May 5, 2020

MEMORANDUM

TO: **Fish and Wildlife Committee members**

FROM: **Mark Fritsch**

SUBJECT: **White Sturgeon status report**

BACKGROUND:

Presenter: Peter M. Stevens, *Columbia River White Sturgeon Project Lead*, ODFW
Blaine L. Parker, *Sturgeon Program Lead*, CRITFC
Laura B. Heironimus, *Sturgeon, Smelt, and Lamprey Unit Lead*, WDFW.

Summary: Peter, Blaine and Laura will each give a short report on sturgeon in the management units, from the Columbia River below Bonneville, Bonneville to McNary, and McNary and lower Snake River, respectively. The information provided will include a short report on sturgeon in the management units and will cover population status, ongoing work, challenges, accomplishments, partners, and future needs for sturgeon.

Relevance: These reports address many measures in the 2014 Fish and Wildlife Program and will help inform the ongoing Program amendment, Sturgeon projects are currently being reviewed as part of the Council's Resident Fish and Sturgeon Project Review process that is currently in the response loop with the ISRP.

Workplan: Fish and Wildlife Division preliminary work plan 2020; Program Implementation (2014 Program and 2020 addendum); and other program implementation. 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.

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Executive Director

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Background: The Fish and Wildlife Program supports two projects that are associated with Sturgeon management in the above management units.

- Project #1986-050-00, *Evaluate Sturgeon Populations in the Lower Columbia River*
- Project #2007-155-00, *Develop a Master Plan for a Rearing Facility to Enhance Selected Populations of White Sturgeon in the Columbia River Basin*

More Info:

- The Council's White Sturgeon web page
- Columbia Basin White Sturgeon Planning Framework
- White Sturgeon Story Map (new)
- 2018 Annual Sturgeon Reports to Council (memo and presentations)
- 2019 White sturgeon status reports for the Columbia River Basin (memo and presentations)

Northwest Power and Conservation Council

12 May 2020

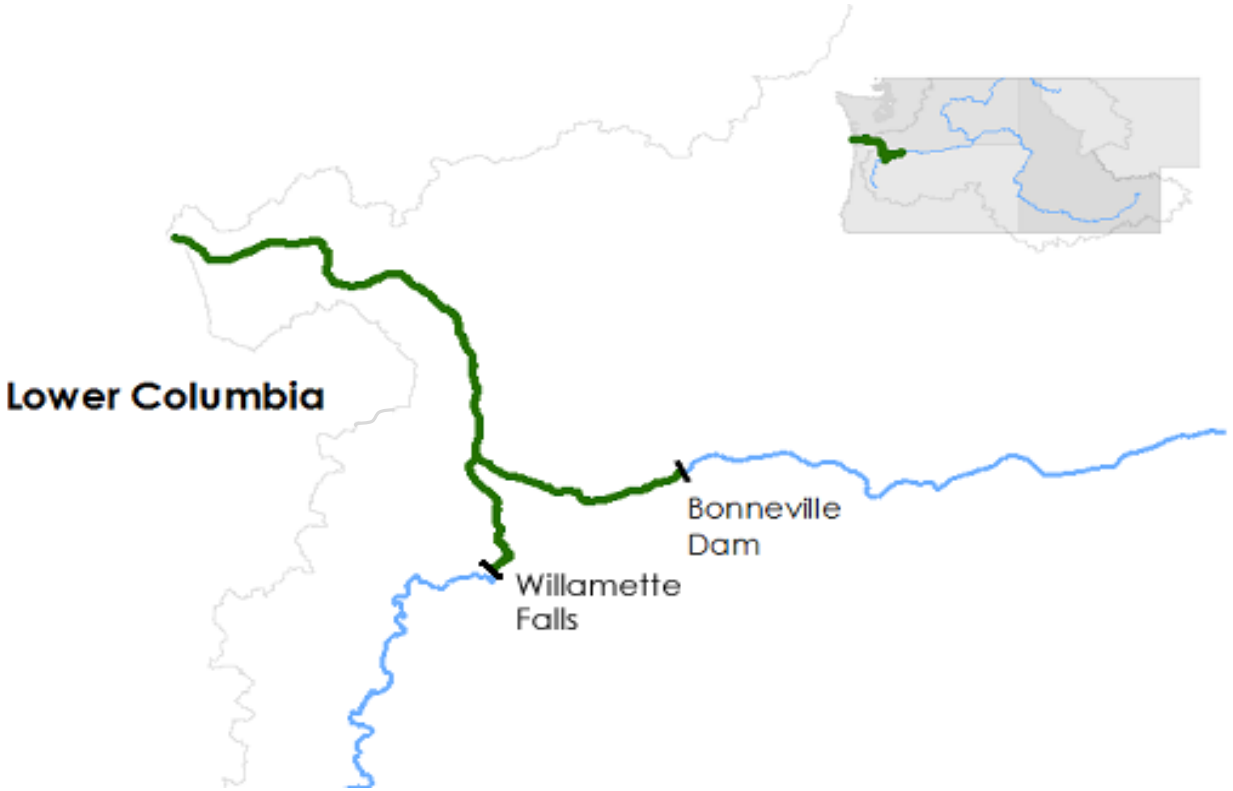
Lower Columbia River White Sturgeon Population Status Update

Peter Stevens

Columbia River Sturgeon Project Leader

Today's Topics

* 2019 stock assessment results
* Current population composition, status, and trends
* Recruitment and Predation context

