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March 30, 2021

MEMORANDUM

TO: Council Members

FROM: Mark Fritsch

SUBJECT: White sturgeon status report for Lower and Mid-Columbia, and Lower Snake rivers

BACKGROUND:

Presenter: Art Martin, *Columbia River Coordination Section Manager*, ODFW
Blaine L. Parker, *Sturgeon Program Lead*, CRITFC
Laura B. Heironimus, *Sturgeon, Smelt, and Lamprey Unit Lead*, WDFW.

Summary: Art, 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 2020 addendum. In addition, it provides information to the region on the status of white sturgeon in the Columbia and Snake rivers.

Workplan: Fish and Wildlife Division work plan 2021; Program Implementation (2014 Program and 2020 addendum); and other program implementation. Sturgeon are listed as an [emerging priority](#) in the Council's 2014 Fish and Wildlife Program.

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*

The Council's 2020 addendum to the 2014 Fish and Wildlife Program recognizes two additional measures that need particular attention:

- Evaluate whether alternative flow regimes might increase sturgeon productivity and recruitment in the lower Columbia below McNary Dam and if so, whether and how operations could be altered to provide those flow regimes without compromising protection for salmon, steelhead and lamprey.
- Increase sturgeon population monitoring between McNary and Priest Rapids dams and in the lower Snake River so that stock status is regularly reported for each area and pool.

More Info:

- The Council's White Sturgeon web [page](#)
- Columbia Basin White Sturgeon [Planning Framework](#)
- [White Sturgeon Story Map](#)



Northwest Power and Conservation Council
April 7, 2021

LOWER COLUMBIA RIVER WHITE STURGEON POPULATION STATUS UPDATE

Art Martin
Columbia River Coordination Section Manager

Today's Topics

- * 2020 stock assessment results
- * Current population composition, status, and trends
- * Recruitment and Predation context



Metrics and Indicators

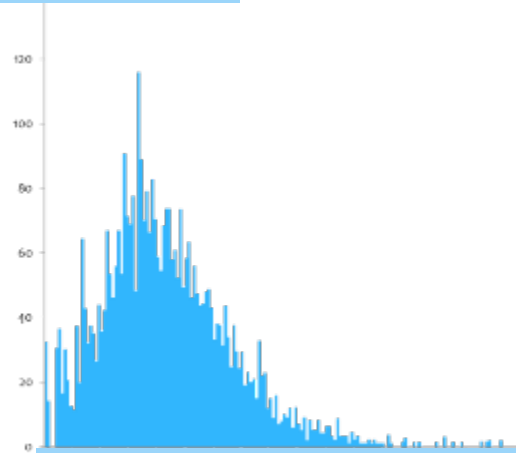


Juvenile Abundance



Adult Abundance

Age-0 Recruitment



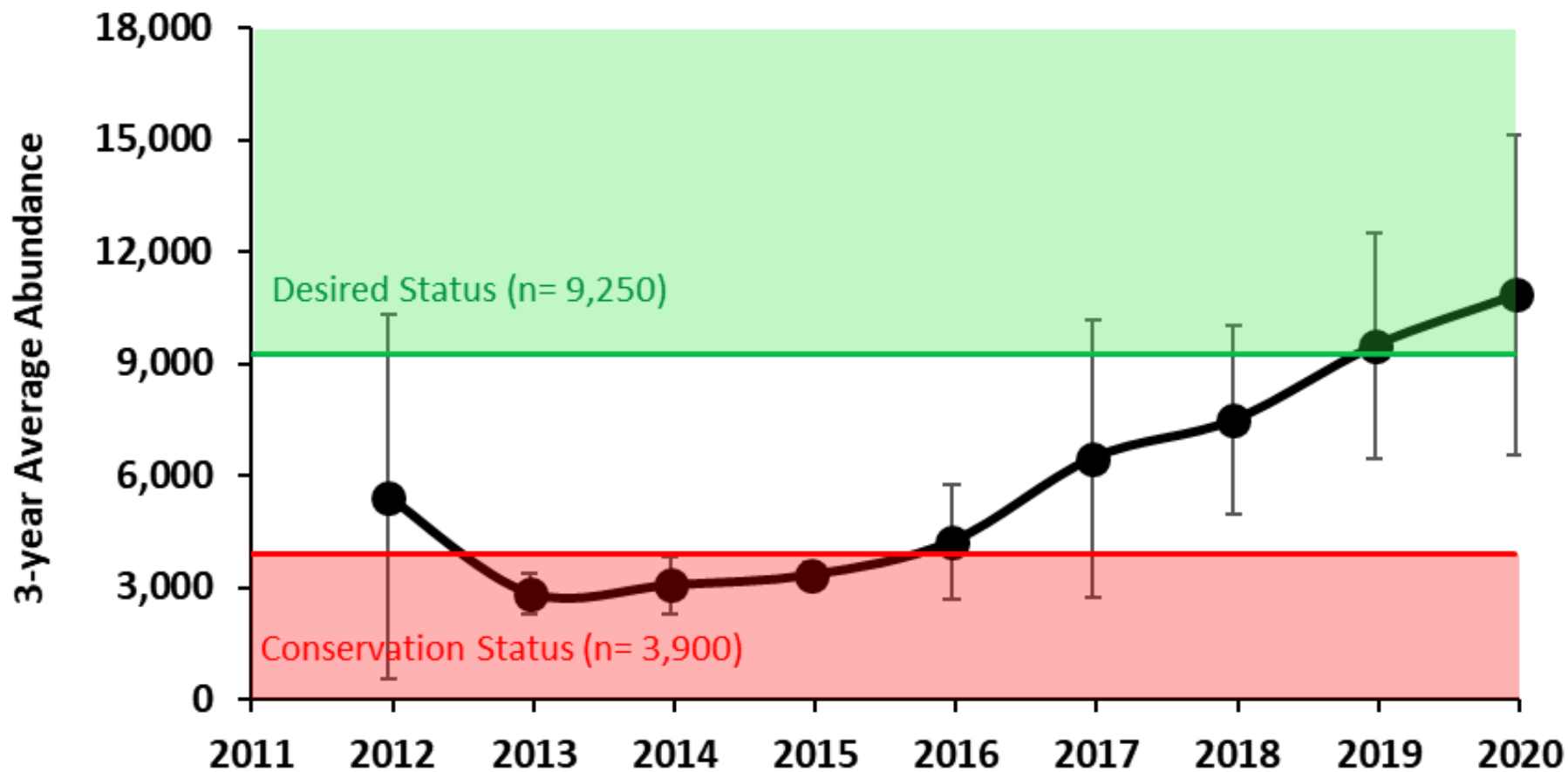
Population Structure

Sea Lions



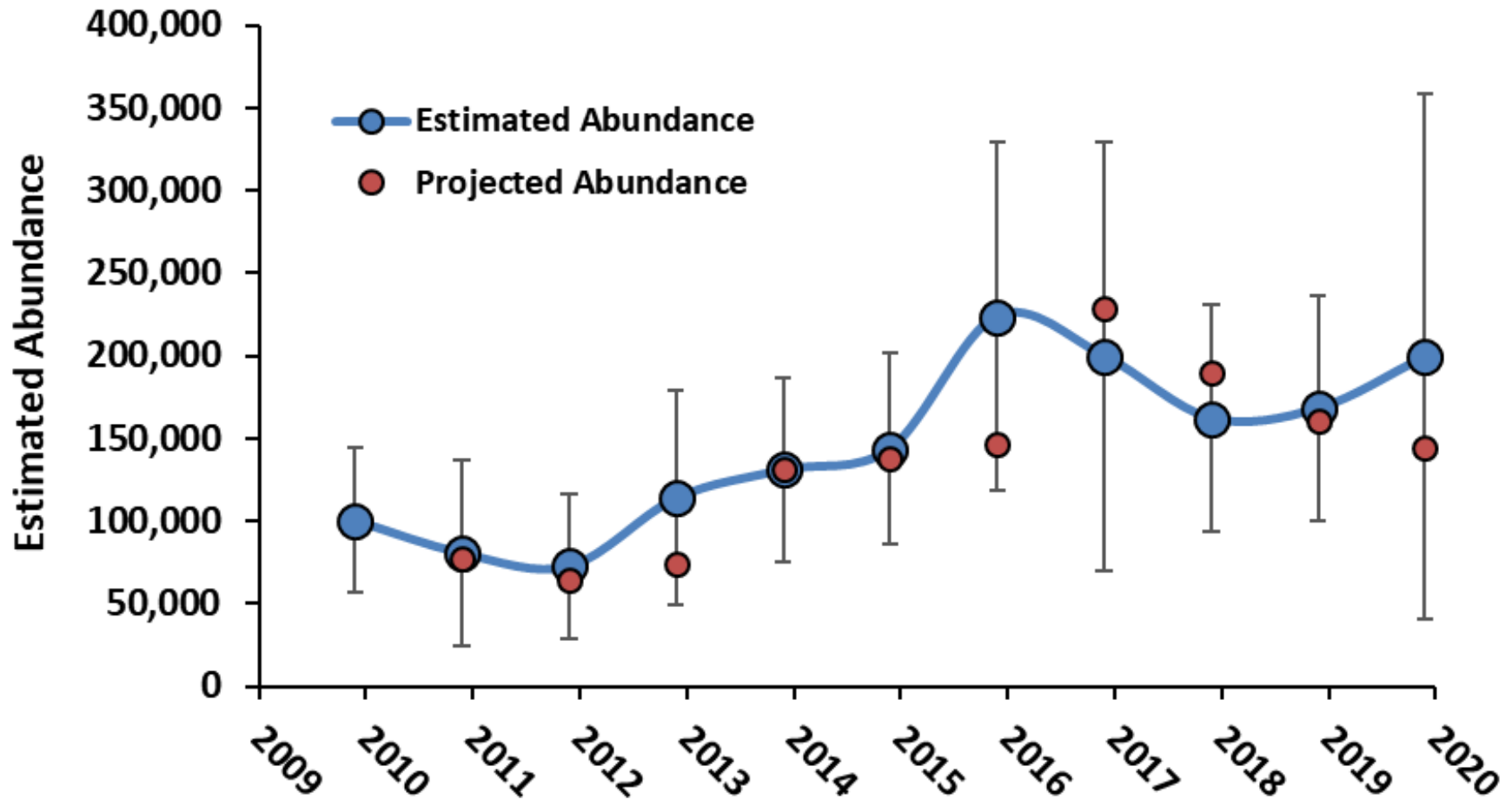
LCR White Sturgeon Abundance

Adult Abundance (66+” FL)

