Northwest **Power** and **Conservation** Council

April 1, 2025

MEMORANDUM

TO: **Council Members**

FROM: **Kate Self**

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

BACKGROUND:

Presenter: Laura Heironimus, Sturgeon, Smelt, and Lamprey Unit Lead (Washington Department of Fish and Wildlife), and Andrea Carpenter, Sturgeon Project Leader (Oregon Department of Fish and Wildlife)

Summary: Laura and Andrea will give a report on White Sturgeon in the established management areas, from the Columbia River below Bonneville and Bonneville to McNary. The information will include the population status, ongoing work, challenges, accomplishments, partners, and future needs for White Sturgeon.

Relevance: These reports address many goals, objectives, and measures in the 2014 Fish and Wildlife Program and 2020 Addendum. This information is reported by Strategy Performance Indicators which are available via the Council's Program Tracker. 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 2025; Program Implementation and Performance. Sturgeon are listed as an emerging priority in the Council's 2014 Fish and Wildlife Program and 2020 addendum.

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

- Project #1986-050-00, *Evaluate Sturgeon Populations in the Lower Columbia River*

In addition, the 2014 Fish and Wildlife Program identified emerging priorities for sturgeon, and the 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 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:

- 2025 Joint Staff Report – Stock status and fisheries for sturgeon and smelt
- The Council's White Sturgeon web page
- Columbia Basin White Sturgeon Planning Framework
- White Sturgeon Story Map

Lower Columbia River White Sturgeon Stock Status Review

Laura Heironimus
Sturgeon, Smelt, and Lamprey Unit Lead
April 8, 2025

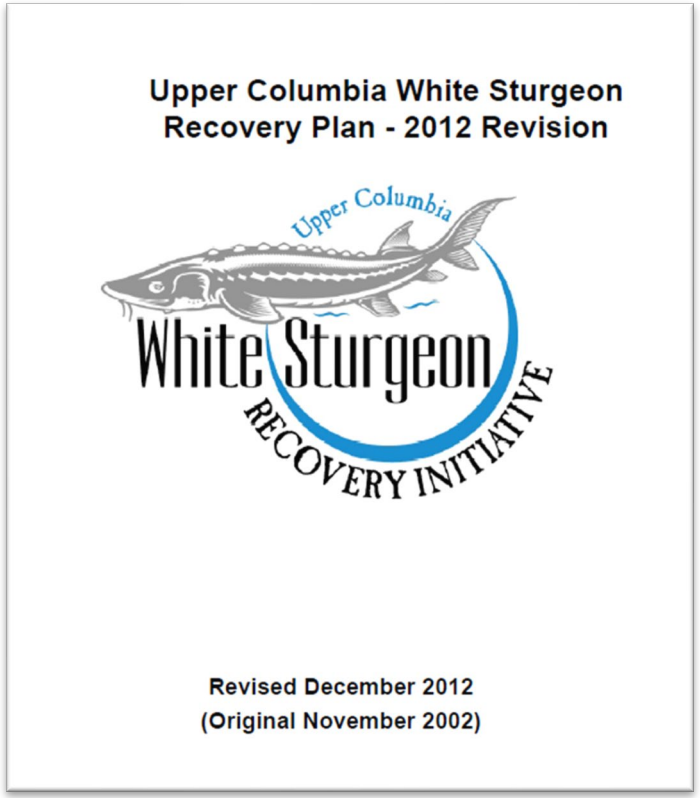
Washington Department of FISH and WILDLIFE