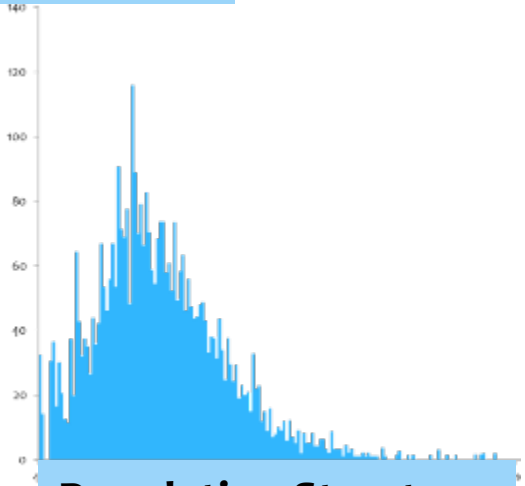


Metrics and Indicators

Juvenile Abundance

Adult Abundance

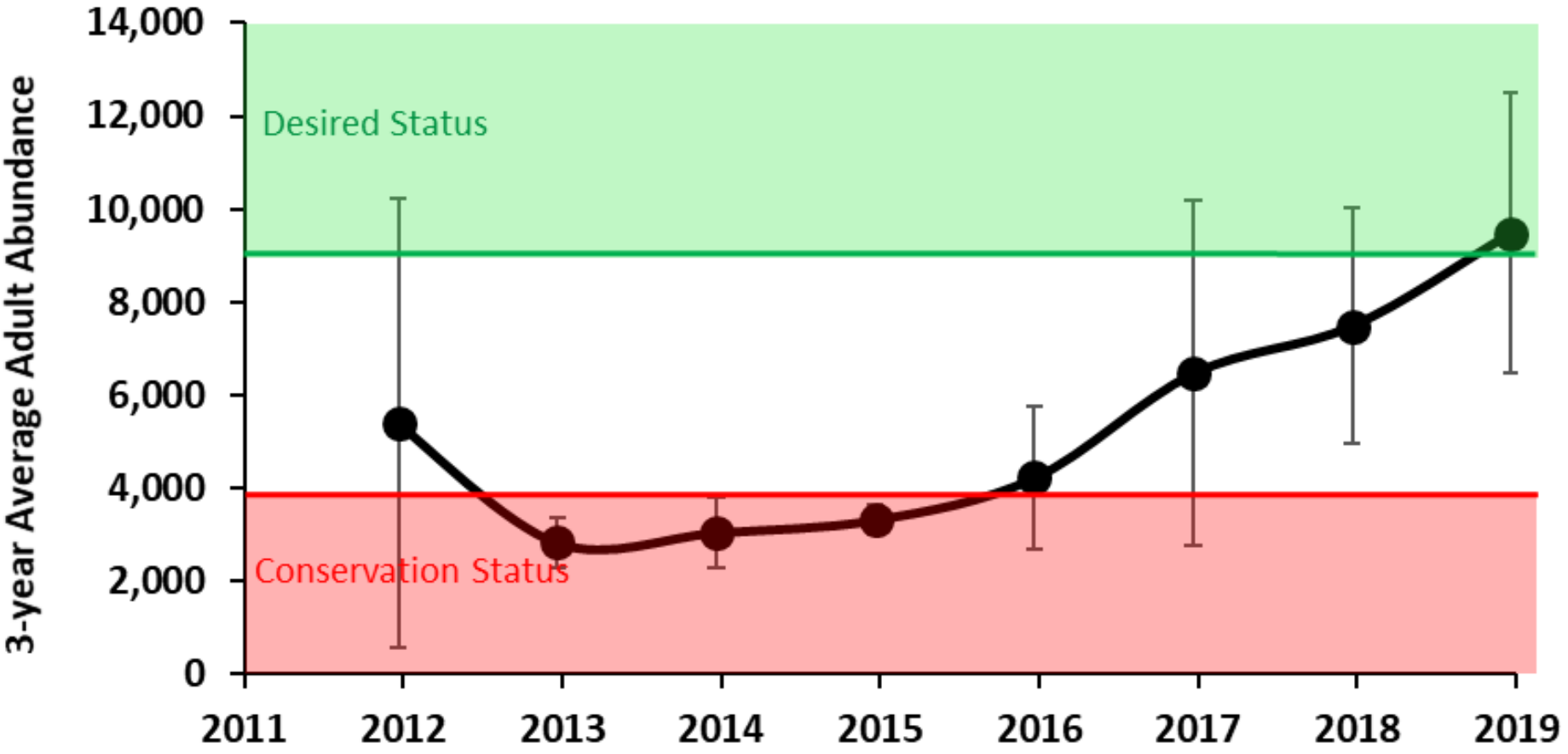
Age-0 Recruitment



Population Structure

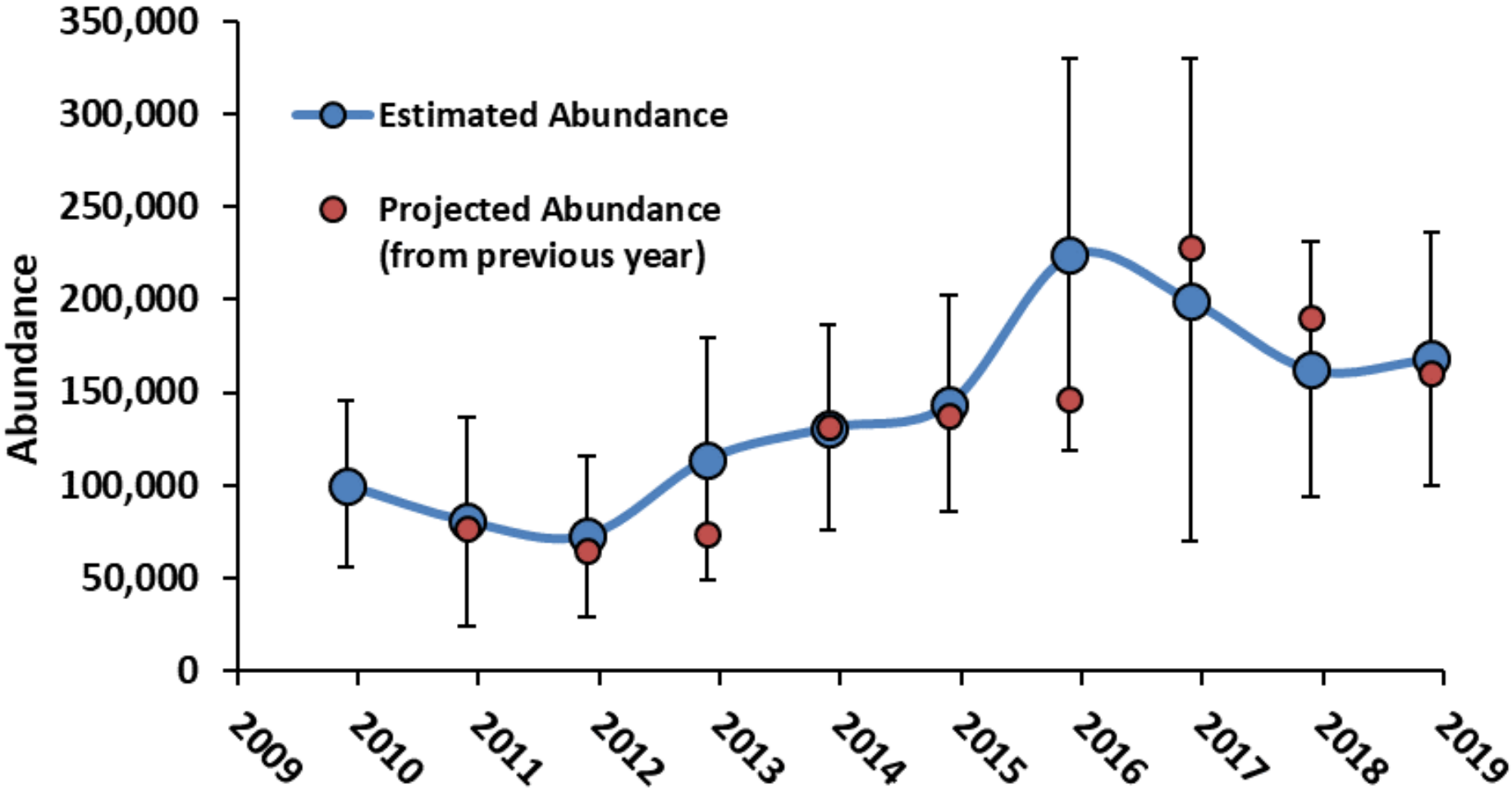
Pinnipeds

LCR White Sturgeon Abundance

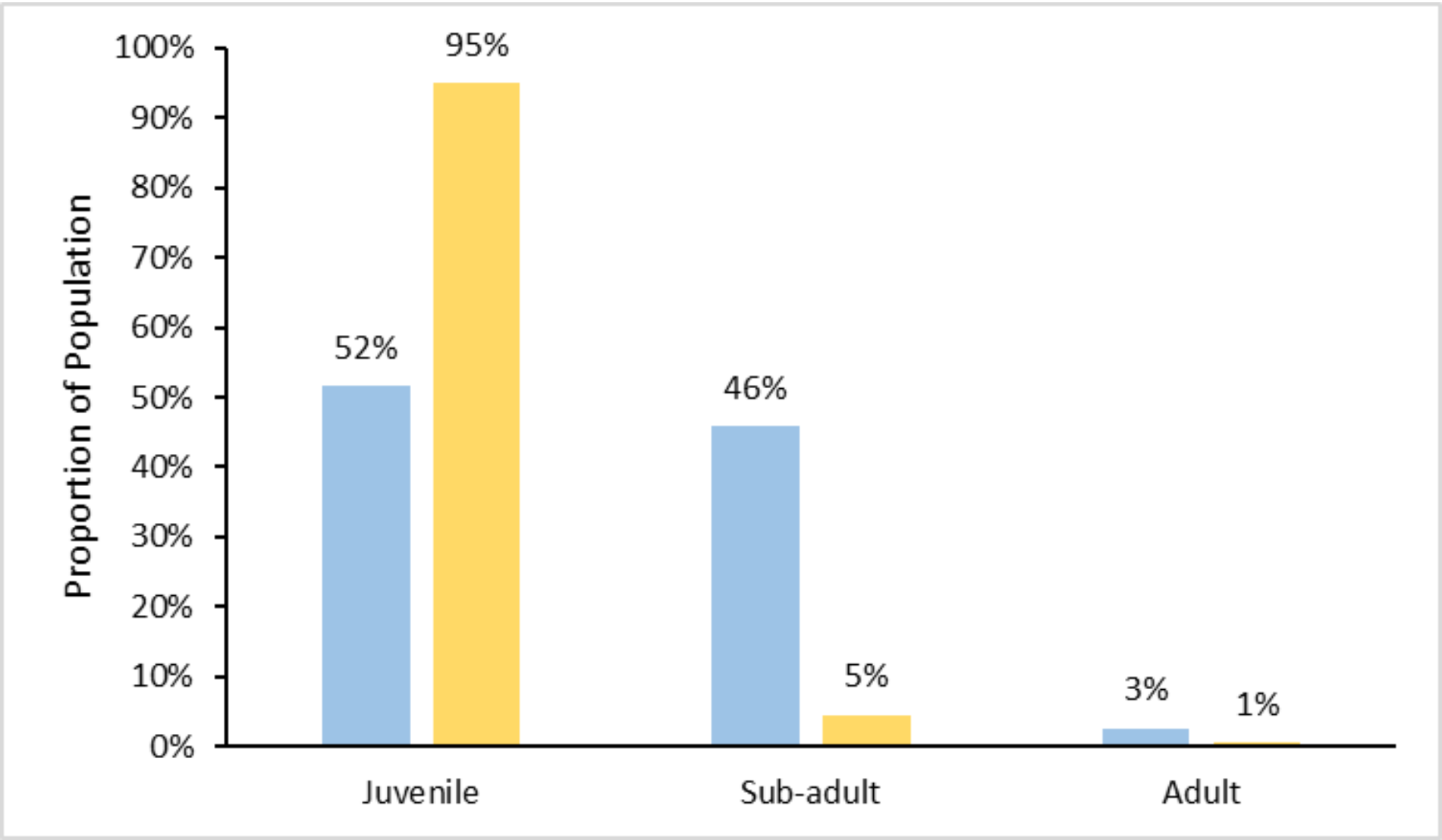


LCR White Sturgeon Abundance

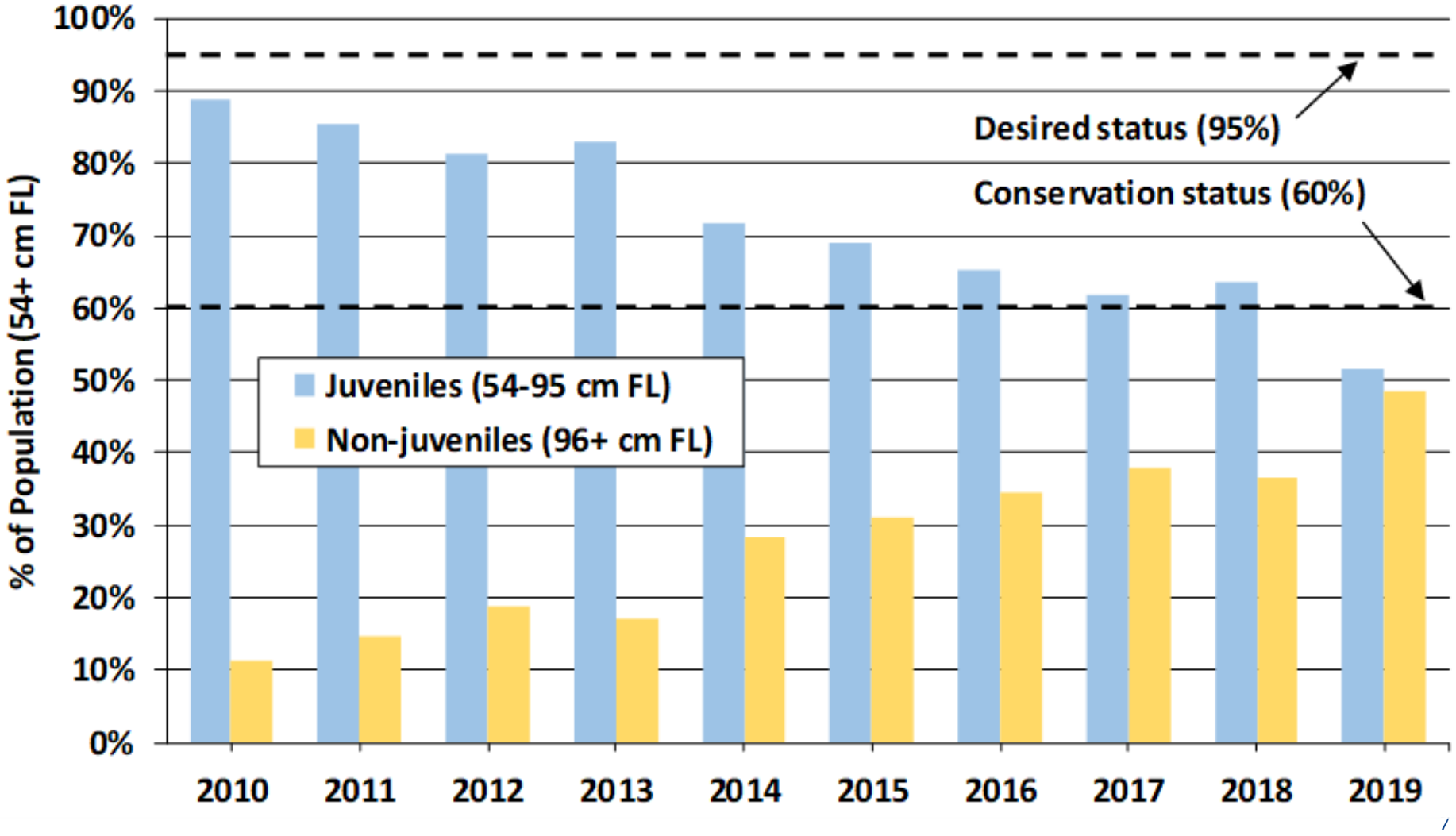
Estimated Legal Abundance (38” – 54” FL)



