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April 3, 2018

### MEMORANDUM

**TO: Fish and Wildlife Committee Members**

**FROM: Lynn Palensky**

**SUBJECT: White sturgeon status reports for the Columbia River Basin**

### BACKGROUND:

#### Presenters:

- Art Martin, Oregon Department of Fish and Wildlife (on behalf of both ODFW and Washington Department of Fish and Wildlife): will present on sturgeon *below Bonneville* (unimpounded populations)
- Blaine Parker, Columbia River Inter-Tribal Fish Commission: will present on sturgeon from *Bonneville to McNary*
- Laura Heironimus, Washington Department of Fish and Wildlife: *Lower Snake*
- Jason McLellan, Colville Confederated Tribes, and Brent Nichols, Spokane Tribe of Indians: will present on sturgeon in the *Upper Columbia*
- Shawn Young, Kootenai Tribe of Idaho and Ryan Hardy, Idaho Department of Fish and Game: will present on *Kootenai River* ESA-listed sturgeon population

**Summary:** Representatives from the Program-funded sturgeon projects will each give a short report on sturgeon in their particular management areas within the basin. Reports will cover population status, ongoing work, challenges, accomplishments, partners, and future needs for sturgeon. The most recent sturgeon [updates](#) occurred in September 2017 on populations and activities in the [mid](#) and [Upper Columbia](#), and in [March 2017](#) for sturgeon populations and activities below McNary Dam. The Kootenai White sturgeon population report occurred over two years ago.

**Relevance:** One of the many sturgeon measures in the 2014 Program calls on the “*Action Agencies and state agencies and tribes to report on sturgeon in the Columbia Basin on a regular basis*”. These reports will also help inform the upcoming Program amendment discussions and recommendations for white sturgeon.

**Workplan:** The work is being tracked in the Division’s annual work plan as a high priority task, and sturgeon are listed as an [emerging priority](#) in the Council’s 2014 Fish and Wildlife Program. See Program language for White Sturgeon [here](#).

**Background:** Ten White sturgeon projects are currently being funded in the Program:

Project #	Project Title	Sponsor	Working Budget 2018
198605000	White Sturgeon Mitigation and Restoration in the Lower Columbia and Snake Rivers	Oregon Department Of Fish and Wildlife	\$1,619,827
198806400	Kootenai River White Sturgeon Aquaculture Conservation Facility	Kootenai Tribe of Idaho	\$3,051,908
200200200	Restore Natural Recruitment of Kootenai River White Sturgeon	Kootenai Tribe of Idaho	\$6,670,500
200715500	Develop a Master Plan for a Rearing Facility to Enhance Selected Populations of White Sturgeon in the Columbia River Basin	Columbia River Inter-Tribal Fish Commission	\$178,503
199502700	Lake Roosevelt Sturgeon Recovery	Spokane Tribe	\$505,982
200737200	Lake Roosevelt Sturgeon Hatchery	Spokane Tribe	\$269,222
200811600	White Sturgeon Enhancement	Colville Confederated Tribe	\$669,224
200845500	Sturgeon Management	Yakama Nation	\$152,300
200850400	Sturgeon Genetics	Columbia River Inter-Tribal Fish Commission	\$172,614
19886500	Kootenai River Fishery Investigations	Idaho Department of Fish and Game	\$500,000
		TOTAL	\$13,790,080

**More Info:**

- The Council’s White Sturgeon web [page](#)
- Columbia Basin White Sturgeon [Planning Framework](#)
- [Upper Columbia White Sturgeon Recovery Plan](#)
- [White Sturgeon Story Map \(new\)](#)

# Lower Snake River:

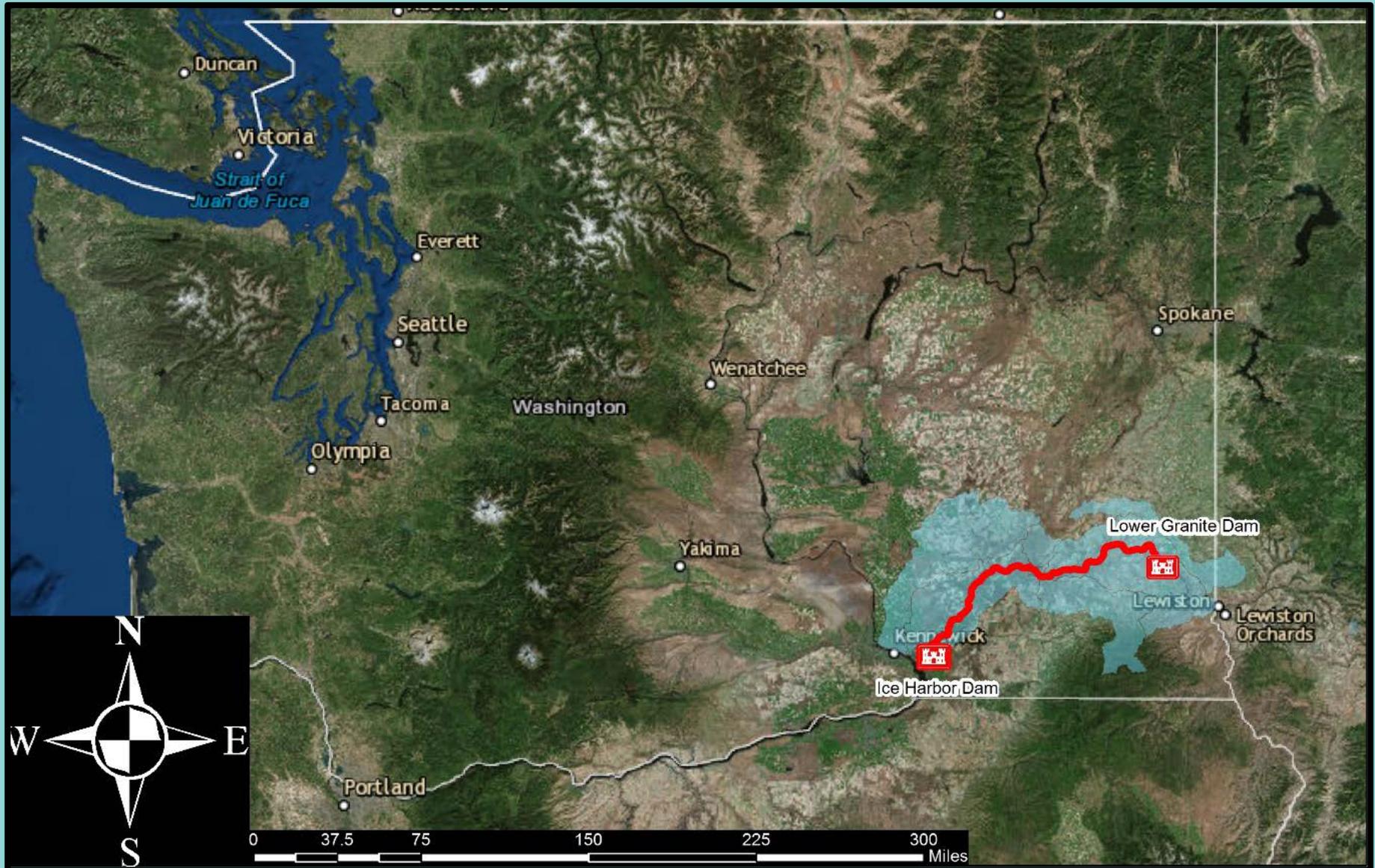
A status review of the White Sturgeon *Acipenser transmontanus* population



**Laura Heironimus, Olaf Langness, & Shaffryn Schade**

Columbia River Management Unit, April 10<sup>th</sup>, 2018

# Lower Snake River



# Outline

- Review past Lower Snake River population surveys
  - Stock Assessment
  - Age-0 Index Surveys
- Discuss management challenges
- Recommendations

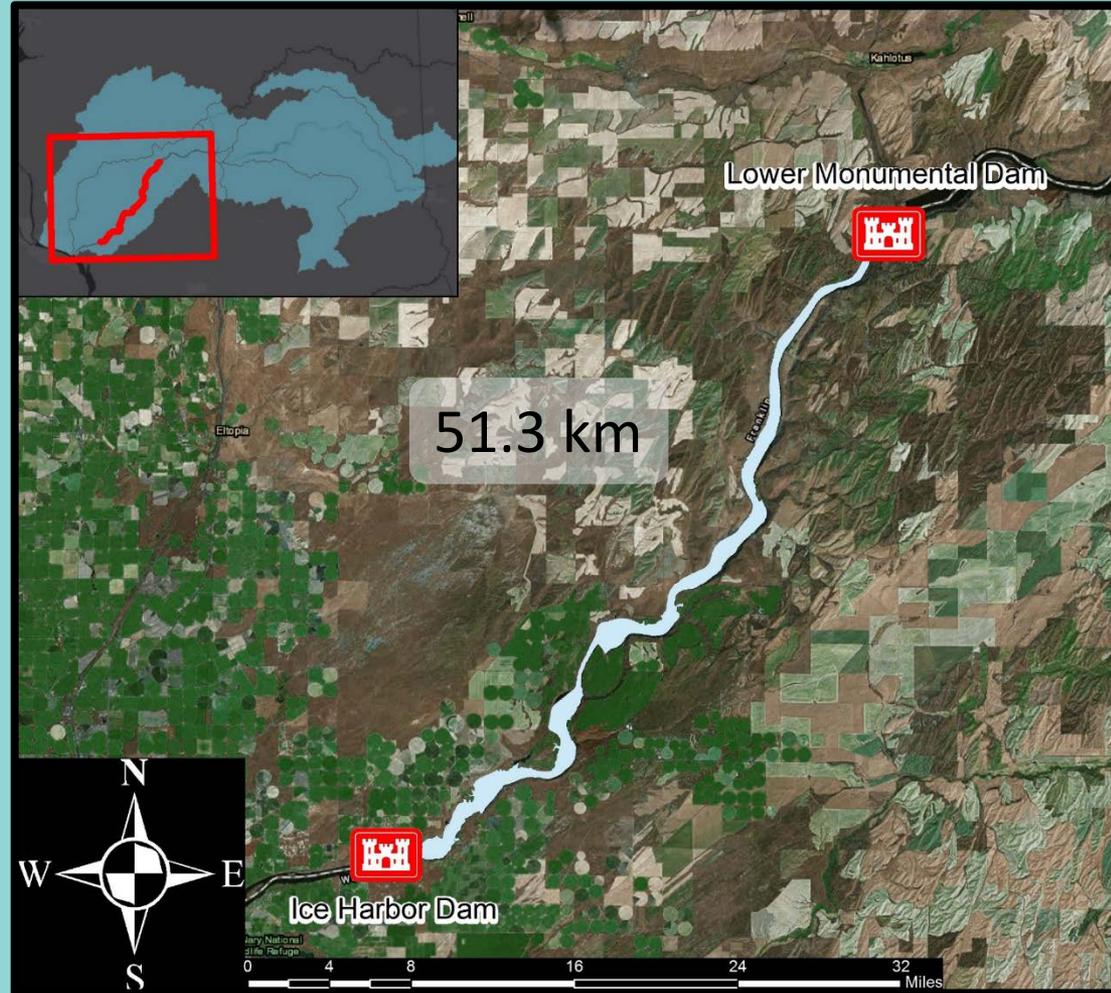
# Ice Harbor Reservoir

## Lake Sacajawea

- 9,200 acres
- Run of River

## Ice Harbor Dam

- Snake River KM 15.6
- Operational 1961





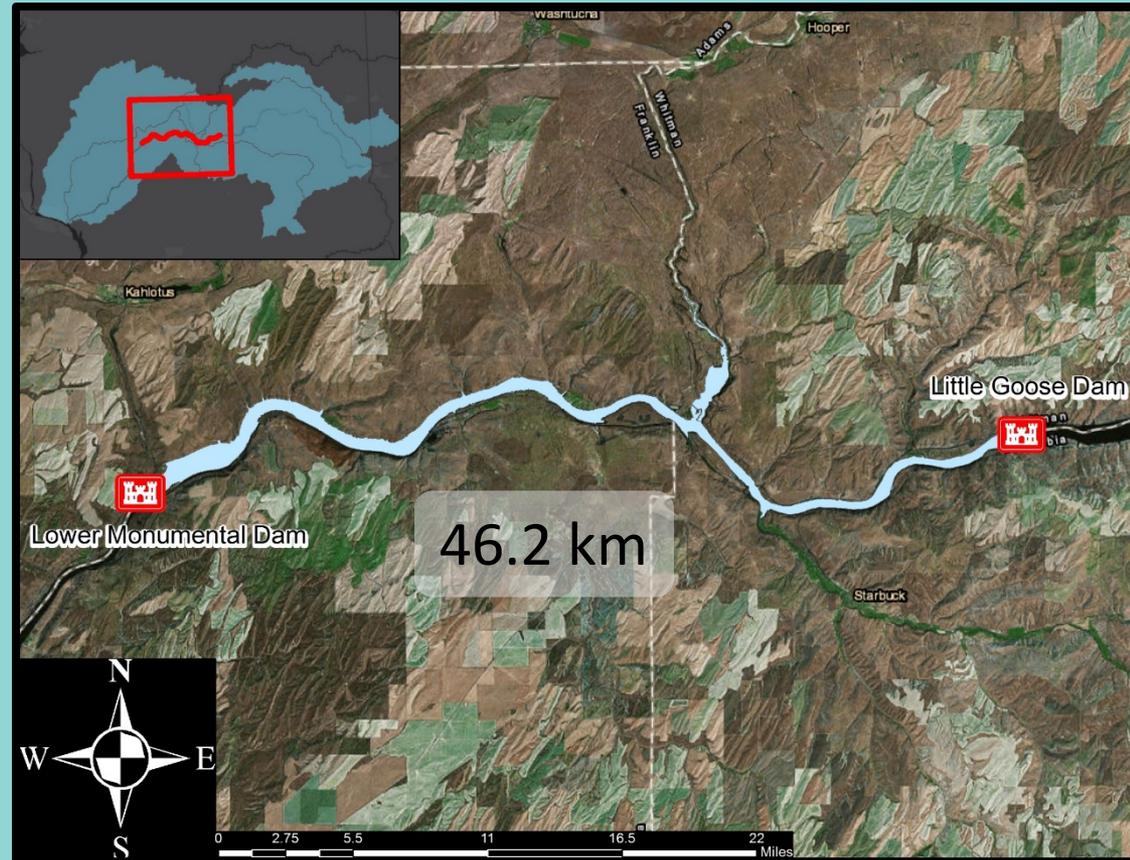
# Lower Monumental Reservoir

## Lake Herbert G. West

- 6,590 acres
- Run of River

## Lower Monumental Dam

- Snake River KM 66.9
- Operational 1969





# Little Goose Reservoir

## Lake Bryan

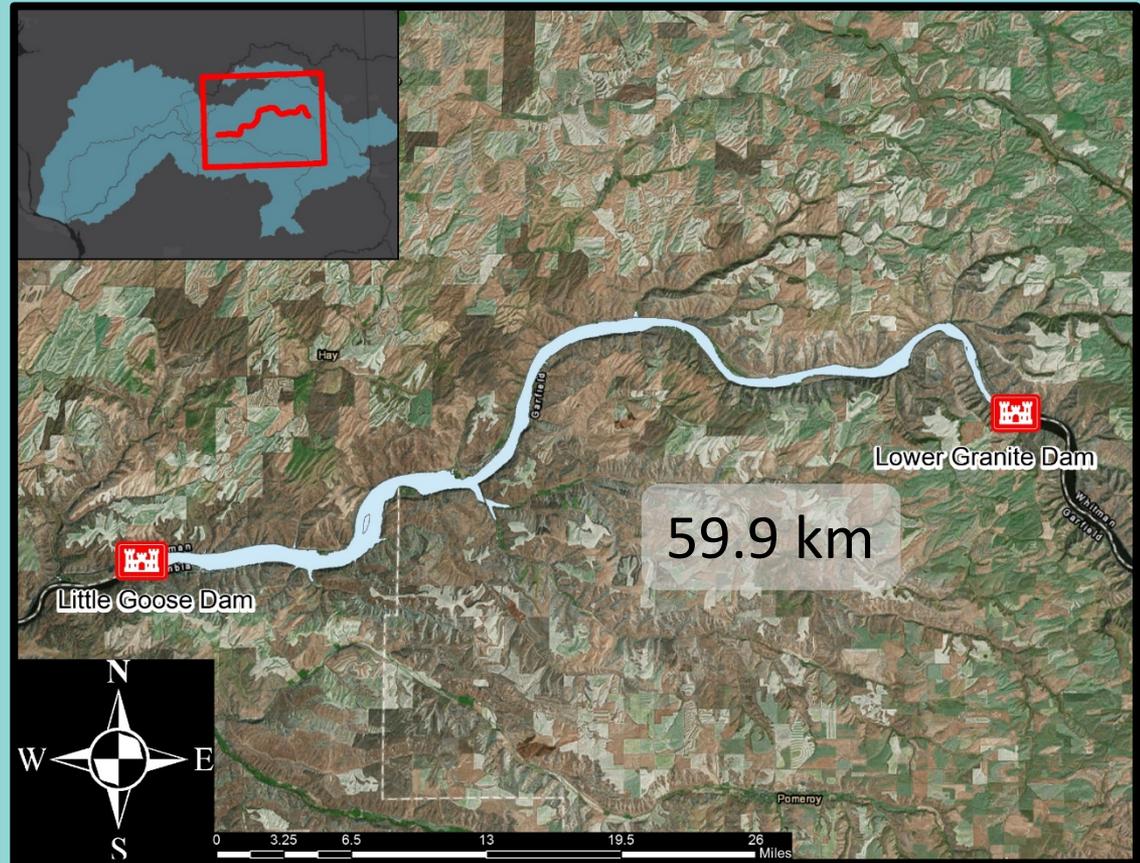
- 10,025 acres
- Run of River

## Little Goose Dam

- Snake River KM 113.1
- Operational 1970

## Lower Granite Dam

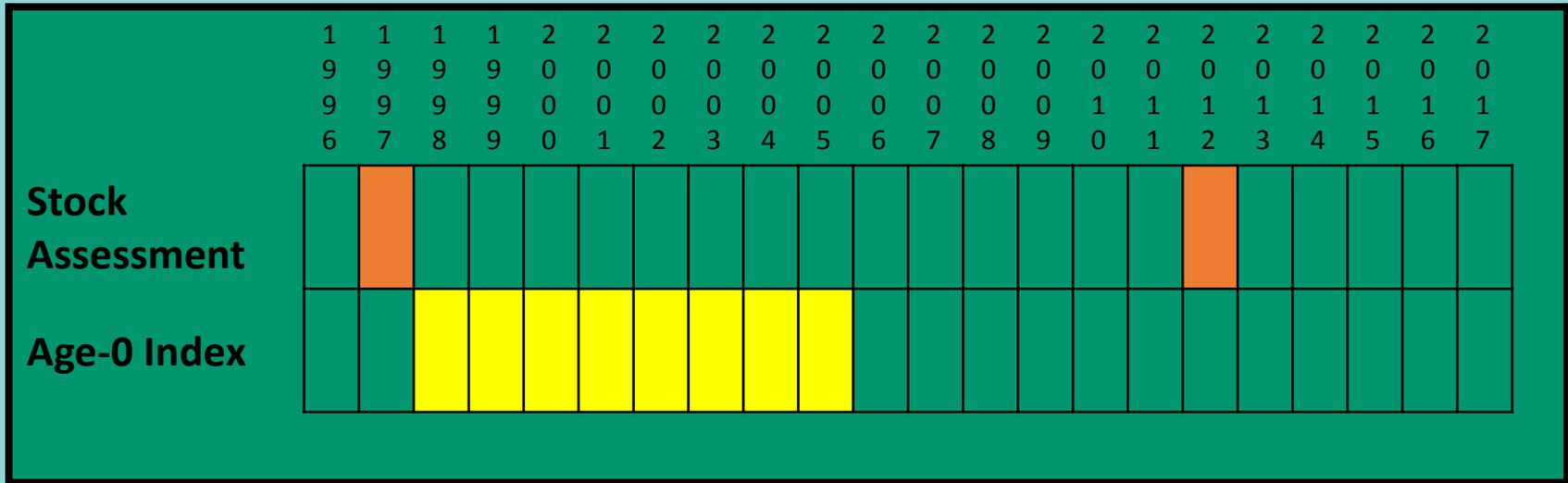
- Snake River KM 173.0
- Operational 1975



# Little Goose Reservoir

BPA “86-50” funded assessments

- Stock assessments: 1997 & 2012 (2 years)
- Age-0 index surveys: 1998–2005 (8 years)



# Stock Assessments

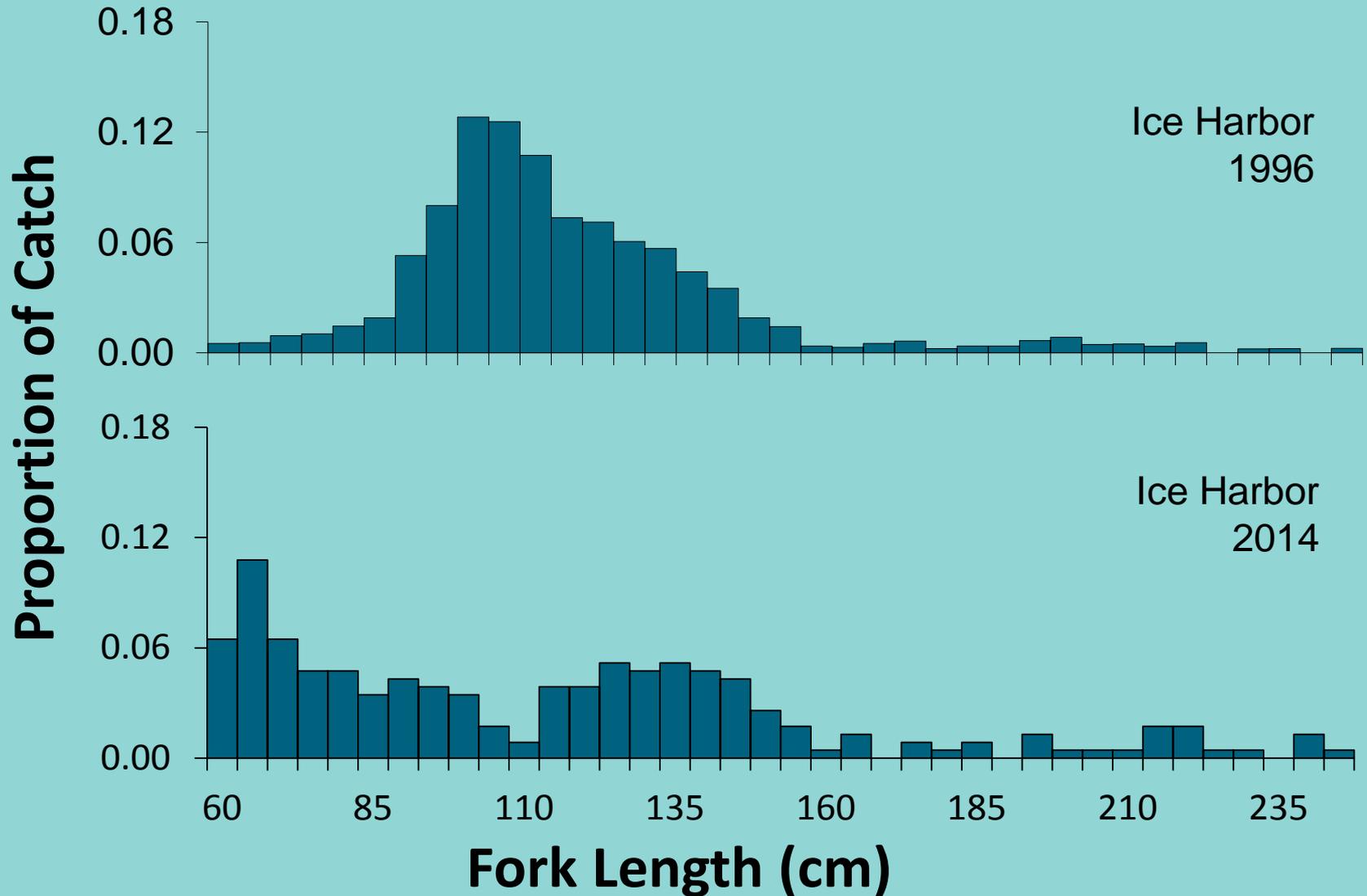


# Ice Harbor Reservoir

	1996	2014
<b>Abundance (&gt;54 cm FL)</b>	4,830	2,235
<b>CPUE (WST per setline)</b>	1.40	1.32