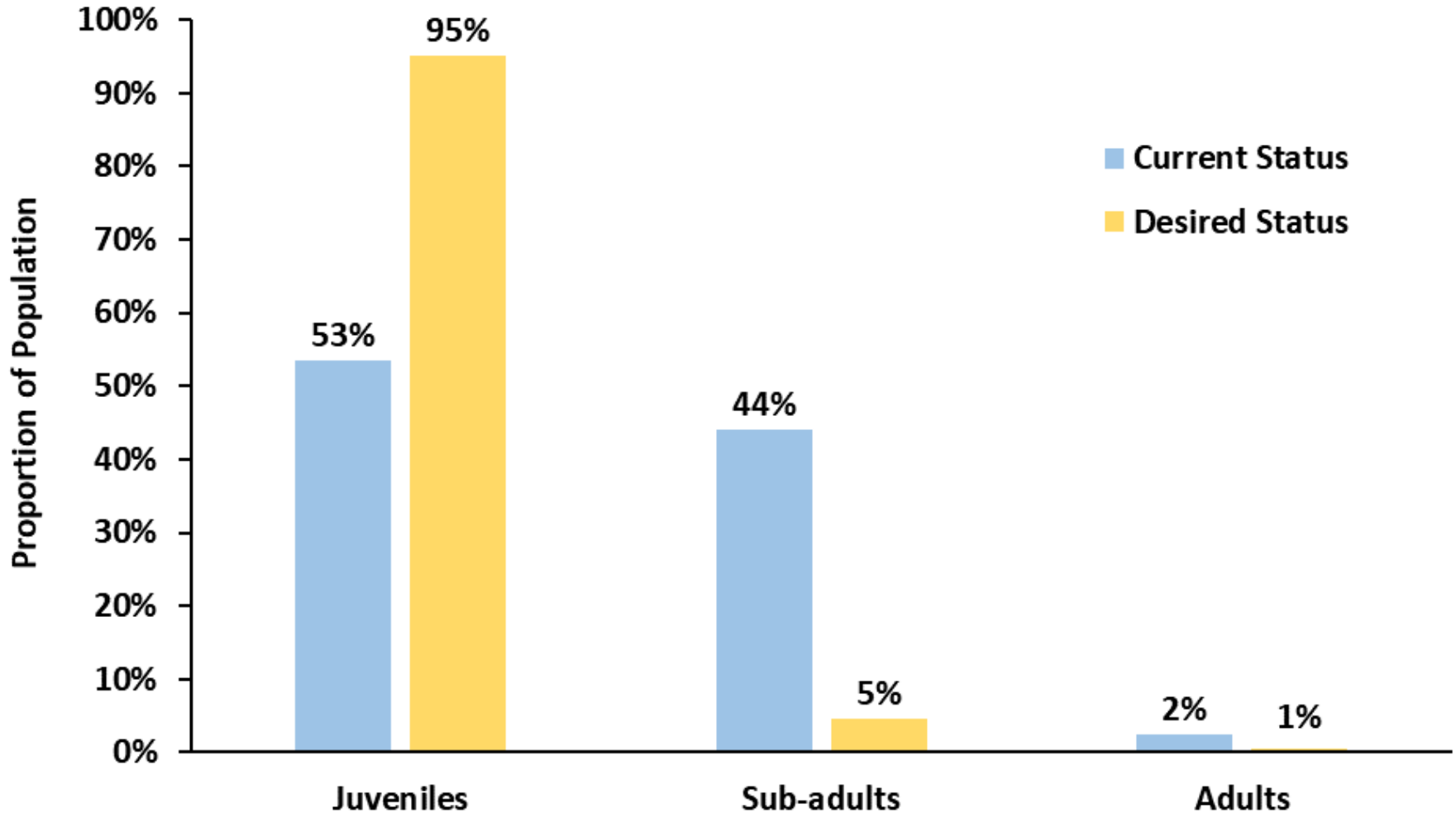


LCR White Sturgeon Abundance

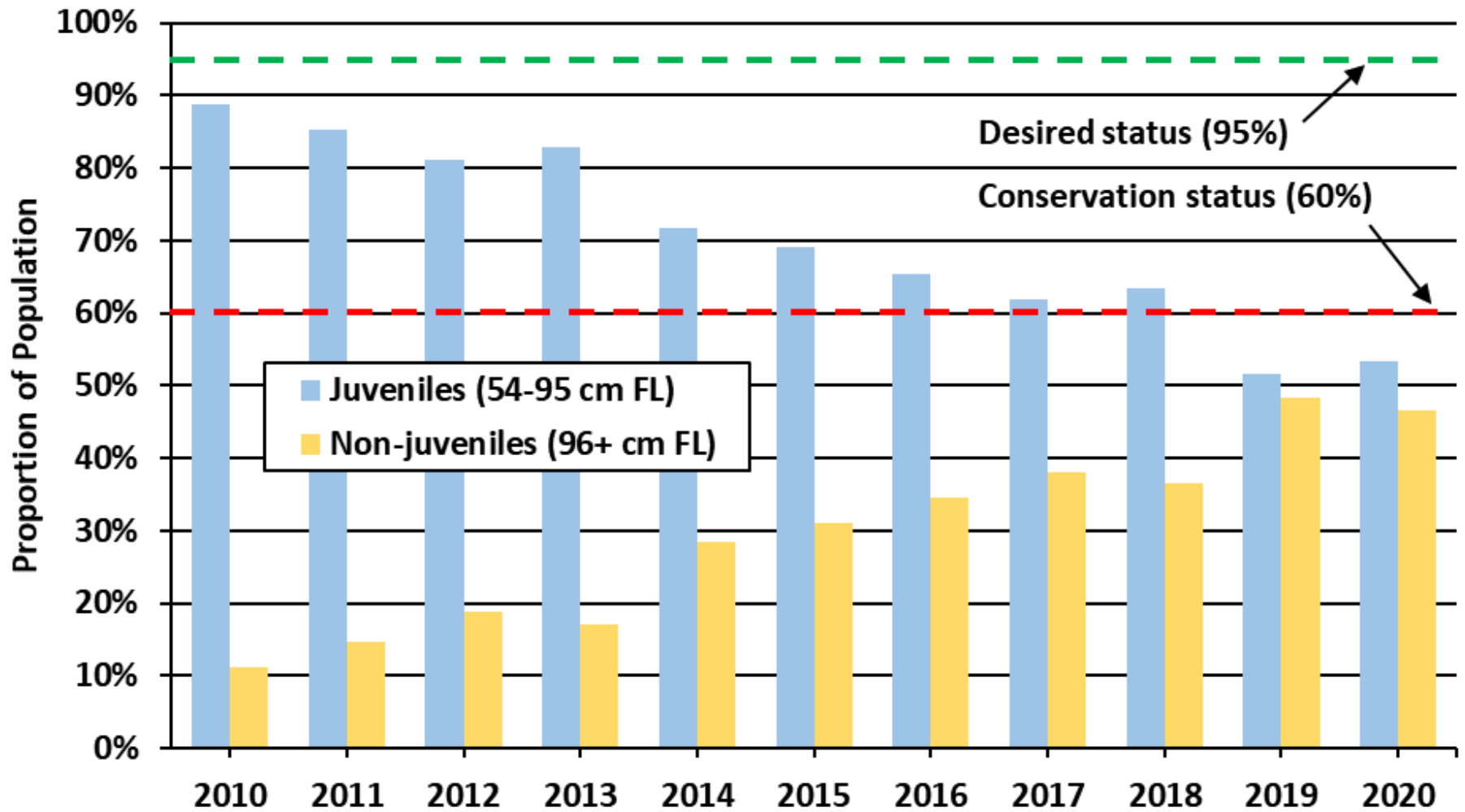
Legal Abundance (38" – 54" FL)



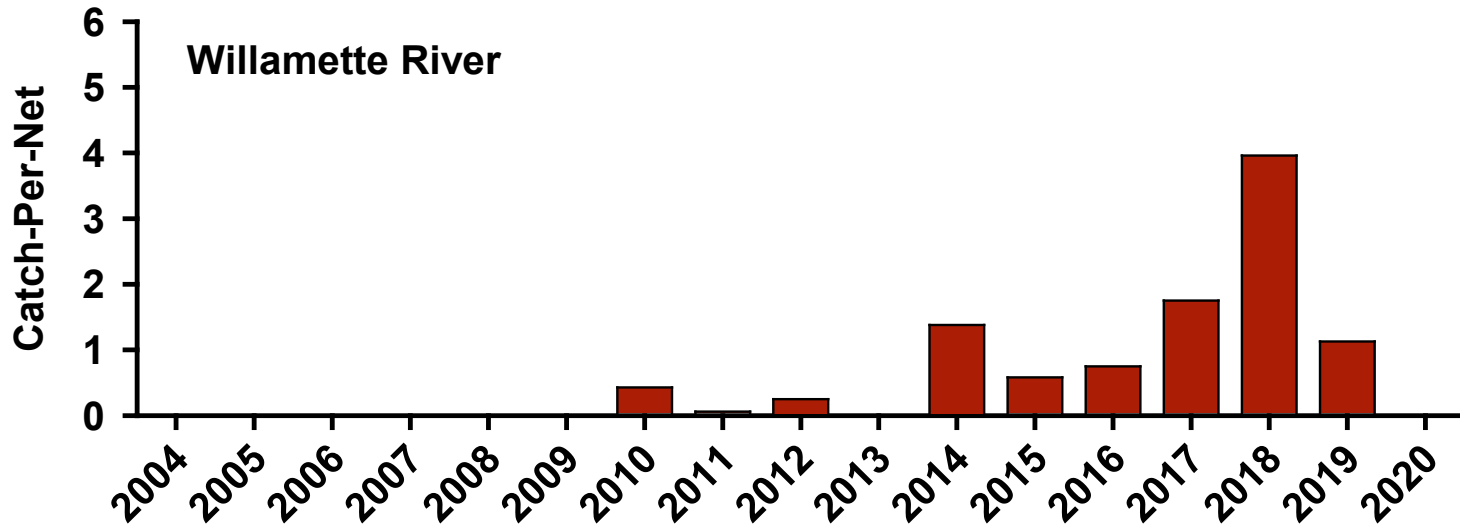
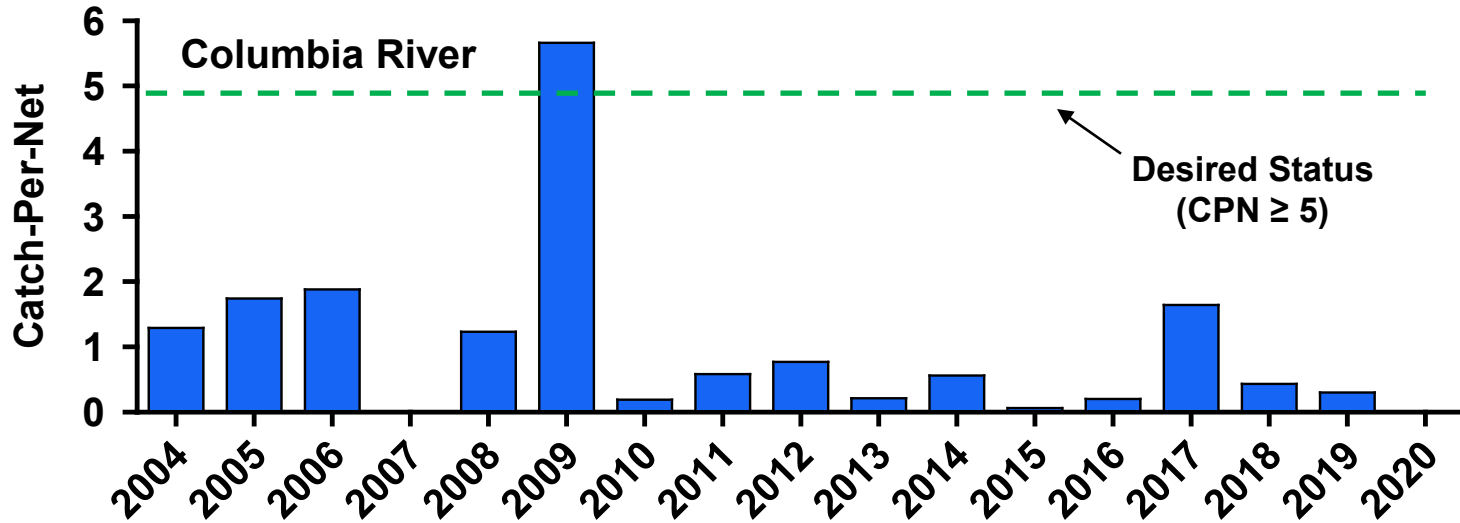
LCR White Sturgeon Size Distribution



LCR White Sturgeon Size Distribution

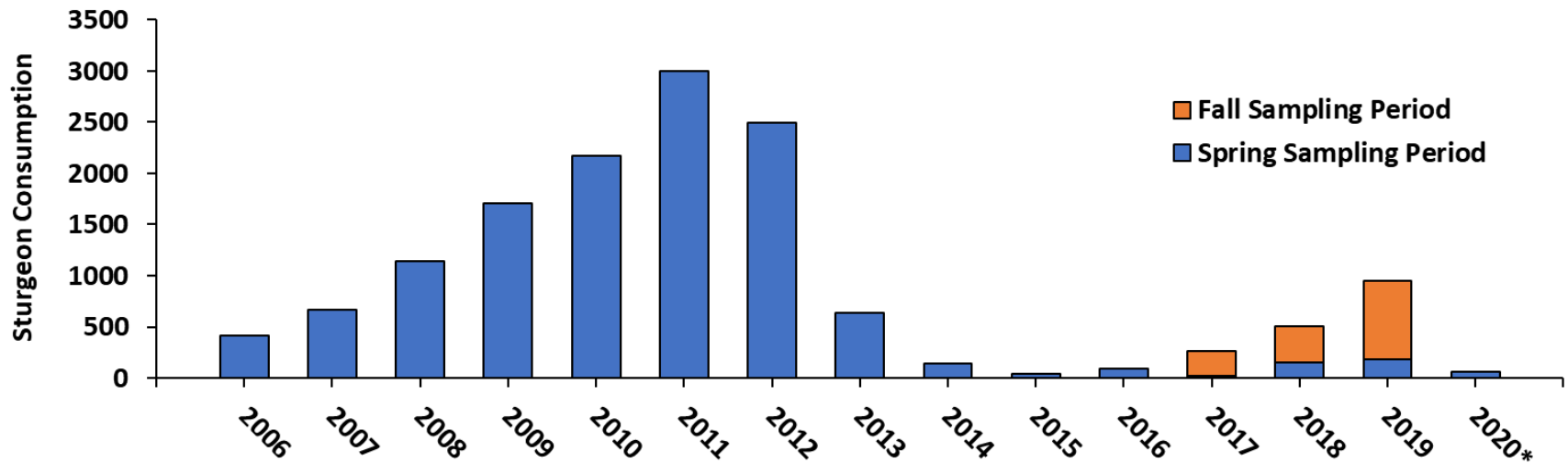
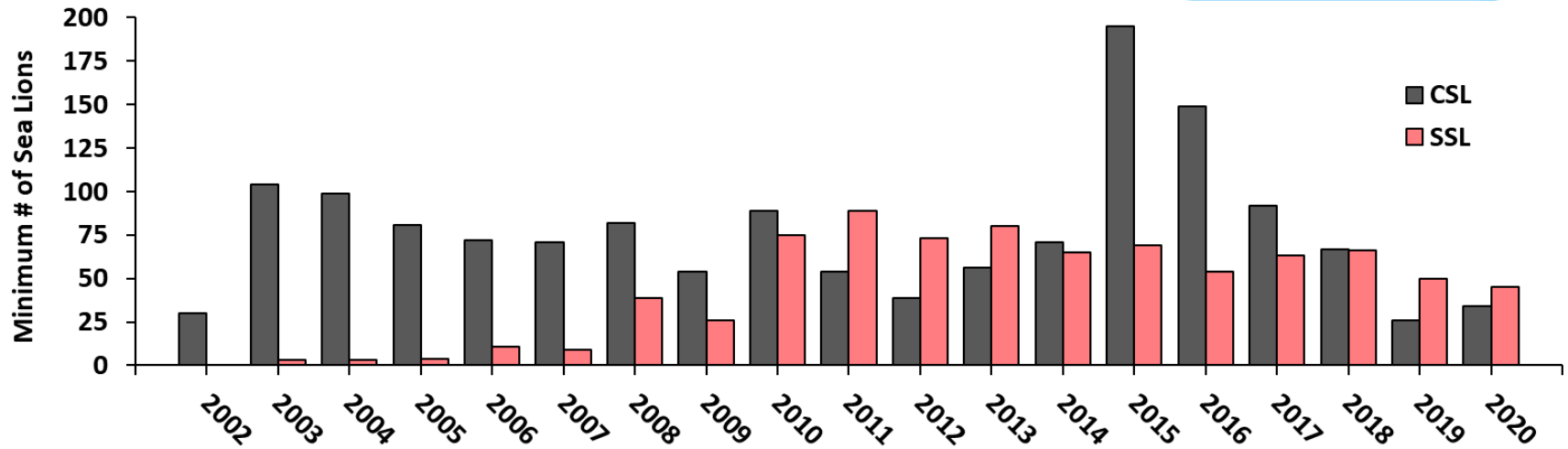