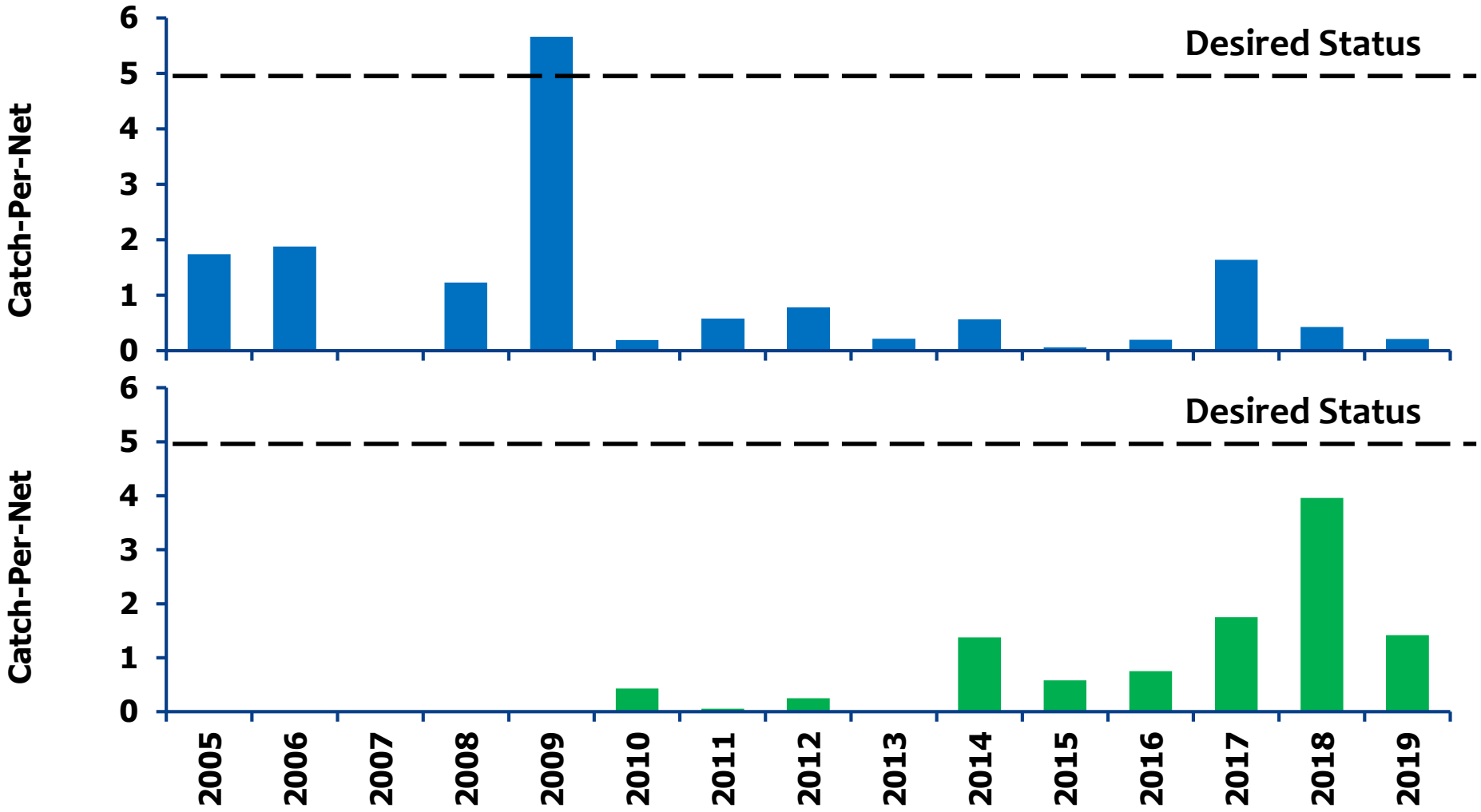
LCR Age Class Distribution



LCR Trend in Population % by Age Class

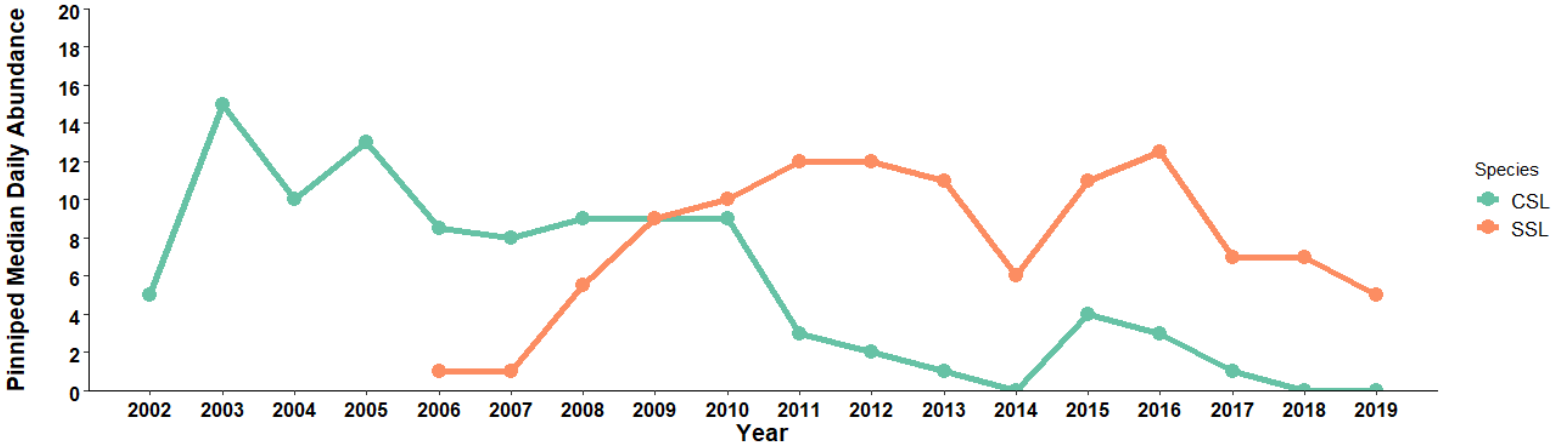


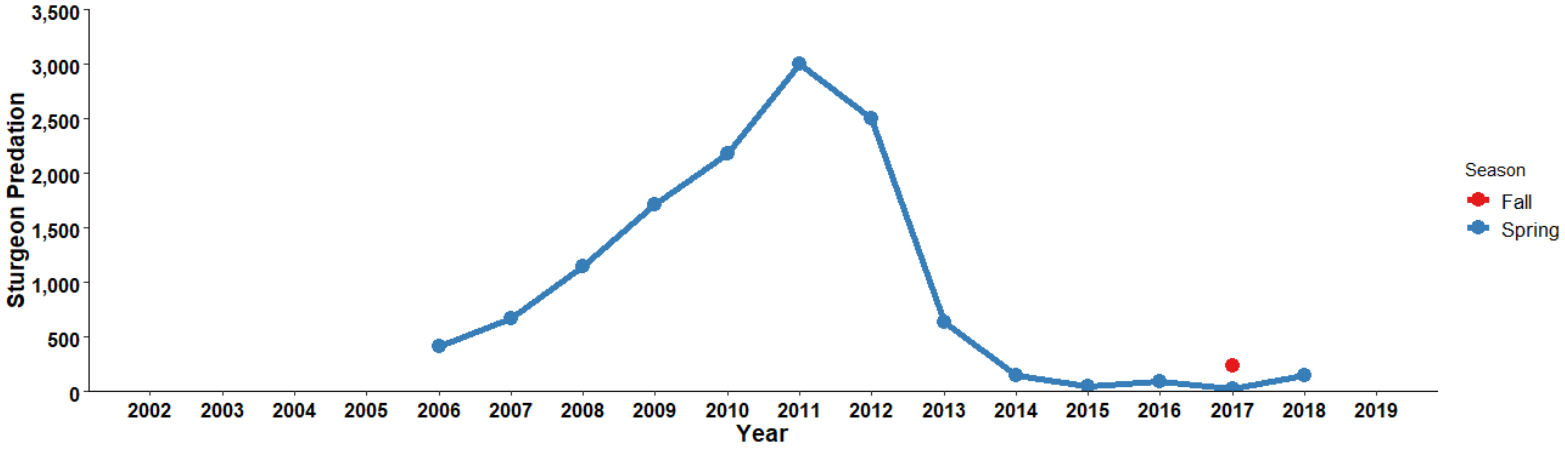
LCR White Sturgeon Recruitment



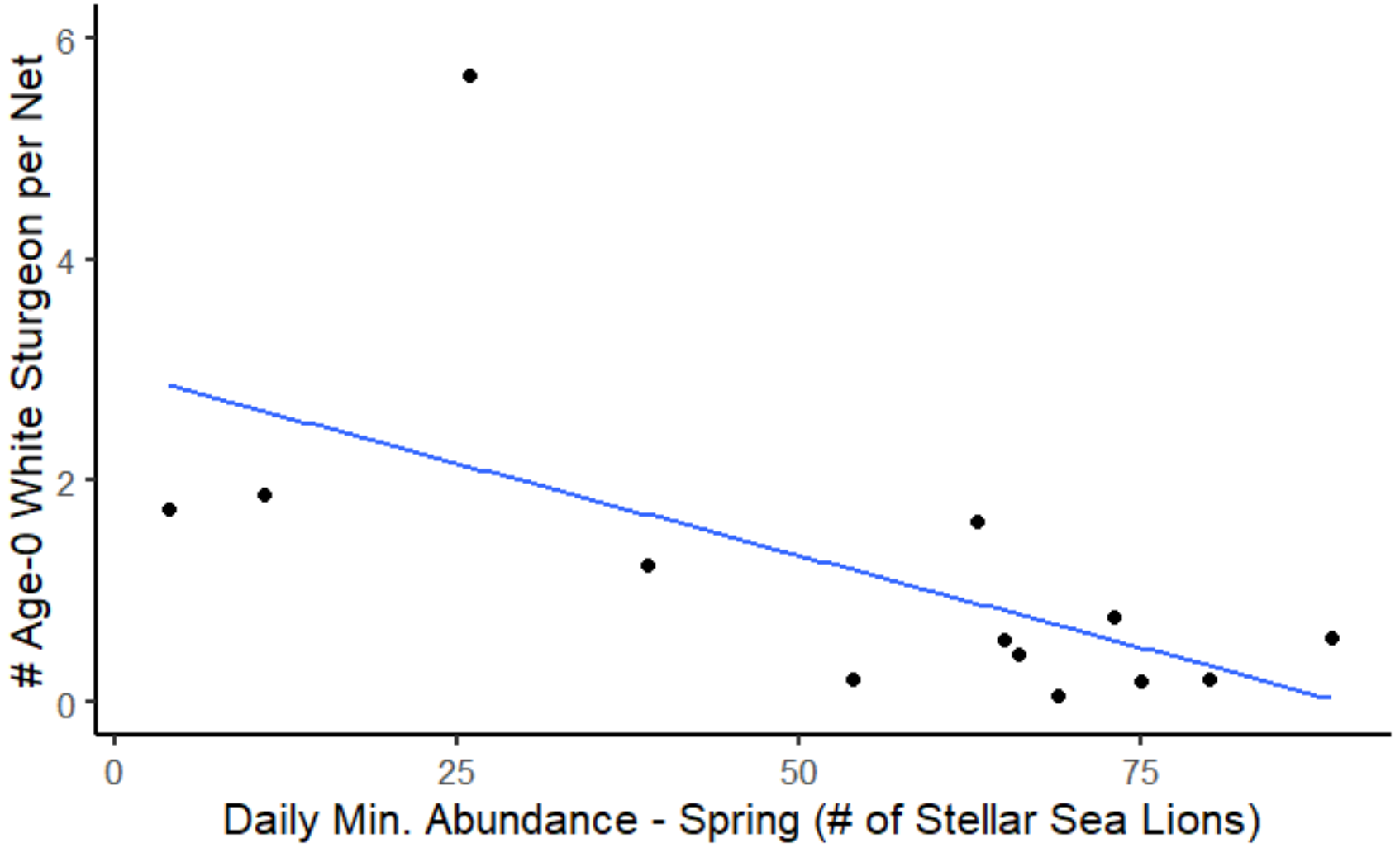
Sea lion Abundance & Predation

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



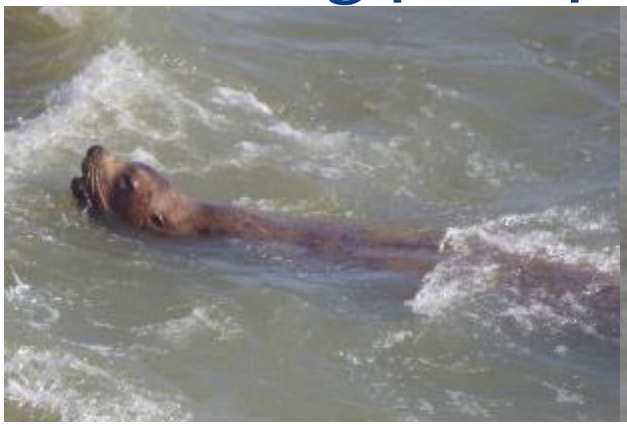


Sea lion Effects: Mainstem



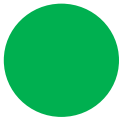
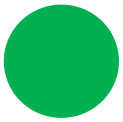
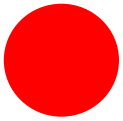
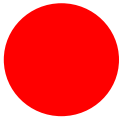
Sea lion predation

Growing pinniped issue in the Willamette



Year	Stellar Sea Lions Observed	Predation Events Observed
2014-15	1-2	-
2016	1-2	8
2017	1-4	69
2018	11	79
2019	10	98

Summary

Metric	N	Interpretation	Brief Summary
Legal Abundance	168,204		Stable year-over-year; Increasing trend in CPUE setline tagging fisheries.
Adult Abundance	6,100 3-yr Avg 9,500		2019 3-yr adult abundance estimate is at/above desired status level.