# Ice Harbor Reservoir

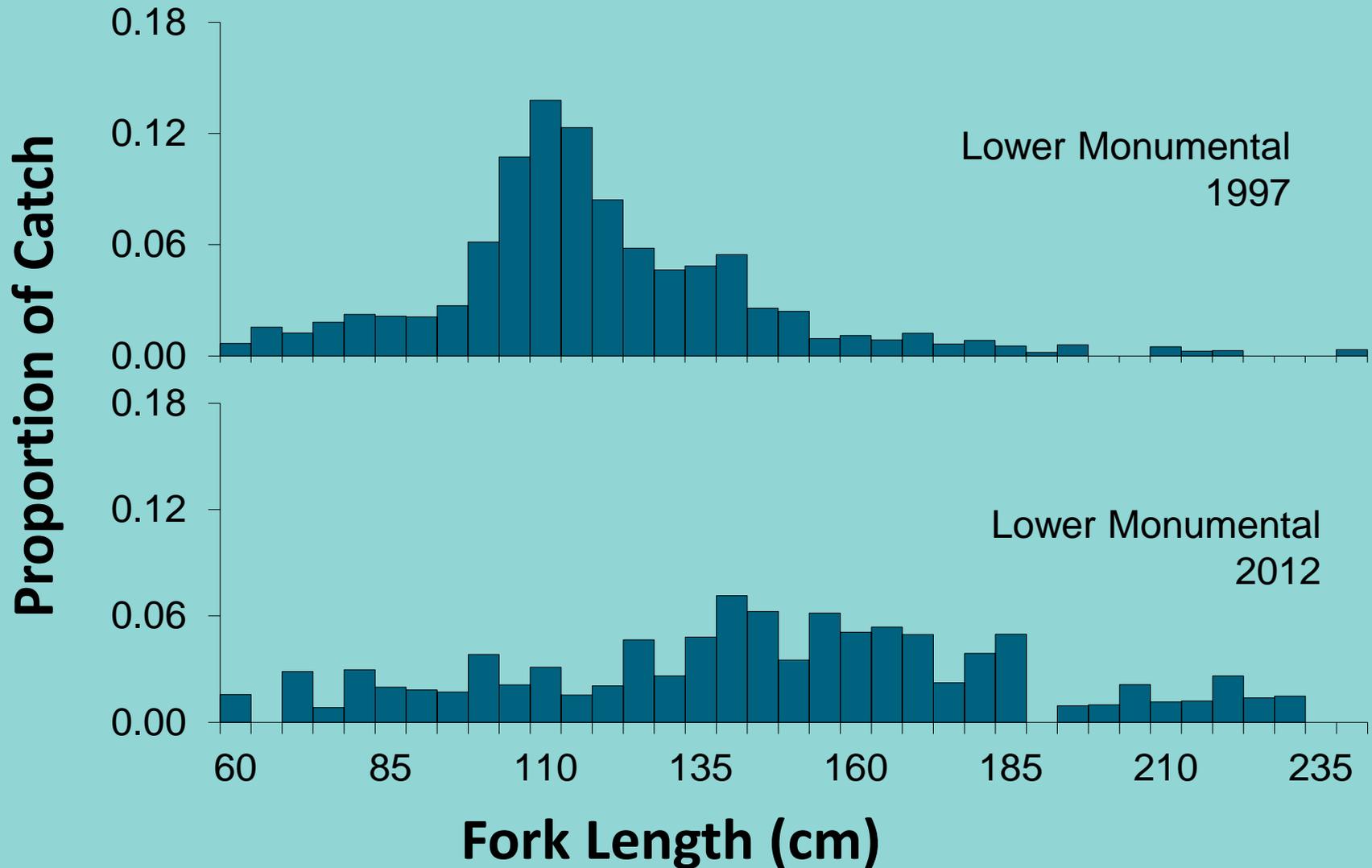


# Lower Monumental Reservoir

	1997	2012
Abundance (110-209 cm FL)	2,230	Insufficient data
CPUE (WST per setline)	1.76	0.56



# Lower Monumental Reservoir



# Little Goose Reservoir

**1997**

**2012**

**Abundance  
(110-209 cm FL)**

4,180

unknown

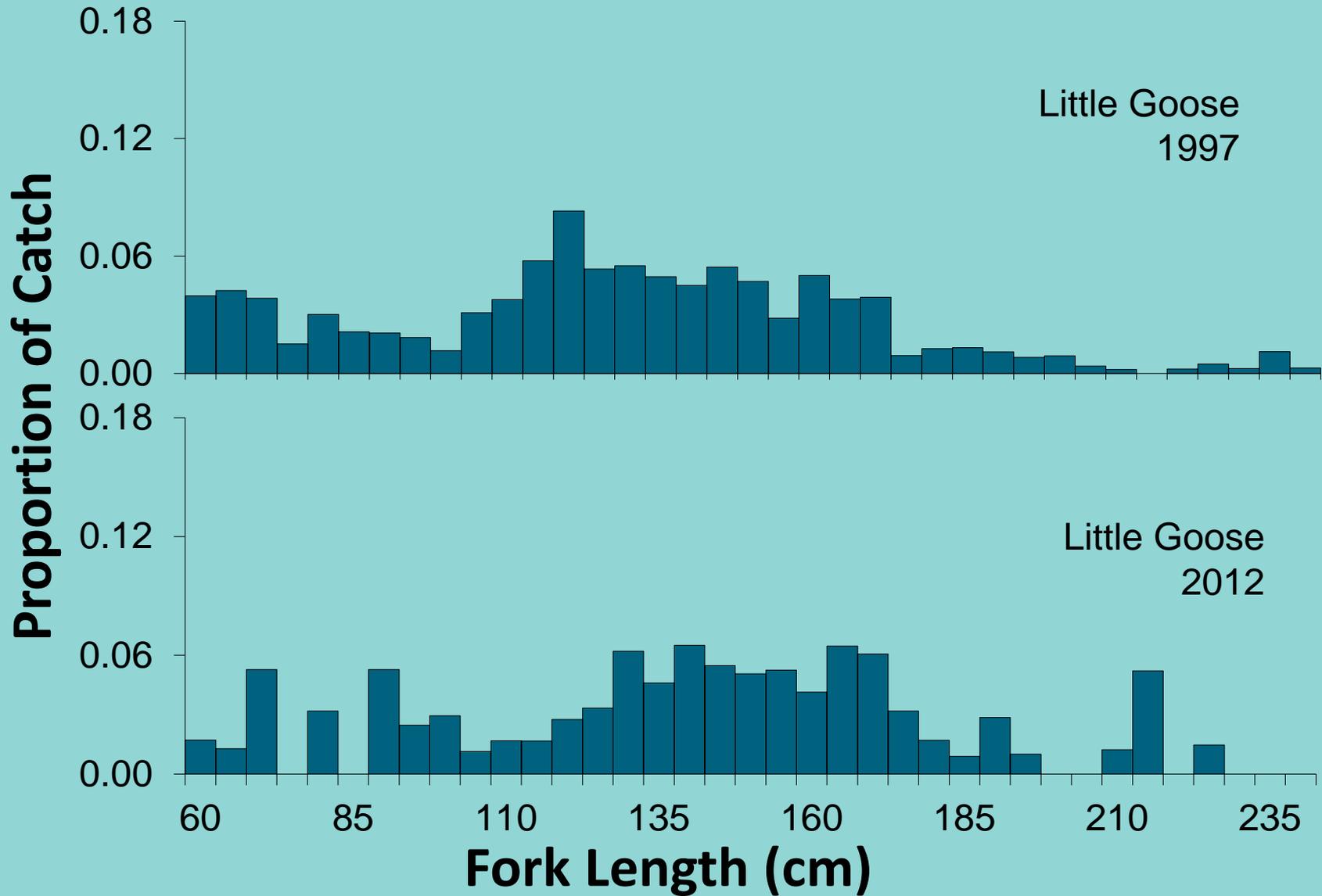
**CPUE  
(WST per setline)**

1.83

1.77



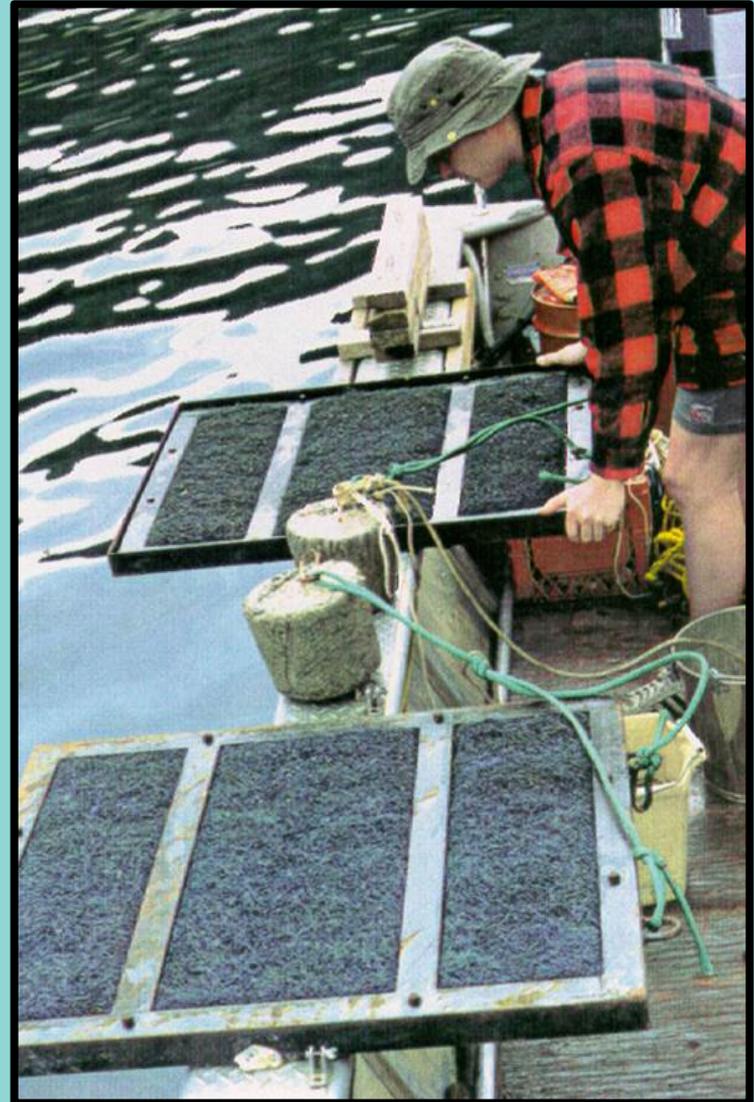
# Little Goose Reservoir



# Recruitment

## 1997/1998 Egg Surveys

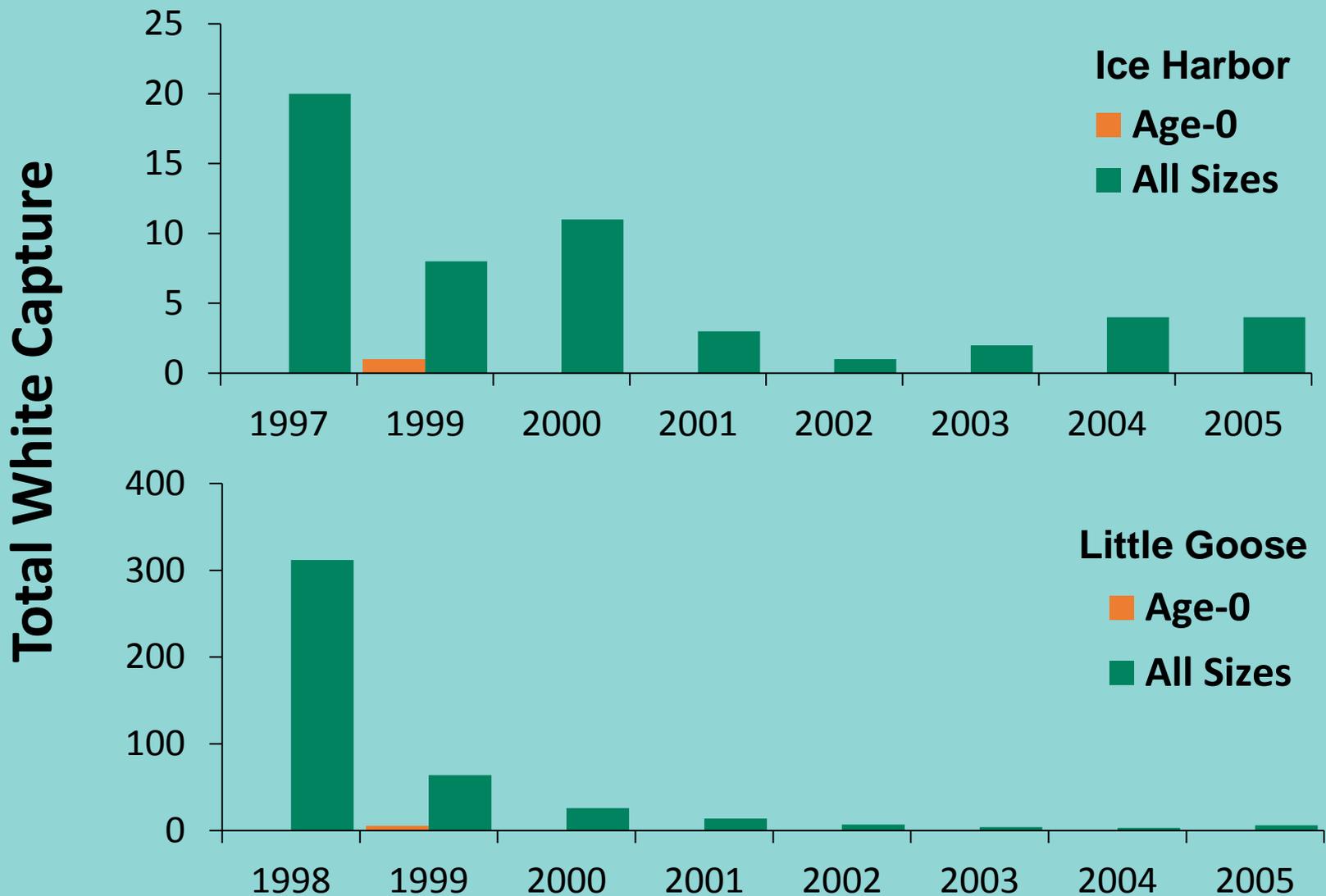
- Detected in all three reservoirs



# Age-0 index surveys



# Age-0 index surveys



# Challenges

- Concerns of slow growth and recruitment failure.
- Inconsistent and sparse monitoring.
- Difficulty assessing adaptive management actions.



# Regulation Changes

- Stock decline triggered management to close all three retention to retention in 2015.
- From 1997-2014, estimated recreational harvest rate was 10% in Ice Harbor Reservoir.



# Upcoming Stock Assessments

- Ice Harbor Reservoir—2018
- Lower Monumental Reservoir—2019
- Little Goose Reservoir—2020?



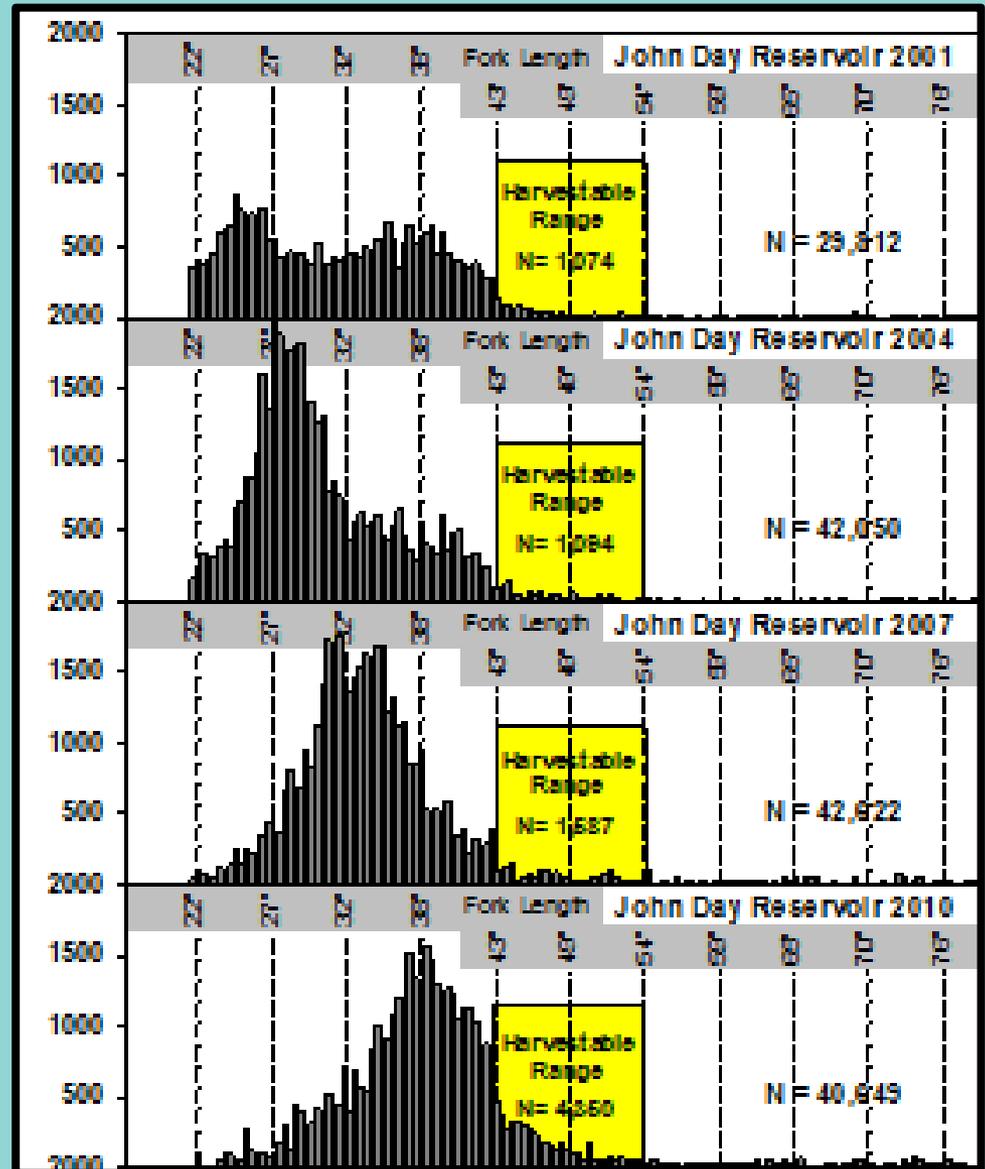
# Improved Sampling Design

- Mark/Recapture sampling design.
  - Longer sampling period

# Recommendation

To track changes in population status and evaluate management actions:

- Monitoring on 3-year rotating basis
- Consistent effort



# Thank you!





Northwest Power and Conservation Council  
10 April 2018

# Lower Columbia River White Sturgeon Population Status Update

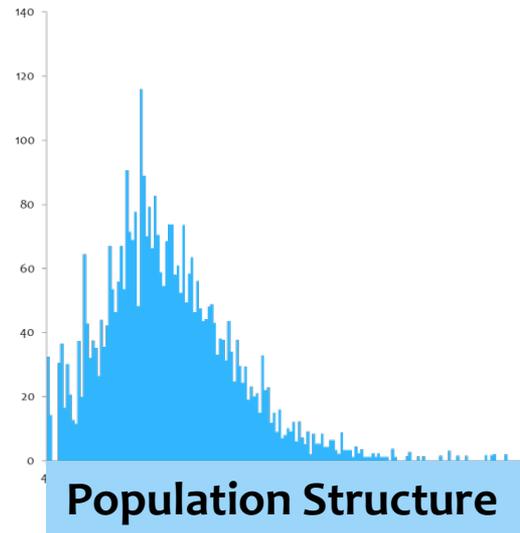
Art Martin  
Columbia River Coordination Section Manager

# Today's Topics

- \* 2017 stock assessment results
- \* Current population composition, status, and trends
- \* Recruitment and Predation context