LCR White Sturgeon Recruitment



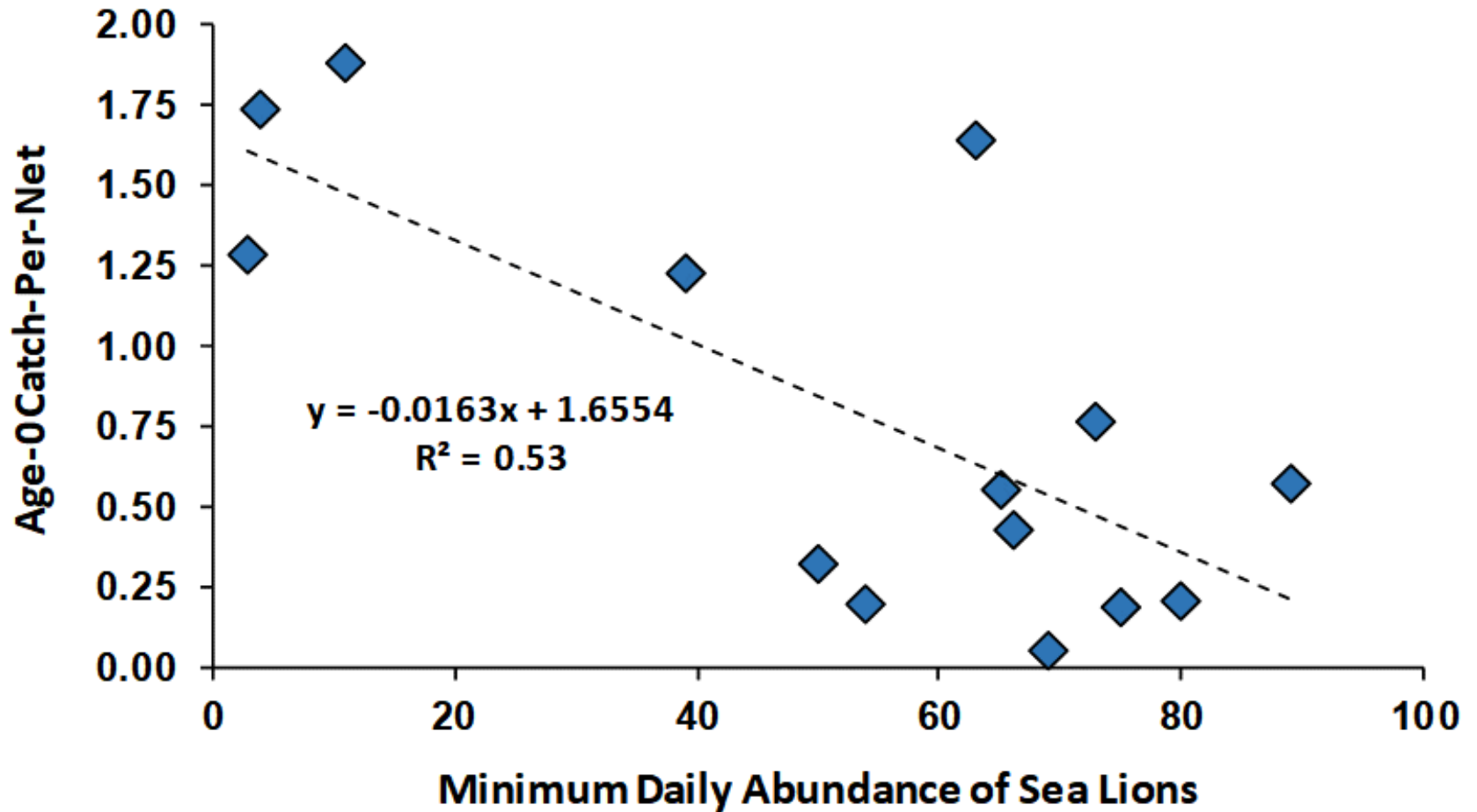
Sea Lion Abundance & Predation

* Steller Sea Lions arrive in 2003 and soon begin to target sturgeon



* Incomplete sampling in 2020 due to Covid-19

Sea Lion Effects: Mainstem Col R



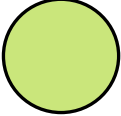
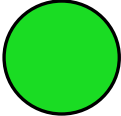
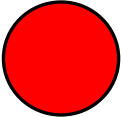
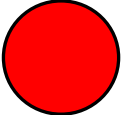
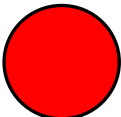
Sea Lion Abundance & Predation

Growing pinniped issue in the Willamette River



Year	Single-Day Maximum Count (SSL)	Sturgeon Predation Events Observed
2014	2	3
2015	2	12
2016	1	8
2017	4	69
2018	11	79
2019	10	98
2020	8	27

Summary

Metric	N	Interpretation	Summary
Legal Abundance	199,487		General increasing trend since 2012. However, decreasing trend in CPUE last two years. Given poor recruitment over last several years, legal-size abundance will eventually decrease.
Adult Abundance	14,497 (3-yr Avg 10,844)		Increasing trend since 2013. 3-yr avg (2018-20) adult abundance is above desired status level.
Population Structure	53% Juveniles		Long-term trend of decreasing juvenile abundance. Proportion of juveniles has been below conservation status since 2019.
Age-0 Recruitment	No age-0 sampling in 2020		Poor recruitment in lower Columbia River over last several years. Recruitment in Willamette River has been better, but clearly not enough to increase relative juvenile abundance.
Sea Lion Abundance	High		High sea lion abundance is problematic for white sturgeon populations. New data suggests predation may be highest during winter.



END

Questions/Discussion?

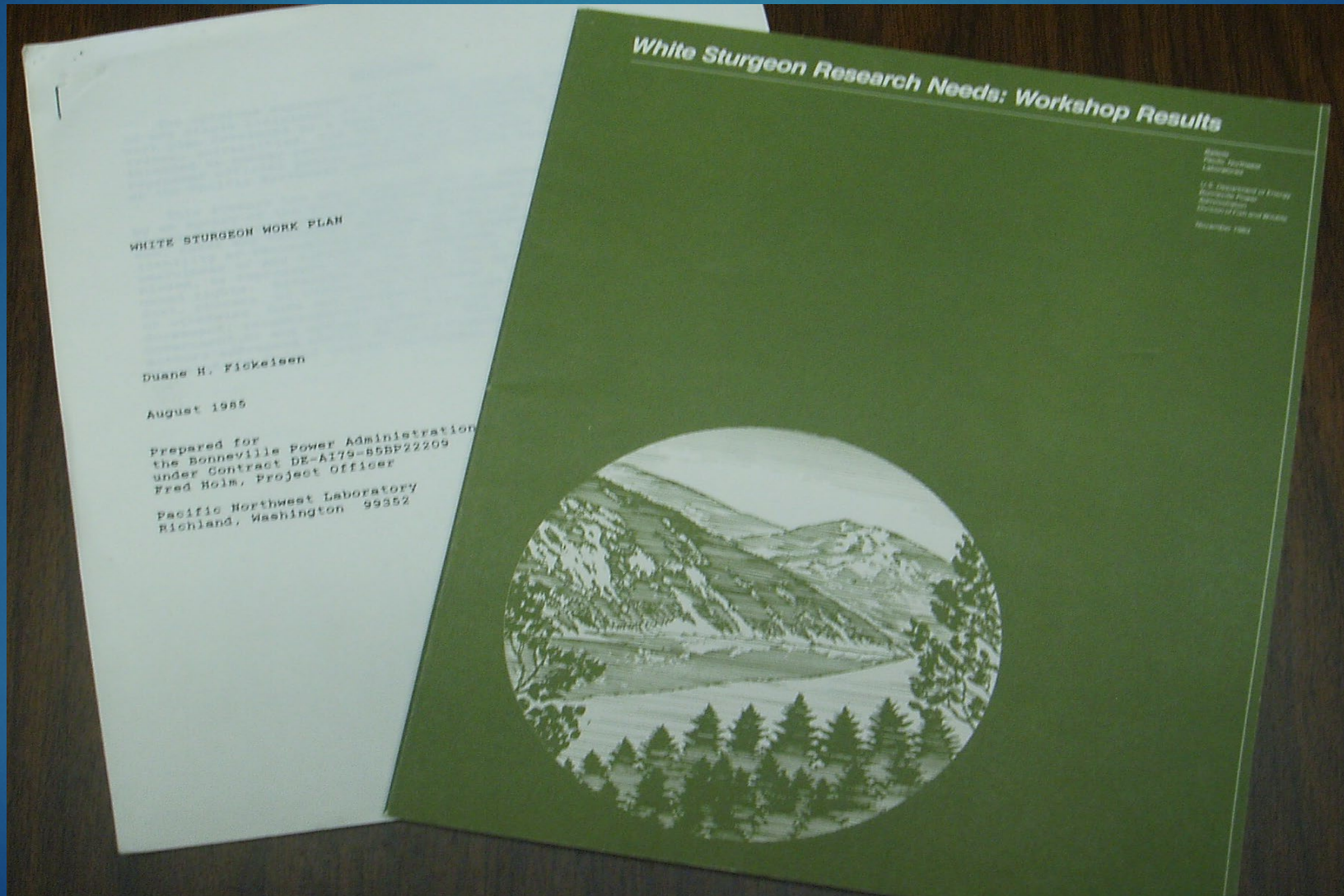
Update on White Sturgeon Populations – Bonneville, **The Dalles** and John Day Reservoirs 2020-2021

