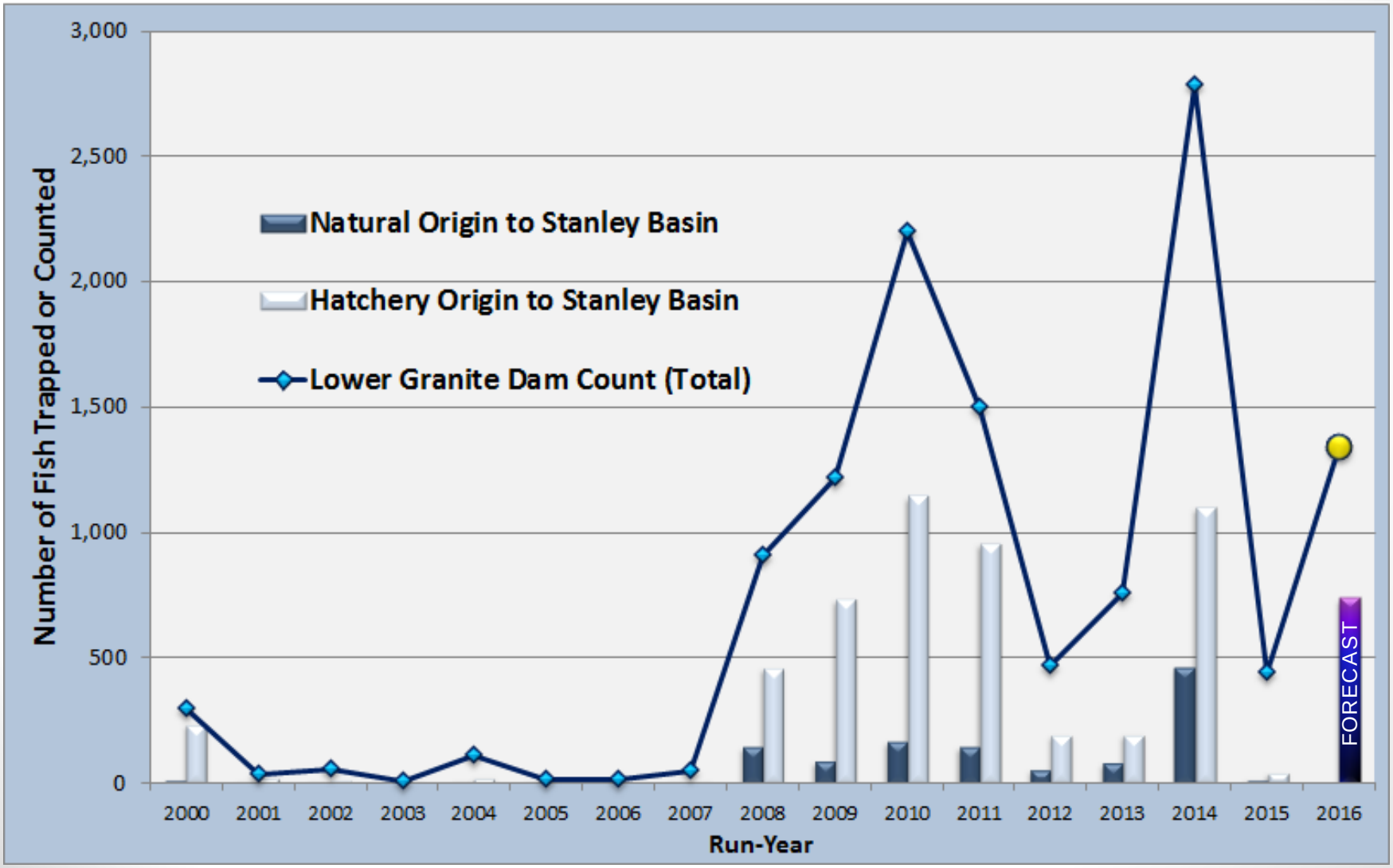


Fall Chinook Salmon

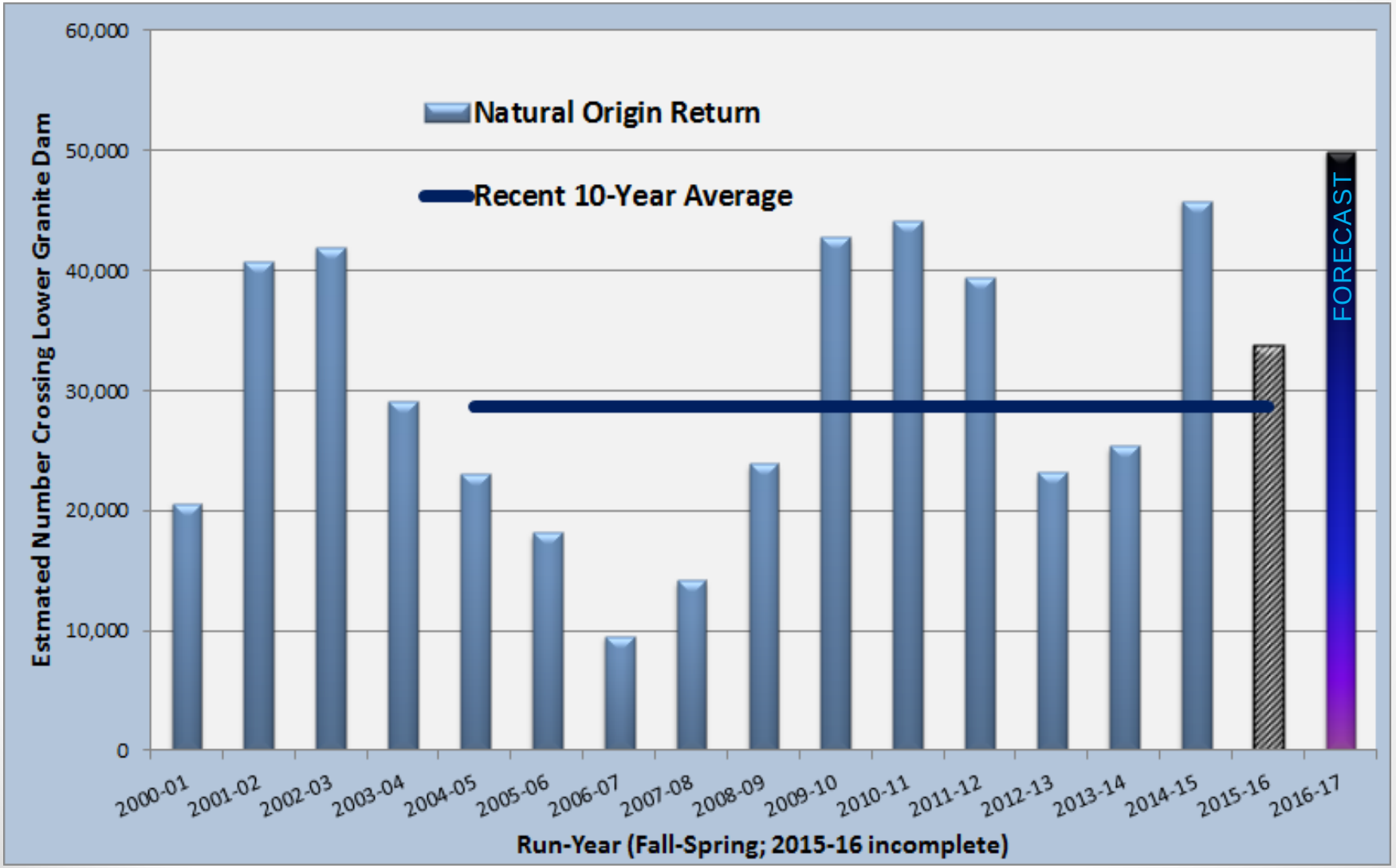




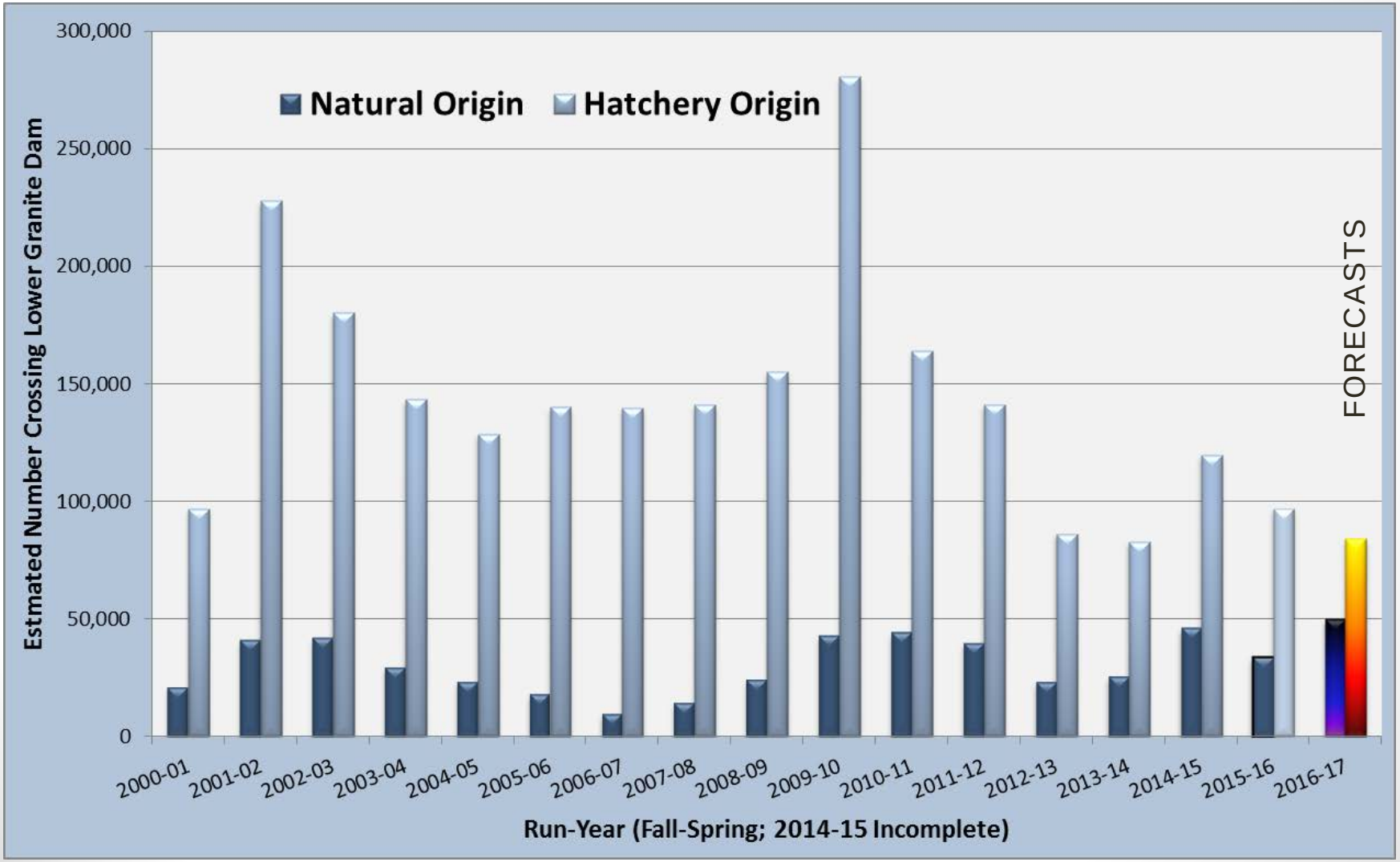
Sockeye Salmon



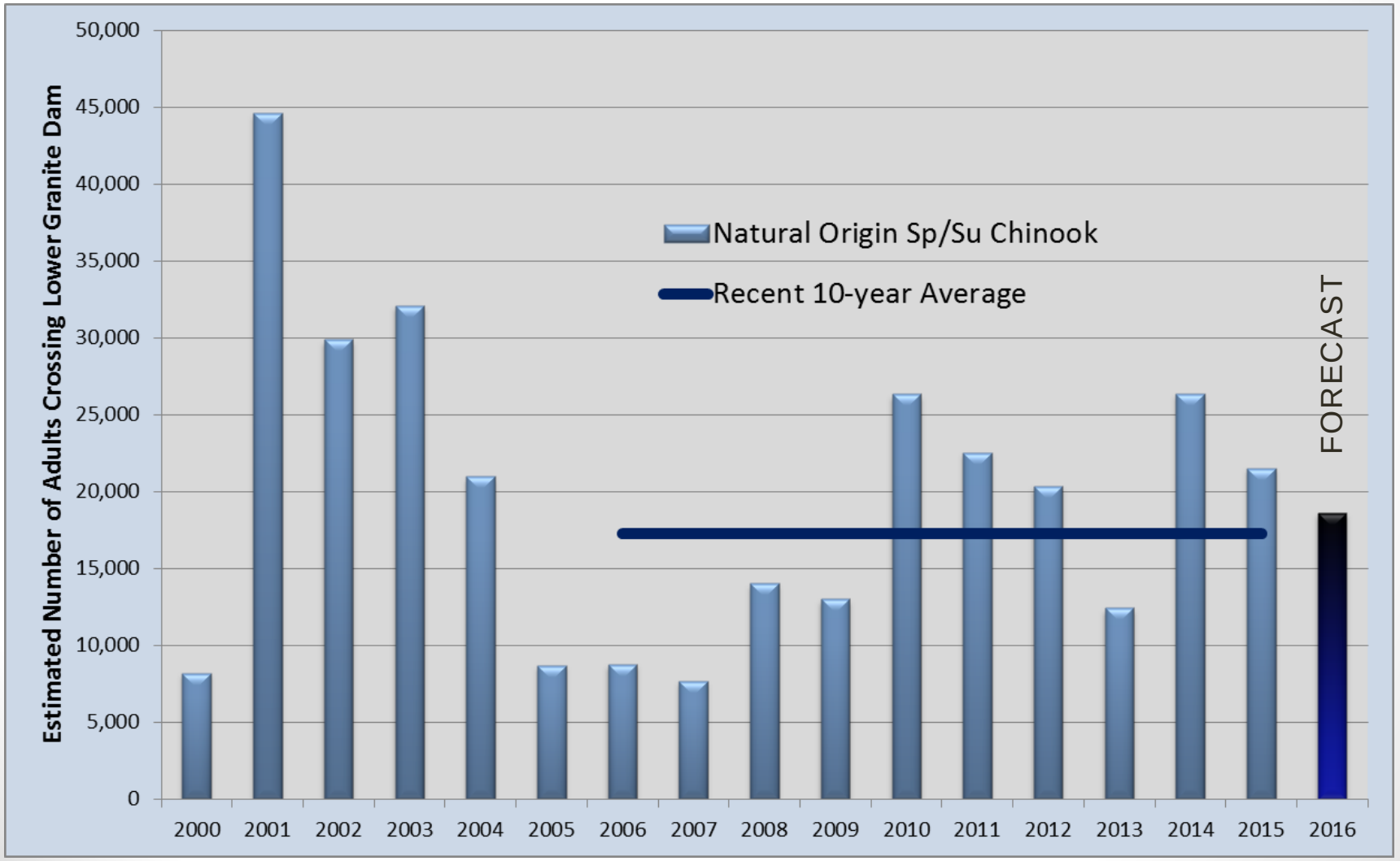
Summer Steelhead



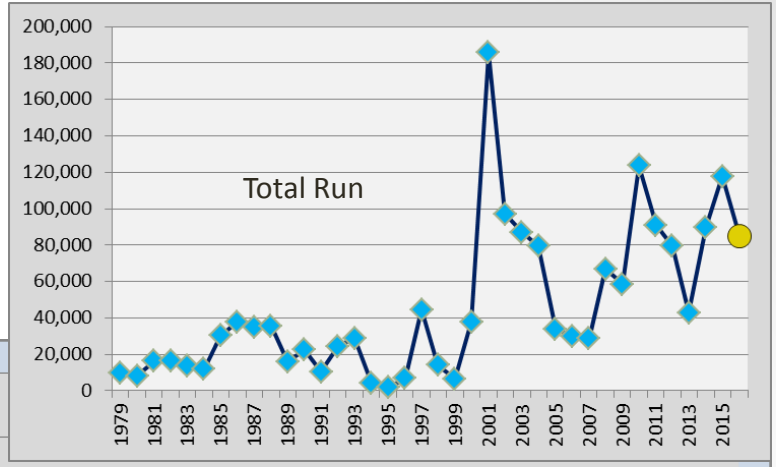