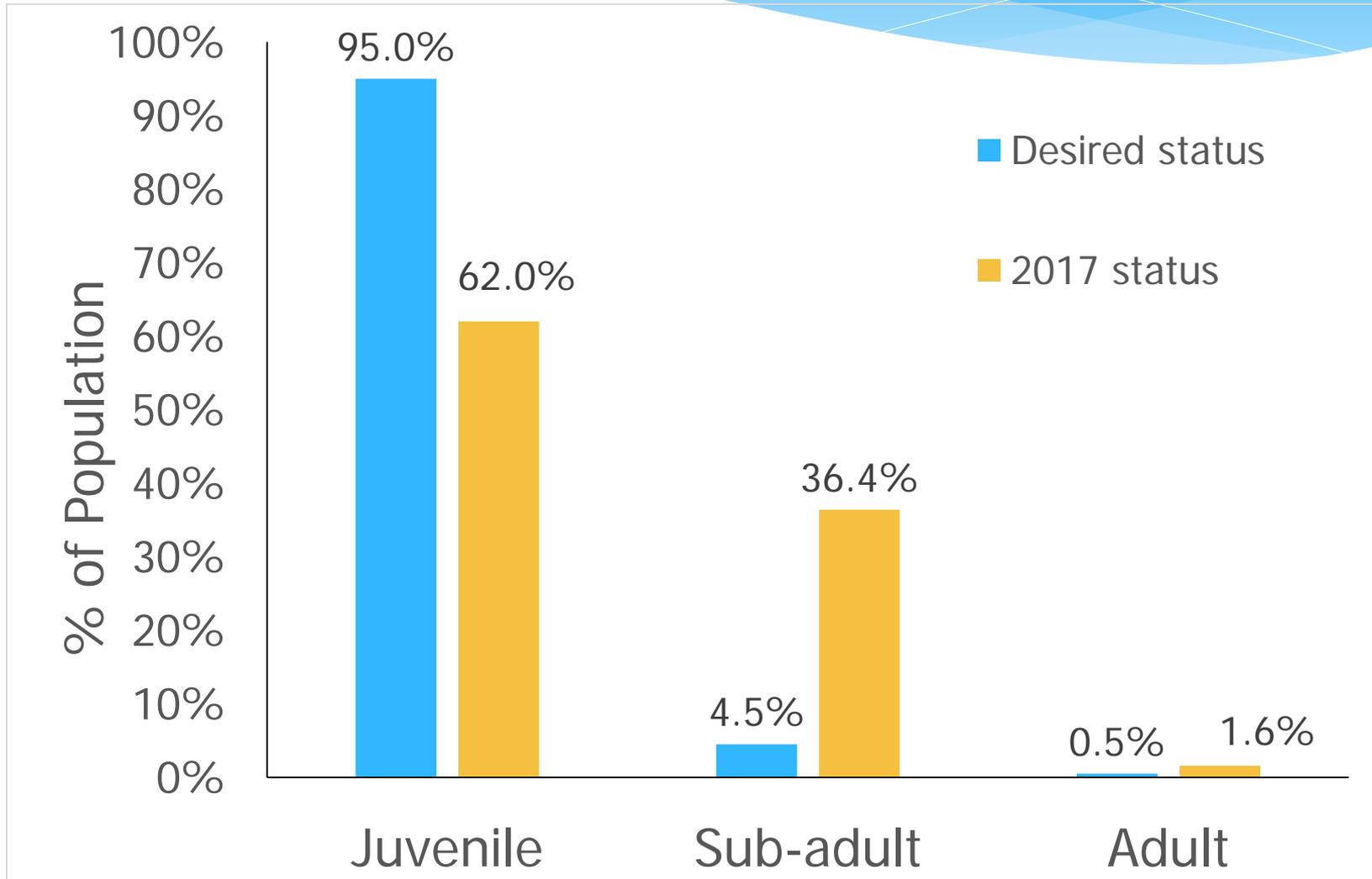
# Metrics and Indicators



# 2017 LCR White Sturgeon Abundance

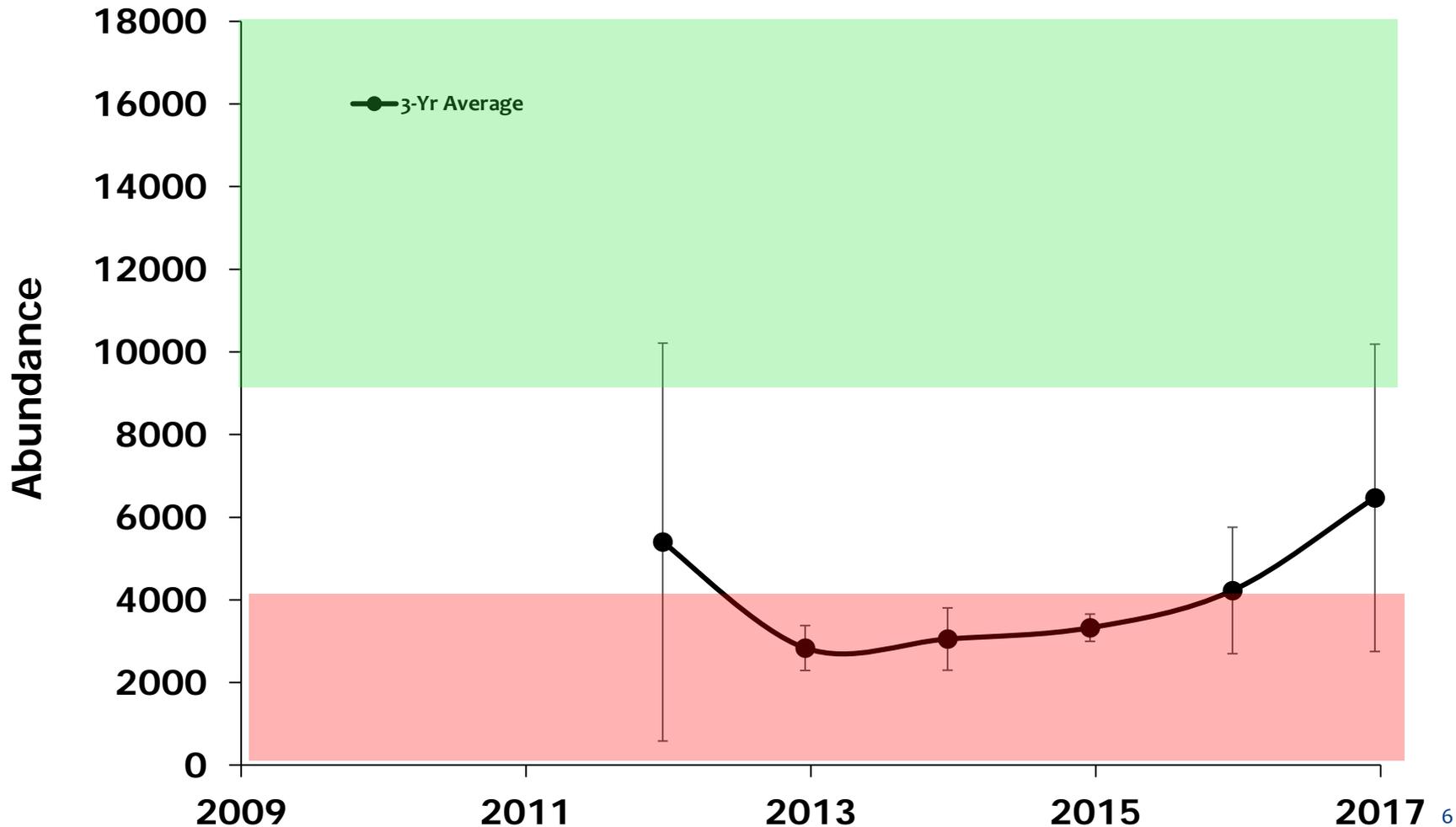
<b>Size Class</b>	<b><math>\hat{N}</math></b>	<b>95% Confidence limits</b>
Juveniles (22-38" FL)	393,602	137,745 – 649,459
Legal (38-54" FL)	199,830	69,932 – 329,727
Over-legals (54-65" FL)	31,681	11,087 – 52,276
Adults (>65" FL)	10,417	3,646 – 17,188
<b>Total (22" +)</b>	<b>635,530</b>	

# LCR Age Class Distribution



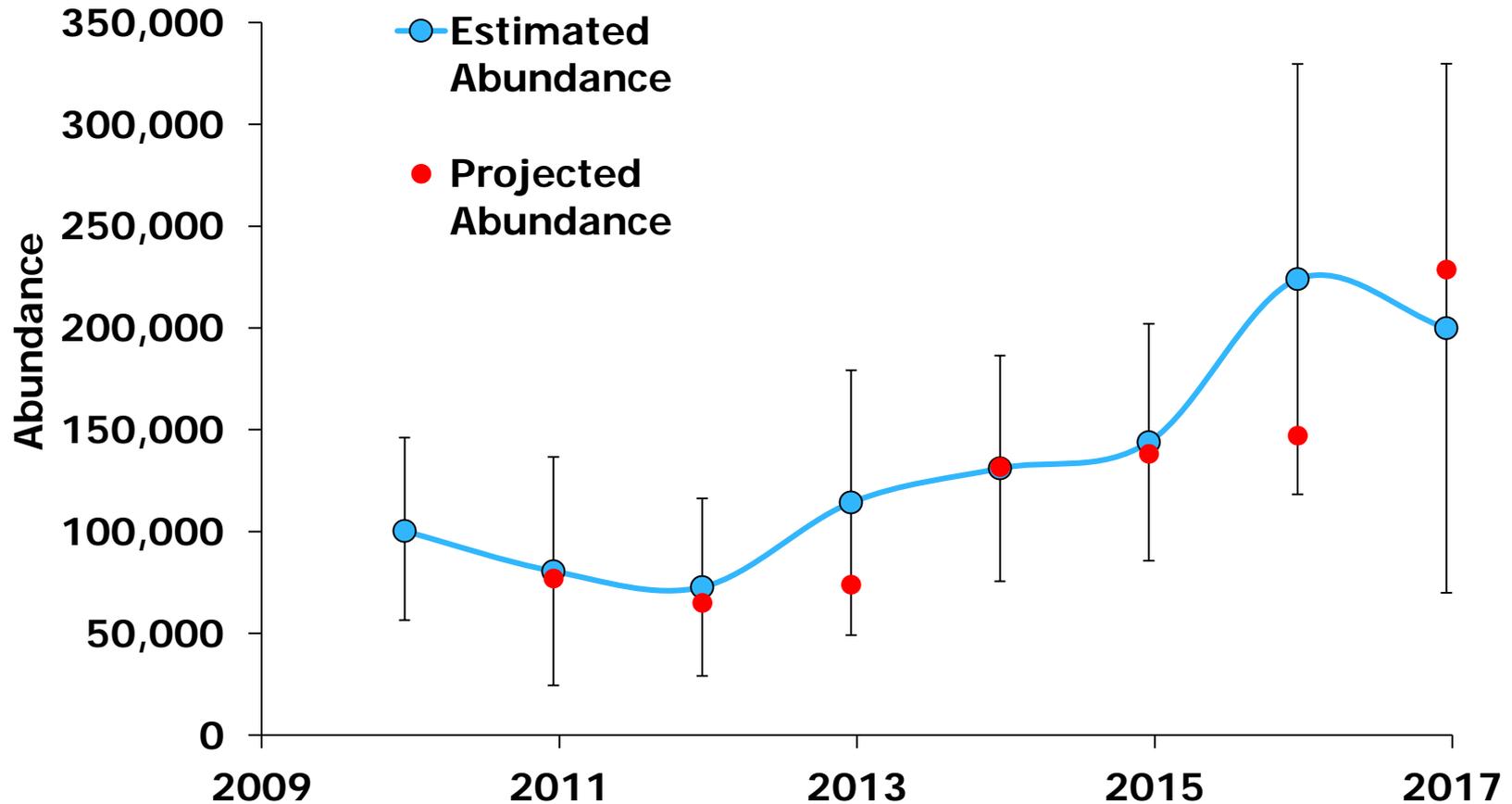
# LCR White Sturgeon Abundance

3 Year Average of Estimated Adult (> 65" FL) Abundance

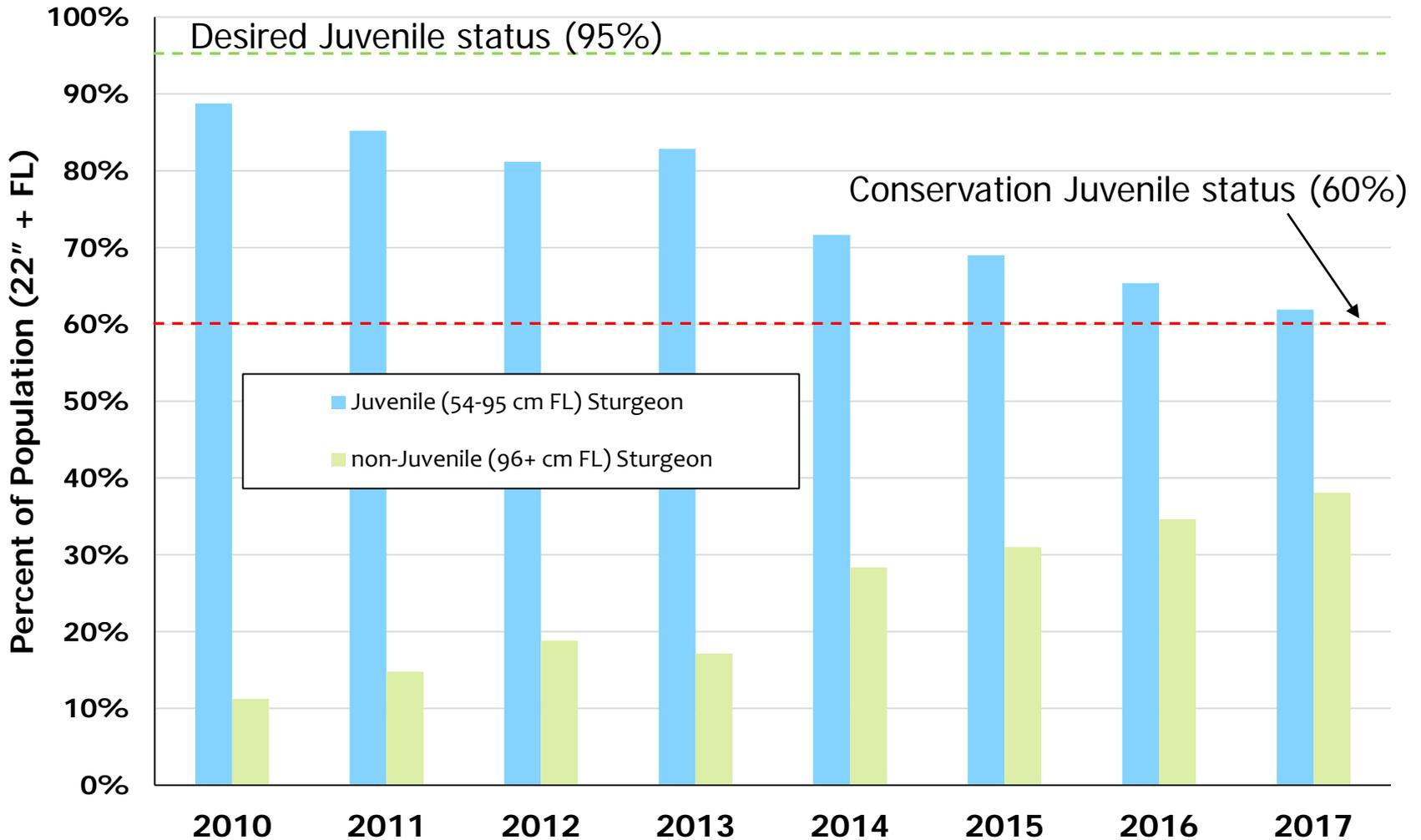


# LCR White Sturgeon Abundance

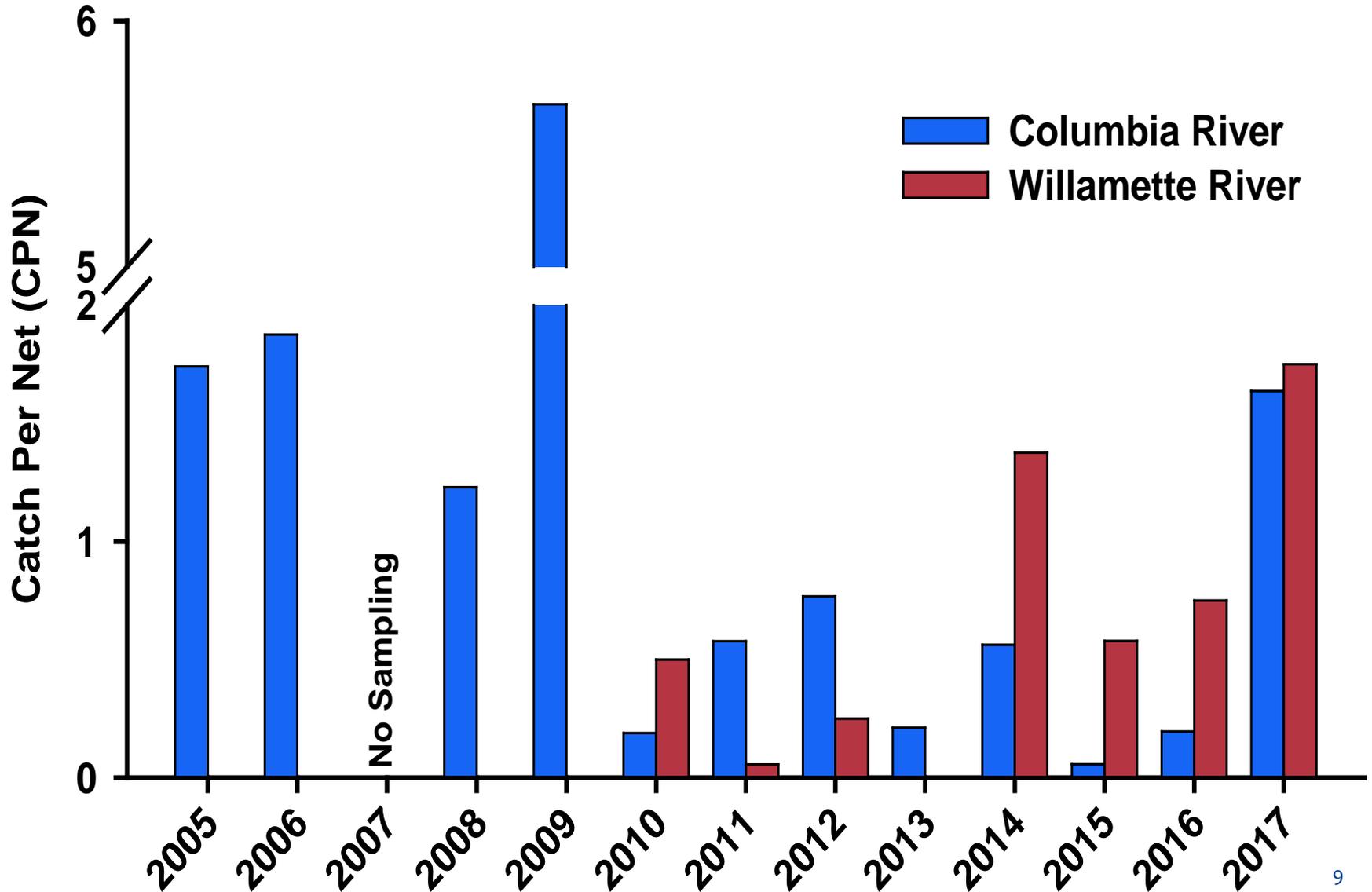
Estimated Legal Abundance (38" – 54" FL)



# LCR Trend in Population % by Age Class

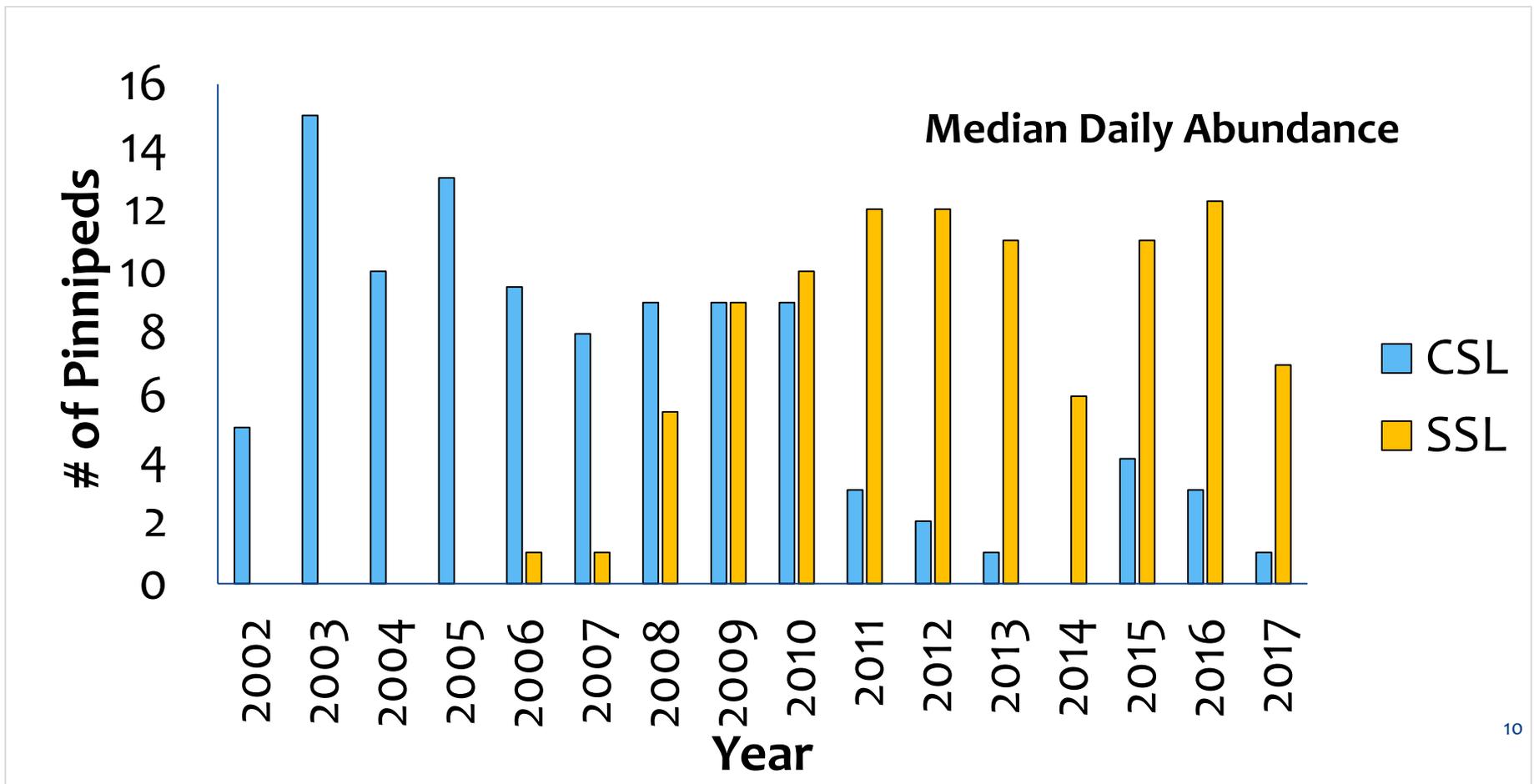


# LCR White Sturgeon Recruitment



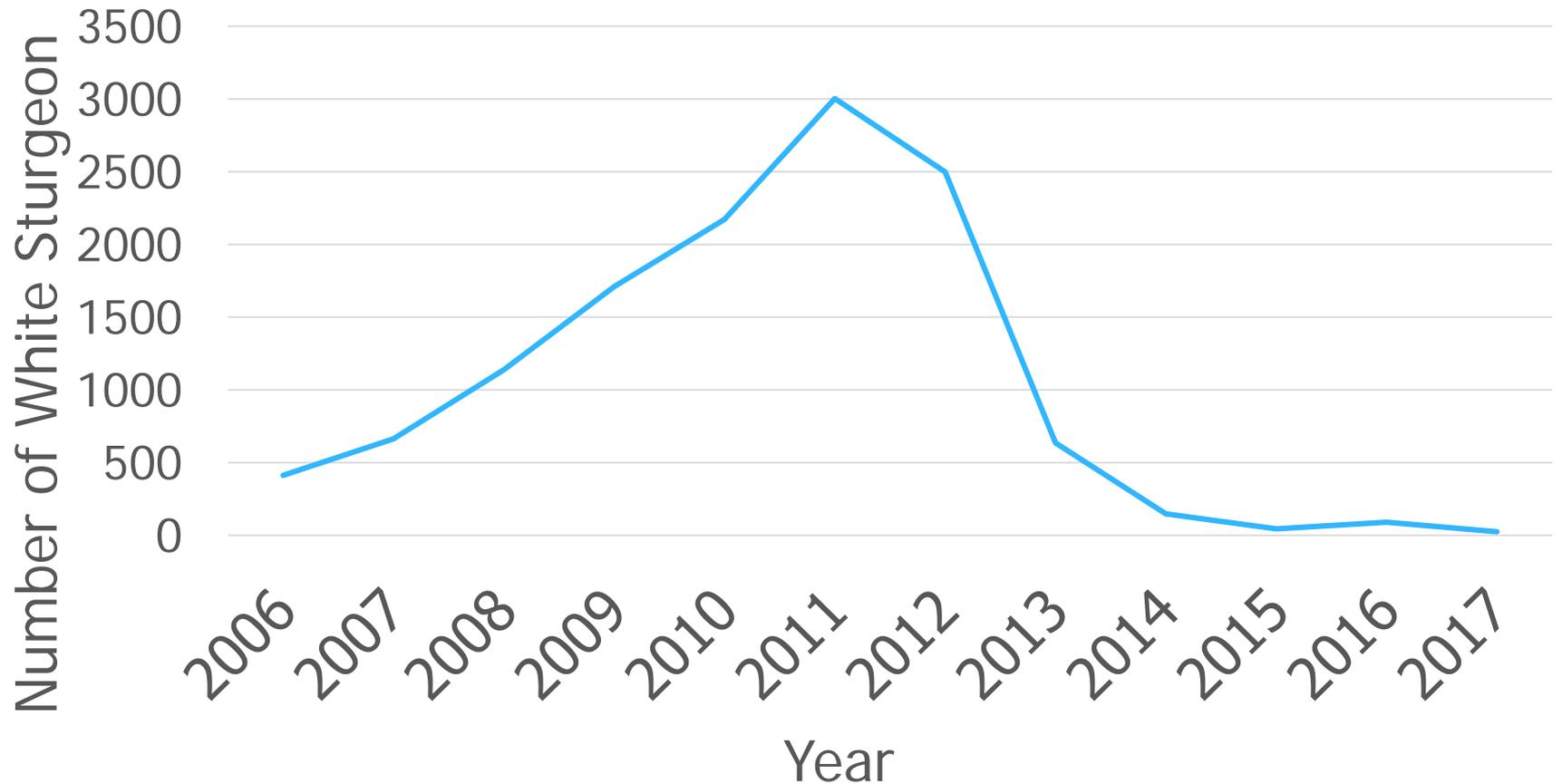
# Sea lion predation

- \* Steller Sea Lions arrive in 2005 and sturgeon started being deliberately targeted