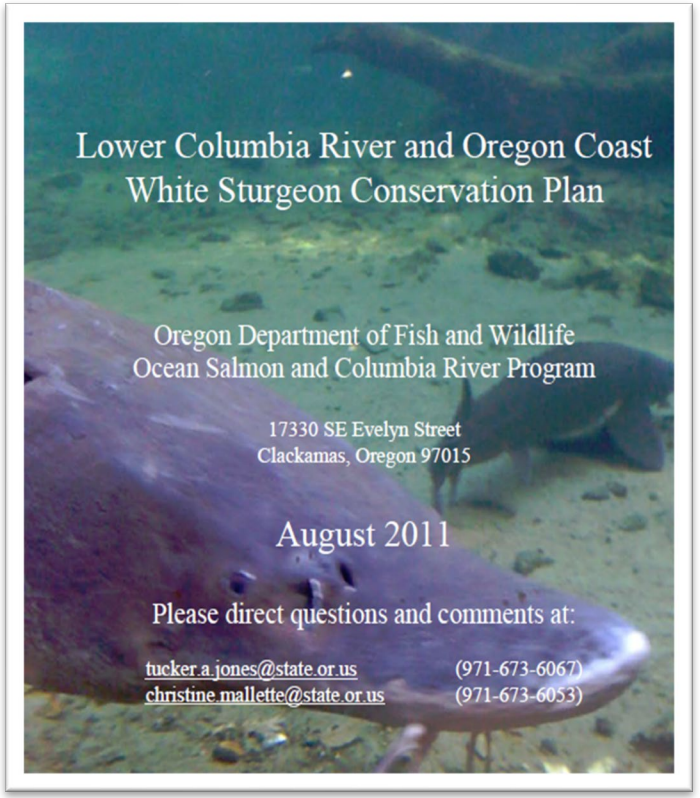
Purpose

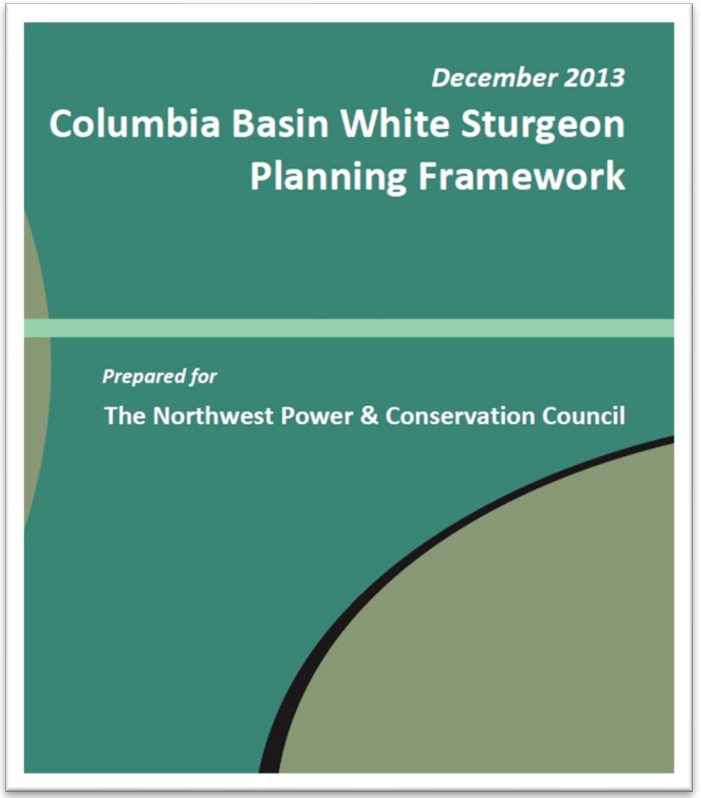
- Overview of Columbia River sturgeon management
- Lower Columbia River, below Bonneville Dam, sturgeon stock status
- Upcoming sturgeon projects