Population Structure	~52% Juveniles		Continued low relative abundance of juvenile and sub-legal sized fish.
Recruitment Index (CPN)	CR: 0.33 WR: 1.42		Mixed. Columbia River <1 in recent years but Willamette 3rd highest since 2010.
Sea Lion Abundance	High		High sea lion abundance is problematic for white sturgeon populations.

END

Questions/Discussion?

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
MAY 12, 2020

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

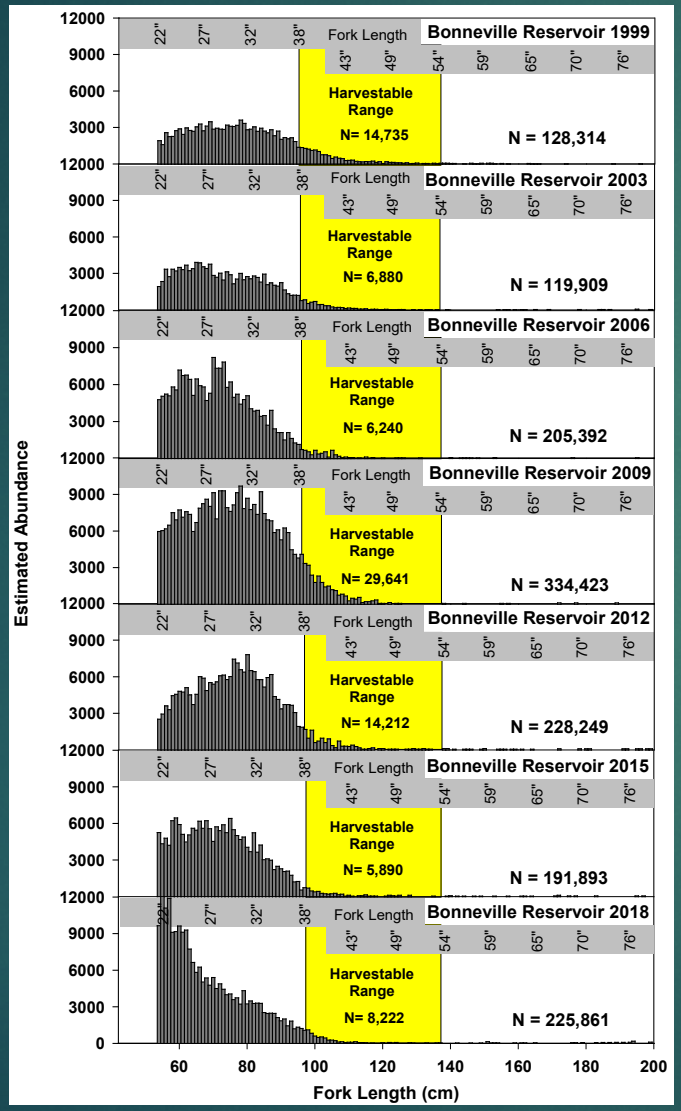
PRESENTATION OVERVIEW

- 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 TAGGING & RECAPTURE* EFFORT BY ODFW, WDFW, AND YAKAMA NATION STAFF
- FALL YOUNG OF YEAR RECRUITMENT MONITORING CONDUCTED BY STATE AND YAKAMA NATION CREW IN THE FALL
- COMMERCIAL, RECREATIONAL AND SUBSISTENCE FISHERIES ARE MONITORED BY TRIBES AND STATES; WDFW PROVIDES FISHERY ANALYSIS, POPULATION ANALYSIS BY ODFW, GENETICS BY CRITFC SCIENTIST'S @ HAGERMAN FISH CULTURE EXPERIMENT STATION – GENETICS LABORATORY