# Sea lion predation

## White Sturgeon Predation



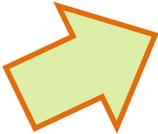
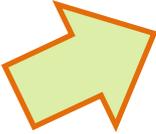
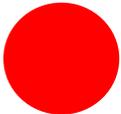
# Sea lion predation

## Growing pinniped issue in the Willamette



- \* 2014-15: 1-2 Steller sea lions observed at Willamette Falls
- \* 2016: 1-2 Steller sea lions observed, 8 sturgeon predation events observed
- \* 2017: 1-4 Steller sea lions observed, 69 sturgeon predation events observed
- \* 2018: 4 Steller sea lions observed, 12 sturgeon predation events observed (thru Feb 1)

# Summary

Metric	N	Interpretation	Brief Summary
Legal Abundance	199,830		Decrease from 2016, but 39% greater than 2015. Also, increasing trend in CPUE setline tagging fisheries continues.
Adult Abundance	10,400 3-yr Avg 6,450		2017 adult abundance estimate is above desired status level; 3-year avg is not (threshold = 9,250 adults).
Population Structure	~62% Juveniles		Continued low relative abundance of juvenile and sub-legal sized fish.
Recruitment Index (CPN)	CR: 1.64 WR: 1.75		Significant increase, 2017 highest since 2009 in LCR and 2010 (ever) for LWR.
Sea Lion Abundance	High		High sea lion abundance is problematic for white sturgeon populations.

# Conclusions

- \* Status of lower Columbia River white sturgeon, while not where we'd like it, is not in danger.
  - \* Still more than 500,000 fish
  - \* Adult population on increasing trend
  - \* Legal abundance is significant
  - \* Productivity issues, but sturgeon life history strategy guards against short periods of low productivity
  - \* Sea lions are problematic
- \* Believe population is sufficiently robust to support limited fisheries similar to 2017

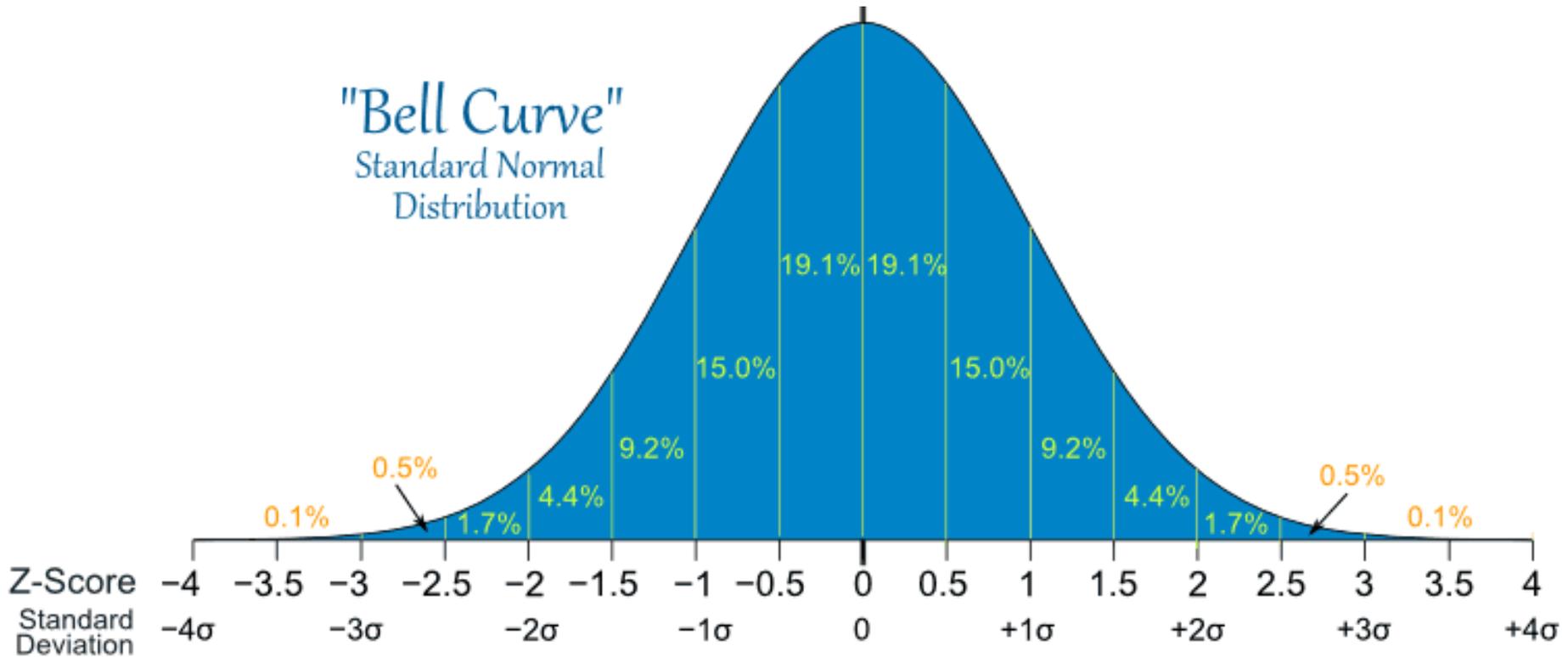


END

Questions/Discussion?

# Variability in Estimates

"Bell Curve"  
Standard Normal  
Distribution



# Illegal harvest (aka poaching)

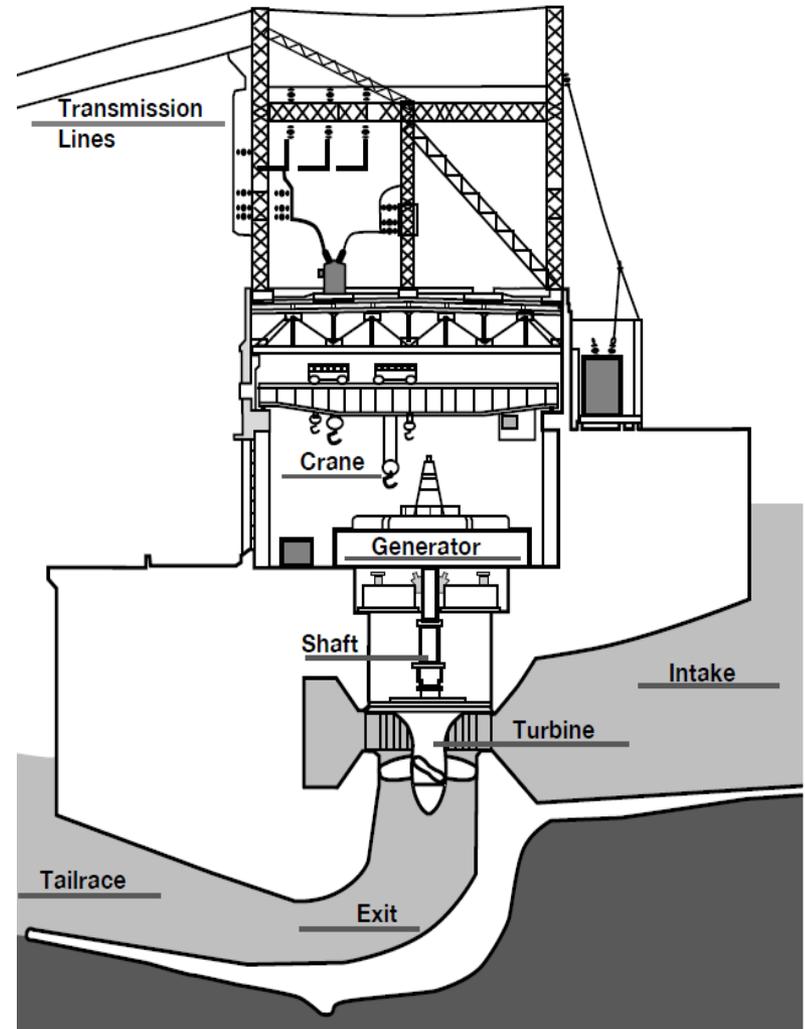


Image courtesy of MacGregor Campbell, OPB



# Direct hydrosystem interactions

- \* Sturgeon enter turbine draft tubes, penstocks and other orifices
- \* Without proper deterrence fish can be exposed to blade strikes, blunt force injuries or barometric trauma
- \* Fish are vulnerable during dewatering activities
  - \* Proper dewatering protocol
  - \* Problem recognition
  - \* Slow-roll at startup



# Update on White Sturgeon Populations – Bonneville, The Dalles and John Day Reservoirs

BLAINE L. PARKER

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

NORTHWEST POWER AND CONSERVATION COUNCIL

FISH AND WILDLIFE COMMITTEE MEETING

APRIL 10, 2018



# BACKGROUND ON PROJECT 86-50

- ▶ BEGAN IN 1985 WITH ODFW AS THE PROJECT LEAD, THE PROJECT STRIVES TO MAINTAIN AND ENHANCE WHITE STURGEON POPULATIONS WITH WDFW AND CRITFC KEY PARTNERS
- ▶ TIME SERIES POPULATION MONITORING INVALUABLE FOR TRACKING CHANGES THROUGH TIME AND UNDERSTANDING POPULATION DYNAMICS
- ▶ YOUNG OF YEAR SURVEYS IN THE FALL ARE A KEY ELEMENT TO TRACK ANNUAL RECRUITMENT FOR EACH RESERVOIR
- ▶ TIME SERIES PAIRED WITH YOUNG OF YEAR MONITORING AND HARVEST DATA HAS ENABLED MANAGEMENT OF THESE POPULATIONS TO A DEGREE NOT FOUND IN OTHER POPULATIONS OUTSIDE THE CRB
- ▶ STURGEON RESEARCHERS (PAST AND PRESENT) WITH THIS PROJECT HAVE CONTRIBUTED

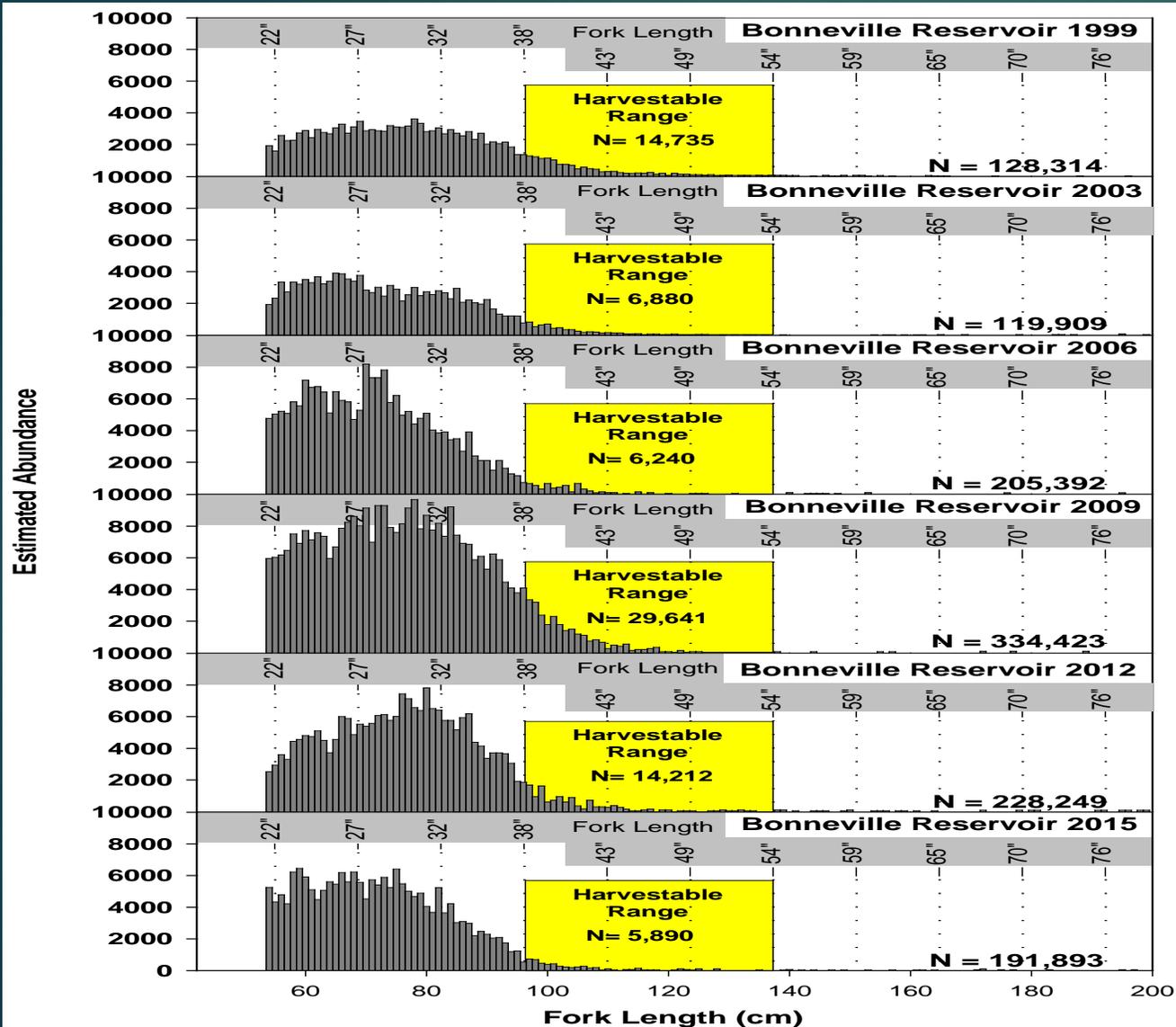
# PRESENTATION OVERVIEW

- ▶ DATA PRESENTED TODAY IS A COLLABORATIVE EFFORT BY CRITFC, ODFW AND WDFW – BPA PROJECT 86-50
- ▶ RESERVOIRS POPULATIONS ARE ASSESSED EVERY 3 YEARS
- ▶ ASSESSMENT IS A 2 PART PROCESS- WINTER TAGGING BY TRIBAL FISHERS AND TECHNICIANS/SUMMER RECAPTURE EFFORT BY JOINT STATE AND TRIBAL STAFF,
- ▶ YOUNG OF YEAR RECRUITMENT MONITORING BY JOINT CREW IN THE FALL
- ▶ FISHERIES ARE MONITORED BY TRIBES AND STATES, WDFW PROVIDES FISHERY ANALYSIS, WITH POPULATION ANALYSIS BY ODFW, GENETICS BY CRITFC

# POPULATION TIME SERIES AND KEY POINTS

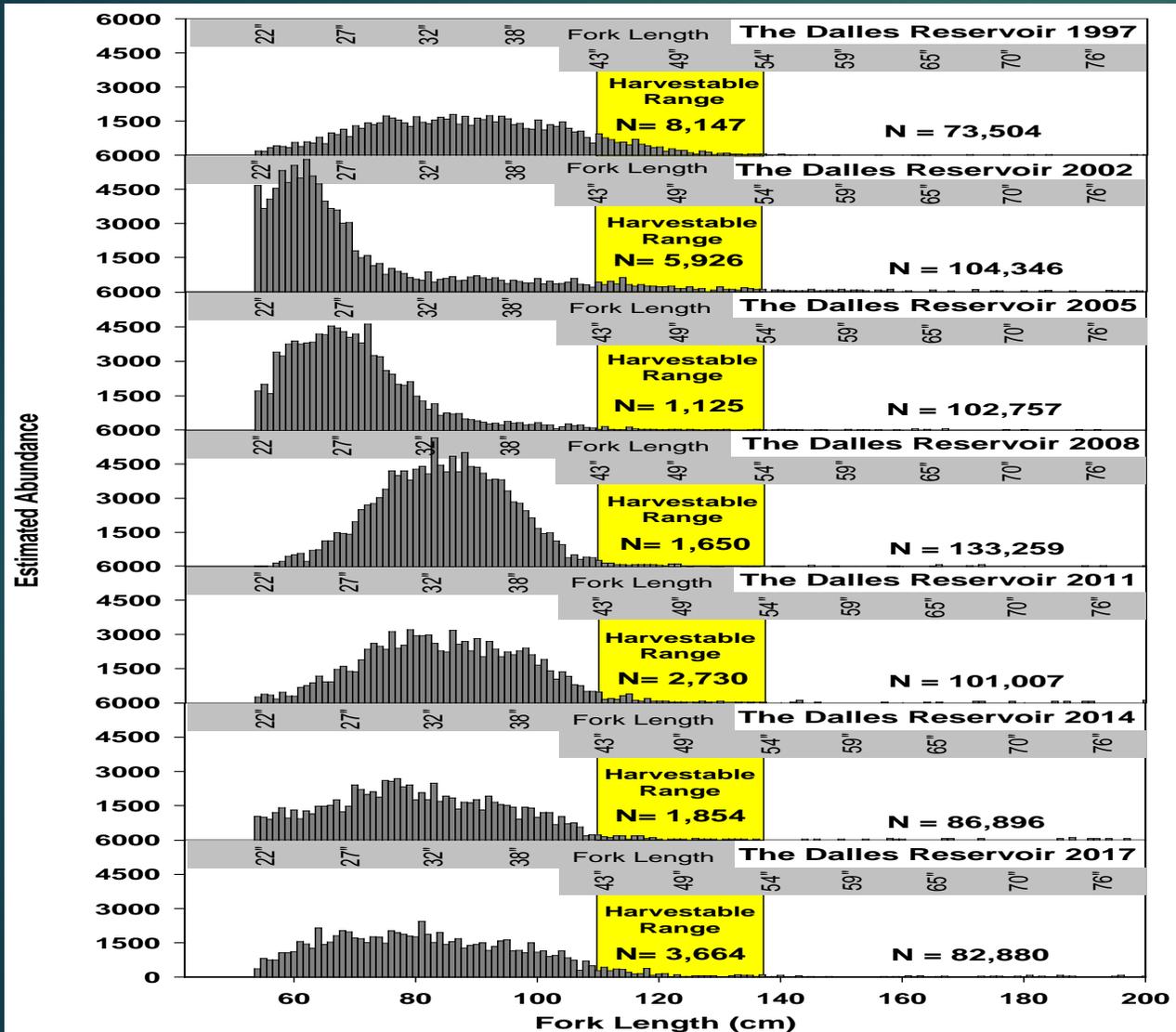
- ▶ BONNEVILLE 1999 - 2015
- ▶ THE DALLES 1997 - 2017
- ▶ JOHN DAY 2001 - 2016

# BONNEVILLE RESERVOIR 1999 - 2015



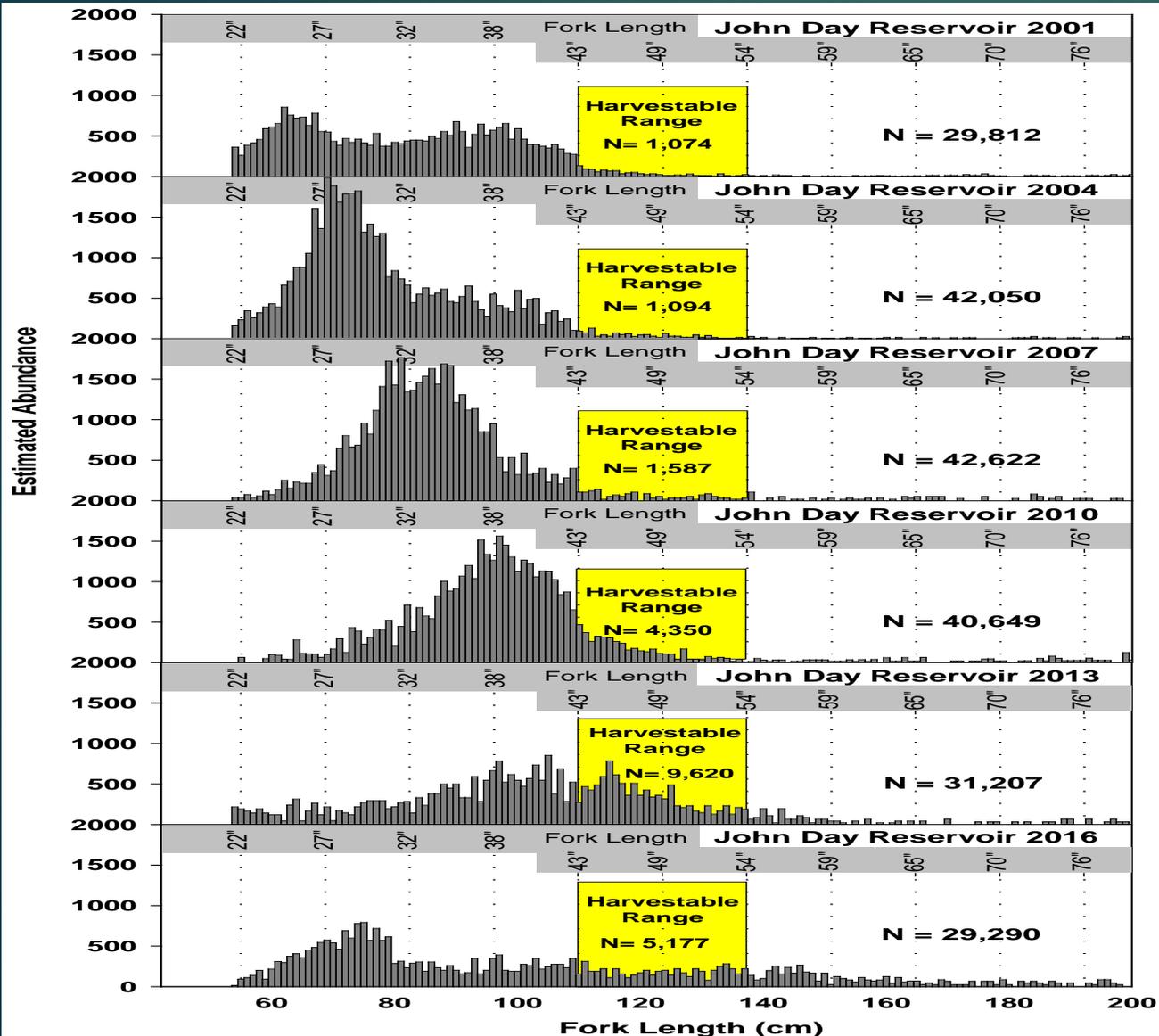
- ▶ TREMENDOUS POPULATIONS SHIFTS
- ▶ HIGH DENSITIES, POOR CONDITION FACTORS CHARACTERIZE THIS PERIOD
- ▶ MOST RECENT SURVEY (2017) MAY SHOW STABILIZATION
- ▶ INCREASED SPECIFIC WEIGHTS AND HIGHER CONDITION FACTORS