Overview of Columbia River sturgeon management

Columbia Basin Sturgeon Plans



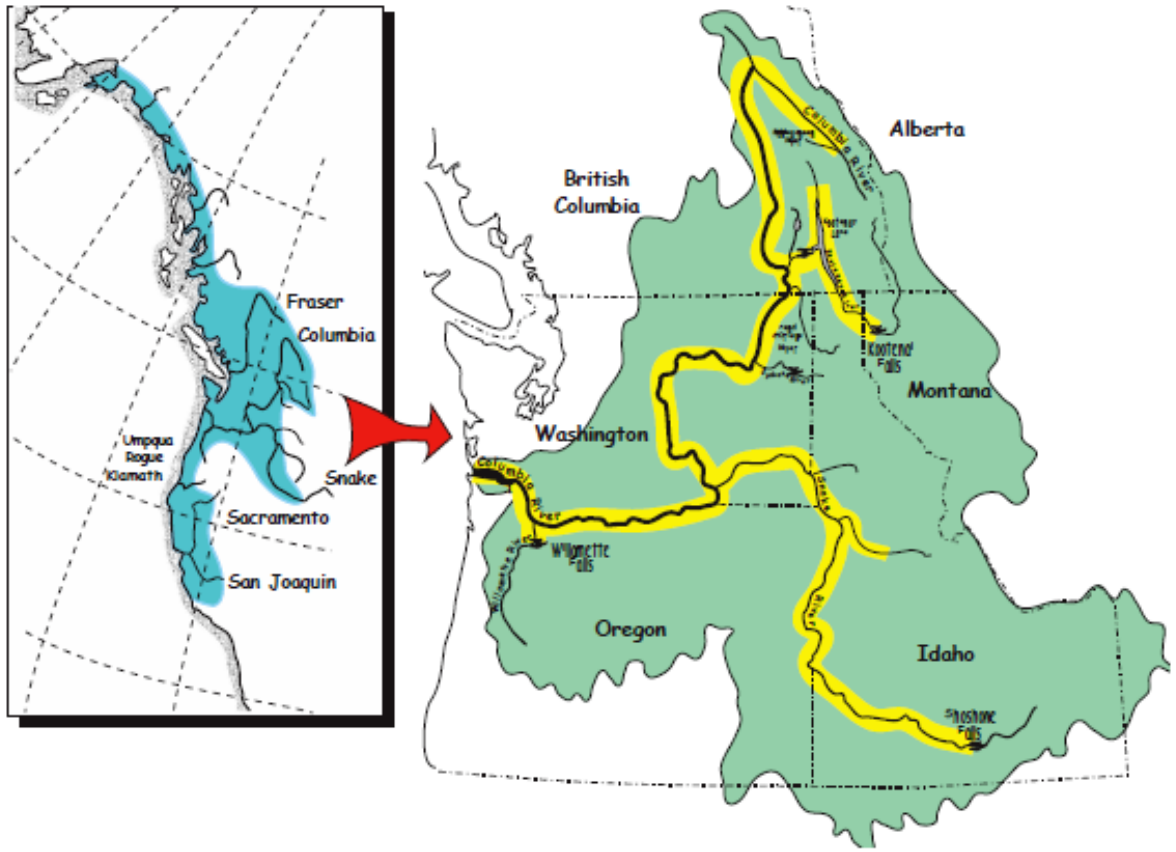




White Sturgeon Limiting Factors and Threats

1. Habitat fragmentation
2. Habitat complexity, quantity, and quality
3. Flow and flow variation
4. Water quality
5. Competition and predation from changes in fish communities
6. Exploitation and illegal harvest
7. Climate patterns and trends

Source: Northwest Power and Conservation Council, 2013



Lower Snake River

Population Monitoring:

- No regular monitoring occurring.
- The last stock assessments were completed in 2019 in Lower Monumental and 2018 in Ice Harbor.
- Characterized by low abundances (mean abundance estimates:1000–2500 fish per reservoir) and infrequent recruitment events.

Hatcheries:

- May be stocked in the future under the CRITFC Hatchery Master Plan.

Joe Dupont, IDFG, will present Snake River sturgeon updates to the council later this year.

Columbia River: McNary Dam to Priest Rapids Dam

Population Monitoring:

- No regular monitoring occurring.
- White sturgeon stock assessments have been conducted twice:
  - 1995: estimated 8,250 fish.
  - 2011: estimated 9,241 fish.
    - An estimated 38% of the population was comprised of hatchery origin fish.

Columbia River: Bonneville Dam to McNary Dam

Andrea Carpenter, ODFW, will present Bonneville Dam to McNary Dam sturgeon updates next.

Population Monitoring:

- Collaboratively monitored and managed by four treaty tribes (Yakama, Nez Perce, Warm Springs, and Umatilla) and two states (WA & OR).
- Each reservoir is surveyed every three years.

Hatcheries:

- May be stocked in the future under the CRITFC Hatchery Master Plan.