POPULATION TIME SERIES AND KEY POINTS

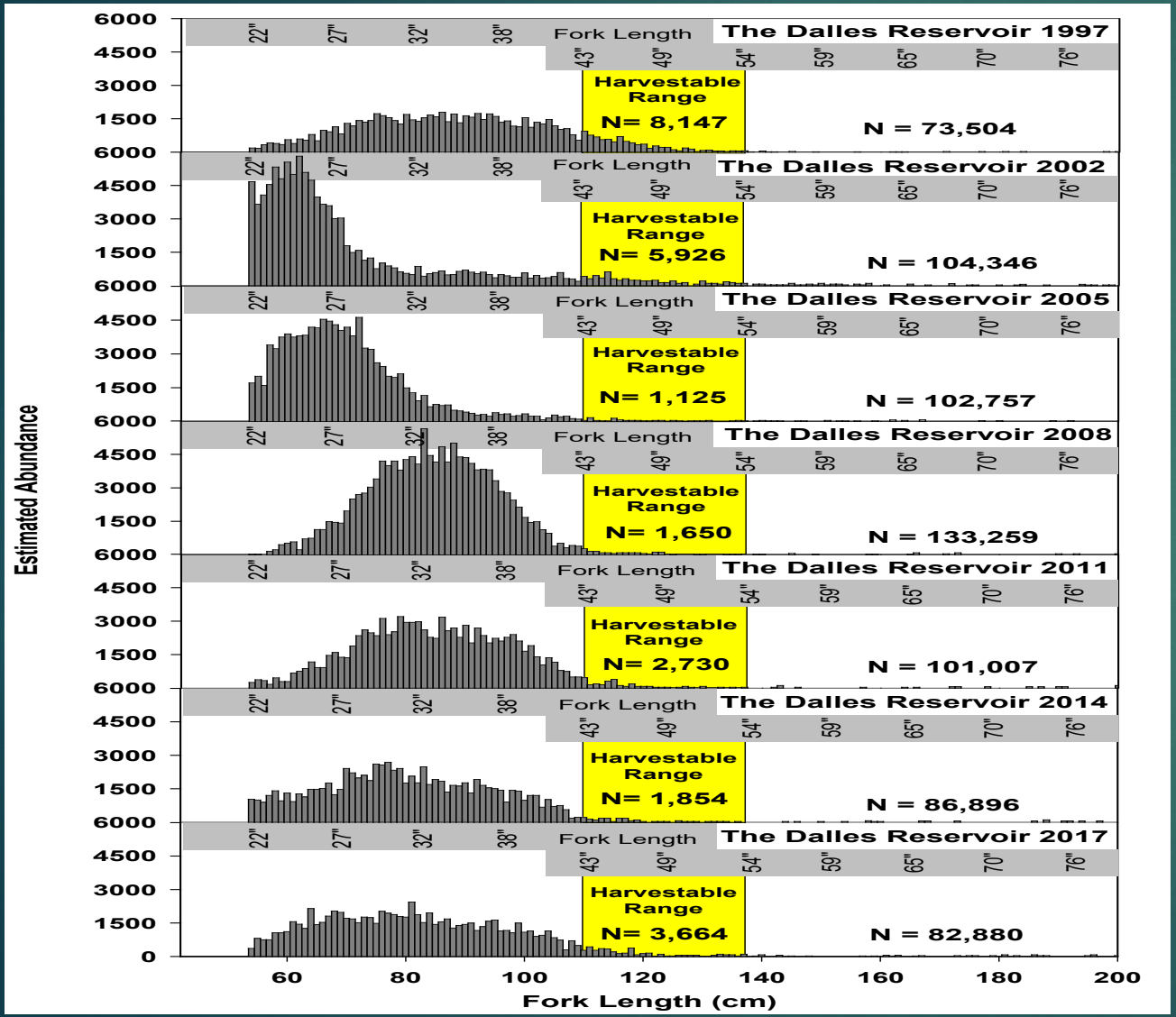
- BONNEVILLE 1999 - 2018
- THE DALLES 1997 – 2017
- JOHN DAY 2001 - 2019

BONNEVILLE RESERVOIR 1999 - 2018



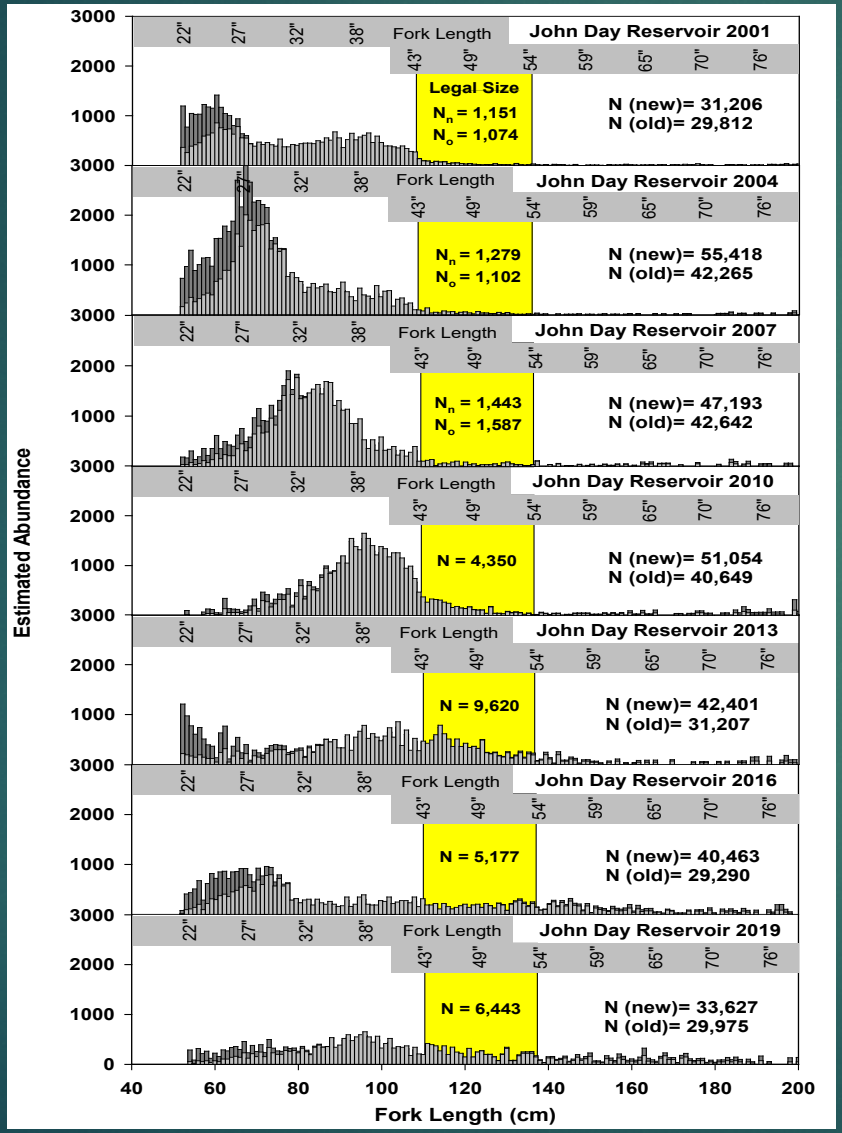
- **TREMENDOUS POPULATIONS SHIFTS**
- **HIGH DENSITIES, POOR CONDITION FACTORS CHARACTERIZE THIS PERIOD**
- **MOST RECENT SURVEY (2018) MAY SHOW STABILIZATION, GOOD WEIGHTS REPORTED BY FISHERS**
- **INCREASED SPECIFIC WEIGHTS AND HIGHER CONDITION FACTORS IN THE LATEST SURVEY**
- **NOTE:** The histogram for 2018 represents a shift from the use of estimated vulnerability curves to empirically-derived vulnerability curves because of the consensus among the technical staff that these curves better represented sampling gear performance and therefore overall estimate population structure.

THE DALLES RESERVOIR 1997 – 2017



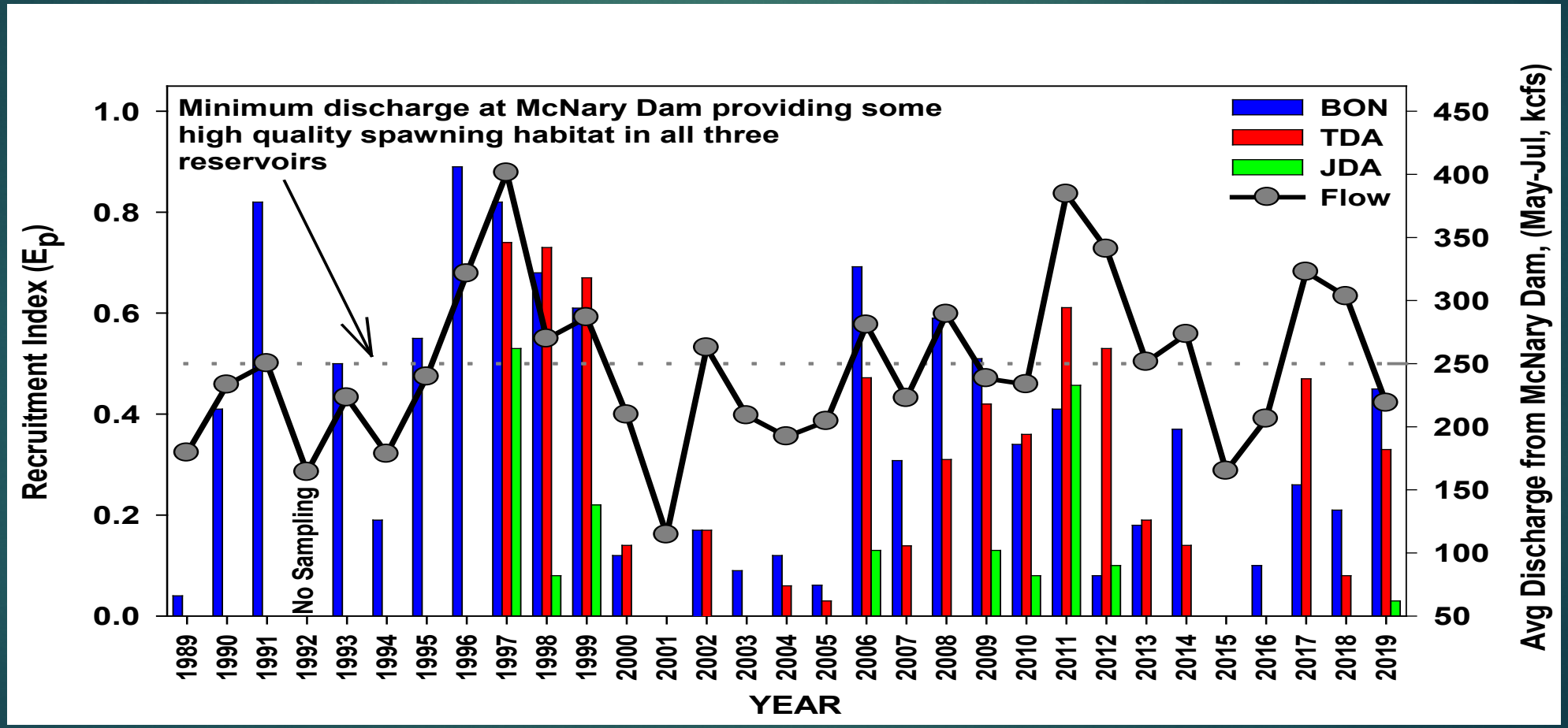
- POPULATION SURGED UPWARDS IN EARLY 2000'S, SIMILAR TO BN POPULATION
- TD FISH SLIGHTLY BETTER CONDITION FACTOR AND GROWTH THAN BN FISH
- DOWNSHIFT SIMILAR TO BN POPULATION
- POPULATIONS DIFFERENCES BETWEEN 2014 AND 2017 MINOR, STABILIZATION ?