**BLAINE L. PARKER, STURGEON PROJECT LEADER
COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION**



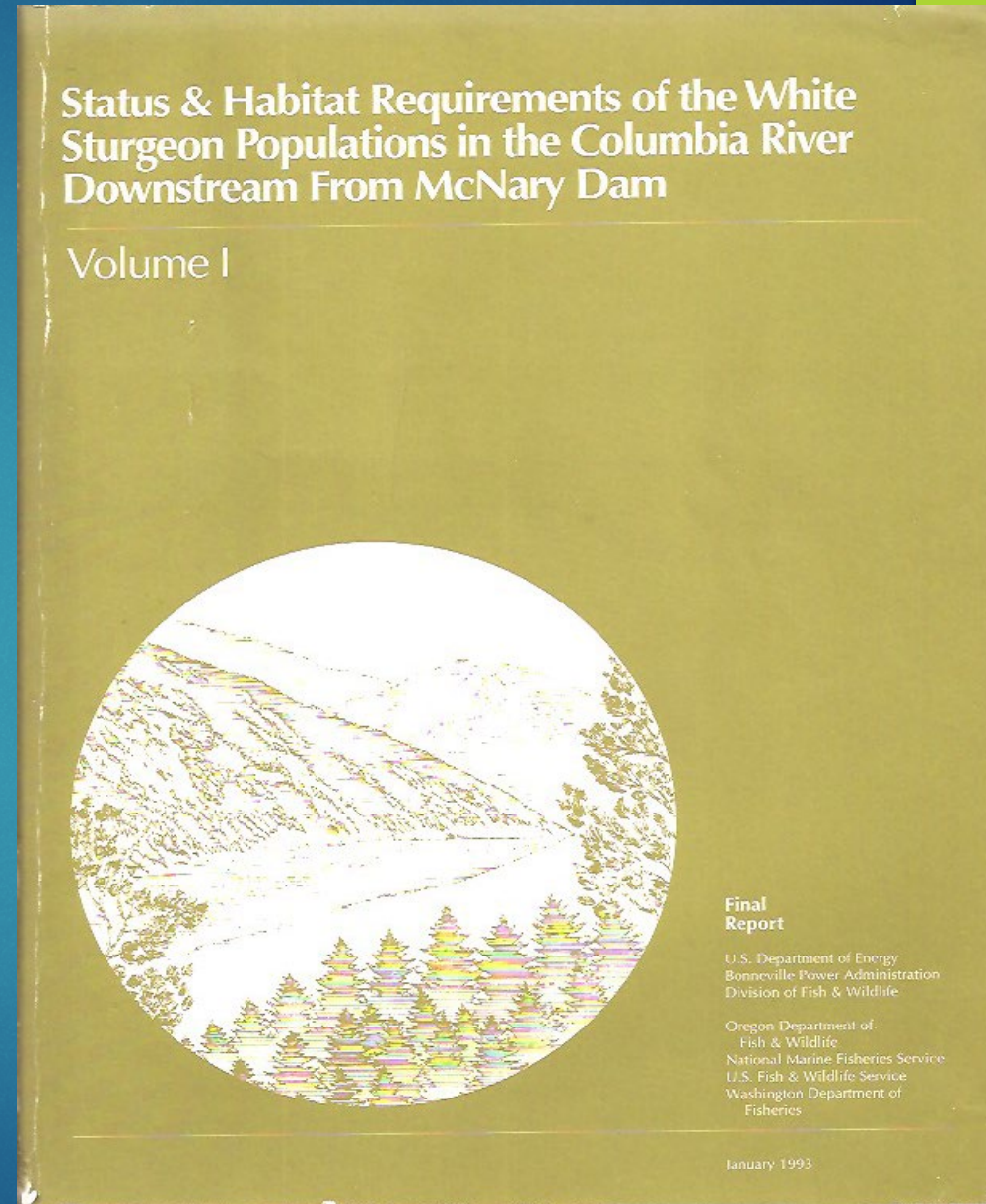
**NORTHWEST POWER AND CONSERVATION COUNCIL
FISH AND WILDLIFE COMMITTEE MEETING
APRIL 7TH, 2021**

In The Beginning...



BPA Project 86-0500

- ❖ **ORIGINATING FROM RESEARCH PLANNING EFFORT IN 1985 (Fickeisen 1985)**
- ❖ **ODFW PROJECT LEAD, KEY PARTNERS CRITFC, WDFW & USFWS**
- ❖ **PROTECT AND ENHANCE WHITE STURGEON POPULATIONS THROUGHOUT THE LOWER MIDDLE COLUMBIA RIVER**
- ❖ **TIME SERIES POPULATION MONITORING UNDERSTANDING POPULATION DYNAMICS**
- ❖ **YOUNG OF YEAR SURVEYS PAIRED HARVEST DATA HAS ENABLED MANAGEMENT OF THESE POPULATIONS**
- ❖ **PROJECT RESEARCHERS (PAST AND PRESENT) LARGEST KNOWN INFORMATION BASE OF ANY STURGEON SPECIES IN THE WORLD**



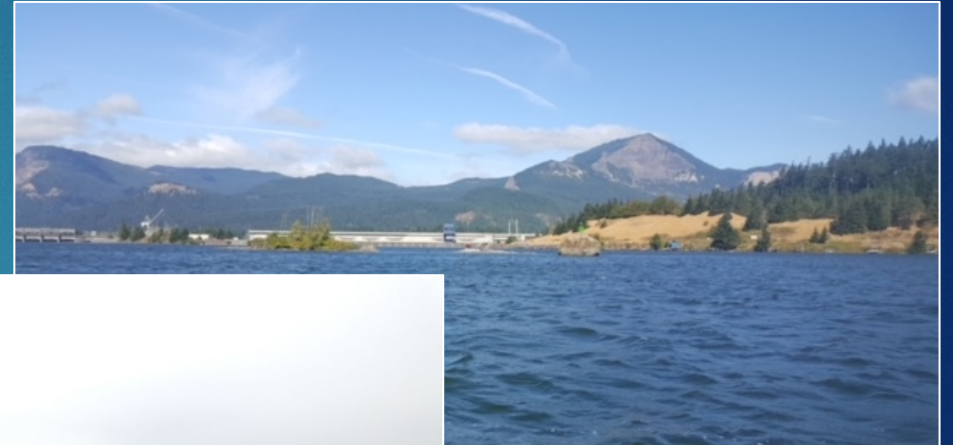
TODAY'S PRESENTATION

- ▶ COLLABORATIVE EFFORT BY CRITFC, ODFW AND WDFW
- ▶ RESERVOIR POPULATIONS ARE ASSESSED EVERY 3 YEARS
- ▶ ASSESSMENT IS A 2 PART PROCESS- **WINTER TAGGING** BY TRIBAL FISHERS AND YN TECHNICIANS - **SUMMER TAGGING & RECAPTURE** EFFORT BY ODFW, WDFW, AND YAKAMA NATION STAFF
- ▶ FALL RECRUITMENT MONITORING CONDUCTED BY STATE AND YAKAMA NATION CREW
- ▶ FISHERIES ARE MONITORED BY TRIBES AND STATES;
- ▶ WDFW PROVIDES FISHERY ANALYSIS, POPULATION ANALYSIS BY ODFW
- ▶ GENETICS BY CRITFC SCIENTISTS @ HAGERMAN FISH CULTURE EXPERIMENT STATION – GENETICS LABORATORY