CRITFC Sturgeon Hatchery Program

Blaine Parker, CRITFC, will present Sturgeon Hatchery Program updates to the council later this year.

CRITFC Hatchery Program Goals:

1. Provide mitigation for the impacts of FCRPS construction and operations on Columbia basin sturgeon.
2. Enhance commercial, subsistence, and recreational fisheries for impounded subpopulations of sturgeon consistent with habitat capacities.
3. Conduct sturgeon enhancement in a manner which ensures protection and conservation of natural populations and the ecosystem.
4. Employ hatchery-produced sturgeon as an experimental tool for applied research on limiting factors, habitat capacity, broodstock limitations, population parameters, and immigration/entrainment in natural populations.

Lower Columbia River, Below Bonneville Dam, sturgeon stock status

Lower Columbia River White Sturgeon

Lower Columbia River sturgeon can be found throughout accessible coastal and Puget Sound waterways.

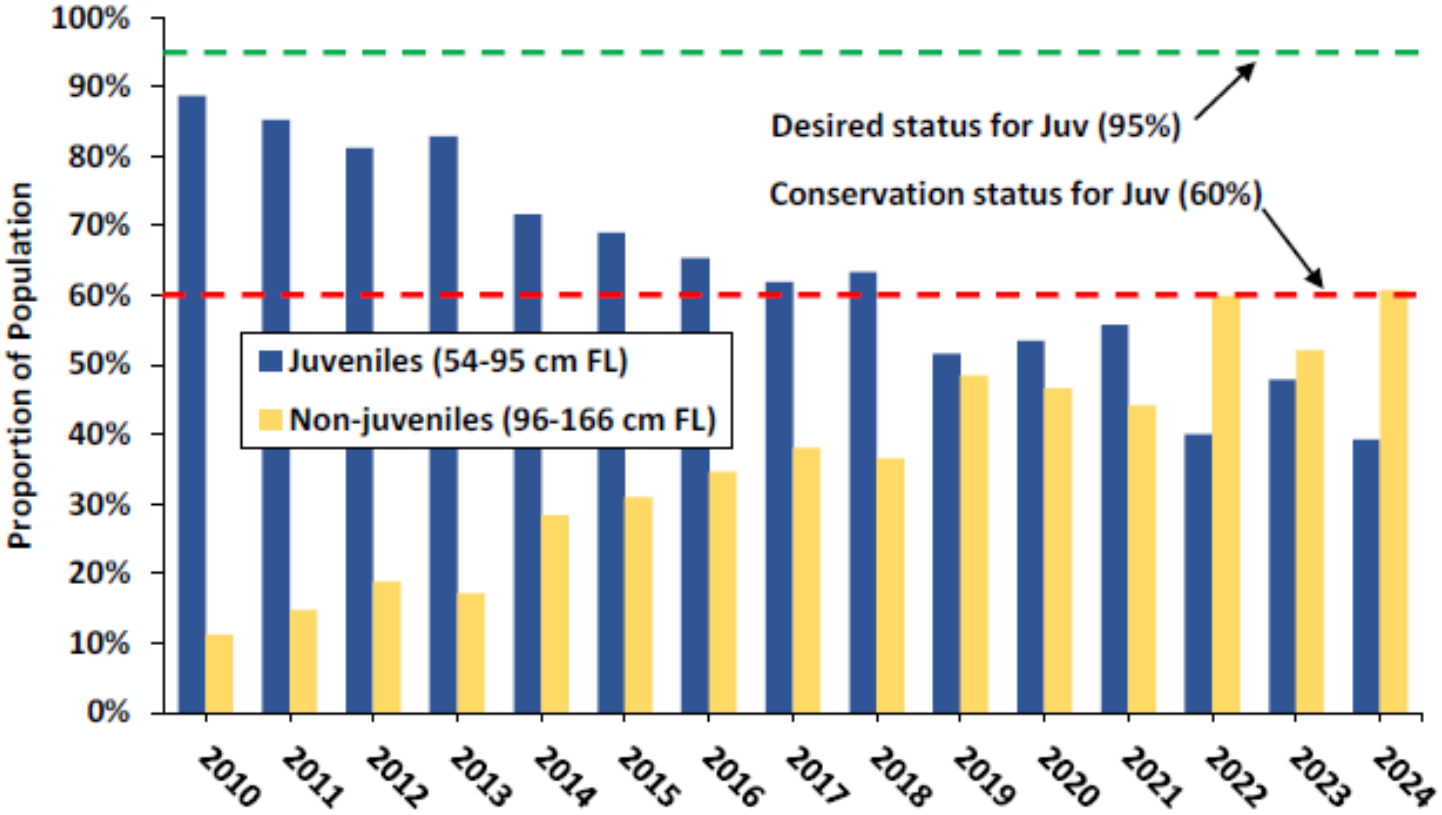
Annual population monitoring occurs in the Lower Columbia River.