Summer Steelhead

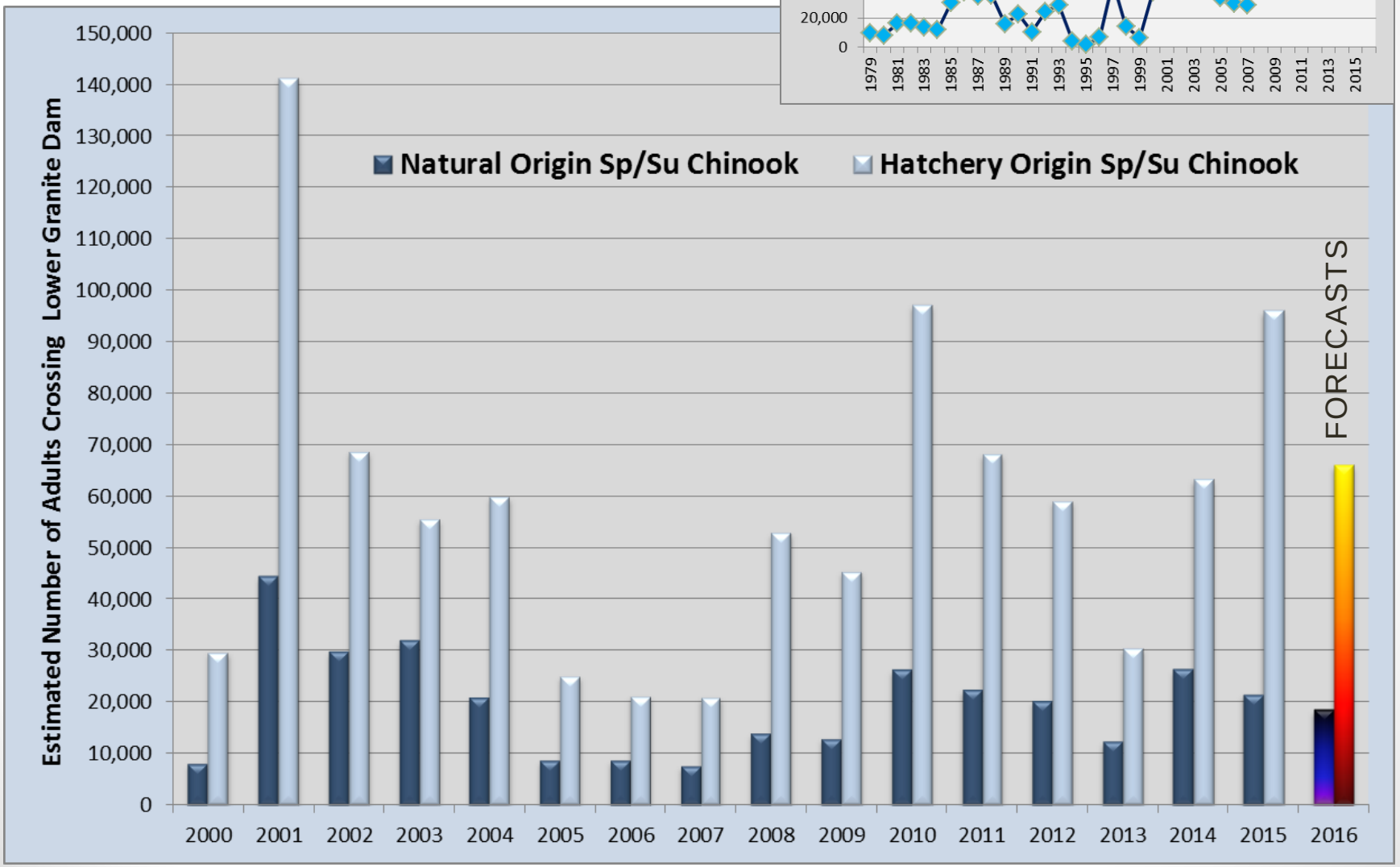


Spring/Summer Chinook Salmon



Spring/Summer Chinook Salmon





Questions ?

Wild Chinook salmon spawner in, Idaho

Recent Ocean Conditions and Outlooks for Salmon