POPULATION TIME SERIES AND KEY POINTS

▶ **Bonneville Reservation**
1999 - 2018



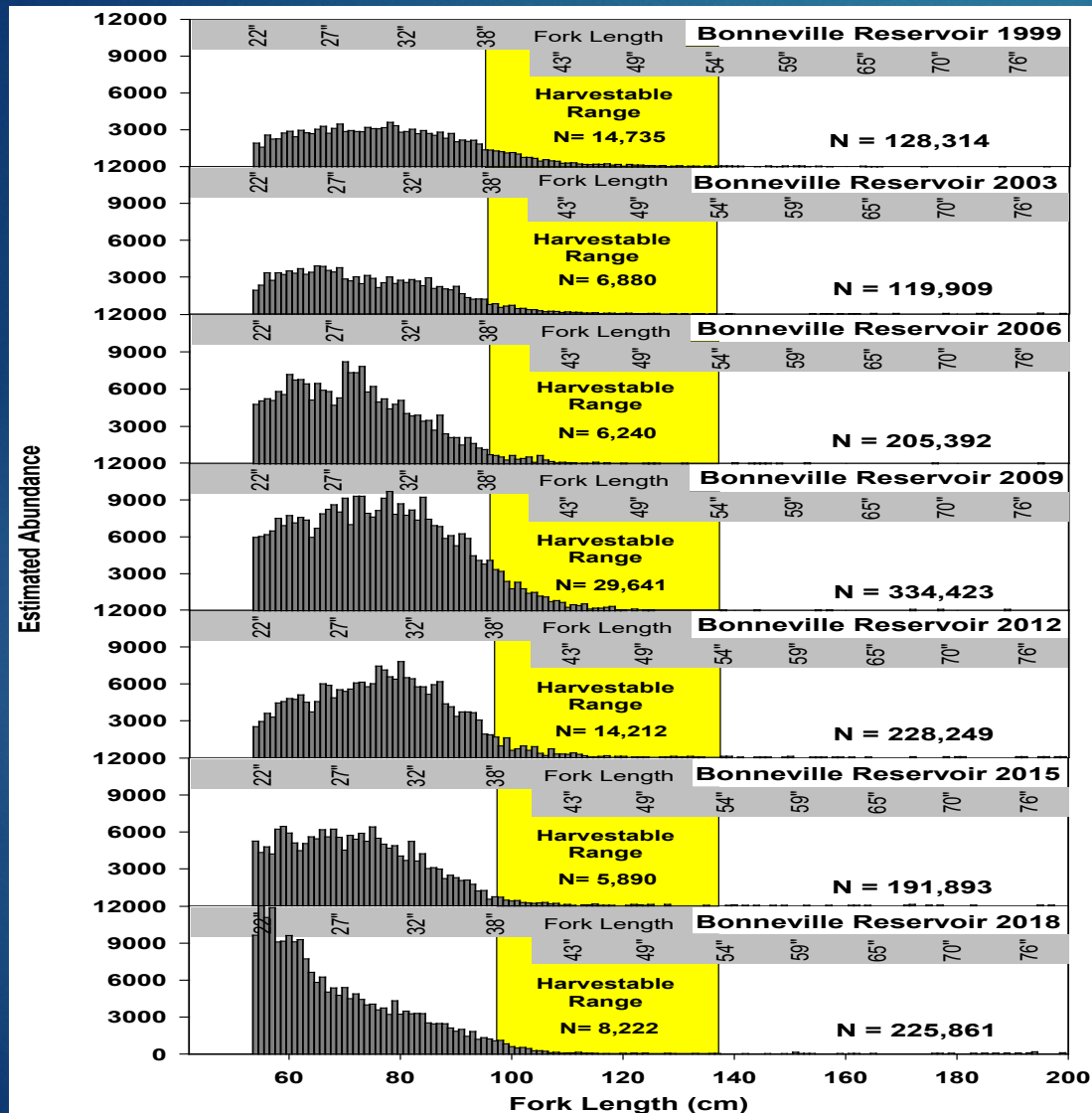
▶ **The Dalles Reservoir**
1997 – 2020



▶ **John Day Reservoir**
▶ 2001 - 2019

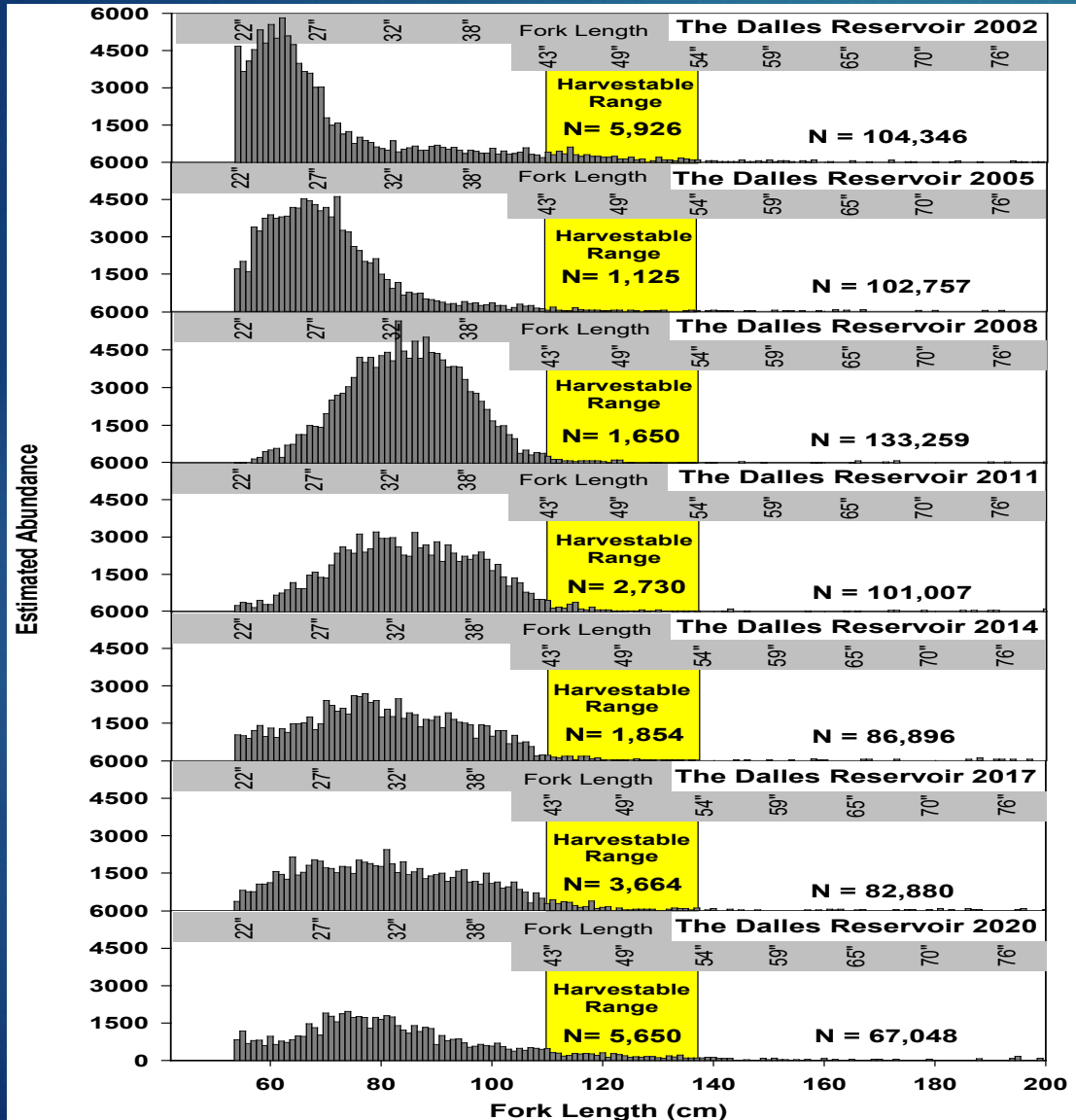


BONNEVILLE 1999 - 2018



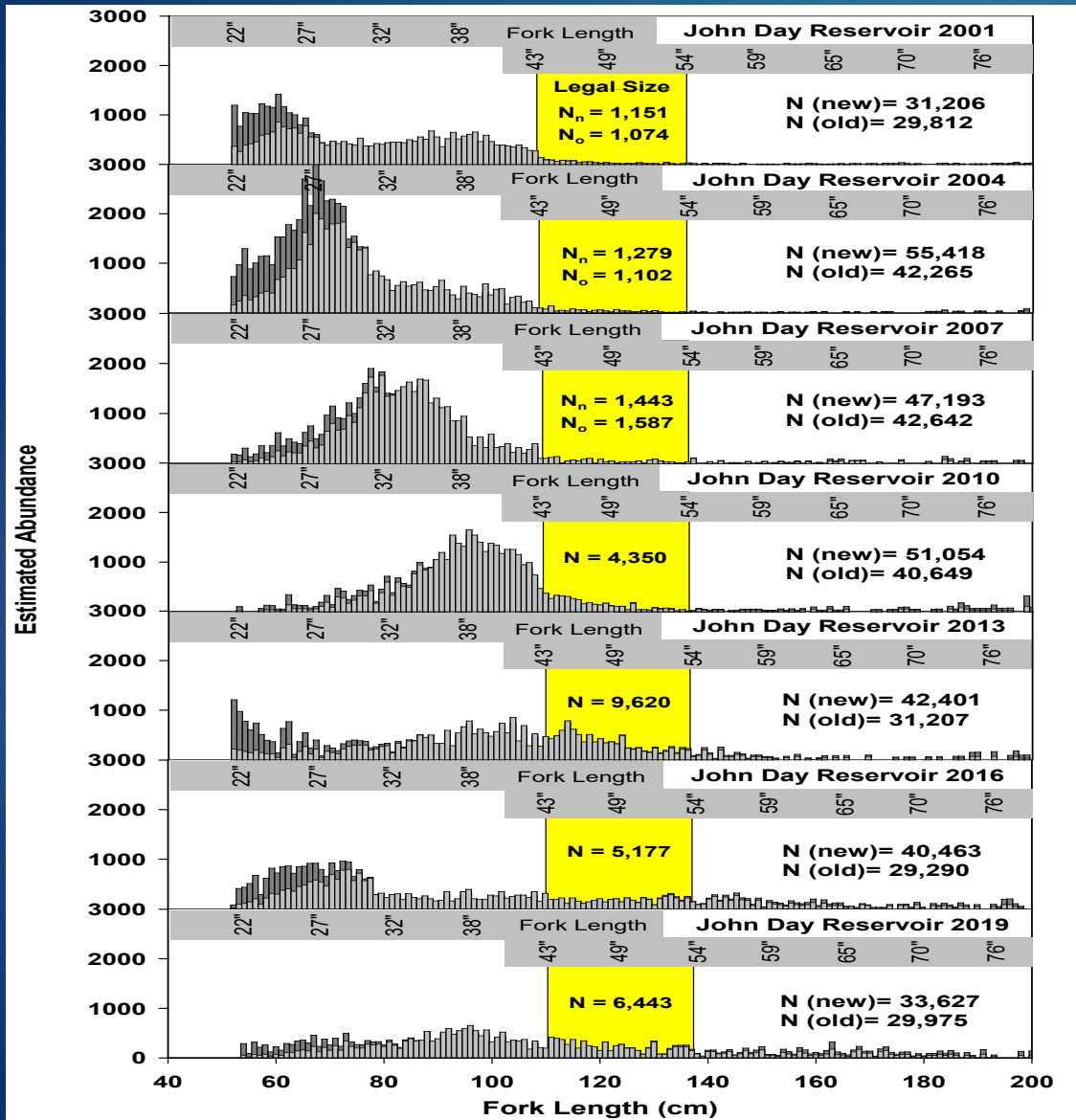
- ▶ **TREMENDOUS POPULATION SHIFTS**
- ▶ **HIGH DENSITIES, POOR CONDITION FACTORS CHARACTERIZE THIS PERIOD**
- ▶ **MOST RECENT SURVEY (2018) MAY SHOW STABILIZATION, GOOD WEIGHTS REPORTED BY FISHERS**
- ▶ **INCREASED SPECIFIC WEIGHTS AND HIGHER CONDITION FACTORS IN THE LATEST SURVEY**
- ▶ **NOTE:** The 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 1997 – 2020



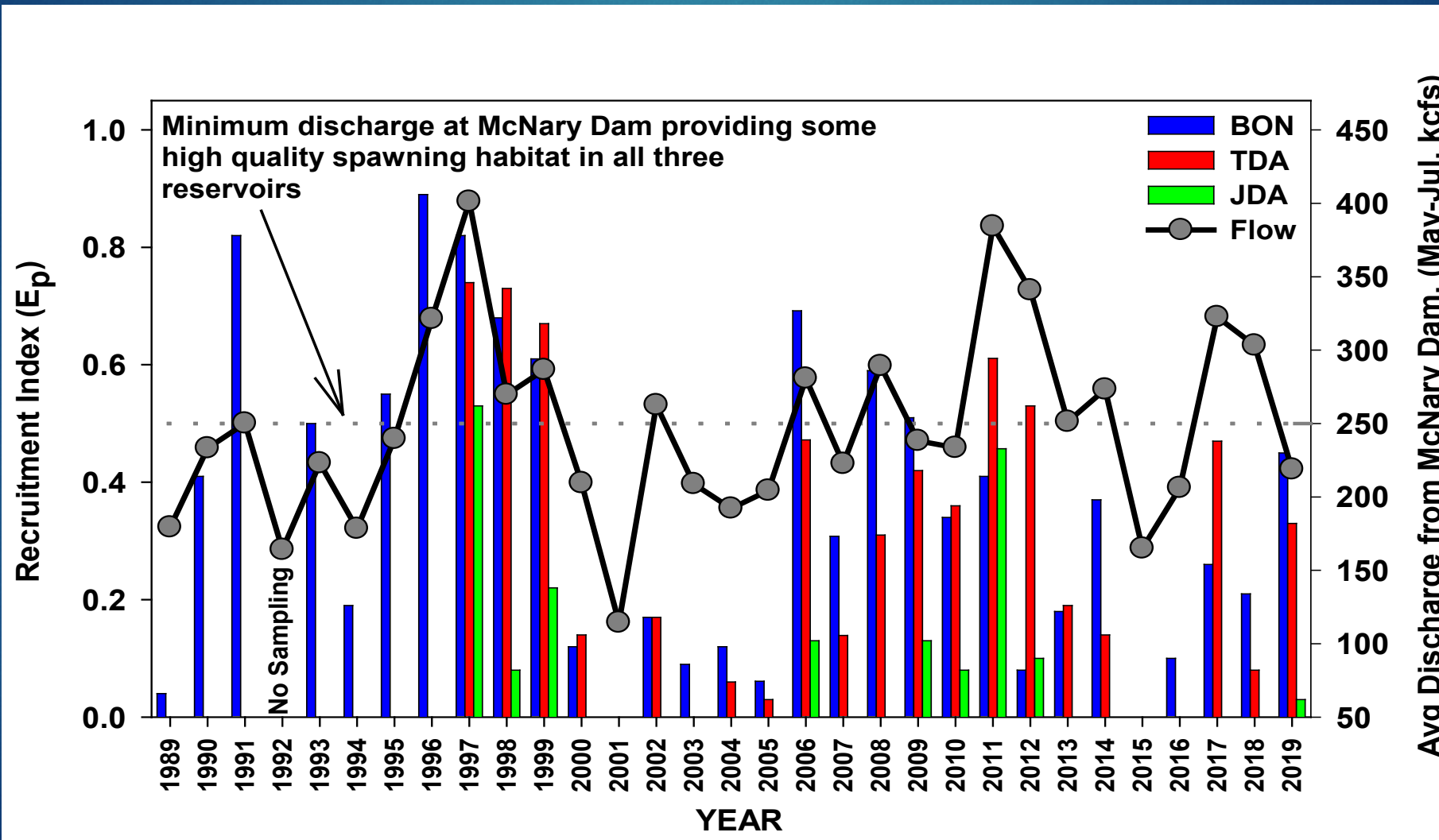
- ▶ POPULATION SURGED UPWARDS IN EARLY 2000'S, SIMILAR TO BN POPULATION
- ▶ TD FISH SLIGHTLY BETTER CONDITION FACTOR AND GROWTH THAN BN FISH
- ▶ DOWNSHIFT SIMILAR TO BN POPULATION
- ▶ OVERALL POPULATION DECLINE BETWEEN 2017 AND 2020, POOR RECRUITMENT FROM 2013-2016

JOHN DAY 2001 - 2019



- ▶ JOHN DAY POPULATION COMES FULL CIRCLE
- ▶ 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

HIGH 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			0.5					
1994			0.19					
1995			0.55					
1996			0.89					
1997			0.82	0.74	0.53		0	
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	0	0	0
2001			0	0	0	0	0	0
2002			0.17	0.17	0	0.06	0	0
2003			0.09	0	0	0	0	0
2004	0.44		0.12	0.06	0	0	0	0
2005	0.49		0.06	0.03	0	0.03	0	0
2006	0.52		0.69	0.47	0.13	0.06		
2007			0.31	0.14	0	0.06		
2008	0.45		0.59	0.31	0	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		
2011	0.34	0.06	0.41	0.61	0.46	0.26		
2012	0.35	0.22	0.08	0.53	0.1			
2013	0.12		0.18	0.19	0			
2014	0.31	0.38	0.37	0.14	0			
2015	0.05	0.26	0	0	0			
2016	0.14	0.5	0.1	0	0			
2017	0.58	0.46	0.26	0.47	0			
2018	0.27	0.83	0.21	0.08	0			
2019	0.21	0.67	0.45	0.33	0.03			
2020	NS	NS	0.37	0.08	0			

FIELD SEASON 2021

- ▶ STOCK ASSESSMENT IN BONNEVILLE RESERVOIR (ODFW, WDFW, CRITFC)
- ▶ FALL YOUNG OF YEAR SURVEYS- BONNEVILLE, THE DALLES, & JOHN DAY RESERVOIRS (ODFW, WDFW, CRITFC)
- ▶ WINTER TAGGING IN JOHN DAY RESERVOIR (YN/TRIBAL FISHERS/CRITFC)
- ▶ COVID-19 FIELD PROTOCOL WILL BE USED BUT WILL NOT AFFECT 2021 FIELD SAMPLING



WHITE STURGEON MASTER PLAN UPDATE

- ▶ MASTER PLAN #200715500
- ▶ STEP 2 IN PROCESS
- ▶ FINALIZING RFP FOR WELL TESTING AND ENGINEERING DESIGNS FOR FACILITY
- ▶ UPDATING MASTER PLAN FROM 2015 VERSION
- ▶ ADDRESSING ISRP QUESTIONS FROM PRIOR REVIEWS
- ▶ PREPARING TO LAUNCH EC PROCESS LATER IN 2021



CONCLUSIONS for 2020

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

THE DALLES – CONCERN WITH THE POPULATION DOWNTURN, BUT RECENT RECRUITMENT WILL REGISTER WITH THE NEXT ASSESSMENT IN 2023

JOHN DAY – DECLINING ABUNDANCE, LIKELY TO CONTINUE, DUE TO 14 YEARS OF LITTLE OR NO RECRUITMENT (22 CONSECUTIVE YEARS OF SAMPLING)

JOHN DAY SUPPLEMENTATION CANDIDATE FOR 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



QUESTIONS?



White Sturgeon: McNary Reservoir and the Lower Snake River



Overview

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	█																█									
	16 yrs.																10 yrs.									
IHR		█																			█			█		
	18 yrs.																		4 yrs.							
LMR			█																							█
	15 yrs.															7 yrs.										
LGR			█																							
	15 yrs.																		9 yrs.							



- The NWPCC supported funding for the 2018 and 2019 stock assessments in Ice Harbor and Lower Monumental through BPA cost-savings.
- No future funding has been identified; however, the 2020 ISRP recommended proposals for stock assessments in these areas (ISRP 2020-8).