Lower Columbia River and Oregon Coast White Sturgeon Conservation Plan

- Completed in 2011, developed by Oregon Department of Fish and Wildlife with contributions from WDFW.
- This plan includes metrics for evaluating the Lower Columbia River White Sturgeon stock assessment results (i.e., desired status vs conservation status).

To read this plan, go to:
https://www.dfw.state.or.us/fish/CRP/docs/lower_columbia_sturgeon/LCR_white_sturgeon_conservation_plan.pdf

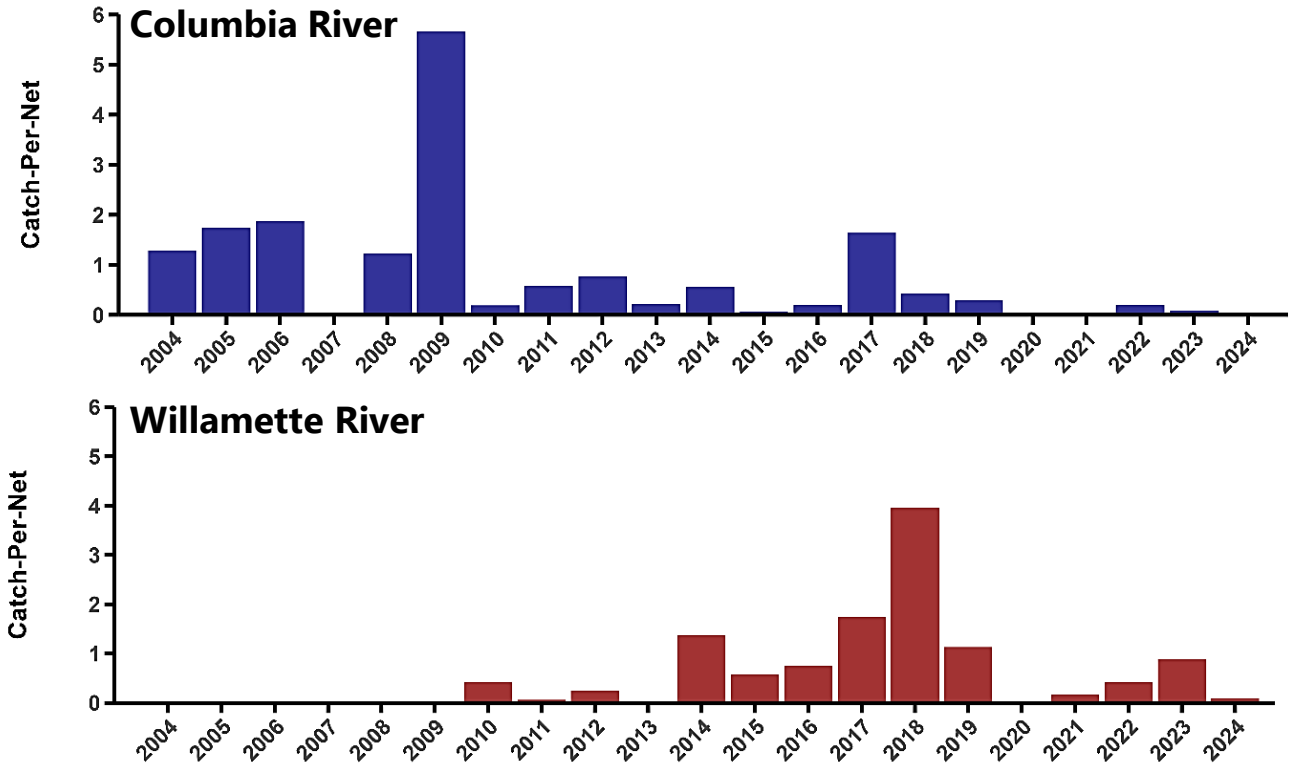
Population Composition



- The conservation plan calls for a population comprised of 95% juvenile fish.
- The juvenile portion of the population is declining.
- The non-juvenile portion of the population now makes up more than 50% of the overall population.