Brian Burke, Kurt Fresh, Kym Jacobson, Cheryl Morgan, Brian Beckman, Bill Peterson, Jennifer Fisher, Ric Broduer, Antonio Baptista, Jessica Miller, Tom Wainwright, David Teel, Jen Zamon, Laurie Weitkamp, Mary Hunsicker, Elizabeth Daly, Marisa Litz, Beth Phillips, Paul Bentley, Susan Hinton, Others, I'm sure

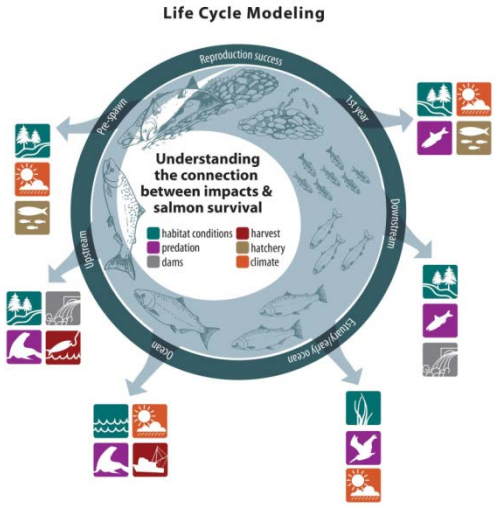
Northwest Power & Conservation Council Meeting, March 8th, 2016

Supported by:

From the Council's Ocean Forum discussion on March 4th, 2016:

What is the purpose of modeling?