JOHN DAY RESERVOIR 2001 - 2019



- 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

Year	LCR	Will. R.	BON[1]	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	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**			
2018	0.27	0.83	0.21	0.08	**0.00**			
2019	0.21	0.67	0.45	0.33	0.03			

Full genome sequencing & sex marker discovery update

- Sex can't be determined based on external physical traits
  - Blood plasma indicators: estrogen, progesterone, testosterone
  - Metabolic indicators: yolk precursor, vitellogenin
  - Ultrasound imaging: using a portable ultrasonography
  - Surgical procedure: direct observation of the gonad
- Current methods exclusive to reproductively mature adult fish
- Utility of a genetic sex marker…….
  - Highly accurate identification
  - Identify sex of fish at any life history stage: YOY, sub-adult
  - Can efficiently determine sex for 1000's of fish at once
  - Allows characterization of sex ratios & gender based demographics
  - At the population level – inform conservation and management concerns

FIELD SEASON 2020

- STOCK ASSESSMENT IN THE DALLES RESERVOIR (ODFW,WDFW,CRITFC)
- FALL YOUNG OF YEAR SURVEYS- BONNEVILLE, THE DALLES, & JOHN DAY RESERVOIRS (ODFW, WDFW, CRITFC)
- WINTER TAGGING IN BONNEVILLE RESERVOIR (YN/TRIBAL FISHERS/CRITFC)
- COVID-19 RESTRICTIONS MAY LIKE ALTER 2020 FIELD SAMPLING, COOPERATORS CURRENTLY WORKING ON STRATEGIES FOR THE SUMMER STOCK ASSESSMENT

CONCLUSIONS

BONNEVILLE –MAYBE FINDING EQUILIBRIUM WITH AVAILABLE HABITAT AND CURRENT POPULATION SIZE, FISHERS REPORT GOOD BODY CONDITION IN HARVESTED FISH

THE DALLES – UNCERTAIN, WE'LL KNOW MORE STARTING IN THE WINTER OF 2019-2020

JOHN DAY – CONTINUES TO DECLINE AND STABILIZE AND BASED UPON OUR MONITORING, IT WILL CONTINUE TO DO SO FOR THE NEAR FUTURE (~ 8-10 YEARS) EVEN IF RECRUITMENT IMPROVES; LIKELY DUE TO 14 YEARS OF NO DETECTABLE RECRUITMENT (21 CONSECTIVE YEARS OF SAMPLING)

JOHN DAY IS A STRONG CANDIDATE FOR SUPPLEMENTATION FROM CRITFC STURGEON SUPPLEMENTATION MASTER PLAN #200715500 – MONITORING, SUPPLEMENTATION, RESEARCH ARE KEY ELEMENTS TO ENSURING WHITE STURGEON THRIVE IN THE COLUMBIA BASIN FOR THE NEXT 7 GENERATIONS

ANY QUESTIONS?

White Sturgeon:
McNary Reservoir and the Lower Snake River

Northwest Power and Conservation Council

Laura Heironimus
Washington Department of Fish and Wildlife
Ridgefield, WA

Areas Overview

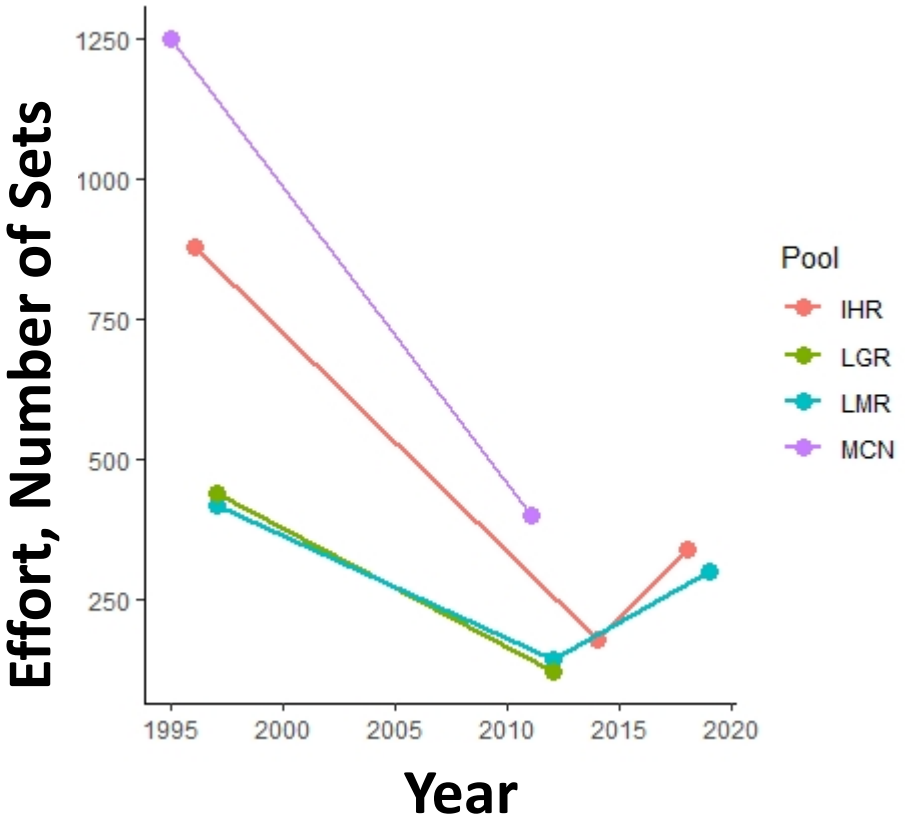
Image: Fish Passage Center

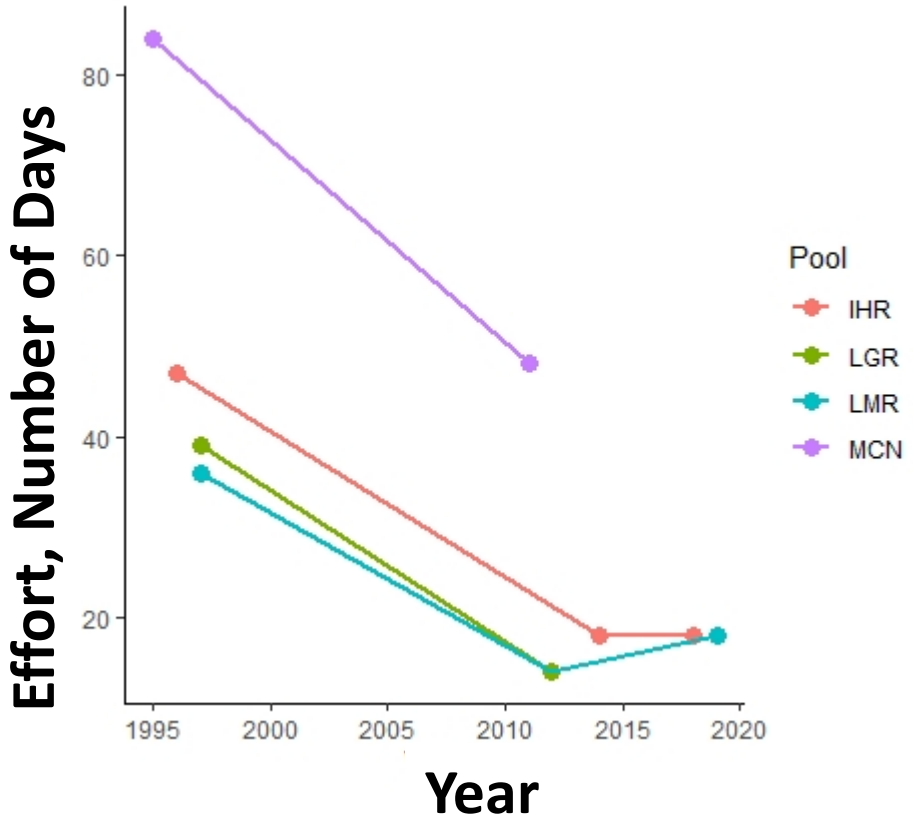
Stock Assessments

Area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
MCN	■																■									
IHR		■																		■				■		
LMR			■															■							■	
LGR			■															■								

- Each area has been surveyed just 2-3 times each since 1995.
- In 2018 & 2019, stock assessments in Ice Harbor and Lower Monumental were funded through BPA cost-savings.
- No future funding has been identified.