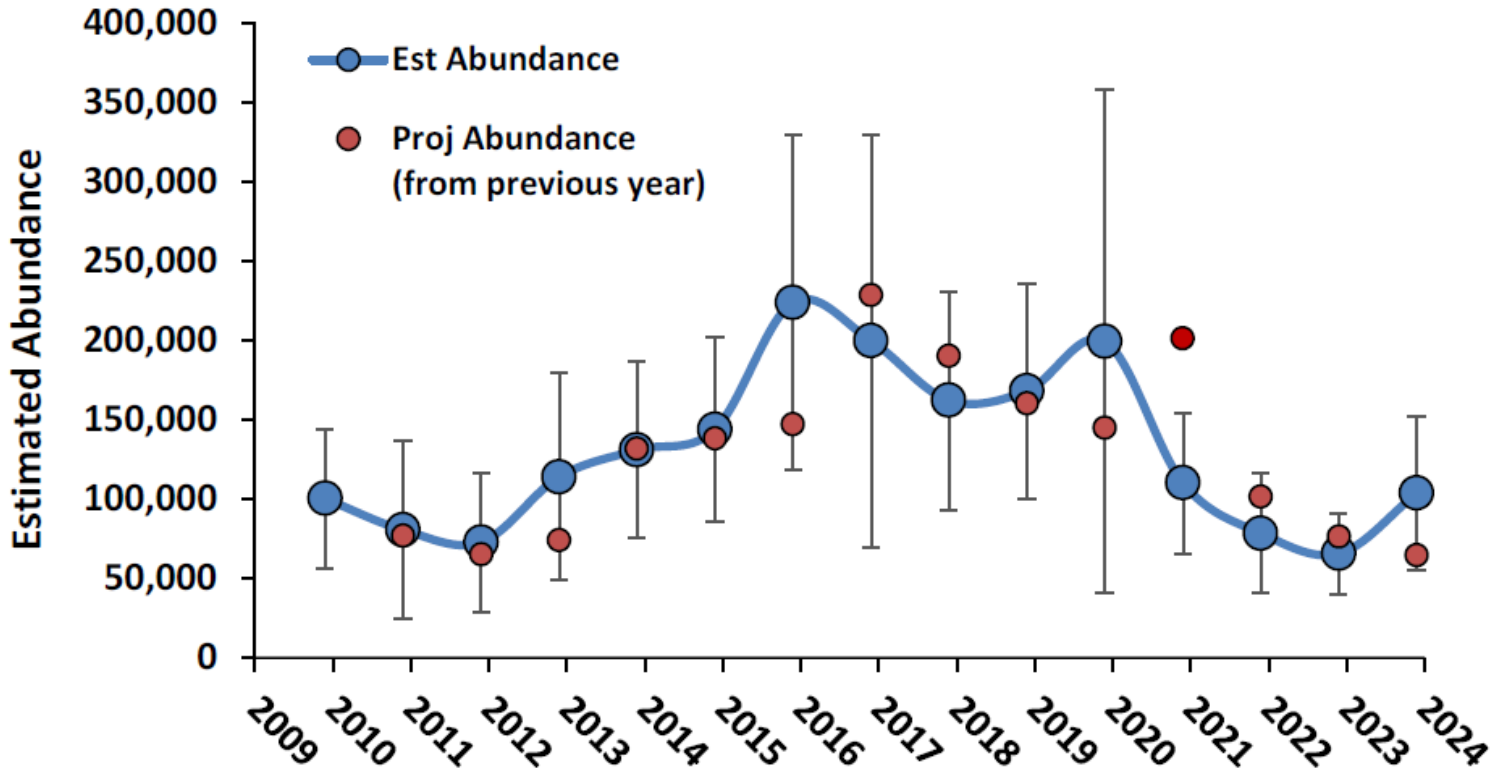
Age-0 Catch Per Net

- Every year that we have looked for age-0 sturgeon, we have found them in the Lower Columbia and Willamette rivers.
- We do not have reproductive failure.
- We do have underlying productivity issues affecting recruitment and survival of the age-0 fish.
- The low catch rate is consistent with the juvenile declines observed in the setline data.