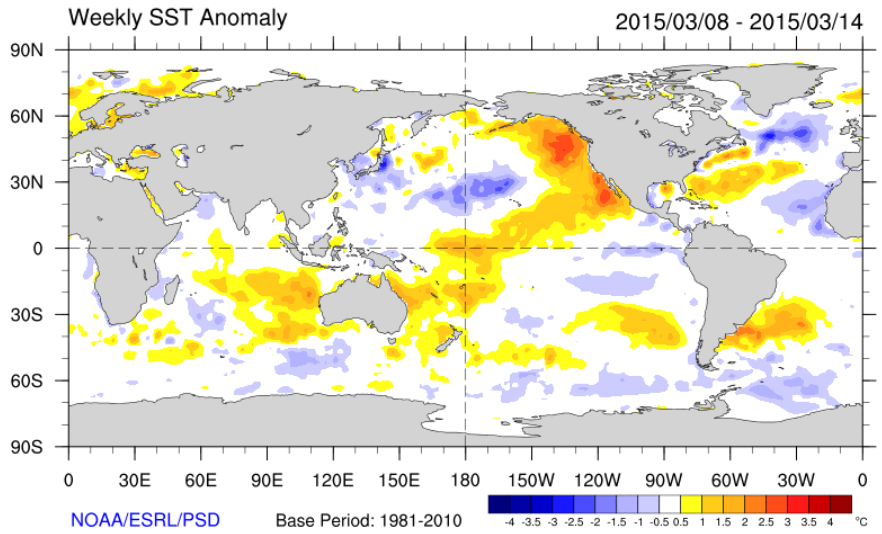
- Harvest management (multi-stock)
- Hatchery management (single-stock)
- Scientific exploration
- Life Cycle Model development