# THE DALLES RESERVOIR 1997 – 2017



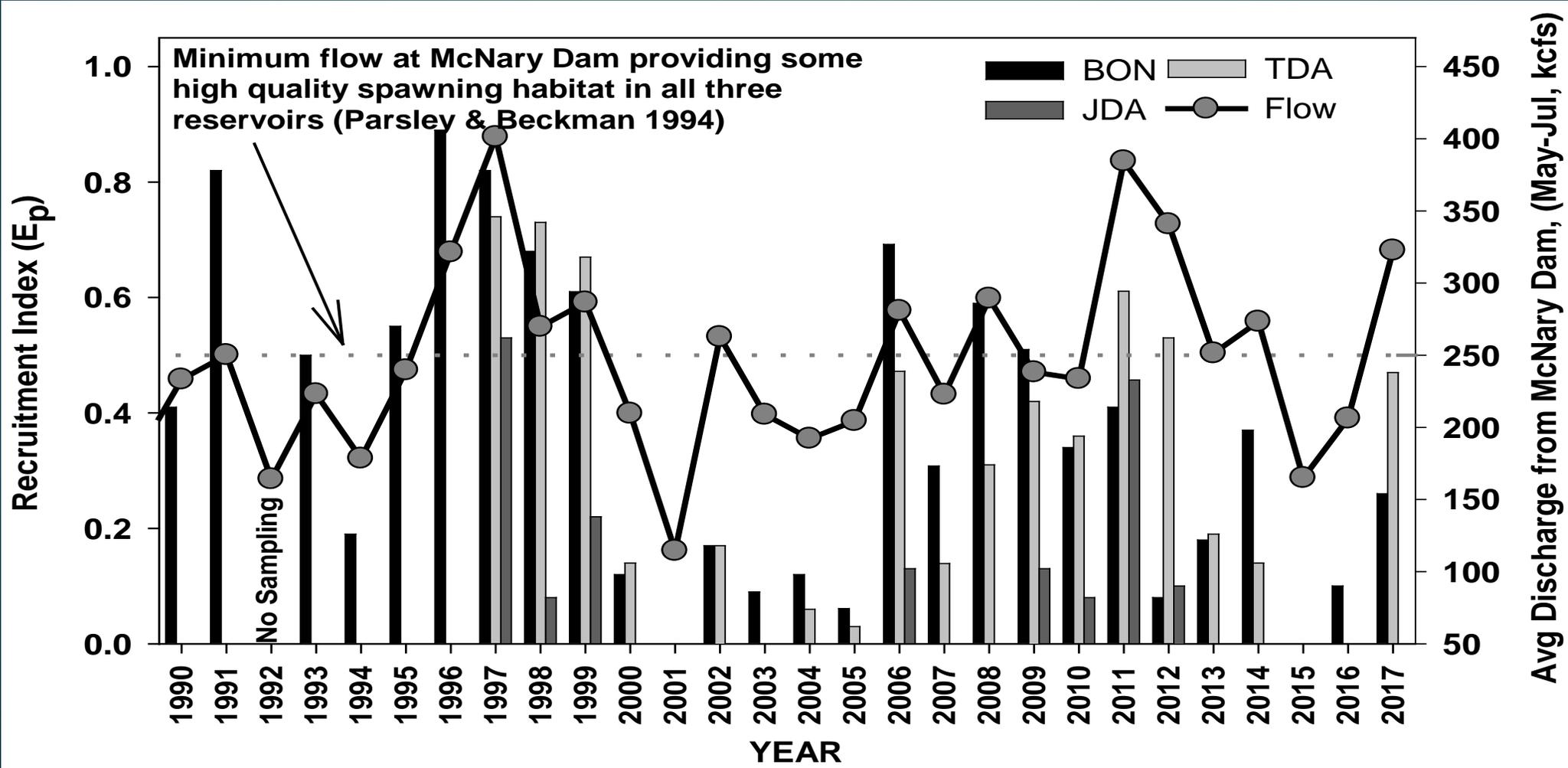
- ▶ POPULATION SURGED UPWARDS IN EARLY 2000'S, SIMILAR TO BN POPULATION
- ▶ TD FISH SLIGHTLY BETTER CONDITION FACTOR AND GROWTH THAN BN FISH
- ▶ DOWNSHIFT SIMILAR TO BN POPULATION
- ▶ POPULATIONS DIFFERENCES BETWEEN 2014 AND 2017 MINOR, STABILIZATION ?

# JOHN DAY RESERVOIR 2001 - 2016



- ▶ JOHN DAY POPULATION COMES FULL CIRCLE
- ▶ JD STURGEON DENSITY AN ORDER OF MAGNITUDE LESS THAN BN & TD RESERVOIRS
- ▶ LACK OF RECRUITMENT HAS BEEN ISSUE FOR MANY YEARS
- ▶ BROOD STOCK NUMBERS GOOD, RECRUITMENT POOR AS A RULE

# SPRING FLOWS PRODUCE JUVENILE STURGEON.....MOST OF THE TIME



# RECRUITMENT MONITORING - YOY SURVEYS

Year2	LCR	Will. R.	BON <sup>1</sup>	TDA	JDA	MCN	IHA	LGO
1989			0.04					
1990			0.41					
1991			0.82					
1992								
1993			0.50					
1994			0.19					
1995			0.55					
1996			0.89					
1997			0.82	0.74	0.53		0.00	
1998			0.68	0.73	0.08			0.32
1999			0.61	0.67	0.22	0.08	0.03	0.08
2000			0.12	0.14	0.00	0.00	0.00	0.00
2001			0.00	0.00	0.00	0.00	0.00	0.00
2002			0.17	0.17	0.00	0.06	0.00	0.00
2003			0.09	0.00	0.00	0.00	0.00	0.00
2004	0.44		0.12	0.06	0.00	0.00	0.00	0.00
2005	0.49		0.06	0.03	0.00	0.03	0.00	0.00
2006	0.52		0.69	0.47	0.13	0.06		
2007			0.31	0.14	0.00	0.06		
2008	0.45		0.59	0.31	0.00	0.06		
2009	0.78		0.51	0.42	0.13	0.06		
2010	0.18	0.24	0.34	0.36	0.08	0.00		
2011	0.34	0.06	0.41	0.61	0.46	0.26		
2012	0.35	0.22	0.08	0.53	0.10			
2013 <sup>22</sup>	0.12		0.18	0.19	0.00			
2014	0.31	0.38	0.37	0.14	0.00			
2015	0.05	0.26	0.00	0.00	0.00			
2016	0.14	0.50	0.10	0.00	0.00			
2017	0.58	0.46	0.26	0.47	0.00			

# FIELD SEASON 2018

- ▶ STOCK ASSESSMENT IN BONNEVILLE RESERVOIR
- ▶ ODFW BROODSTOCK SPAWNING HABITAT RESEARCH IN McNARY TAILRACE (JD RESERVOIR): *EMERGING PRIORITIES RESEARCH PROJECT*
- ▶ FALL YOUNG OF YEAR SURVEYS
- ▶ WINTER TAGGING IN JD RESERVOIR (YN/TRIBAL FISHERS/CRITFC)

# CONCLUSIONS



*BONNEVILLE* –MAYBE FINDING EQUILIBRIUM WITH HABITAT

*THE DALLES* – UNCERTAIN, MAYBE

*JOHN DAY* – CONTINUES TO DECLINE AND BASED UPON OUR MONITORING IT WILL FOR THE NEAR FUTURE (~ 8-10 YEARS) EVEN IF RECRUITMENT IMPROVES

*JOHN DAY* IS A STRONG CANDIDATE FOR SUPPLEMENTATION FROM CRITFC STURGEON SUPPLEMENTATION MASTER PLAN (#200715500)

*FUTURE* – MONITORING, SUPPLEMENTATION, RESEARCH ARE KEY ELEMENTS TO ENSURING WHITE STURGEON THRIVE IN THE COLUMBIA BASIN FOR THE NEXT 7 GENERATIONS

QUESTIONS...

# Upper Columbia White Sturgeon Recovery

Northwest Power and Conservation Council Meeting

Portland, Oregon

April 10, 2017

Jason McLellan  
&

Matt Howell

Colville Confederated  
Tribes



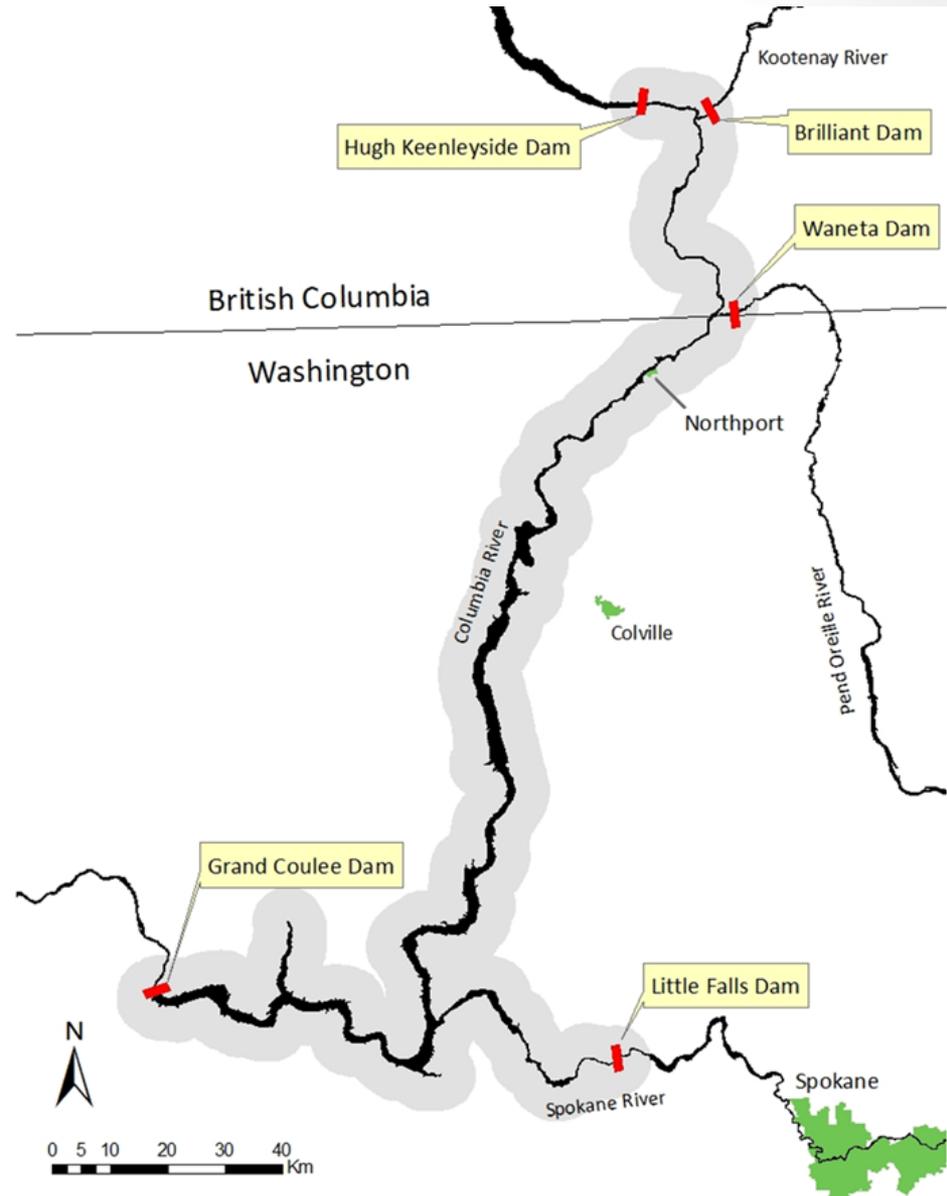
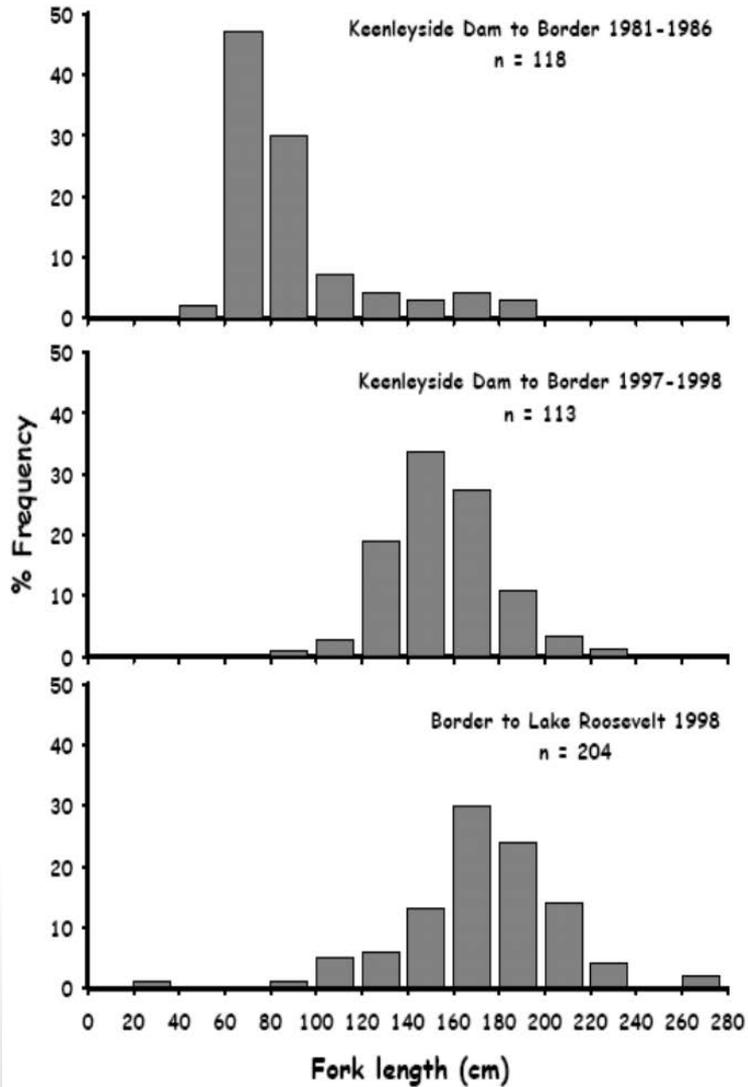
Andy Miller  
Spokane Tribe of  
Indians



Mitch Combs  
Washington  
Department of Fish  
and Wildlife



# Persistent Recruitment Failure



# Upper Columbia White Sturgeon Recovery Initiative (UCWSRI)

- **GOAL**

“...ensure the persistence and viability of naturally-reproducing populations...”

And

“...restore opportunities for beneficial use if feasible.”

Upper Columbia White Sturgeon  
Recovery Plan - 2012 Revision



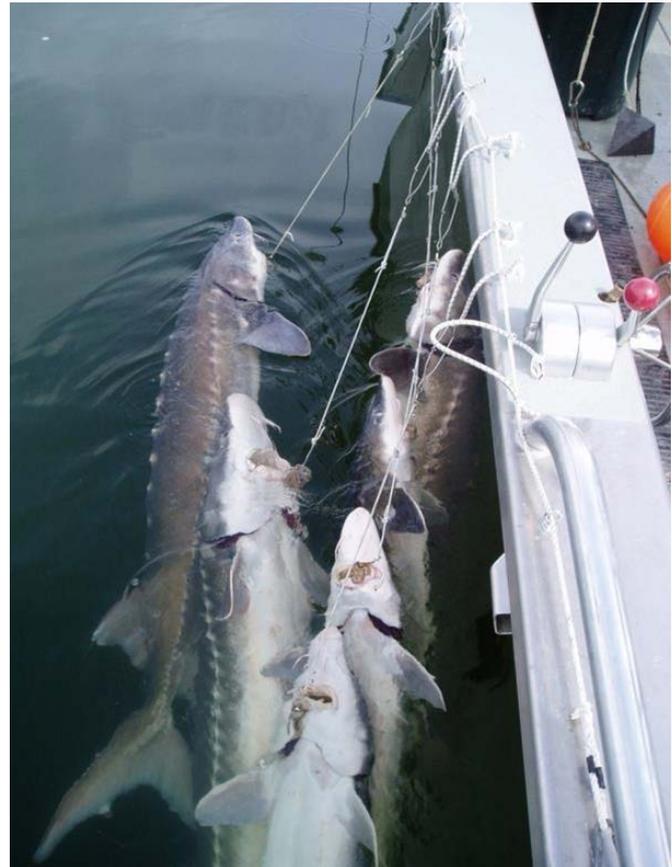
Revised December 2013  
(Original November 2002)

# Recovery Plan Implementation - WA

- Colville Confederated Tribes
  - White Sturgeon Enhancement Project (2008-116-00)
- Spokane Tribe of Indians
  - Lake Roosevelt Sturgeon Recovery (1995-027-00)
- Washington Department of Fish and Wildlife

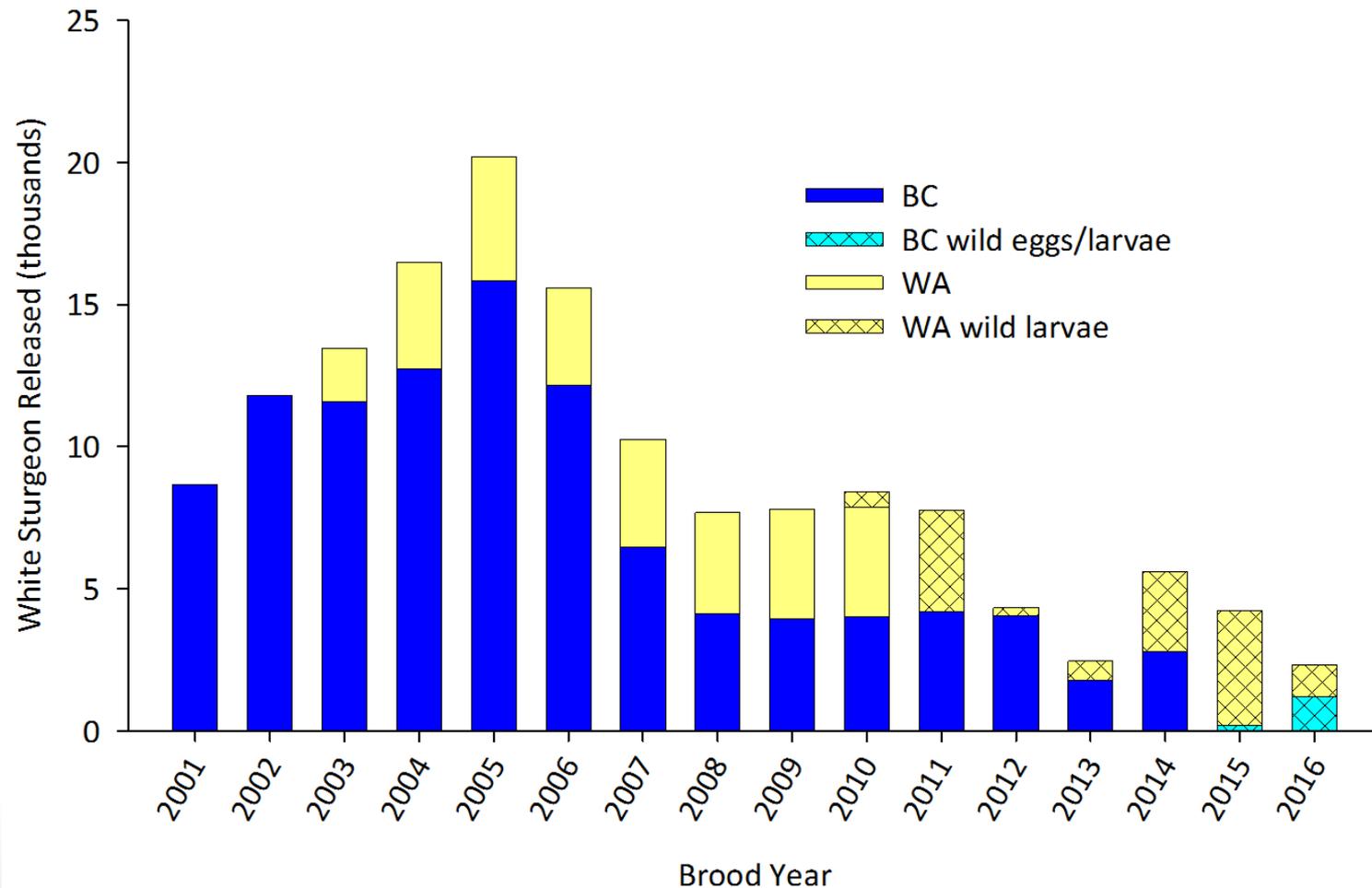
# Recovery Objectives & Strategies

- Supplementation
  - Aquaculture
- Monitor status and trends
  - Stock assessment
- Identify factors limiting natural recruitment
  - Recruitment failure research