McNary Reservoir & Hanford Reach

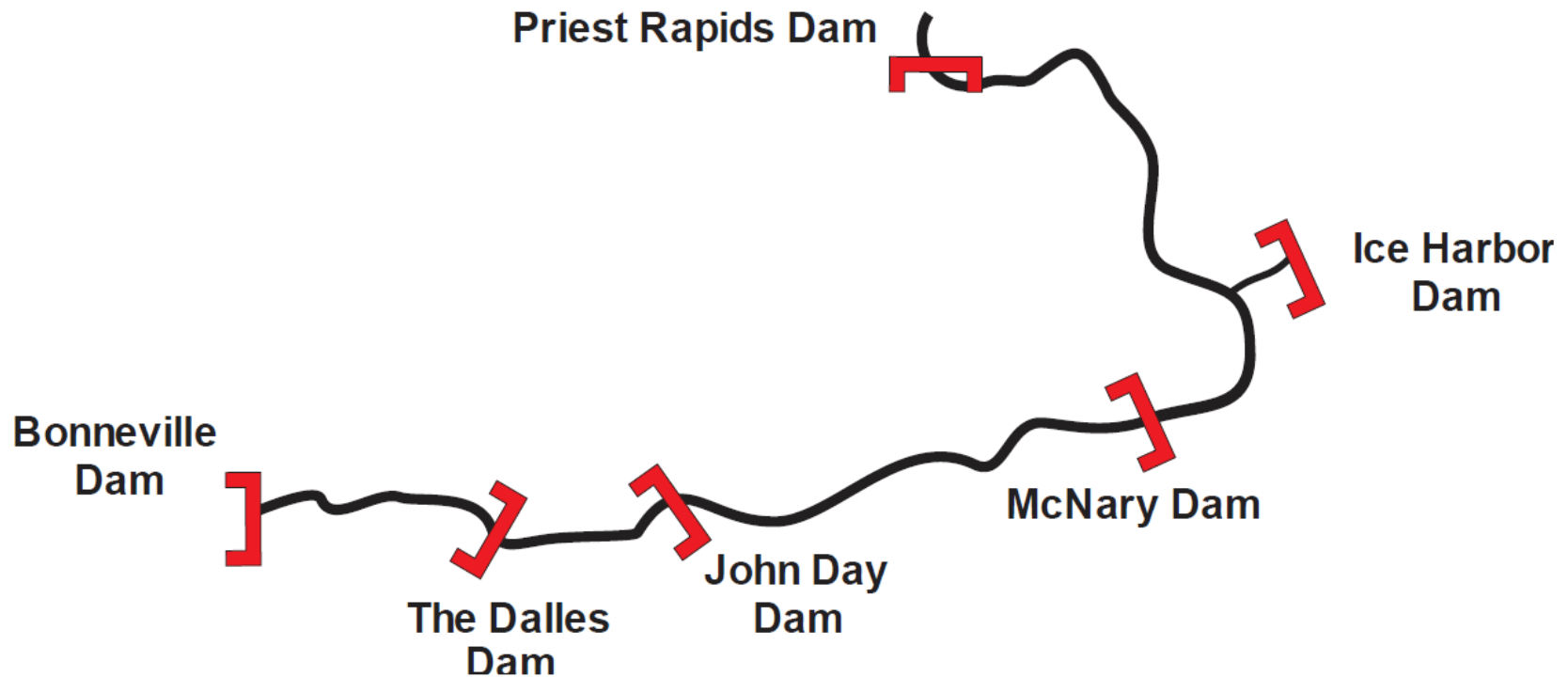


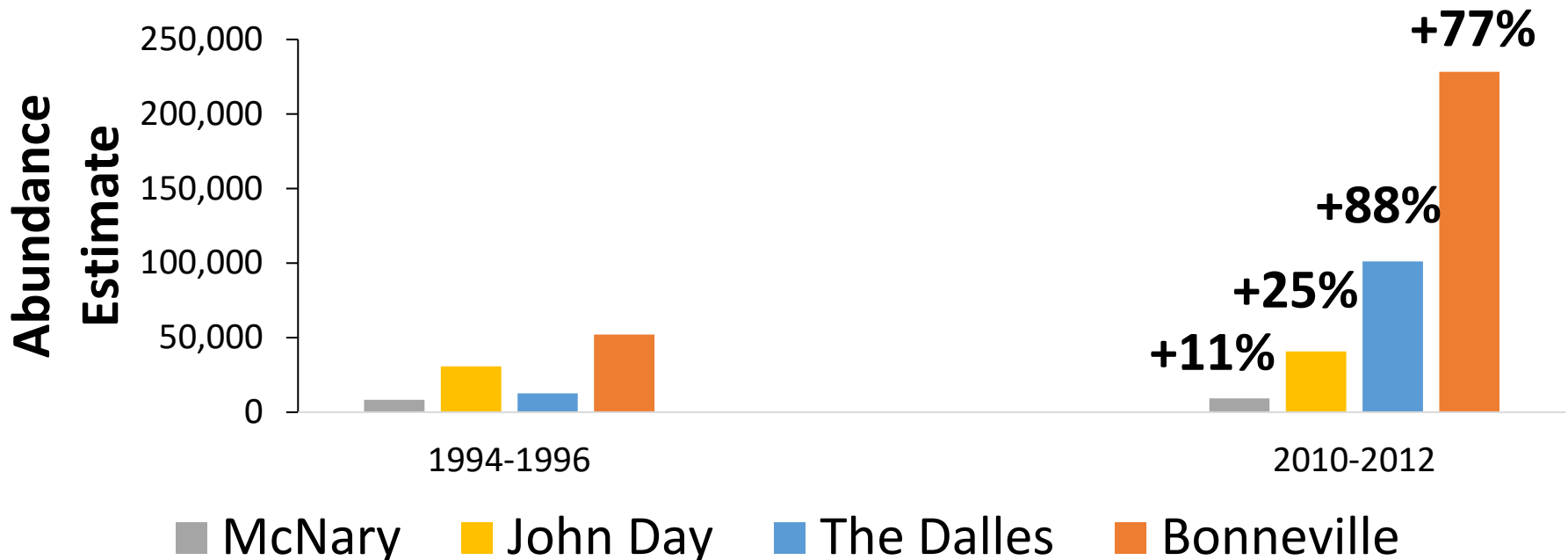
Figure 28. Map of the lower-mid-Columbia River sturgeon management unit.

Image: Columbia Basin White Sturgeon Planning Framework (NWPC 2013)

Population Comparison

By surface area, McNary Reservoir (45,500 acres) is similar to or much larger than other lower-mid-Columbia Reservoirs, yet the abundance of sturgeon remains much lower.

- 0.9x smaller than John Day (51,900 acres)
- 4x larger than The Dalles (11,100 acres)
- 2x larger than Bonneville (20,800 acres)



McNary Reservoir & Hanford Reach

Total Abundance
 1995: 8,250
 2011: 9,241*
 *38% hatchery

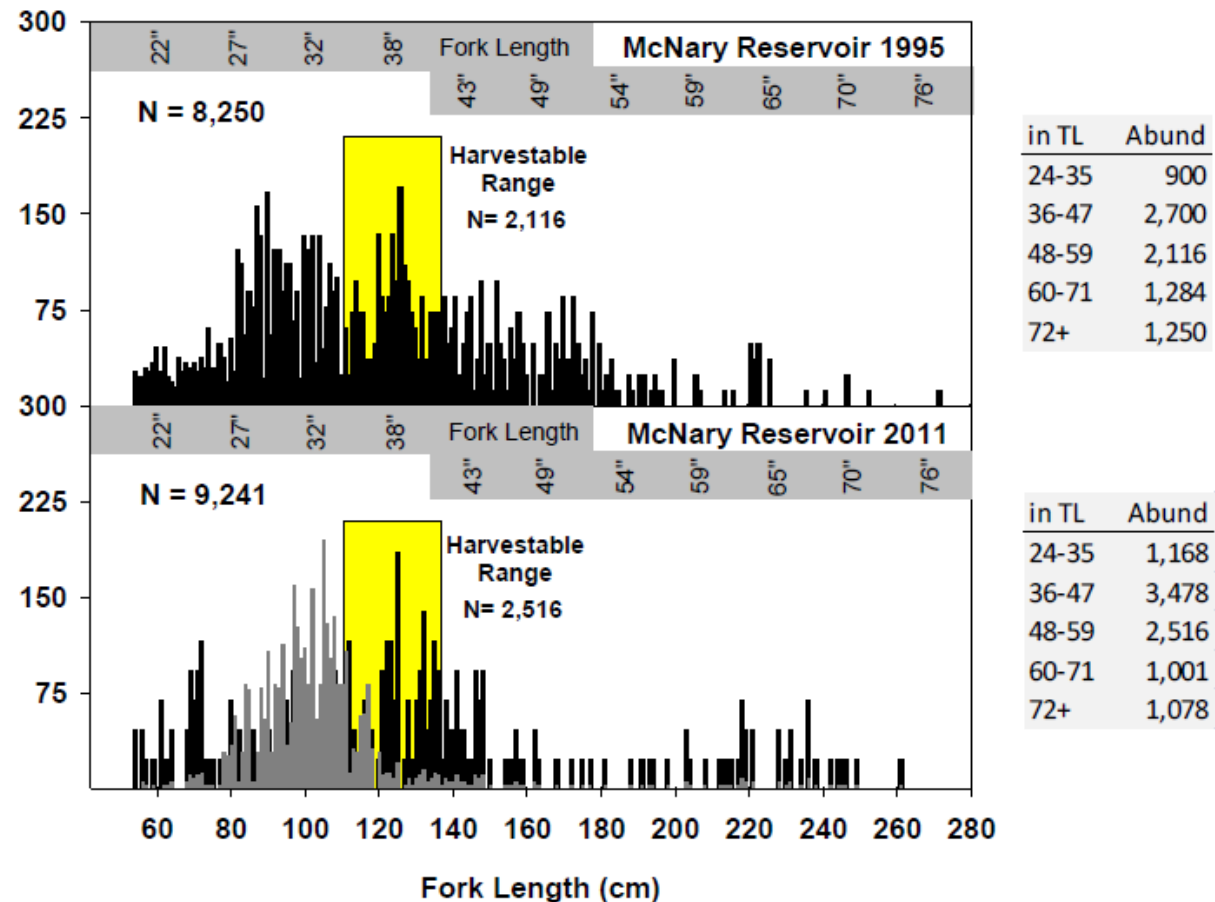


Figure 32. Estimated abundance of white sturgeon (≥ 24 inches total length) in McNary reservoir, 1995 and 2011. Grey bars in the bottom graph represent the estimated 3,472 hatchery-reared fish now part of the white sturgeon population in McNary Reservoir.