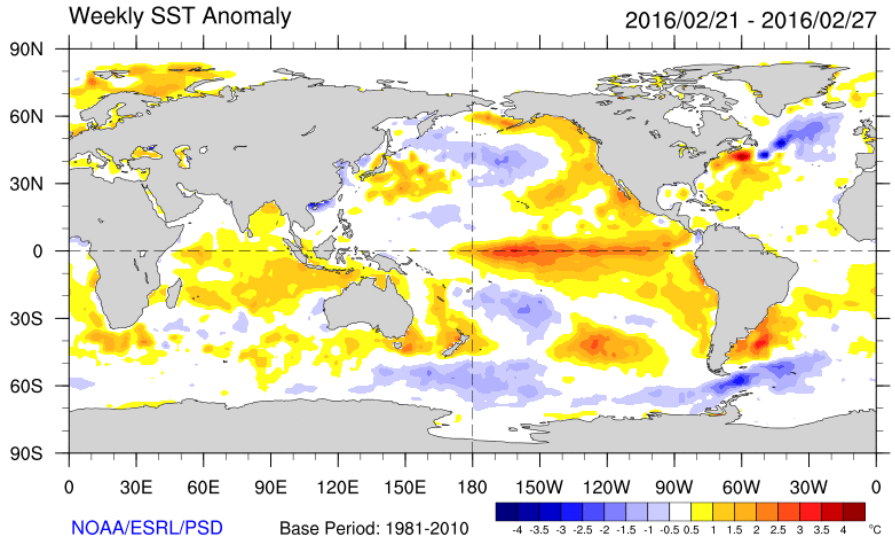
Chehalis hatchery

Pacific Basin Dynamics

March 2015

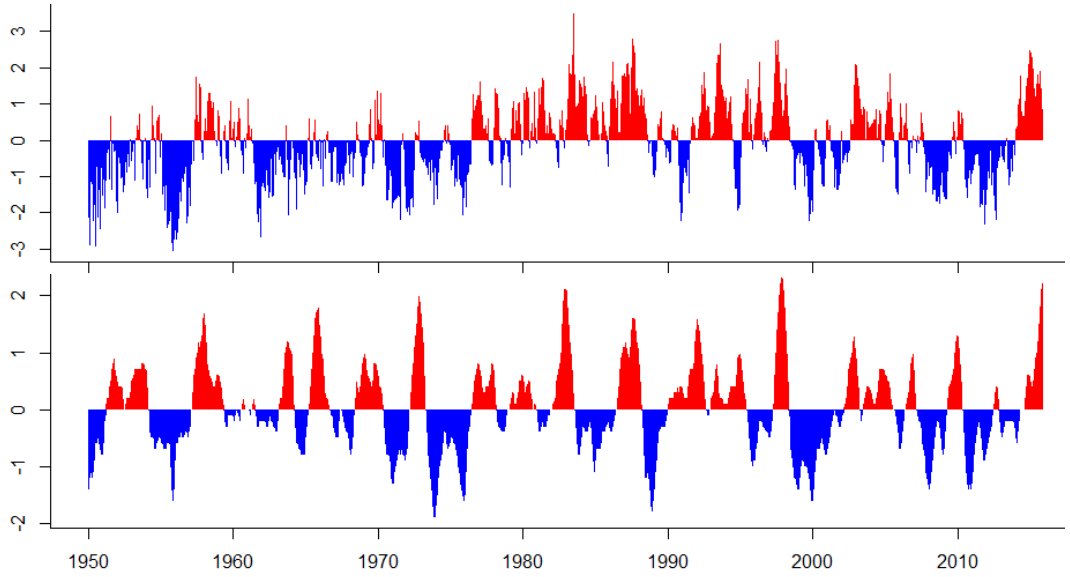


Last week

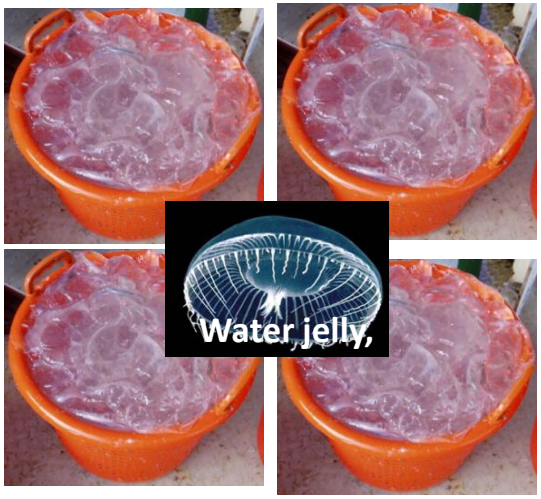


PDO

ONI



Unusual Ecology



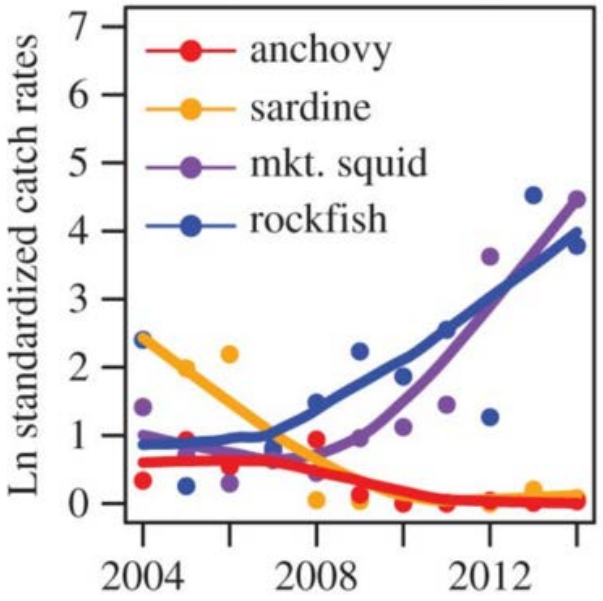
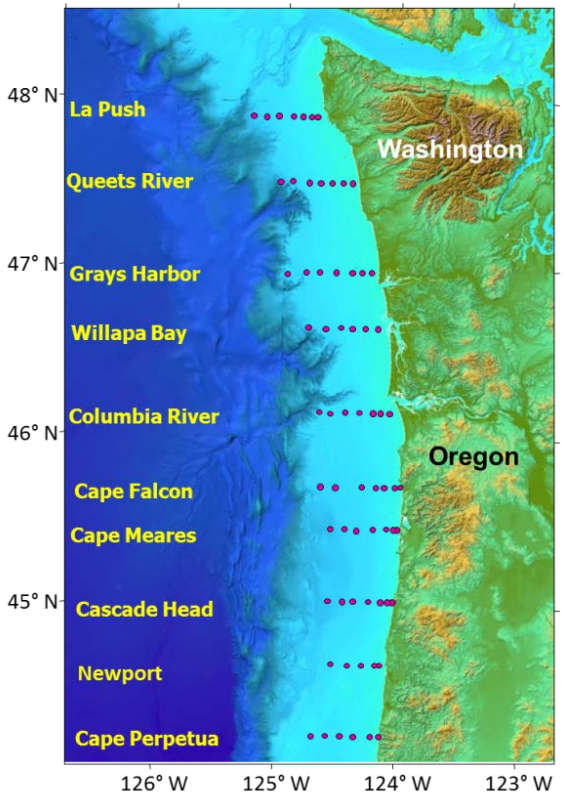


Figure 2a from McClatchie et al. 2016. Royal Society Open Science

Overall, the taxa most responsible for regime diet composition differences were changes in the amount of juvenile rockfishes eaten…