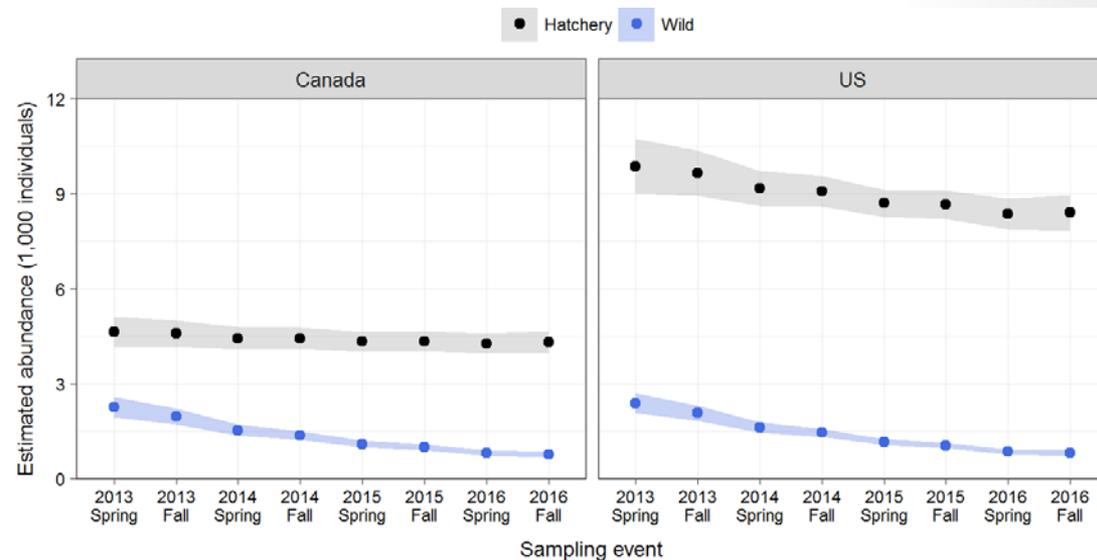
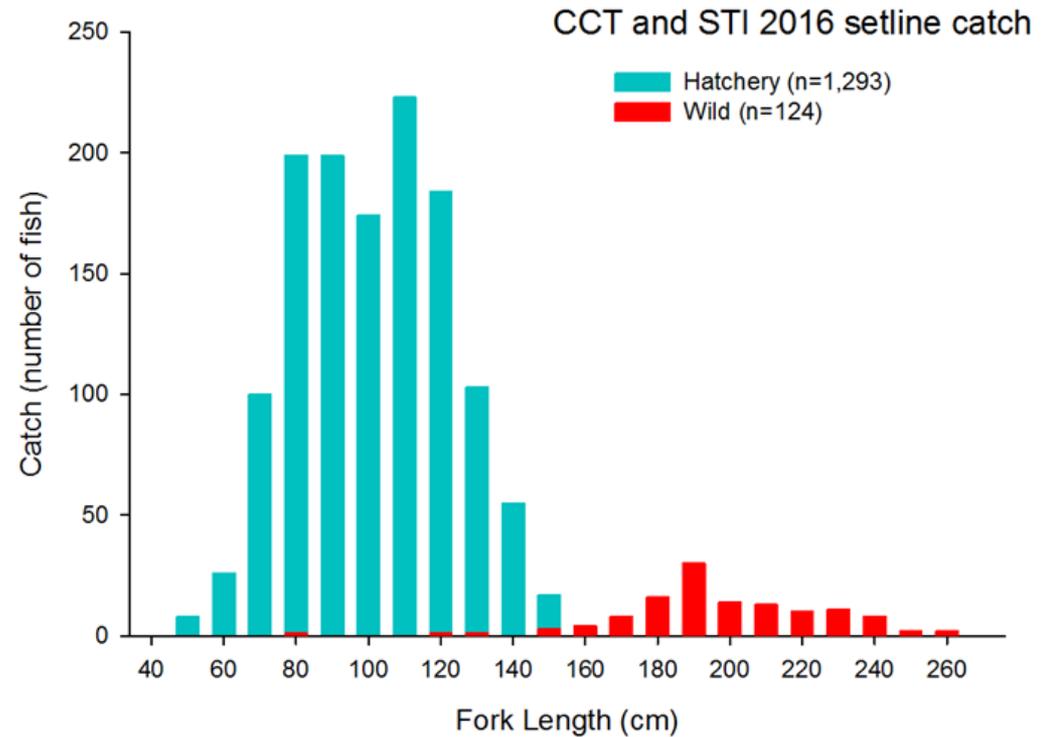
# Conservation Aquaculture

- Released  $\approx$  150,000 juveniles since 2002



# Stock Assessment

- Wild abundance  $\approx$  2,500 adults
- Continued lack of recruitment
- Hatchery fish survival high



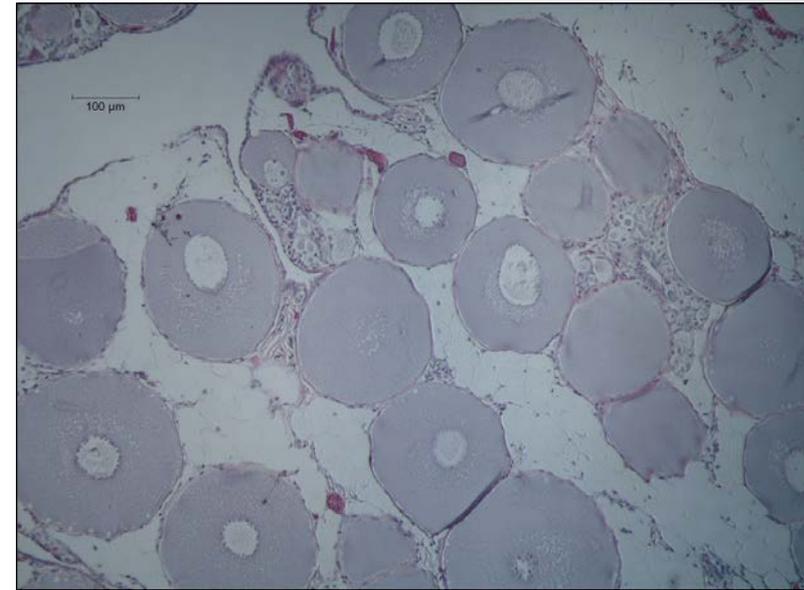
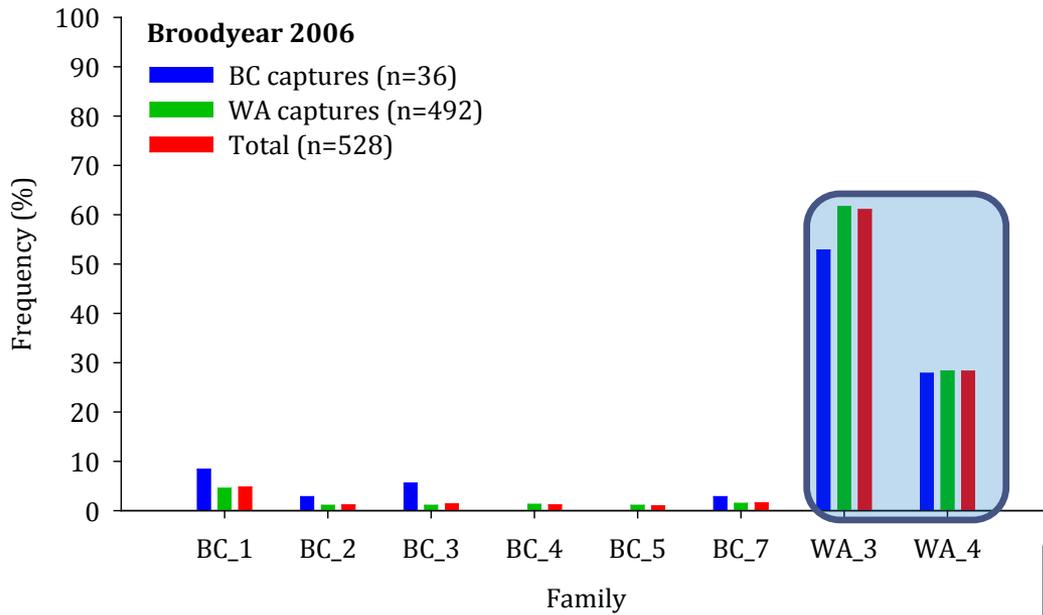


Photo credit: Molly Webb

- Family over-representation
- Reaching maturity
- Risk of swamping wild population

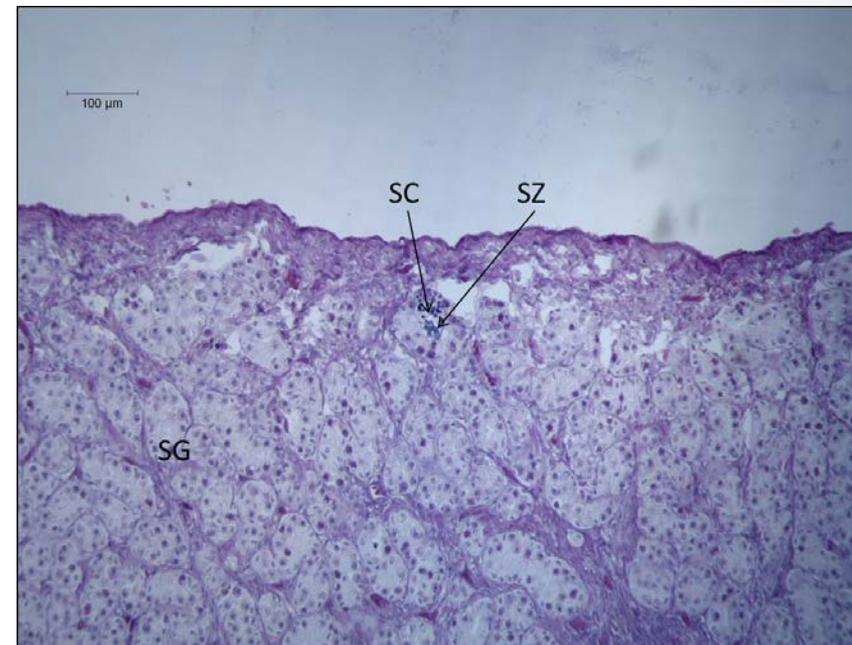


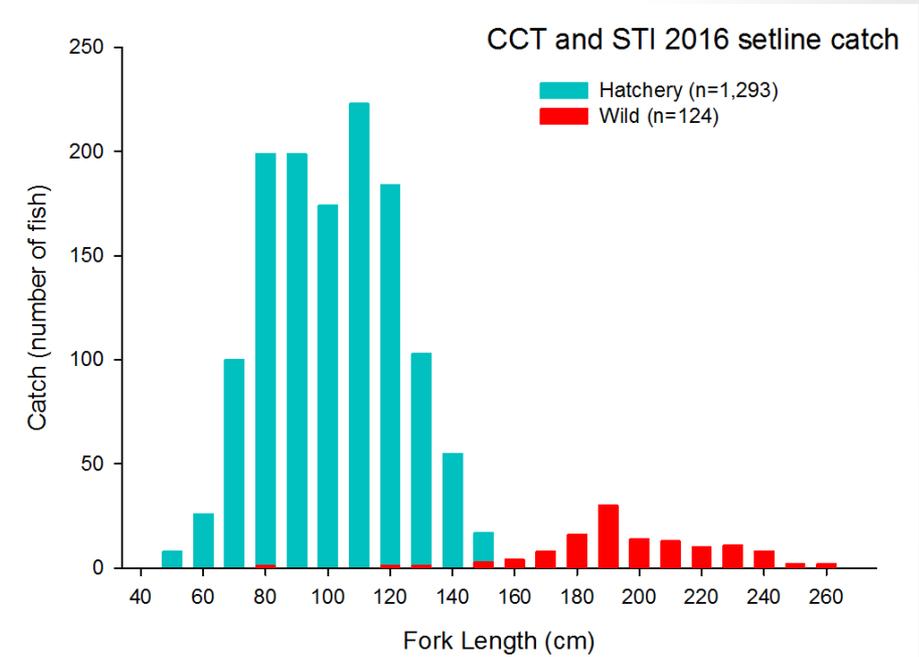
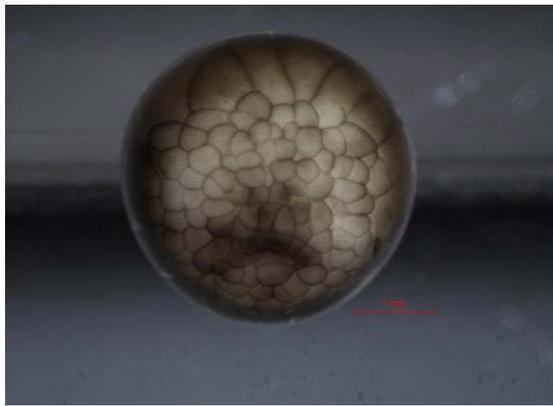
Photo credit: Molly Webb

# Lake Roosevelt White Sturgeon Fishery

- Purpose: family size equalization
  - Targeting hatchery fish – slot limit
  - Spawning sanctuary
- ≈ 3,500 fish harvested in 2017
- 2018
  - Tribal ongoing
  - Non-tribal under development
  - Tribes to conduct harvest w/ stock assessment



Photo credit: Chris Donley



Recruitment Bottleneck – between first-feeding larval and fall age-0 juvenile stages

# Recruitment Failure Research

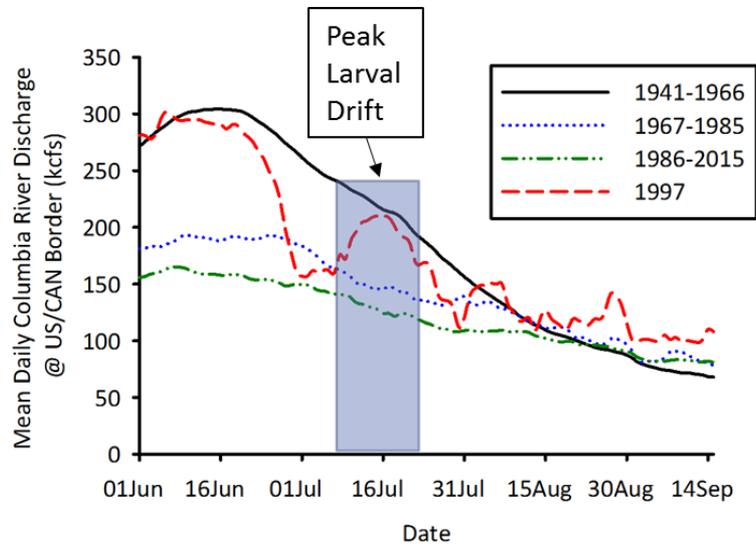
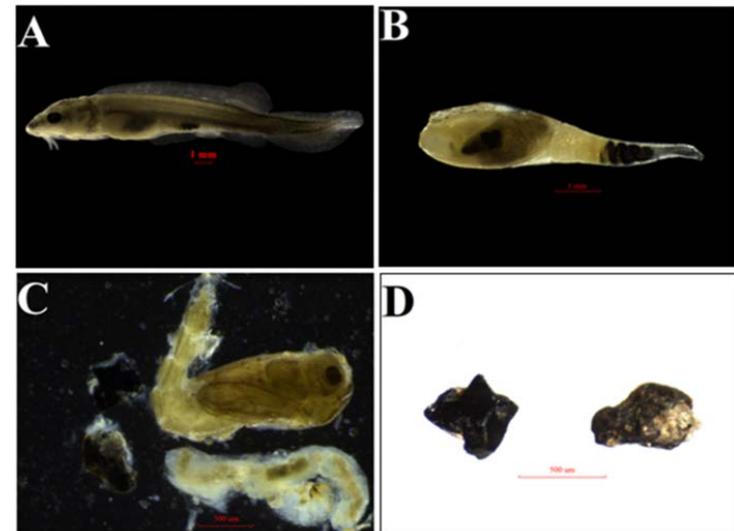
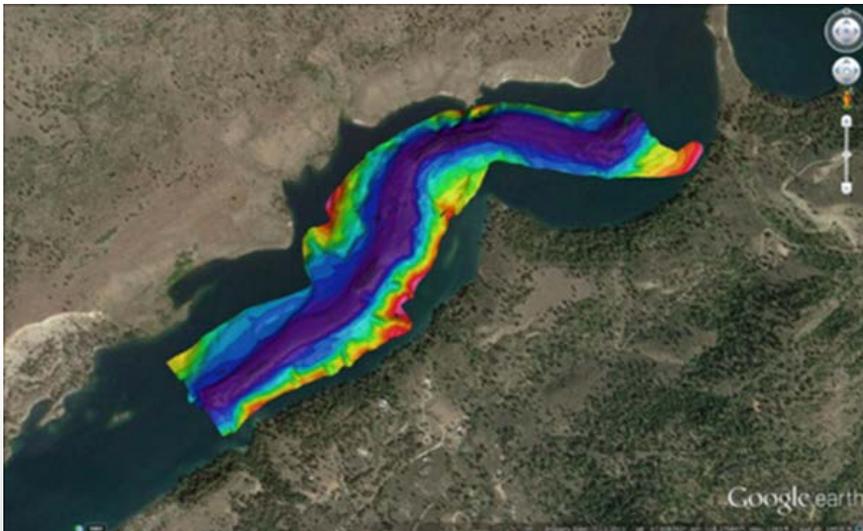
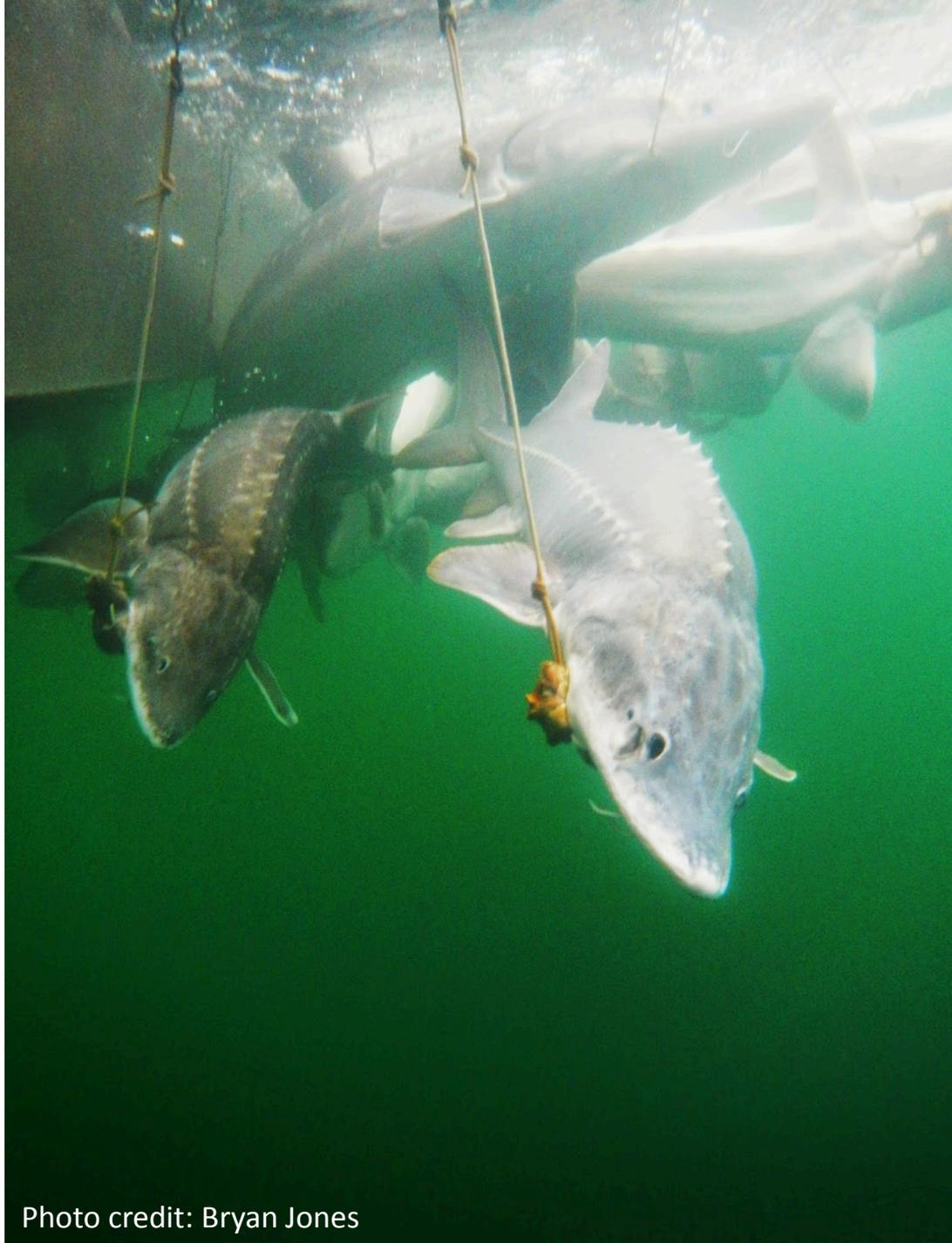


Photo provided by WDFW



# Summary

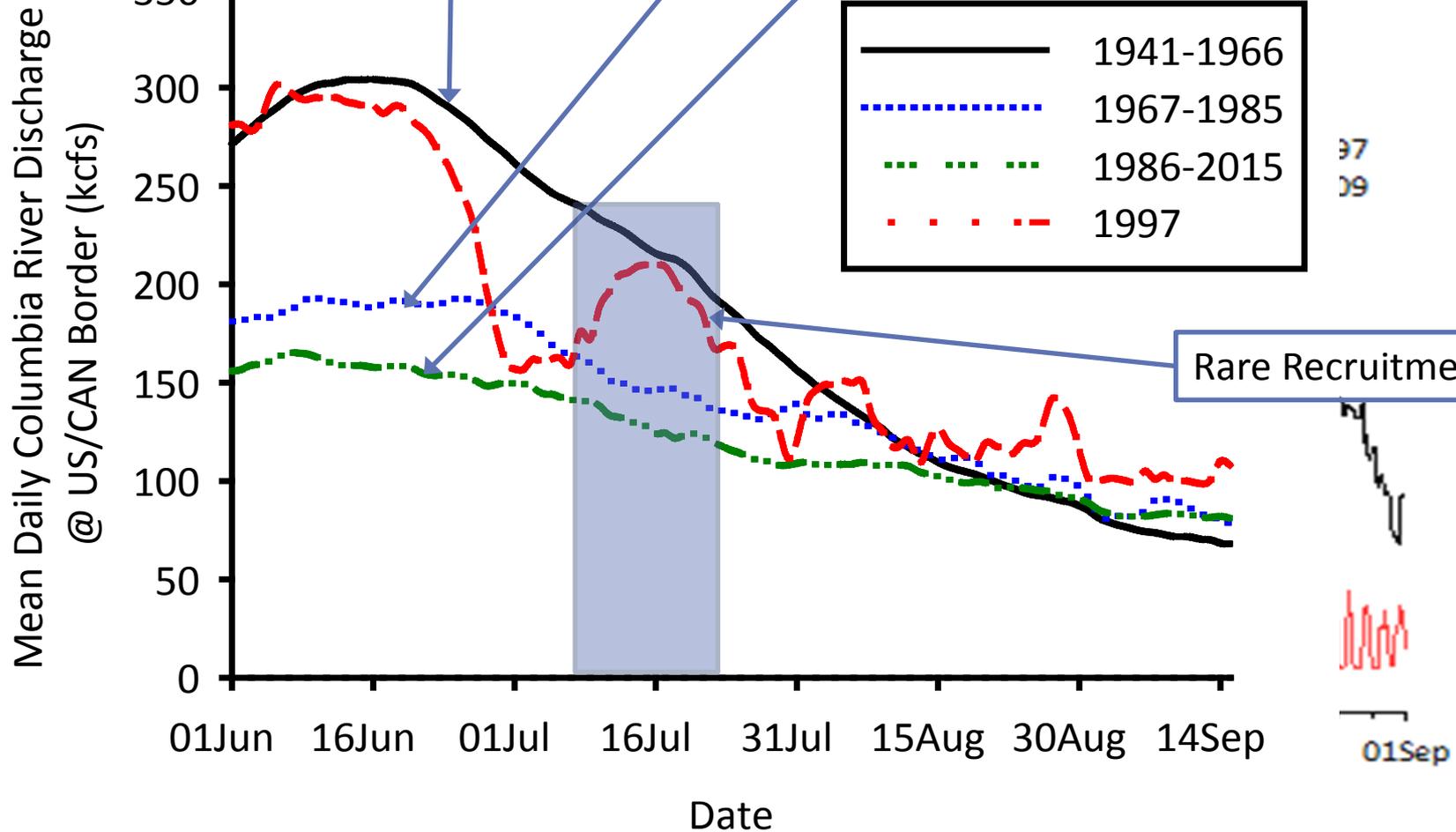
- $\approx 2,500$  wild adults – recruitment limited
- Successful aquaculture program
- Fishery established
- Identified recruitment bottleneck
- Investigating causes of recruitment failure