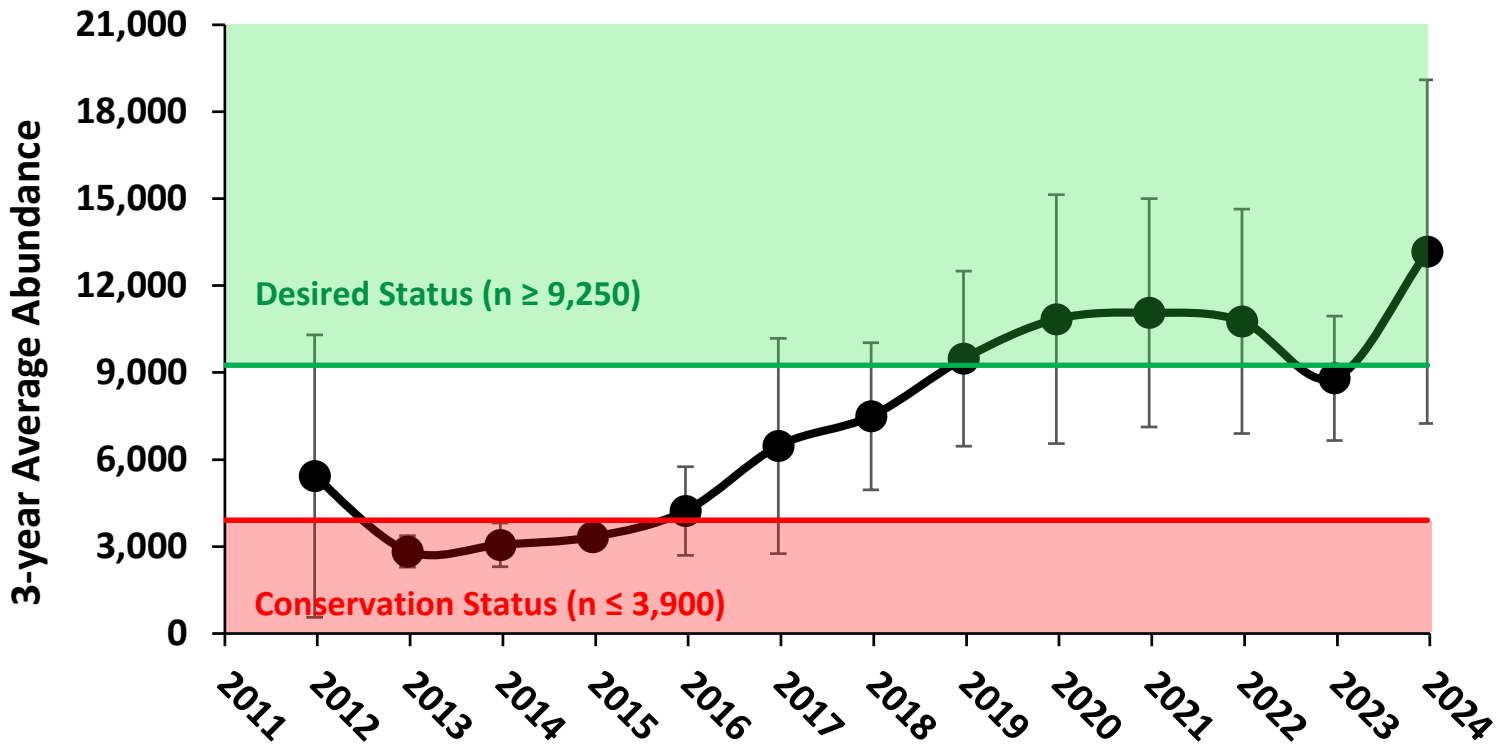
Trends in Legal Abundance (38-54" FL)

- The decrease in juveniles has led to fewer fish available to grow into the legal-size slot, meaning fewer fish are available for harvest.
- Some years (2016, 2017, & 2020) have higher uncertainty around the estimate due to sampling limitations in those years.