-Daly et al. 2015. PLoS One 10:e0144066

Qualitative Indicator Summary

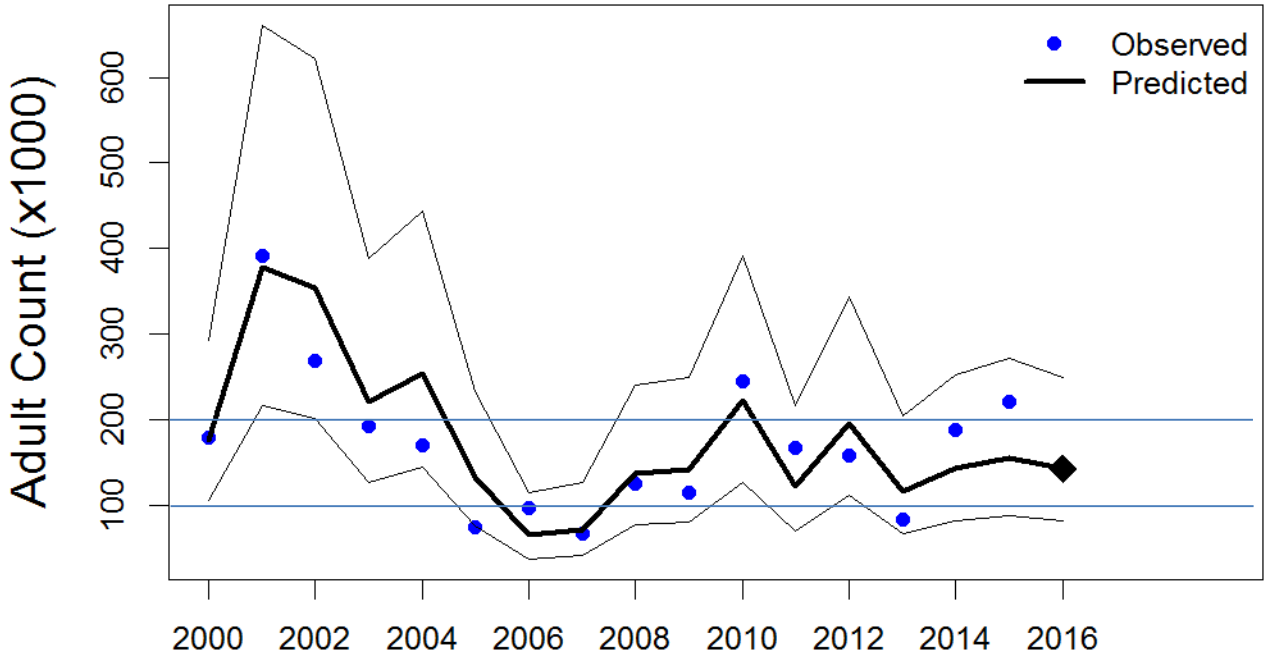


	Year																	
Ecosystem Indicators	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
PDO (Sum Dec-March)	16	6	3	12	7	17	11	15	13	9	5	1	14	4	2	8	10	18
PDO (Sum May-Sept)	10	4	6	5	11	15	14	16	12	13	2	9	7	3	1	8	17	18
ONI (Average Jan-June)	18	1	1	6	12	14	13	15	8	11	3	10	16	4	5	7	9	17
46050 SST (°C; May-Sept)	15	8	3	4	1	7	18	14	5	16	2	9	6	10	11	12	13	17
Upper 20 m T (°C; Nov-Mar)	17	11	8	10	6	14	15	12	13	5	1	9	16	4	3	7	2	18
Upper 20 m T (°C; May-Sept)	14	11	13	4	1	3	18	16	7	8	2	5	12	10	6	15	17	9
Deep temperature (°C; May-Sept)	18	6	8	4	1	9	12	14	10	5	2	7	13	11	3	17	16	15
Deep salinity (May-Sept)	18	3	7	4	5	14	15	8	6	1	2	11	16	10	9	13	17	12
Copepod richness anom. (no. species; May-Sept)	17	3	1	7	6	13	12	16	14	11	8	10	15	4	5	2	9	18
N. copepod biomass anom. (mg C m^{-3}; May-Sept)	17	13	9	10	3	15	12	18	14	11	6	8	7	1	2	4	5	16
S. copepod biomass anom. (mg C m^{-3}; May-Sept)	18	2	5	4	3	13	14	17	12	10	1	7	15	9	8	6	11	16
Biological transition (day of year)	17	11	6	7	8	12	10	16	15	3	1	2	14	4	9	5	13	18
Ichthyoplankton biomass (mg C 1000 m^{-3}; Jan-Mar)	18	9	2	5	7	16	15	11	14	13	1	10	3	12	8	6	17	4
Chinook salmon juvenile catches (no. km^{-2}; June)	17	4	5	15	10	12	16	18	11	8	1	6	7	14	3	2	9	13
Coho salmon juvenile catches (no. km^{-2}; June)	17	7	12	5	6	2	14	18	15	3	4	9	10	13	16	1	11	8

http://www.nwfsc.noaa.gov/oceanconditions

Spring Chinook at Bonneville Dam

March 15 – May 31



Outlook for 2016: 142K

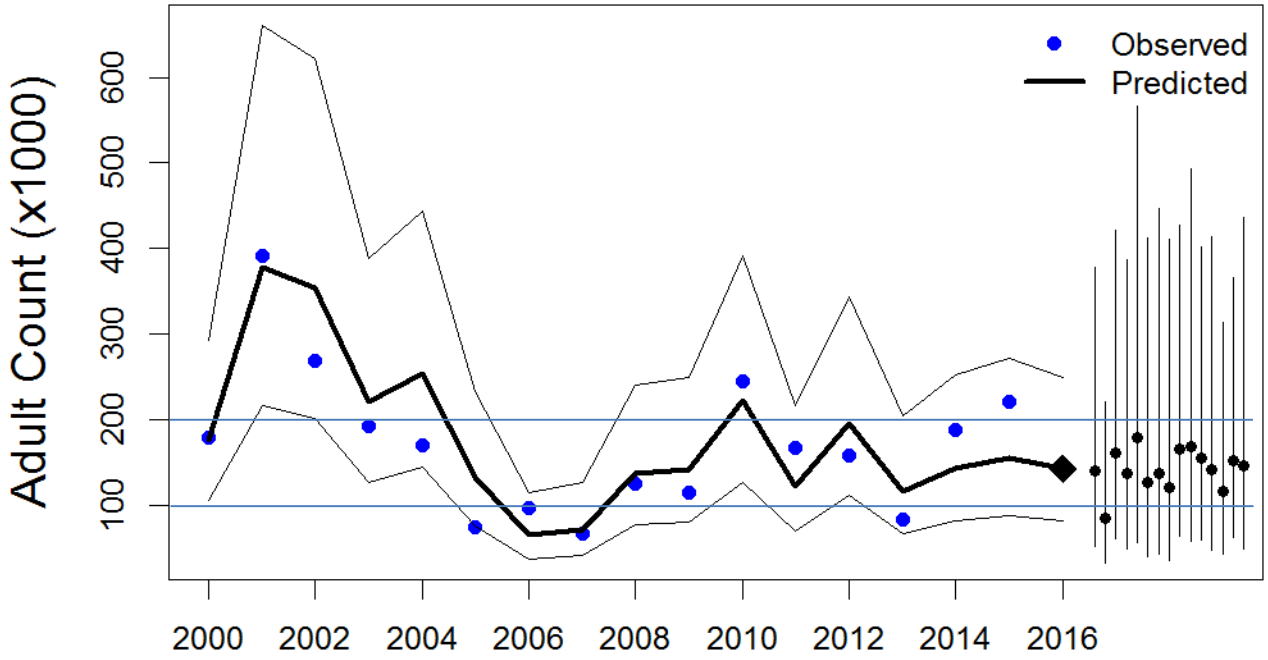
Dynamic Linear Models

With jack counts and the first Principal Component of the stoplight chart variables