Sampling Effort





- Funding limitations have impacted total sampling effort in recent years.

Sampling Design

Early Efforts

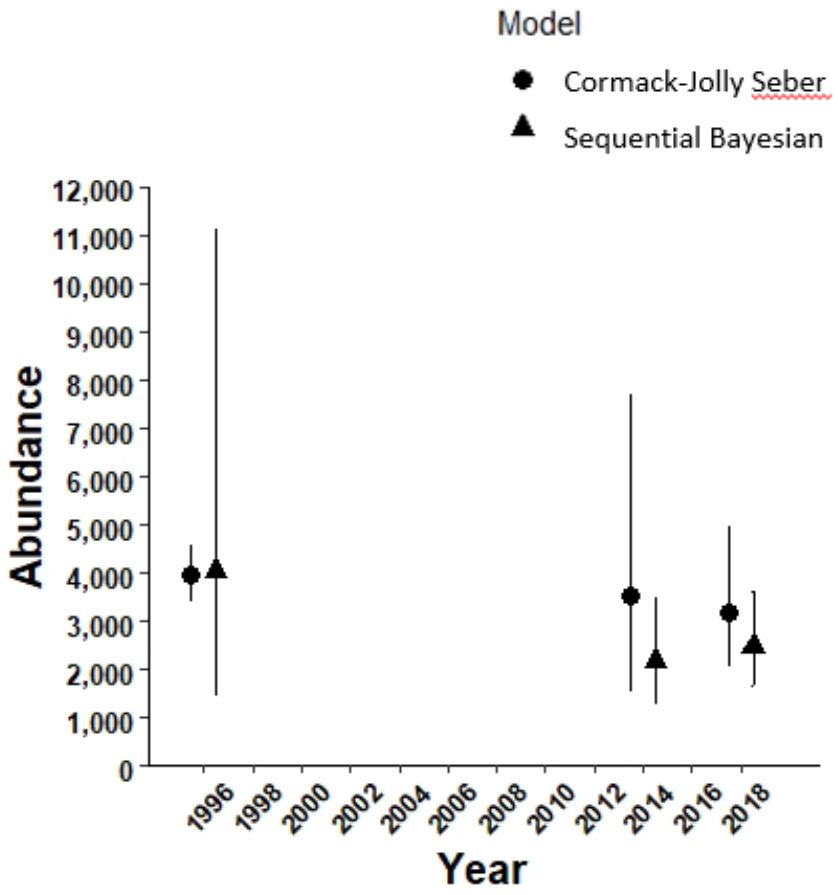
- 1995-1997
  - 3-14 stratified sections
  - April-September
  - Modified Schnabel estimator

2011-2014 Efforts

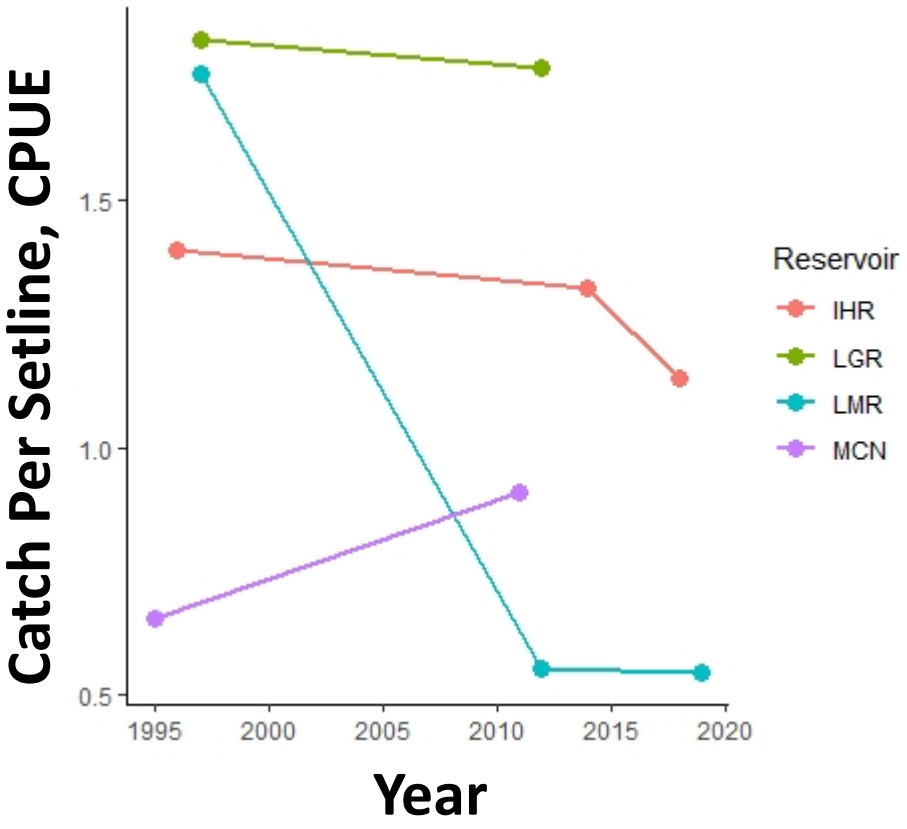
- 2011-2014
  - 2-6 stratified sections
  - June-August
  - Modified Schnabel or Lincoln Peterson estimator

2018 & 2019 Modifications

- Updated Sampling Design:
  - GRTS sampling design
  - Spatially balanced point selection
  - Full reservoir coverage daily
- Updated Models:
  - Incorporating open-population model and Bayesian framework
  - Evaluate annual abundance
  - Evaluate survival and population growth metrics between sampling events
  - Develop 95% CI for abundance estimates