Lower Snake Reservoirs

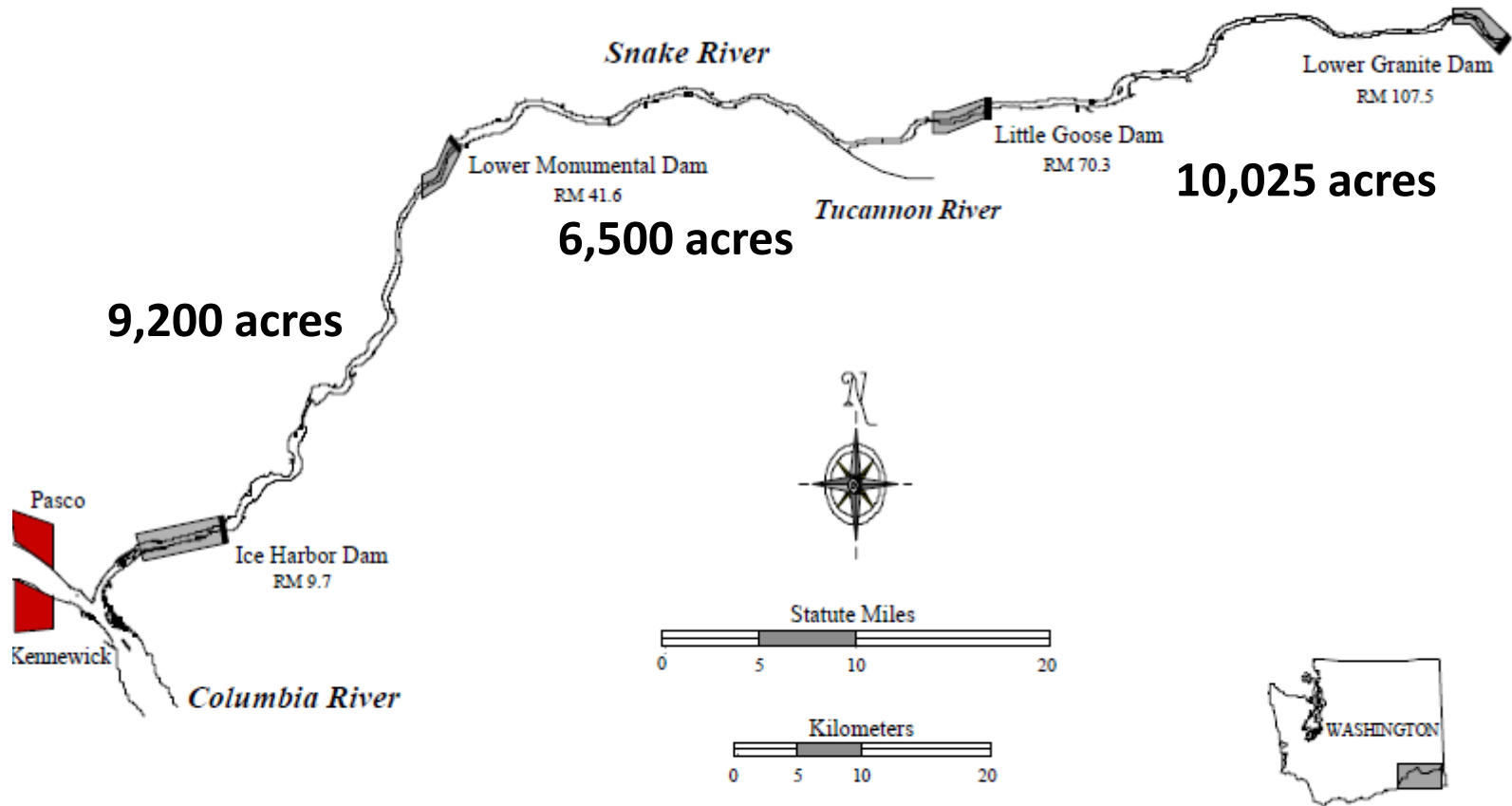
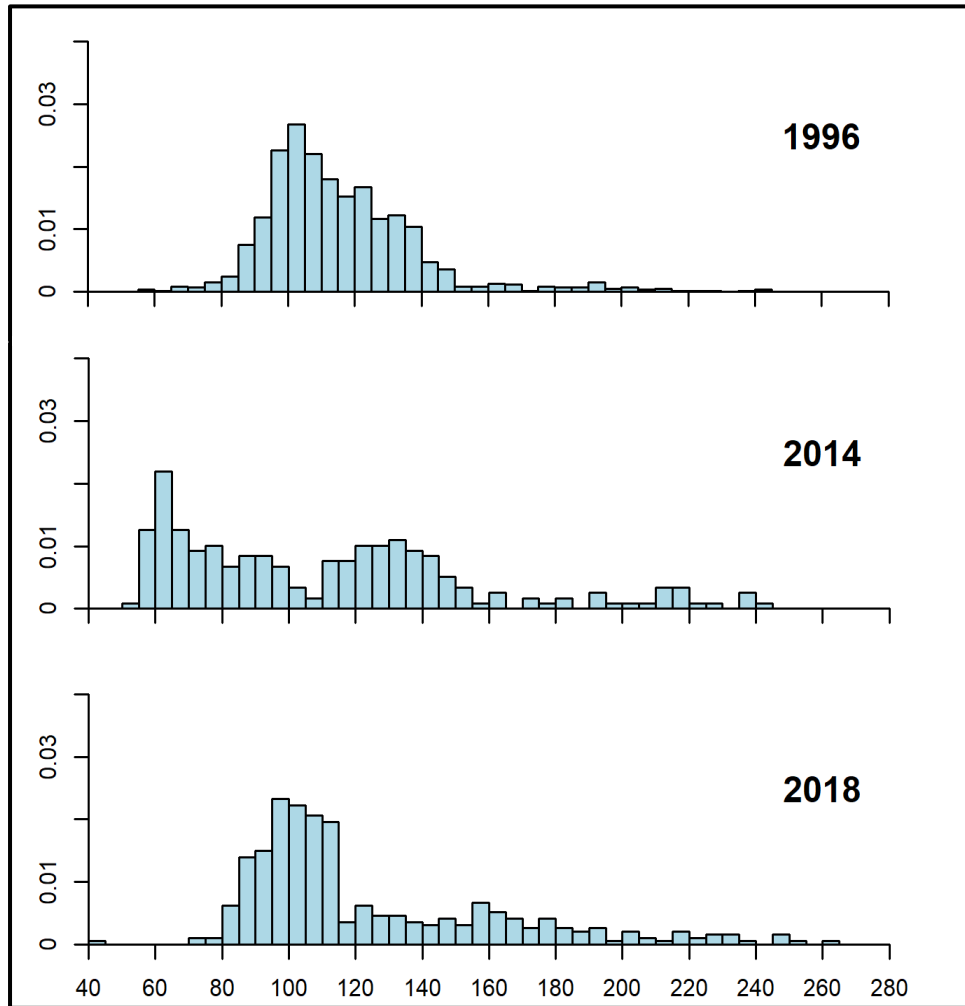


Figure 40. Lower Snake (Ice Harbor Dam to Lower Granite Dam) Management Unit.

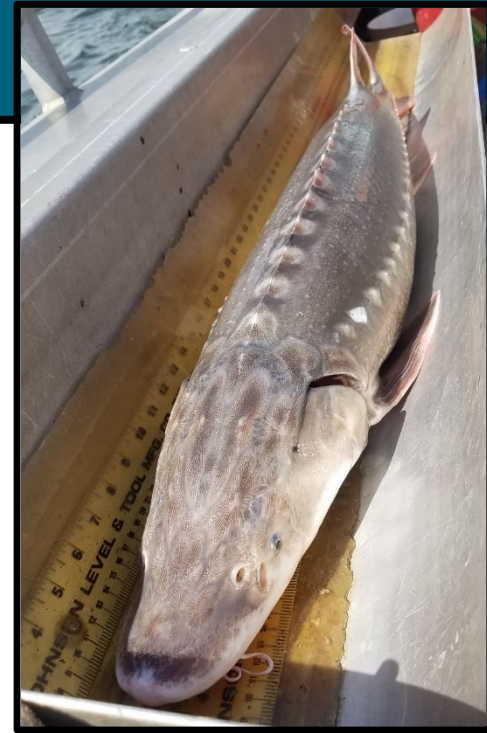
Image: Columbia Basin White Sturgeon Planning Framework (NWPCC 2013)

Ice Harbor

Proportion of Catch



Fork Length (cm)



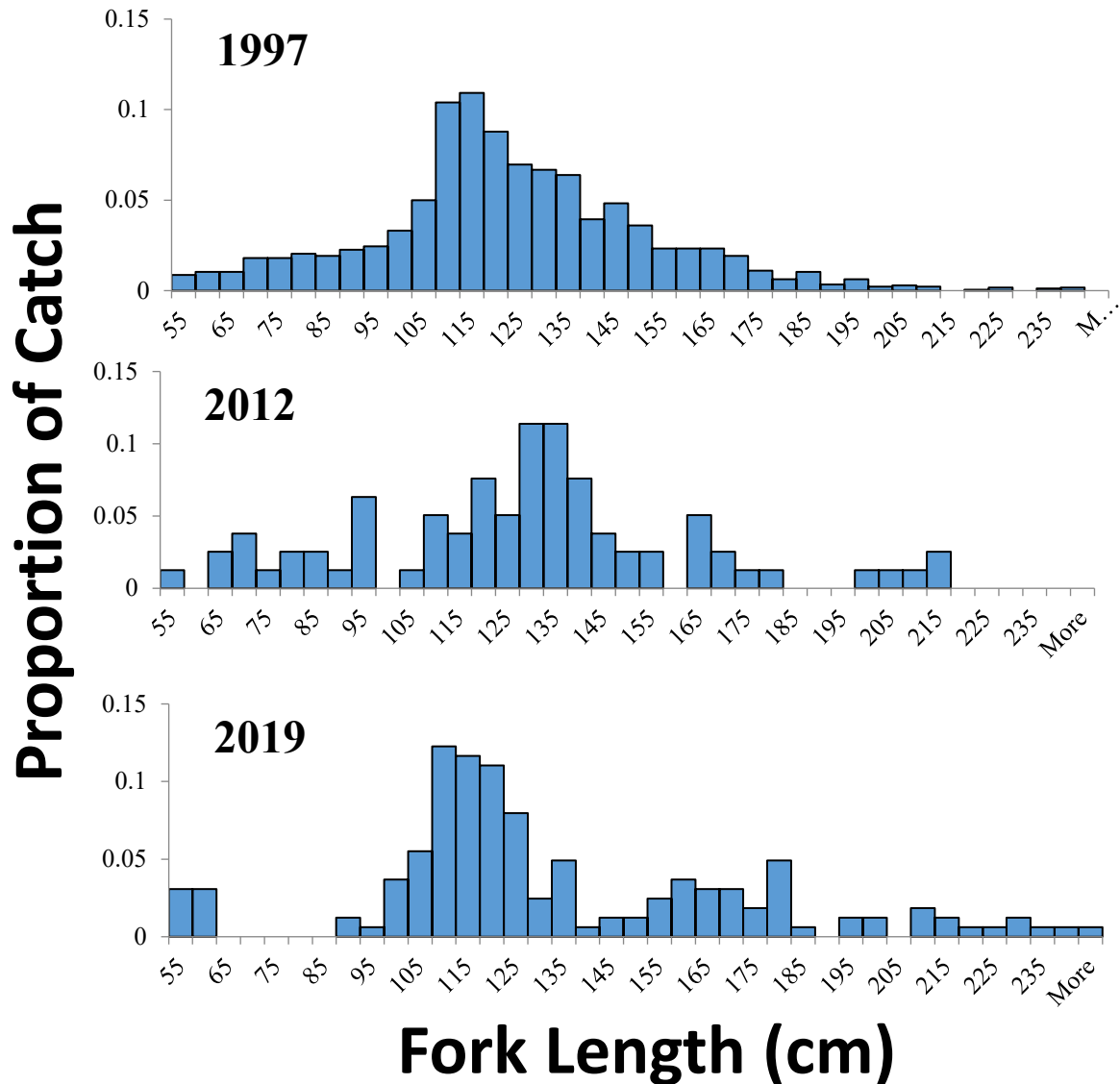
2018 Catch Data

Fork Length:

Range: 42-261 cm FL

Median: 110 cm FL

Lower Monumental



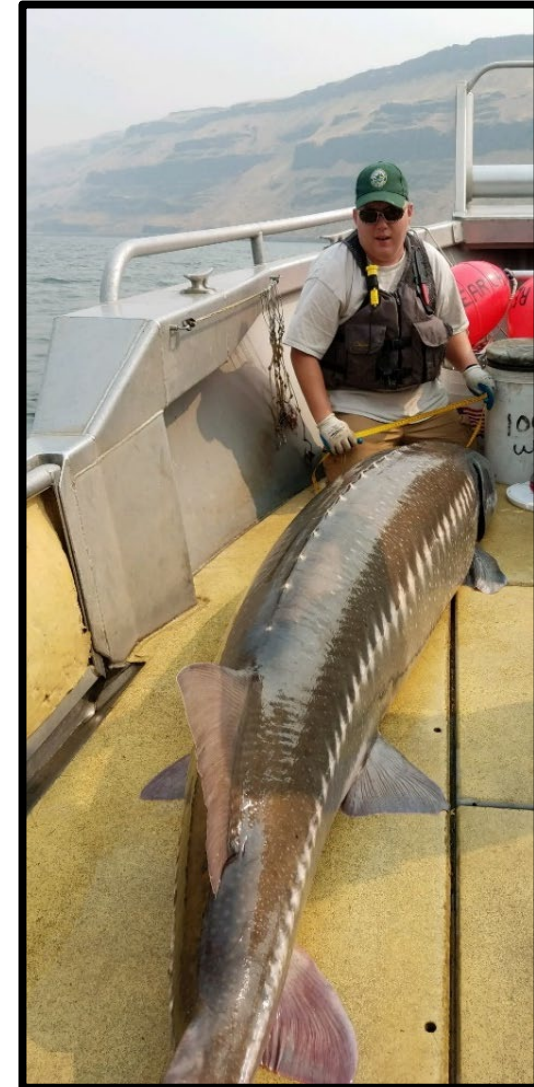
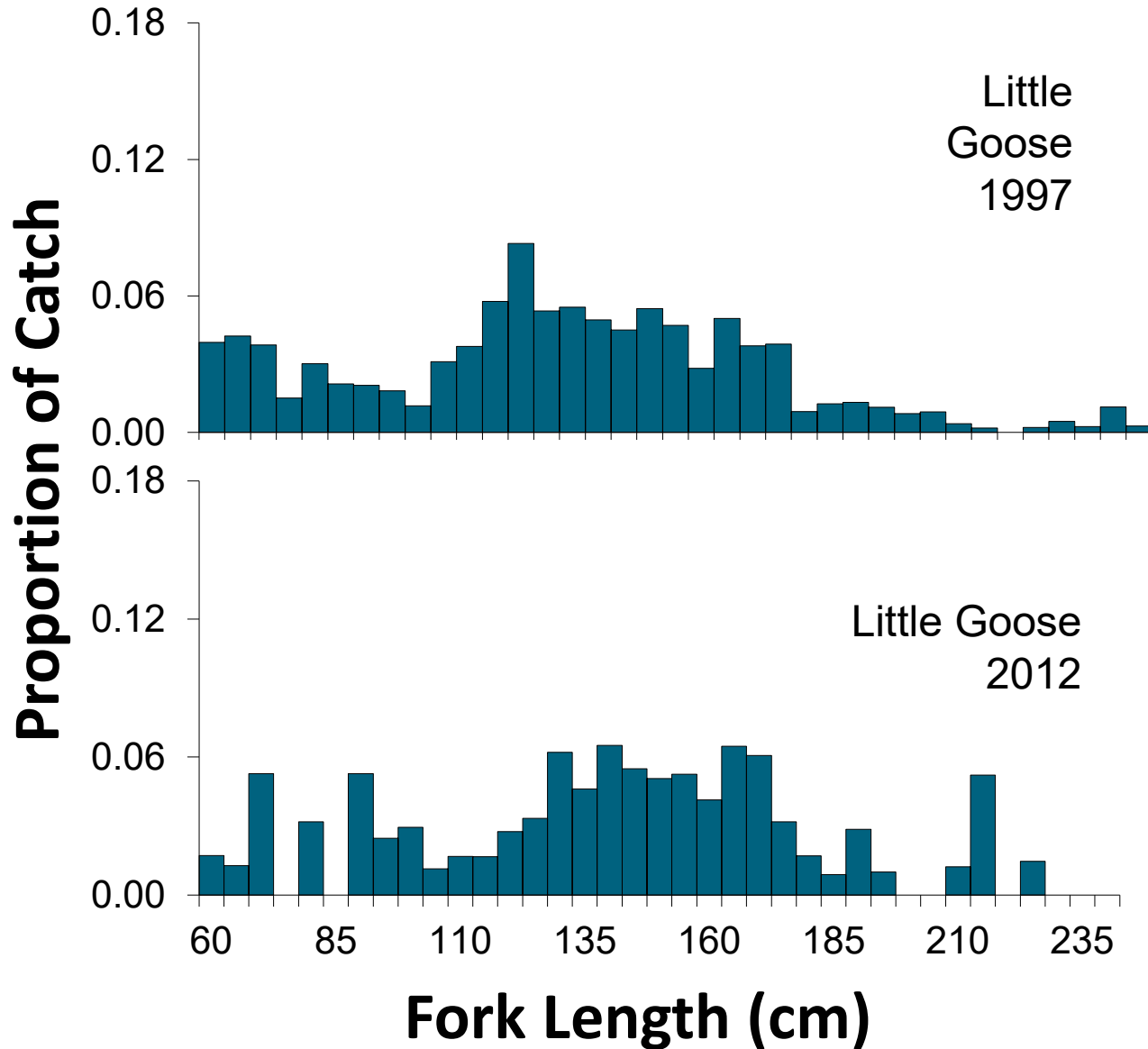
2019 Catch Data