Data from Columbia Basin Research, DART

Spring Chinook at Bonneville Dam

March 15 – May 31



Outlook for
2016: 142K
2017: 94K*

*Does not include jacks

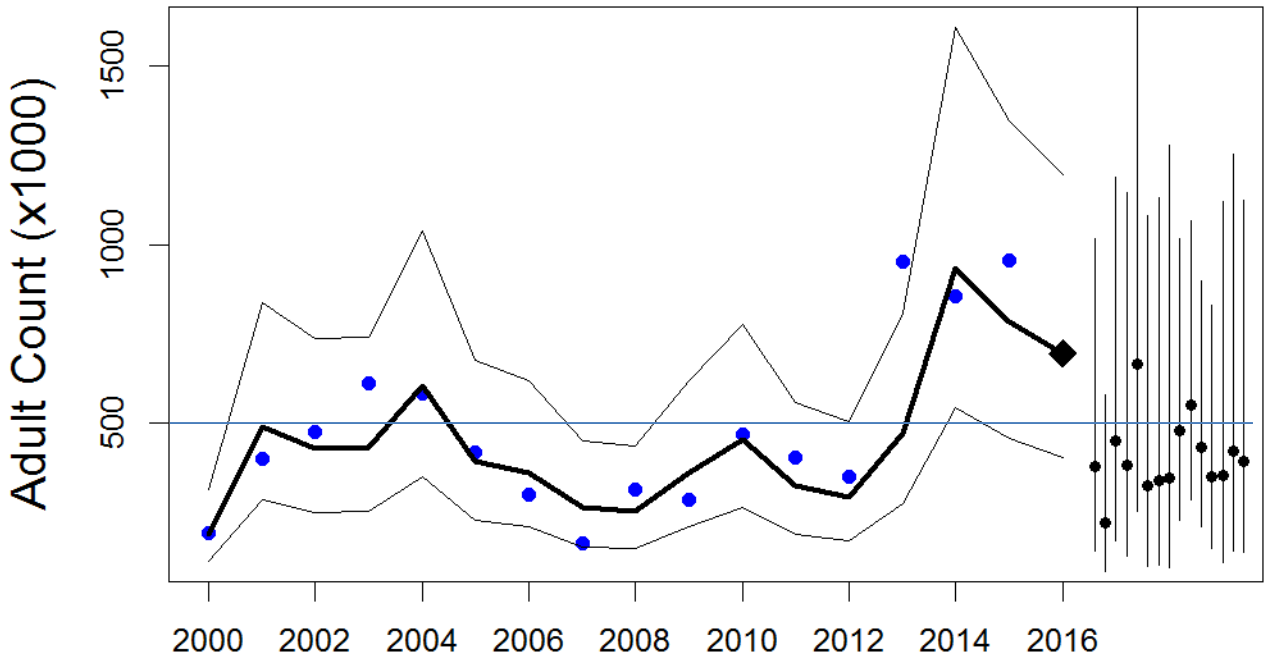
Dynamic Linear Models

With jack counts and the first Principal Component of the stoplight chart variables

Also shown: Linear regressions with jacks and single ocean indicators

Data from Columbia Basin Research, DART

Fall Chinook at Bonneville Dam

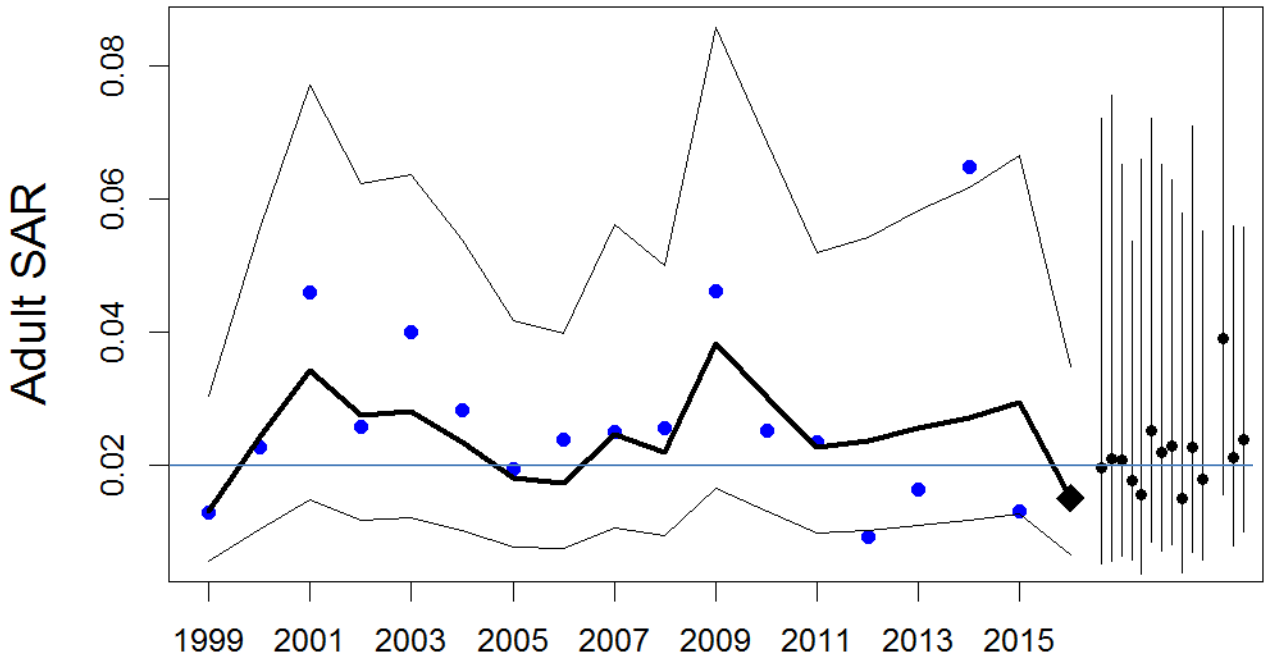


Outlook for
2016: 660K
2017: 427K*

*Does not include jacks

Data from Columbia Basin Research, DART

OPIH coho survival



Outlook for 2016: 1.5%

Steelhead

Refocused May sampling has allowed us to better characterize ocean dynamics for steelhead