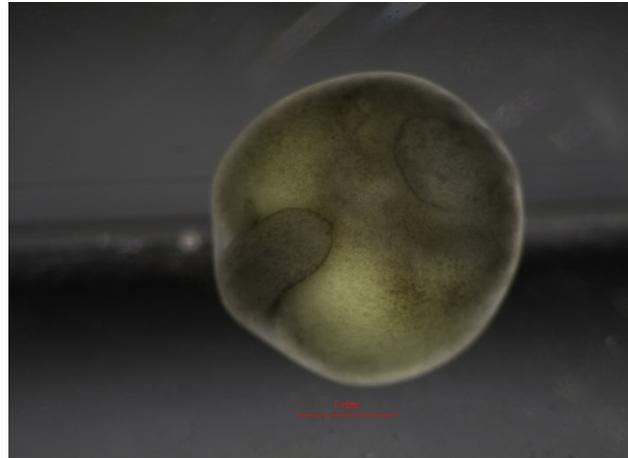
# Acknowledgements

- BPA
- BC Hydro
- BC MOE
- FFSBC
- US DOI – NRDA
- NPS
- USGS
- WDOE
- USFWS BFTC
- PNNL
- Sitka
- US EPA
- Golder Associates
- Cramer Fish Sciences
- Teck American Incorporated
- CH2M Hill
- Windward Environmental
- Columbia Navigation
- WDOH
- Douglas PUD
- CCT, WDFW, STI - Field & hatchery crews

# Flow Alteration



# Eggs/larvae collection



# KOOTENAI RIVER

## White Sturgeon

### *Recovery Efforts*

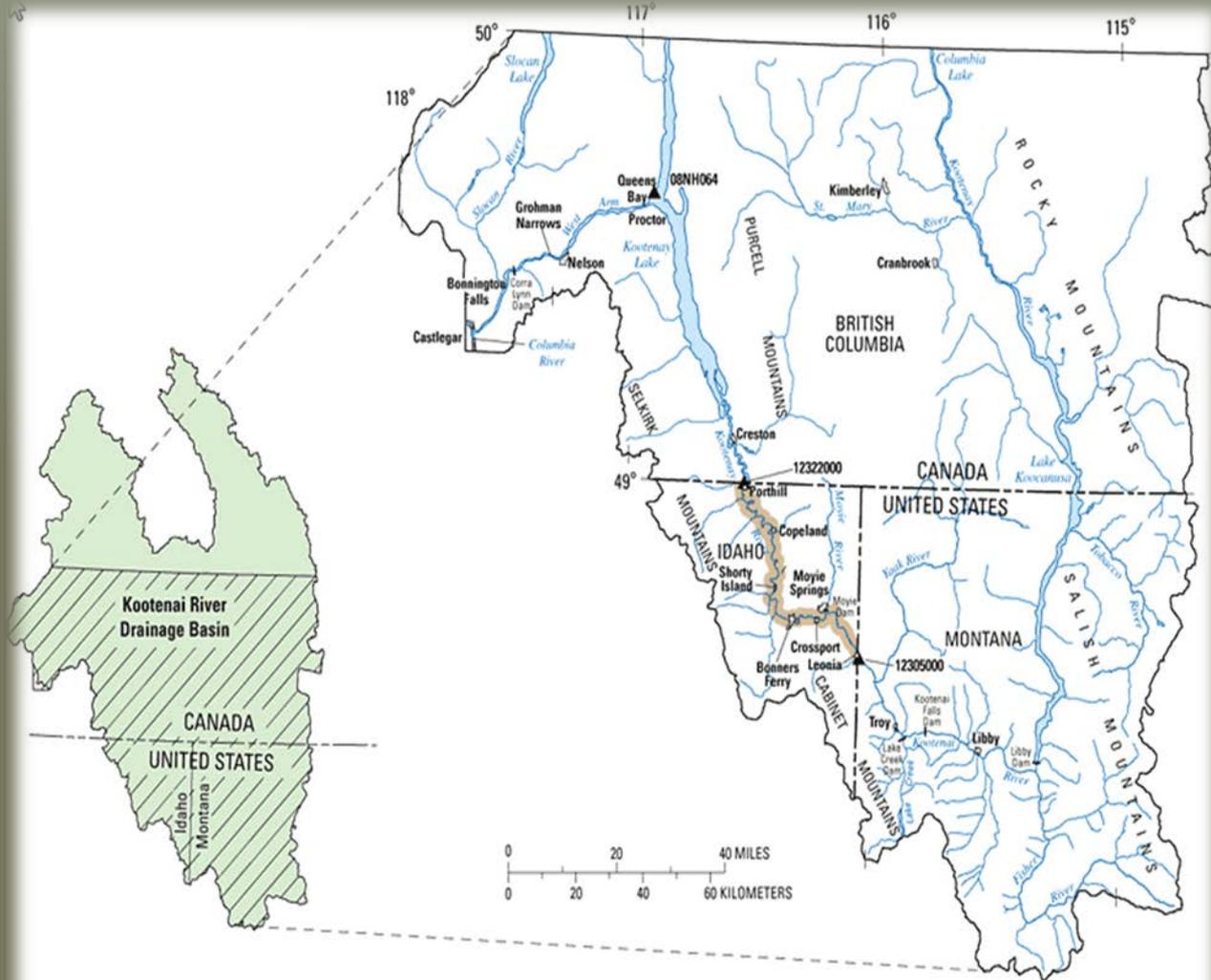


**Ryan Hardy**

**Idaho Dept. of Fish and Game**



# Kootenai River Drainage



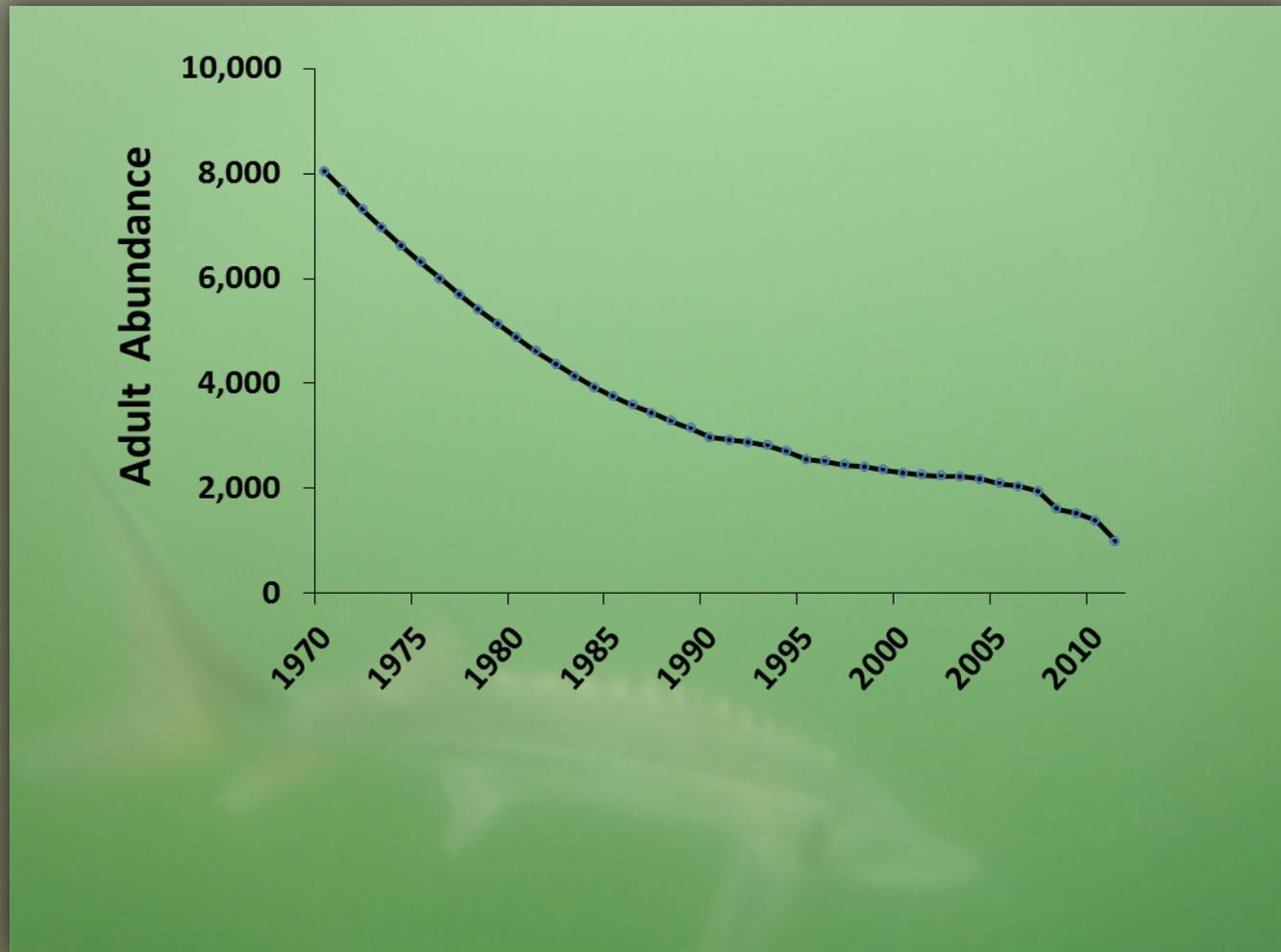
# Problems

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# Population Decline

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# Recruitment Failure

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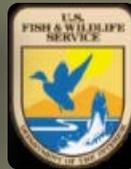
# Actions / Solutions

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- **ESA Listed**
- **Conservation Aquaculture**
- **Mitigation Activities**
- **Monitoring and Evaluation**



# Collaboration



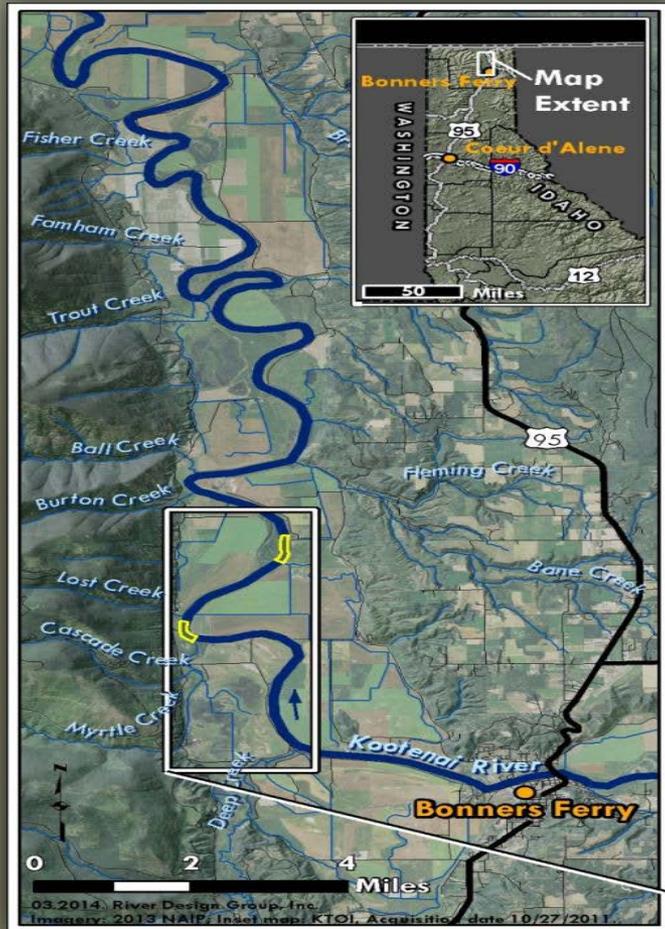
# Goal

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- Self sustaining population and fishery



# Spawning Habitat Additions

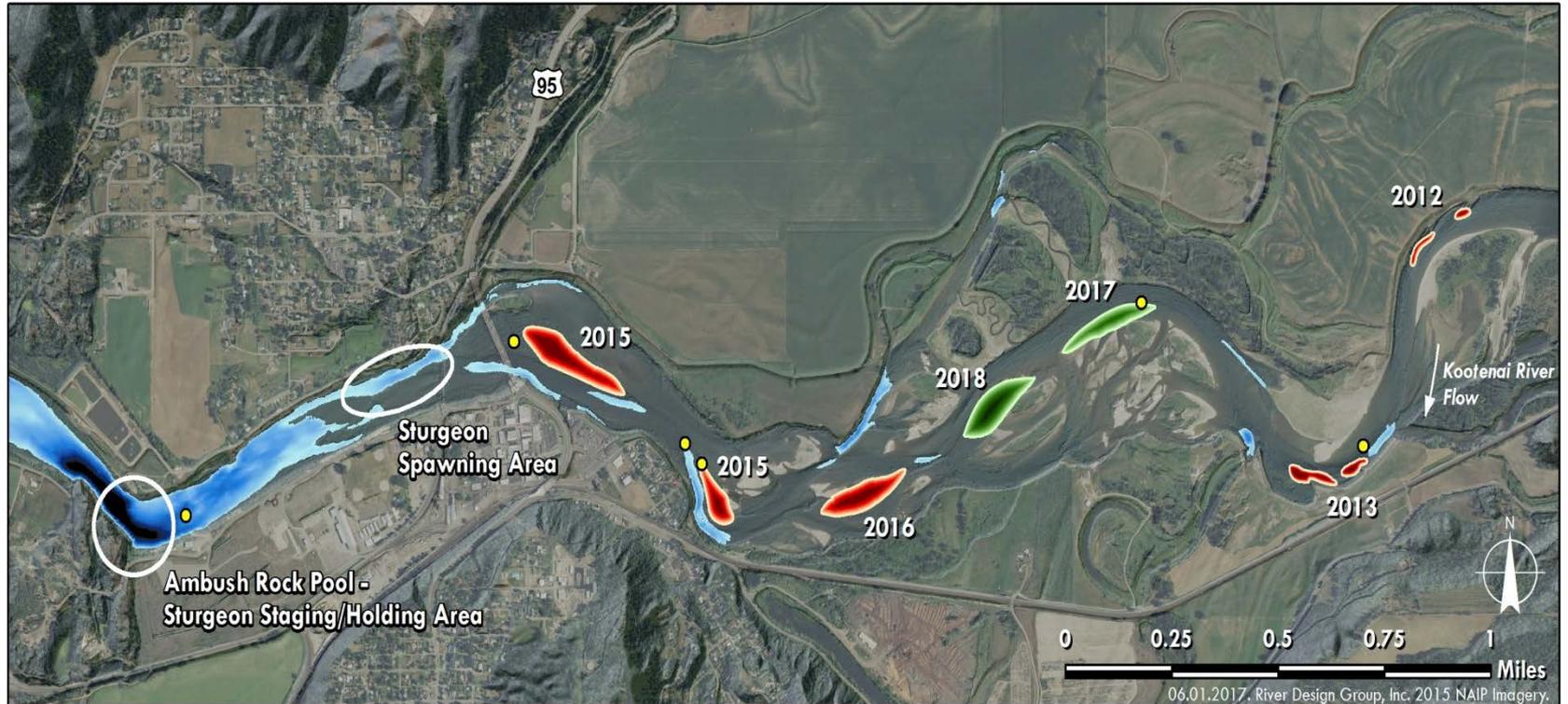


# Habitat Restoration



Kootenai River  
Habitat Restoration Program 2016 Pool Ladder Status

Features	
	Constructed Pool
	Existing Pool
	Proposed Pool



# Habitat Restoration

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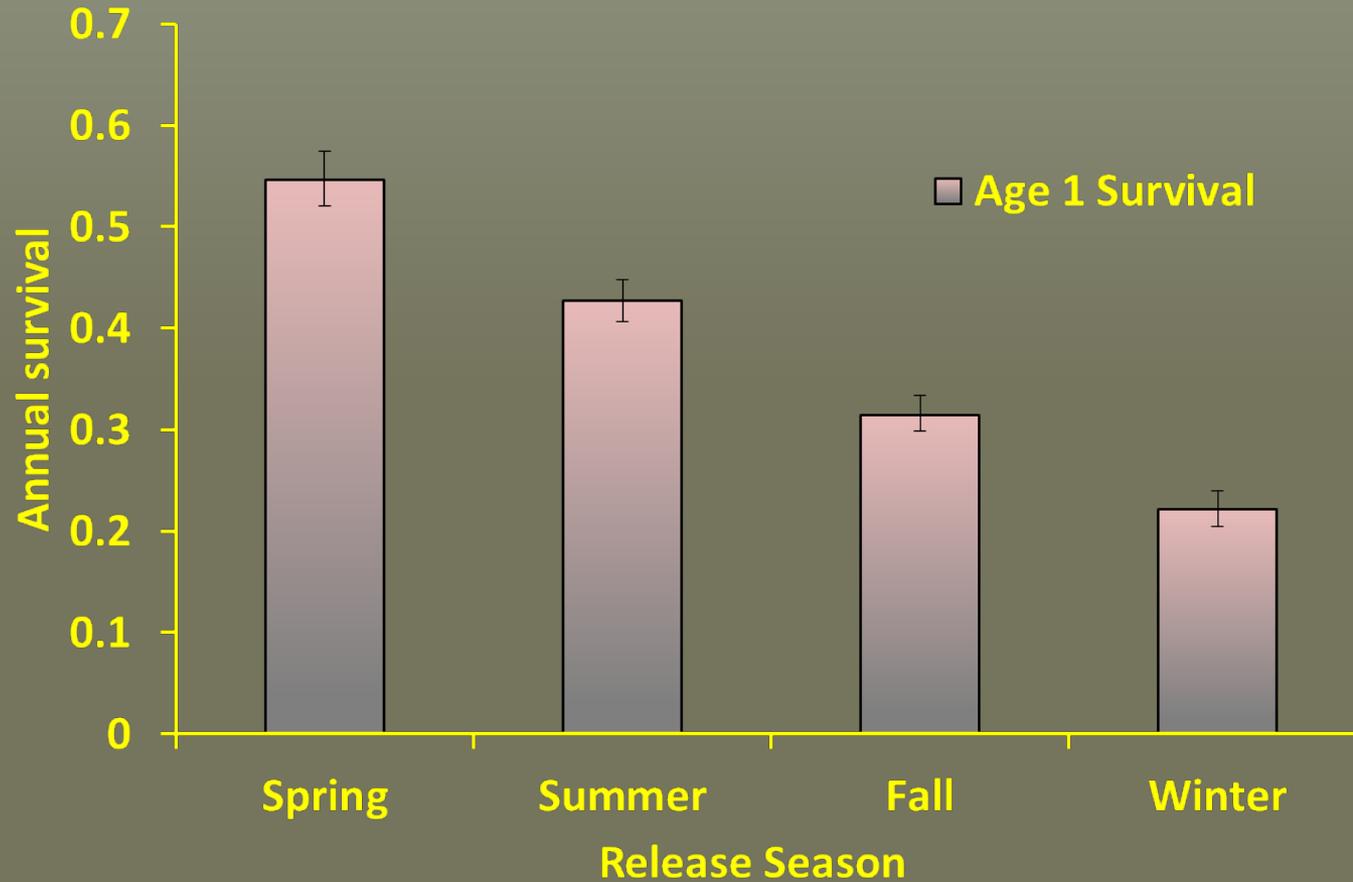
# Vital Rate Evaluation

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# Inform Release Strategies

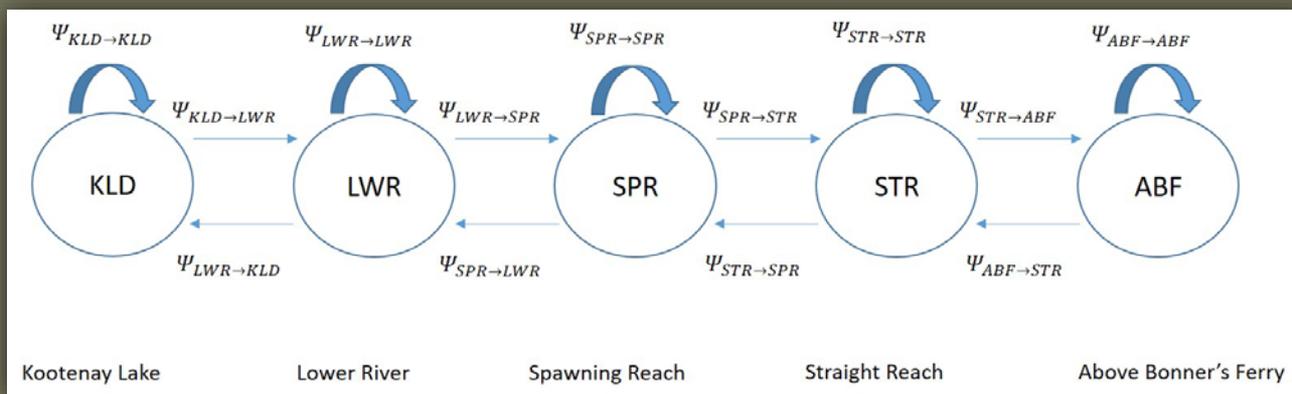
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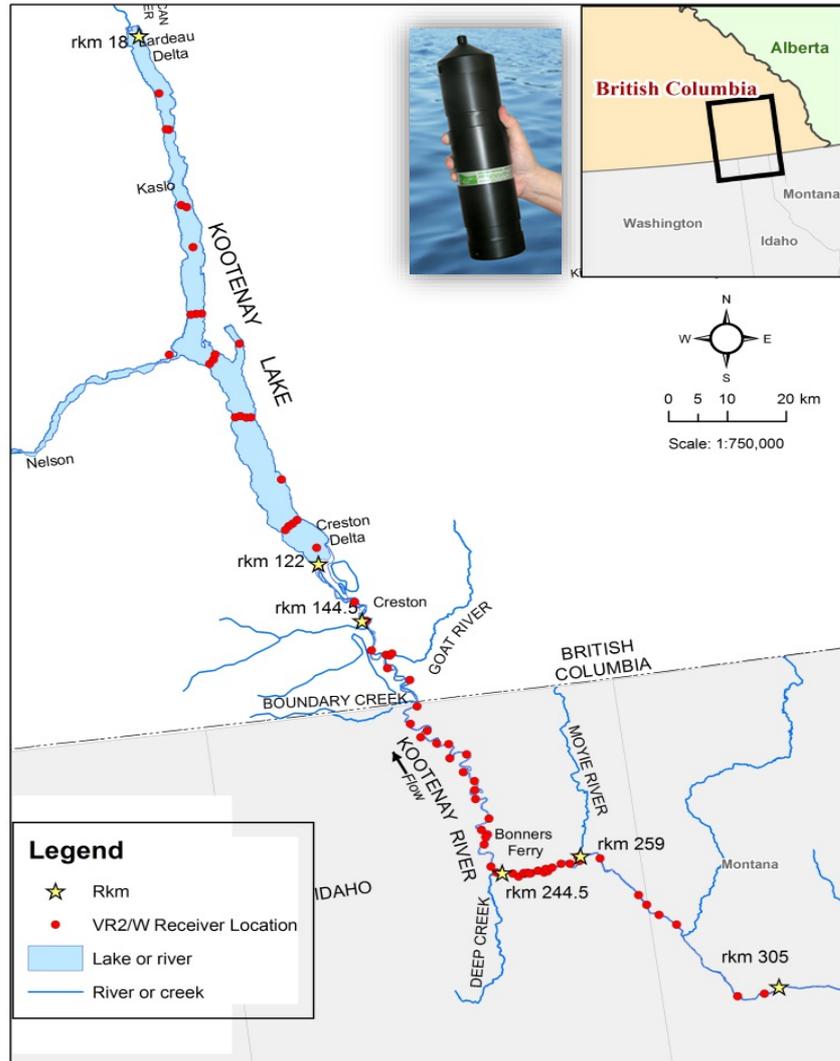
# Abundance Estimates