Fork Length:

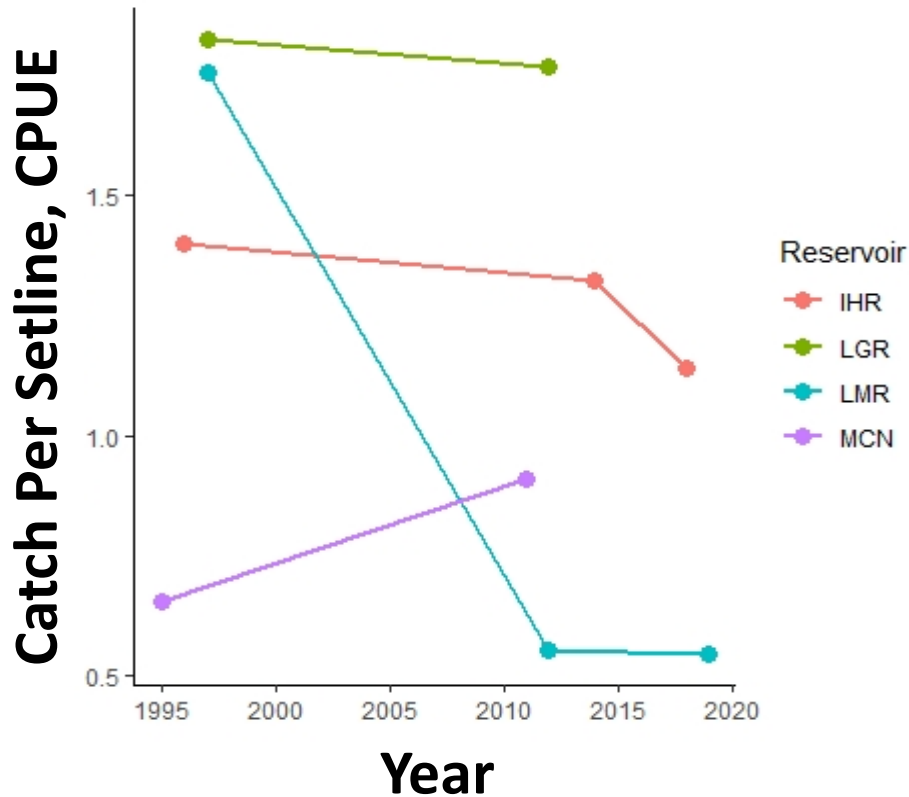
Range: 51-242 cm FL

Median: 119 cm FL

Little Goose



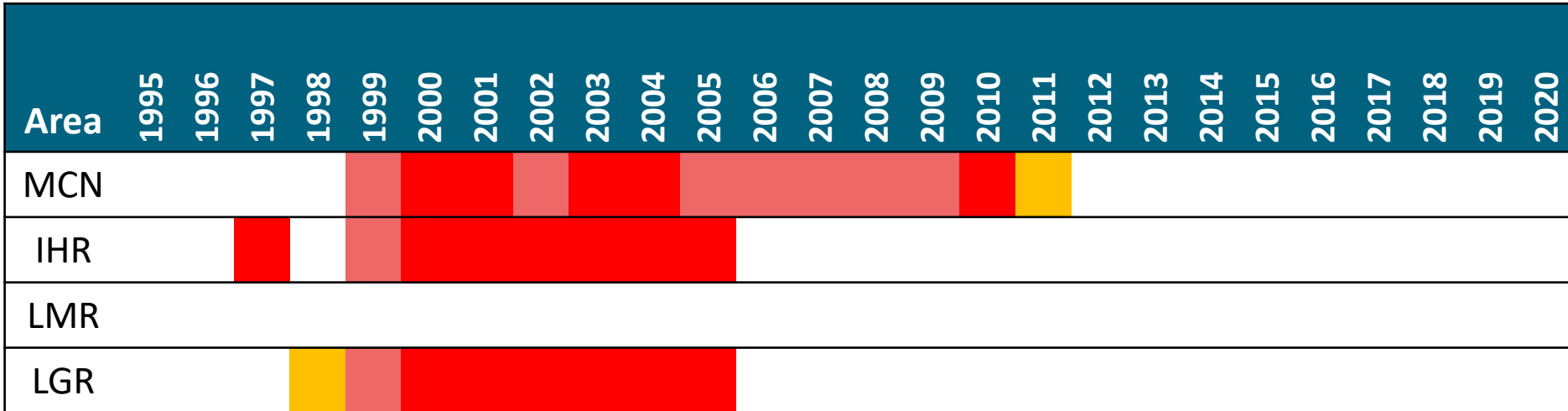
Population Changes



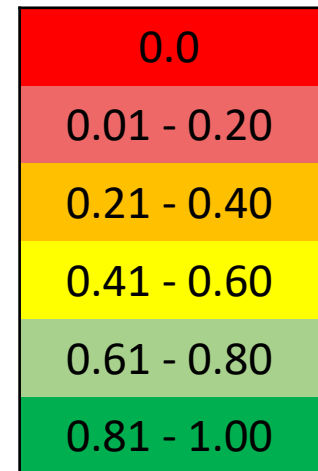
- In the Snake River, mean abundance ranges approximately 2,000-4,000 sturgeon per pool.
- Not all areas were able to calculate an abundance estimate during recent stock assessments due to low capture/recapture rates.
- CPUE indicates a decline in all areas except McNary.



Young-of-Year Index Surveys



EP = Proportion of nets with at least one sturgeon captured

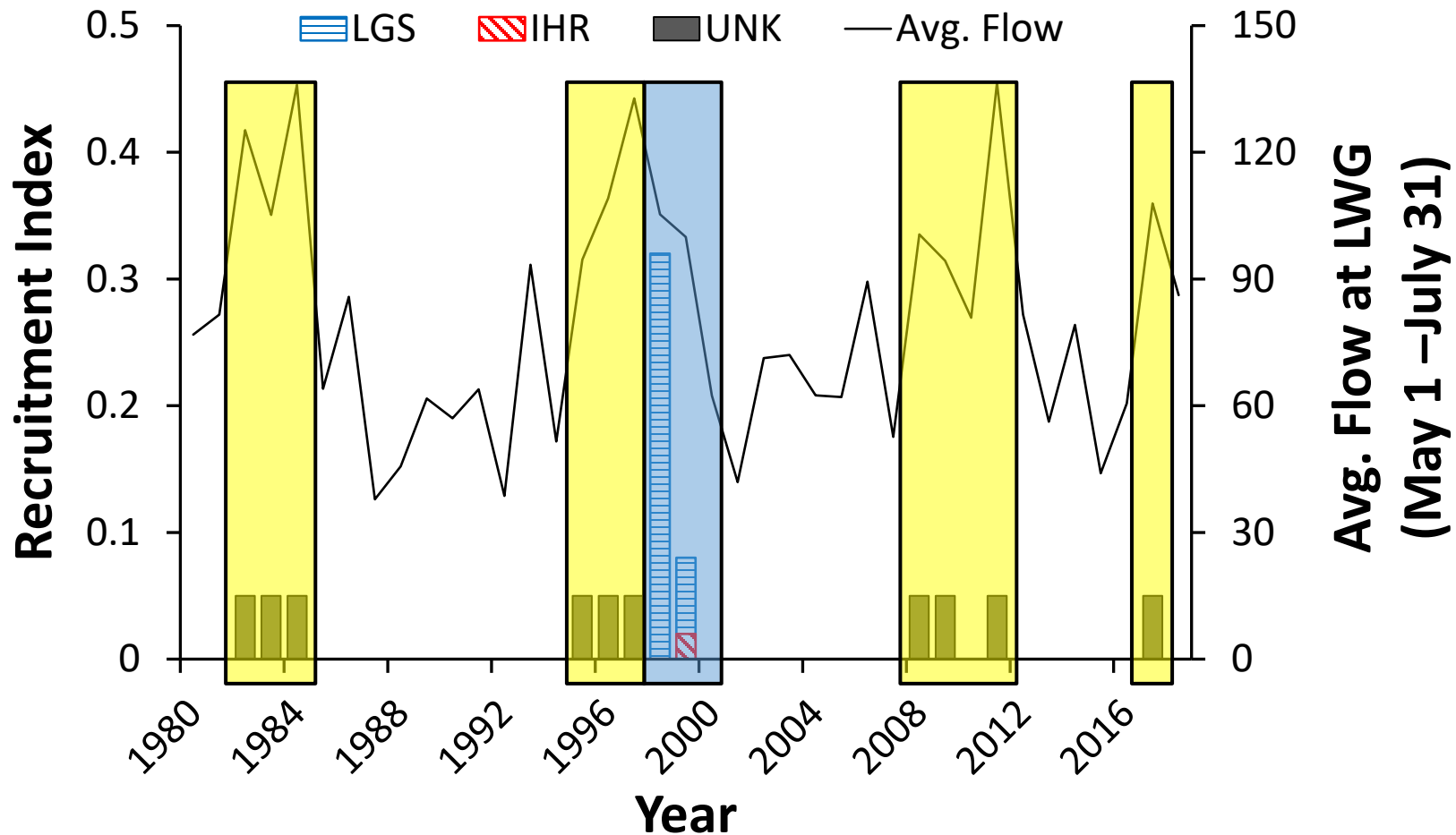


Recruitment



Young of Year
Sampled

Recruitment
Inferred



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.



Regulations

- All three Lower Snake reservoirs closed to sturgeon harvest in 2015 due to the detected decline in sturgeon abundance and lack of recruitment.
- McNary Reservoir and Hanford Reach were closed to sturgeon harvest in 2020 due to a lack of recent monitoring data and poor evidence for natural recruitment.
- Sturgeon spawning sanctuaries expanded through Aug. 31 and the sanctuary below Priest Rapids Dam was expanded to Vernita Bridge to improve recruitment.



Needs & Uncertainties



Consistent with CBWSPF, 2013:

- To evaluate conservation and management actions, baseline tracking of population structure and trends is needed:
 - Monitoring on more frequent basis
- Uncertainty in population productivity (growth, length-weight relationships, relative weight)
- Uncertainty concerning how hydro operations influence spawning success, egg deposition, dispersal of free-swimming embryos, and access to rearing habitats.
- Need to determine and quantify critical habitat use by early life stages and the effects of environmental variables (flow, flow variability, contaminants).

We would like to work with the Northwest Power and Conservation Council to implement the Fish and Wildlife Program's white sturgeon recommendation for additional white sturgeon stock assessments in Snake River and McNary pools.