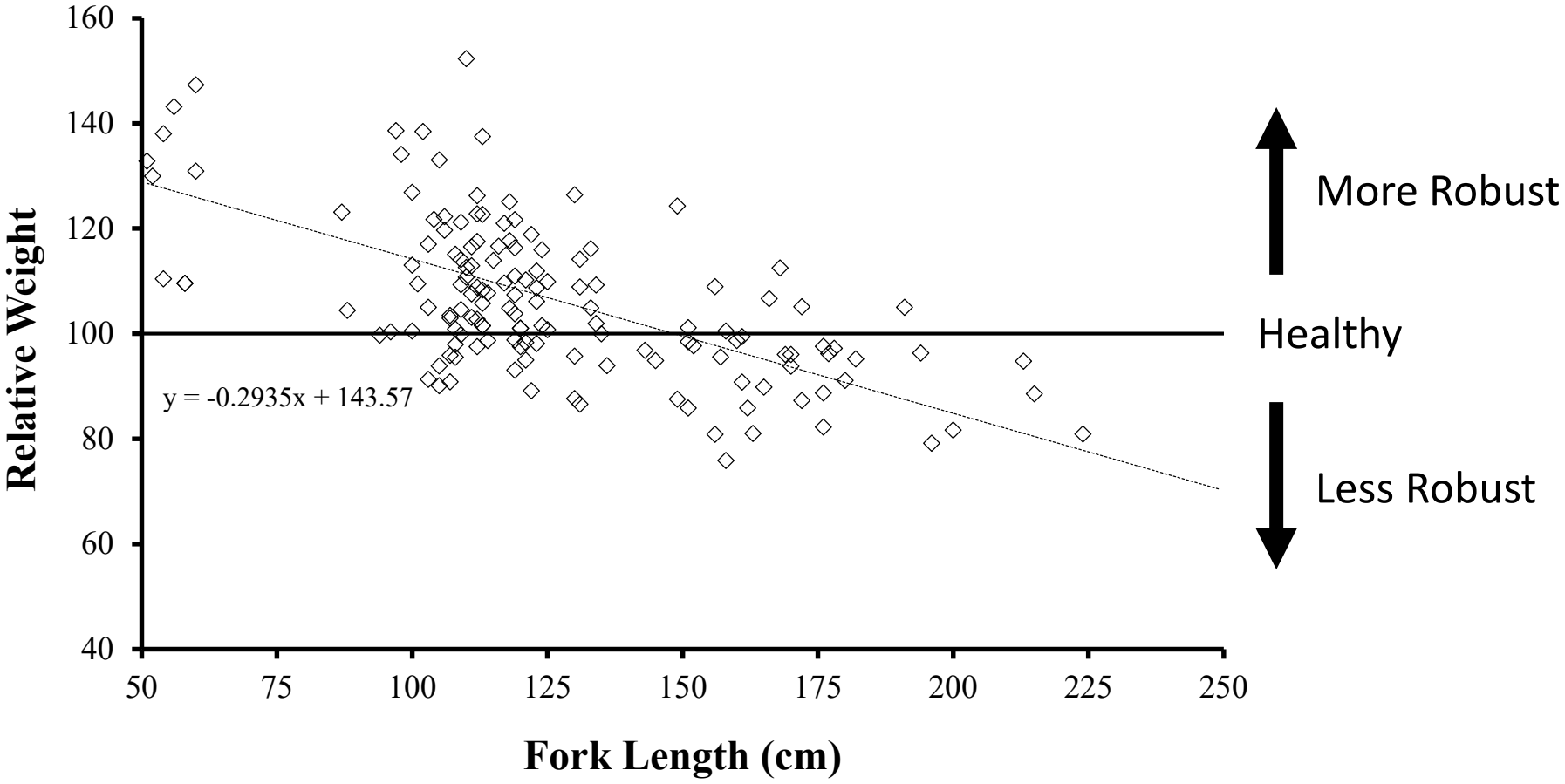


Population Changes



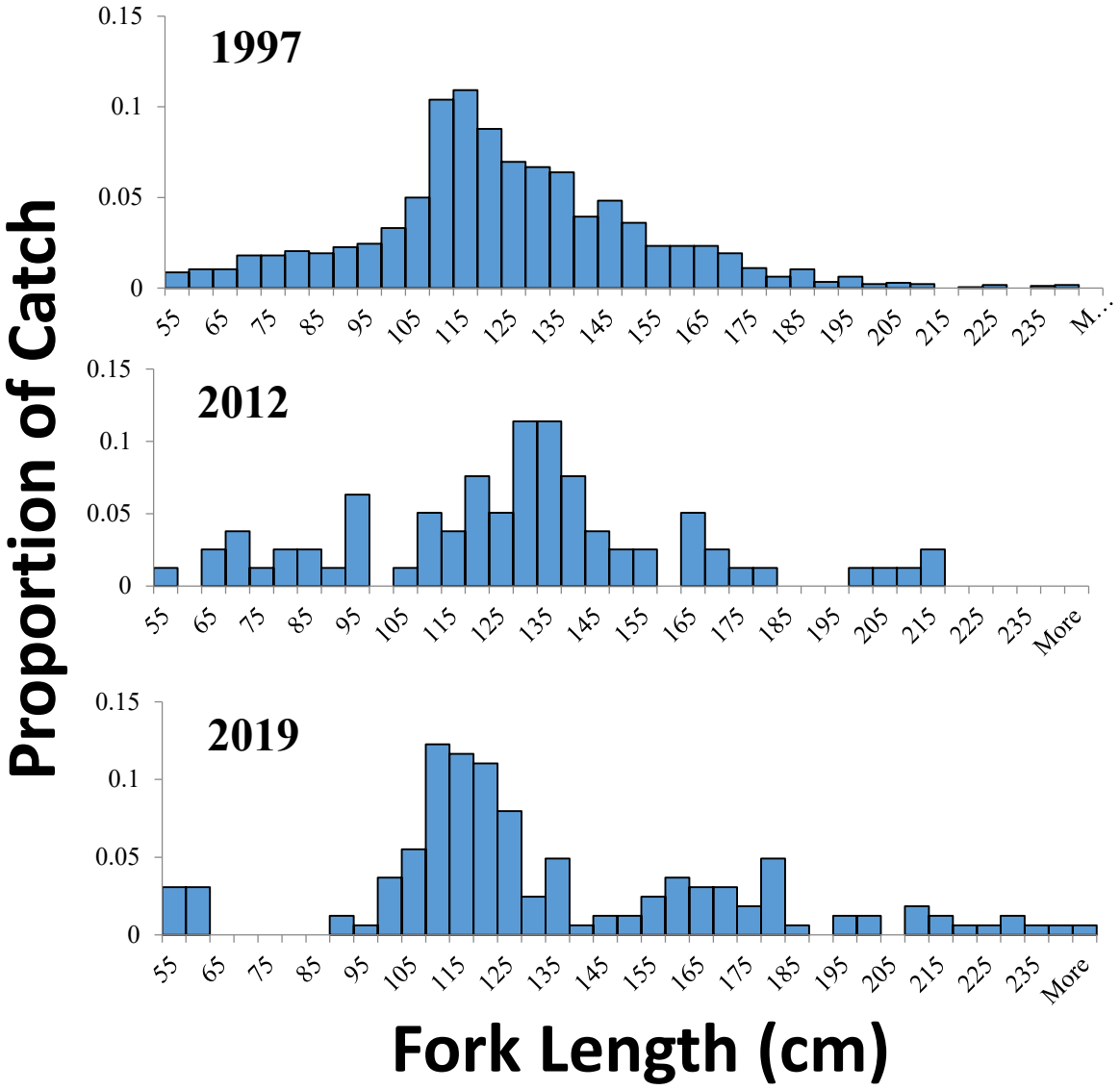
- Not all areas were able to calculate an abundance estimate during recent stock assessments due to low capture/recapture rates.
- The modified technique has not been applied to all areas (and may not work in all areas).
- CPUE indicates a decline in all areas except McNary, but that could be due to a sampling bias.
- No new data has been collected in McNary or Little Goose in nearly a decade.

Relative Weight: LMR



2019 LMR Mean: 107 (Healthy)
2018 IHR Mean: 104 (Healthy)

Population Structure: LMR



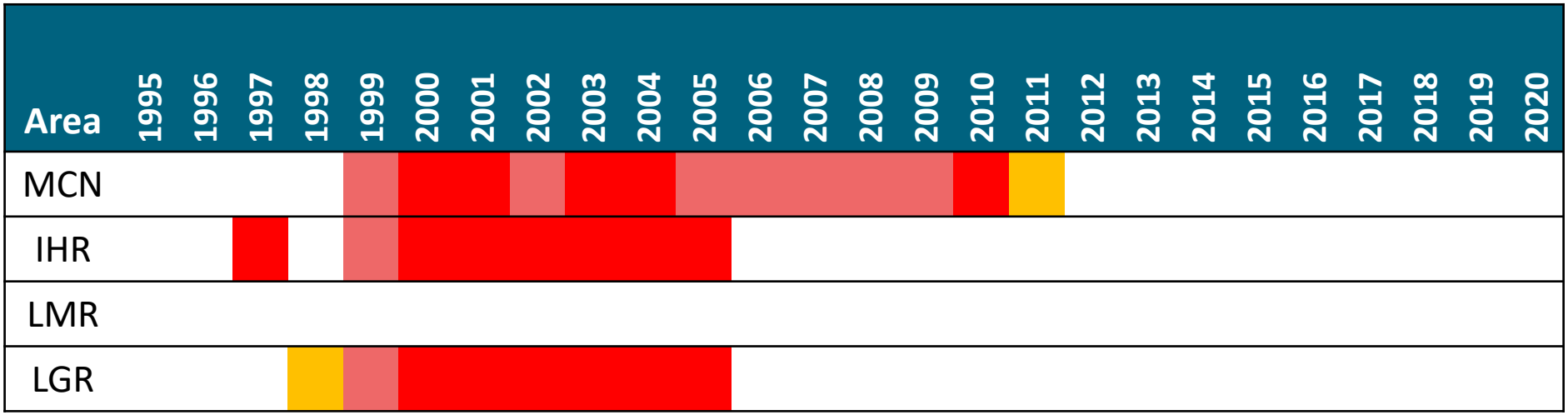
2019 Catch Data

Fork Length:

Range: 51-242 cm FL

Median: 119 cm FL

Young-of-Year Index Surveys

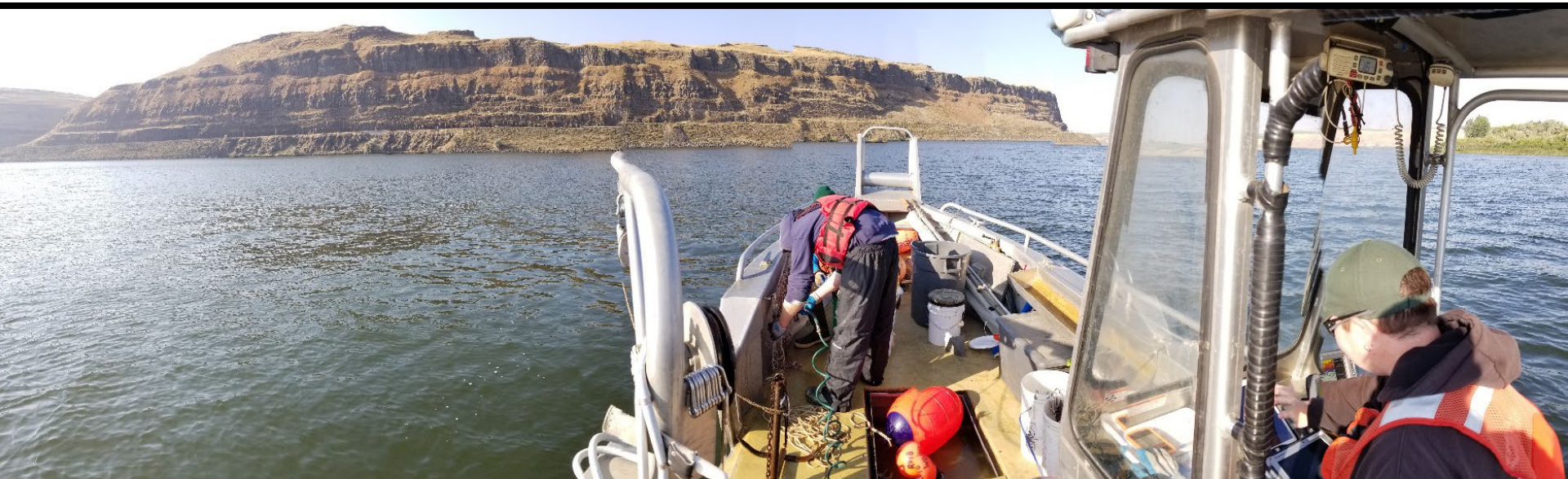


EP = Proportion of nets with at least one sturgeon captured

0.0
0.01 - 0.20
0.21 - 0.40
0.41 - 0.60
0.61 - 0.80
0.81 - 1.00

Conclusions

- Unknown survival and growth of hatchery-origin sturgeon below Priest Rapids Dam.
- Concerns of slow growth and recruitment failure.
- Inconsistent and sparse monitoring.
- Difficulty assessing adaptive management actions.



Regulation Changes

- All three Lower Snake reservoirs closed to sturgeon harvest in 2015 due to the detected decline in sturgeon abundance and lack of recruitment.
- The Columbia River from McNary Dam to Priest Rapids Dam and the Snake River below Ice Harbor Dam closed to sturgeon harvest in 2020 due to a lack of recent monitoring data and poor evidence for natural recruitment.

Regulation Changes

- Sturgeon spawning sanctuaries expanded through Aug. 31 and the sanctuary below Priest Rapids Dam was expanded to Vernita Bridge to improve recruitment.

Funding Challenges

- A proposal to resume monitoring in all of these areas was submitted during the current ISRP review cycle.
- No future funding has yet been identified to survey these areas.
- To evaluate conservation and management actions, baseline tracking of population structure is needed:
  - Monitoring on 3-year rotating basis
  - Consistent sampling effort

Thank you!

Northwest Power and Conservation Council