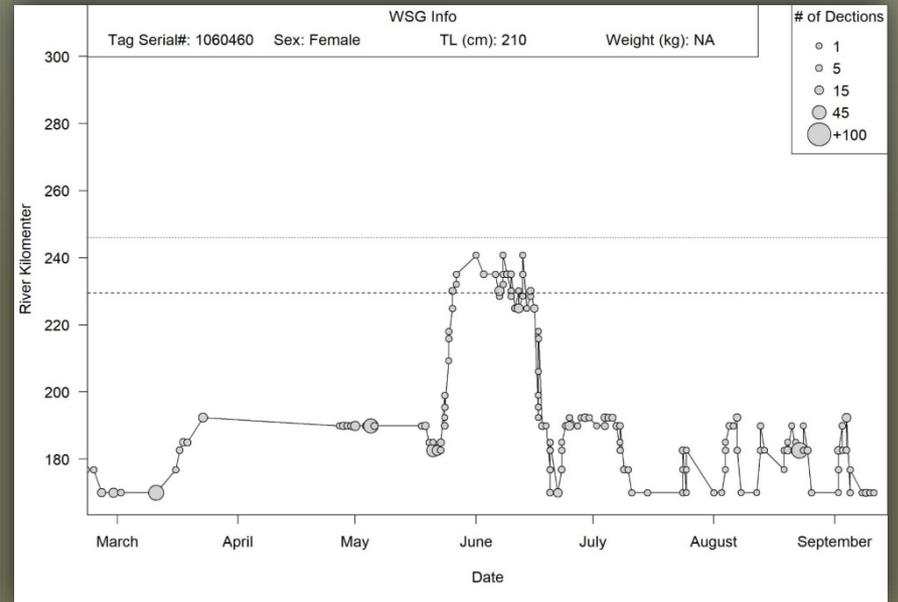
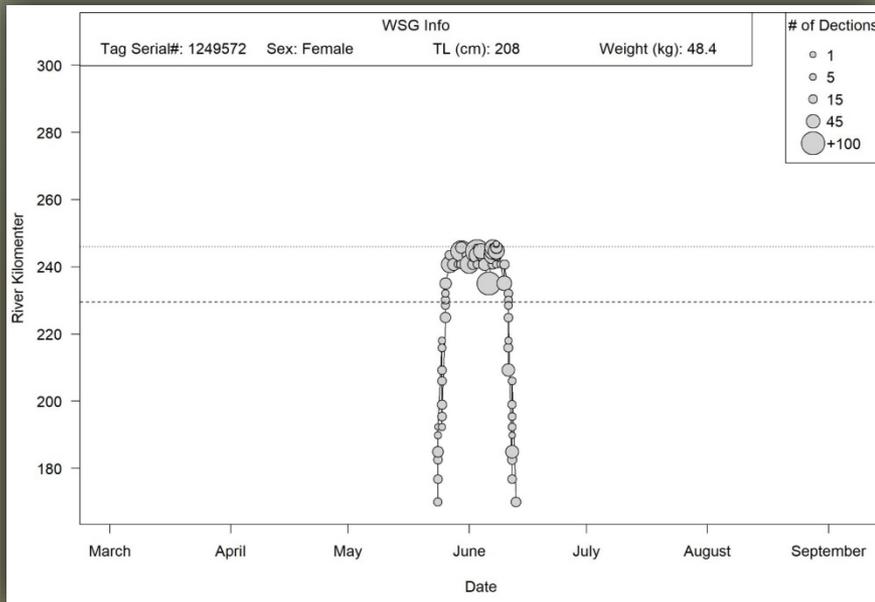
# Adult Movement Modeling



# Movement Evaluations

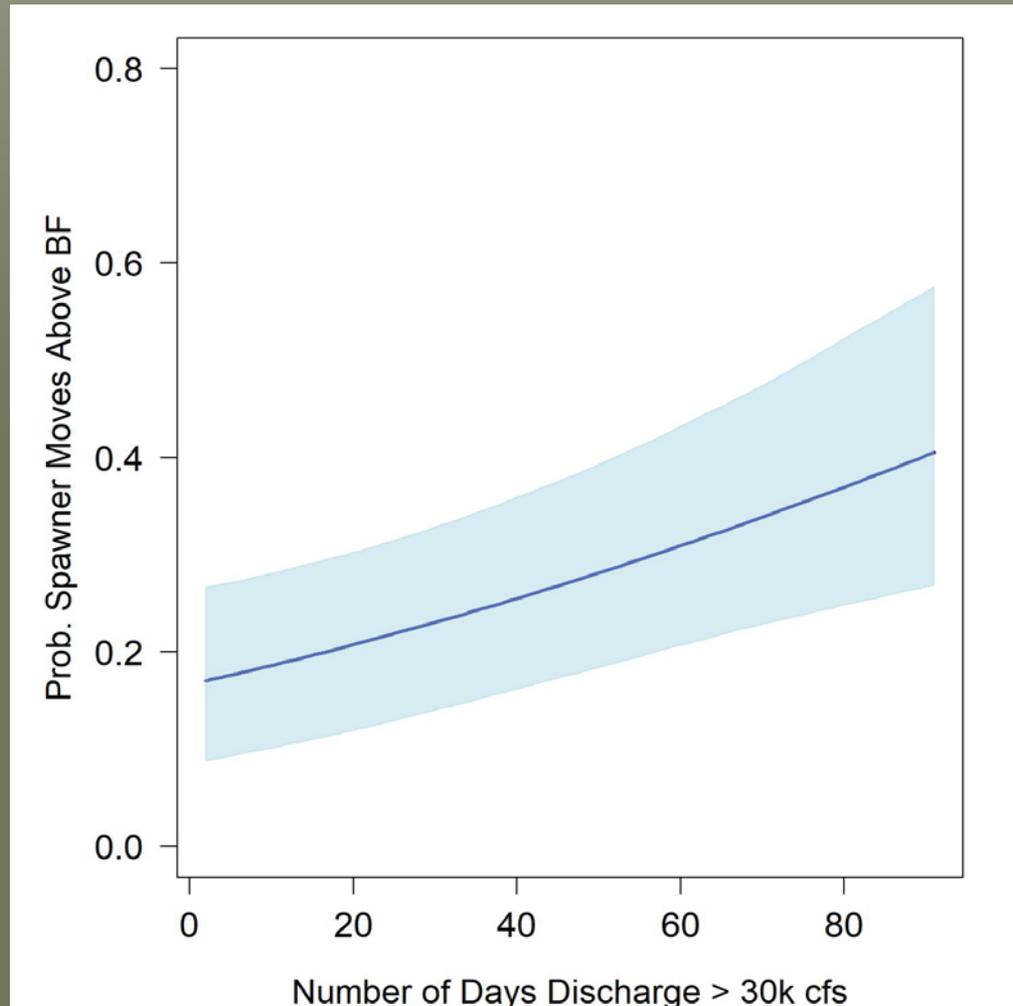


# Movement Variability

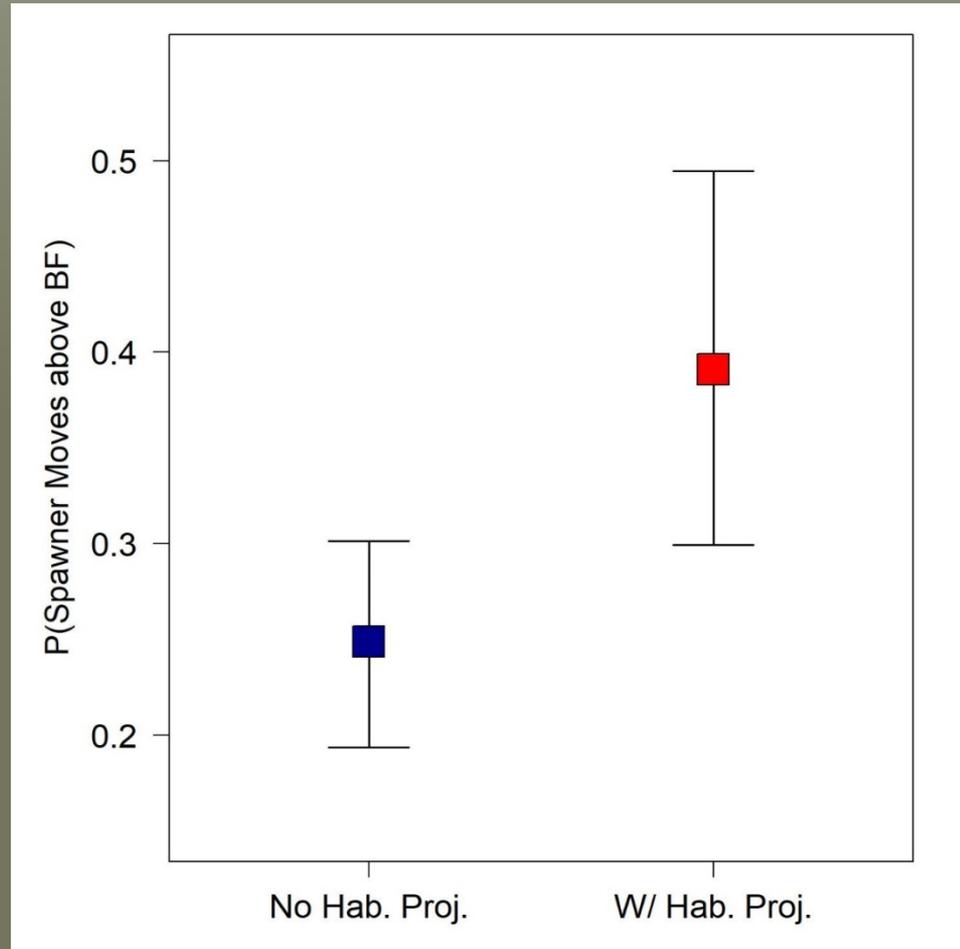


# Movement vs Discharge

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# Movement vs Habitat



# Outlook

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## Thanks to Cooperators:

KTOI

BCMFLNRORD

MFWP

USFWS

USGS

USACE

River Design Group – Matt Daniels and Tom Parker

Cramer and Associates

Steve Dinsmore – Iowa State University

Sima Usvyatsov – Golder Associates

Mike Hansen – USGS

Rich McDonald

IDFG Staff

BPA



# Kootenai River White Sturgeon Conservation Aquaculture

Shawn Young

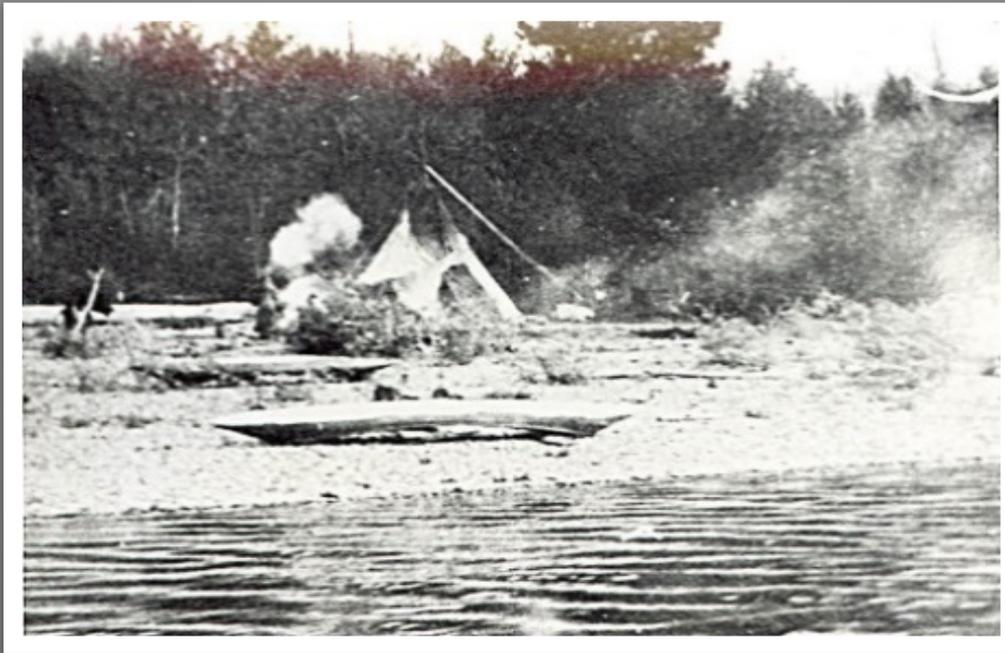
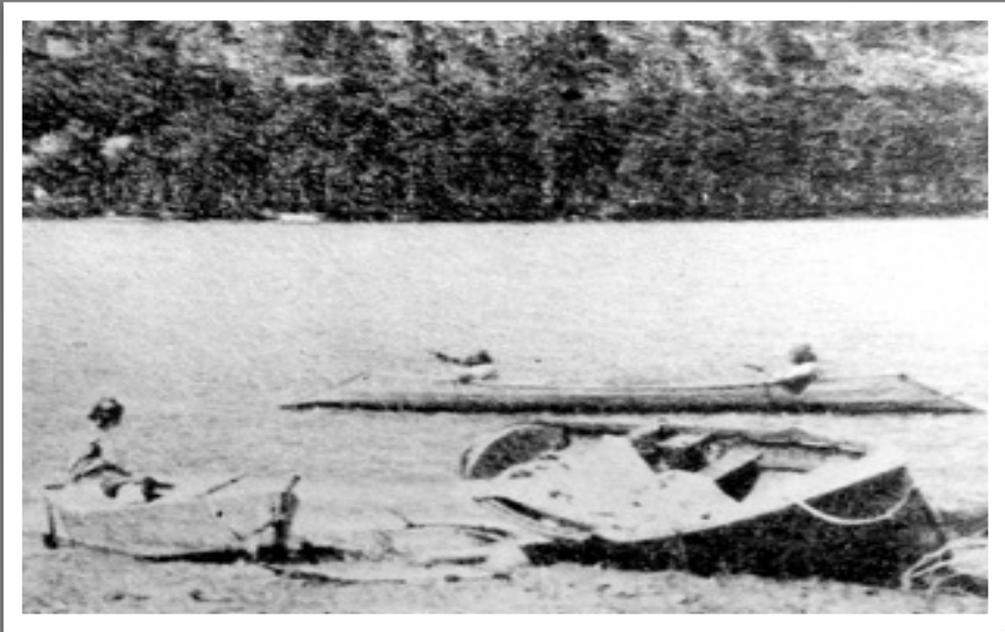
Chris Lewandowski

Sue Ireland

Kootenai Tribe of Idaho Staff



Northwest Power and Conservation Council  
April 10, 2018



# 100+ Years of Changes



# 44 Years: Changes + Libby Dam





# 28 Years!

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✓ KTOI has been rearing KR White Sturgeon since 1990.





# Goals

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Short-term:

- ✓ “Ward off extinction”
- ✓ Balance aquaculture production with genetic management and ecosystem carrying capacity.

Long-term:

- Restore a self-sustaining sturgeon population in the Kootenai River Ecosystem.

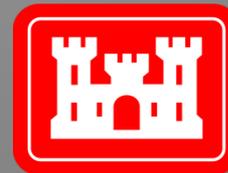


# Collaboration / Planning

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## Annual Coordination Meetings / Program Reviews:

- Sturgeon Aquaculture Annual Program Review
- Kootenai White Sturgeon Recovery Team
- Burbot Aquaculture Annual Program Review
- International Kootenai Ecosystem Restoration Team (IKERT)
- Habitat Restoration Team Meetings
- Sturgeon Spawning Flows Technical Team



# Apply Monitoring & Evaluation Results

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- ✓ Post-release survival
- ✓ Dispersal
- ✓ Population Abundance
- ✓ Population Structure
- ✓ Growth
- ✓ Spawning / Recruitment
- ✓ Genetics



# Apply Monitoring & Evaluation Results

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➤ Wild broodstock genetic contributions a priority.

≈ 400 wild white sturgeon adults spawned

New group of spawning adults each year

- ✓ 10 females
- ✓ 30 males per year



Hopefully, we will double that number over the next decade.

# Apply Monitoring & Evaluation Results

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## Annual Spawning Plan

- ✓ 30 unique families
- ✓ Eggs per family  $\approx$  6,000

==



# Apply Monitoring & Evaluation Results

## Rearing Plan

≈ 50% of fish from each family reared at 14°C for accelerated growth.

≈ 50% of fish from each family reared at ambient river temperatures.



# Apply Monitoring & Evaluation Results

Annual Release

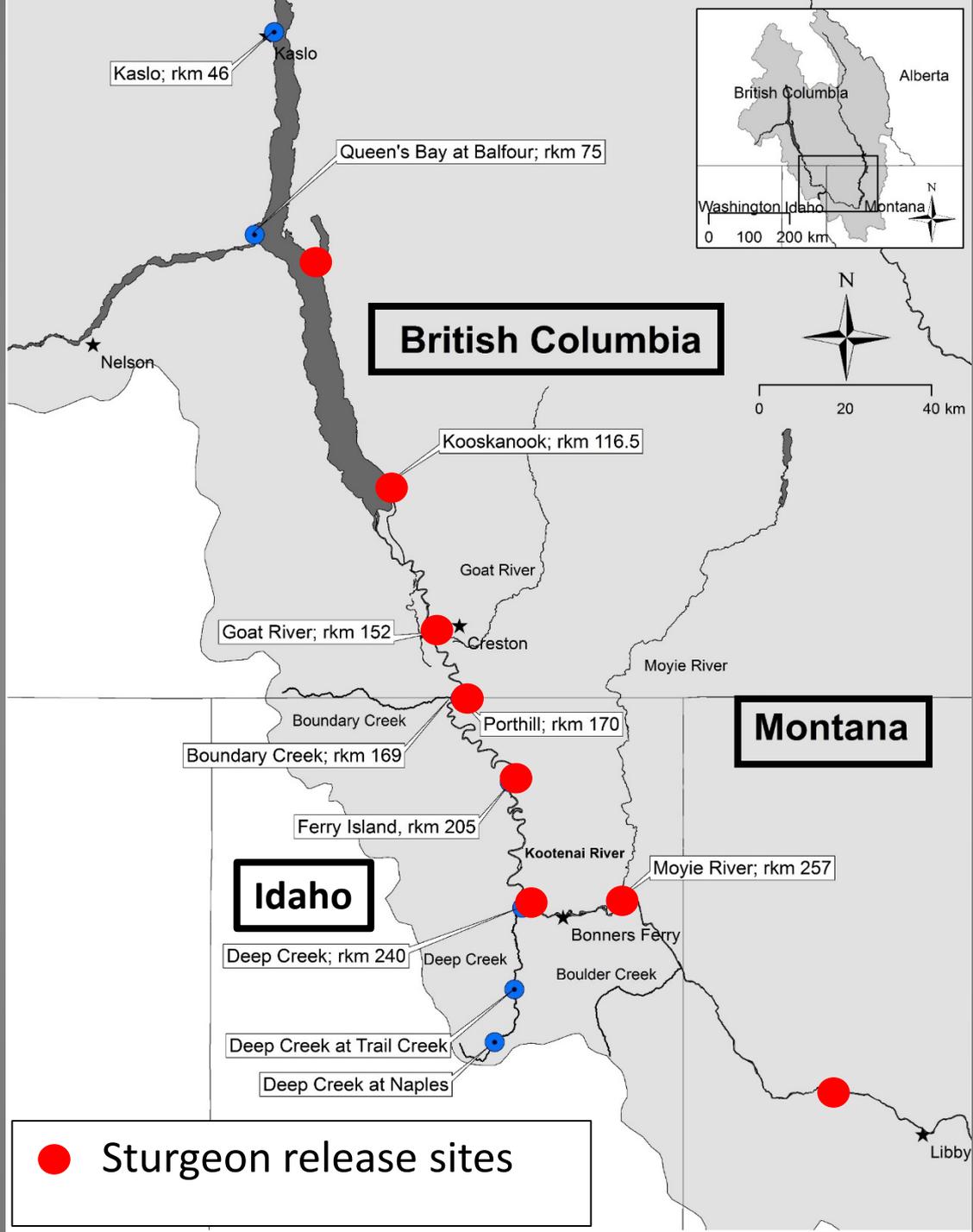
≈ 5,000 - 15,000

1-year old juveniles



## Research, Monitoring, and Evaluation has guided the program.

Years / Year Classes	Hatchery					
	KTOI – Tribal Sturgeon*		BCFFS**		KTOI – Twin Rivers*	
	Released / Families	Mean Wt (g)	Released/ Families	Mean Wt (g)	Released/ Families	Mean Wt (g)
1990 - 1998 / 5	2,630 / NA	47 - 863	-	-	-	-
1999 - 2003 / 5	19,857 / 50	33 - 294	27,927 / 25	44 - 99	-	-
2004 - 2006 / 3	65,363 / 30	10	37,107 / 15	10	-	-
2007 - 2014 / 8	44,839 / 80	32 - 76	55,647 / 40	56 - 101	-	-
2015 - 2016 / 2	10,381 / 10	6.6	-	-	20,838 / 18	44



# STATUS

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Hatchery-reared juvenile sturgeon released to date =

***290,000 from 23 year classes***

Current hatchery-reared juvenile abundance estimate =

***≈ 12,000***



(IDFG, McConnell et al. 2018)  
(IDFG, Dinsmore et al. 2015)  
(KTOI, Beamesderfer et al. 2014a)



# STATUS

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- ✓ No hatchery-reared sturgeon have been confirmed to be sexually mature; however, some are reaching hypothesized size and age to be so.



- ✓ 56% of families created are represented in river. (Schreier et al. 2015)

# Genetics - Spontaneous Autopolyploidy

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- ✓ Continue to monitor wild broodstock and hatchery-reared sturgeon.
- ✓ Continue to support research.



# Thanks to all our partners for continued support of the Kootenai River Restoration Program!



Bonneville Power Administration (FUNDING)  
Northwest Power and Conservation Council  
Idaho Department of Fish and Game  
BC Ministry of Forests Land Natural Resource Operations  
Montana Fish Wildlife and Parks  
U.S. Army Corp of Engineers  
U.S. Fish and Wildlife Service  
U.S. Geological Survey  
Kootenai Valley Resource Initiative  
Boundary County  
City of Bonners Ferry  
Idaho Department of Environmental Quality  
Idaho Department of Water Resources  
Idaho Office of Species Conservation  
Natural Resource Conservation Service  
Local Landowners  
U.S. Forest Service  
Bureau of Land Management  
AND MORE!!!