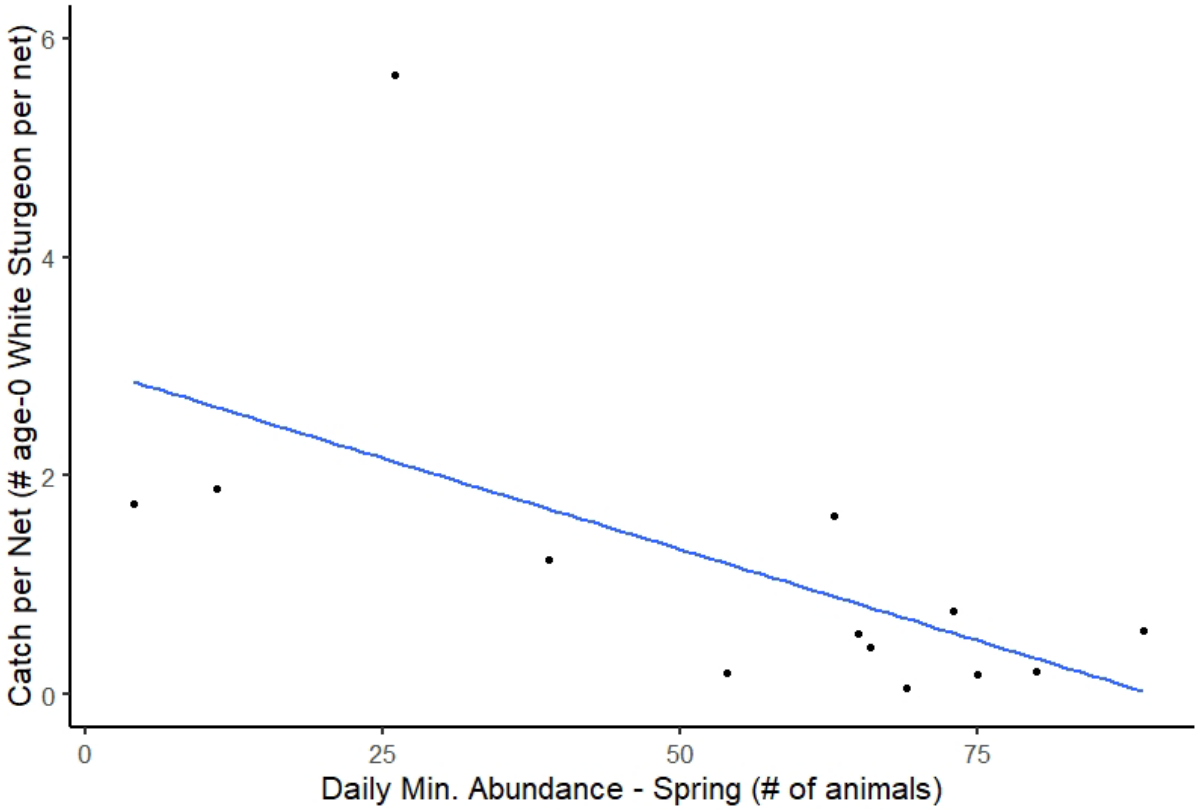
Trends in Adult Sturgeon Abundance (>65" FL)

- There is high uncertainty around the adult sturgeon point estimates due to the difficulty in sampling this life stage.
- Changes to harvest management decisions over the past decade have resulted in an increasing trend in adult abundance.
- We are building the recruitment potential in the population.



Pinniped Abundance vs Age-0 Catch Per Net

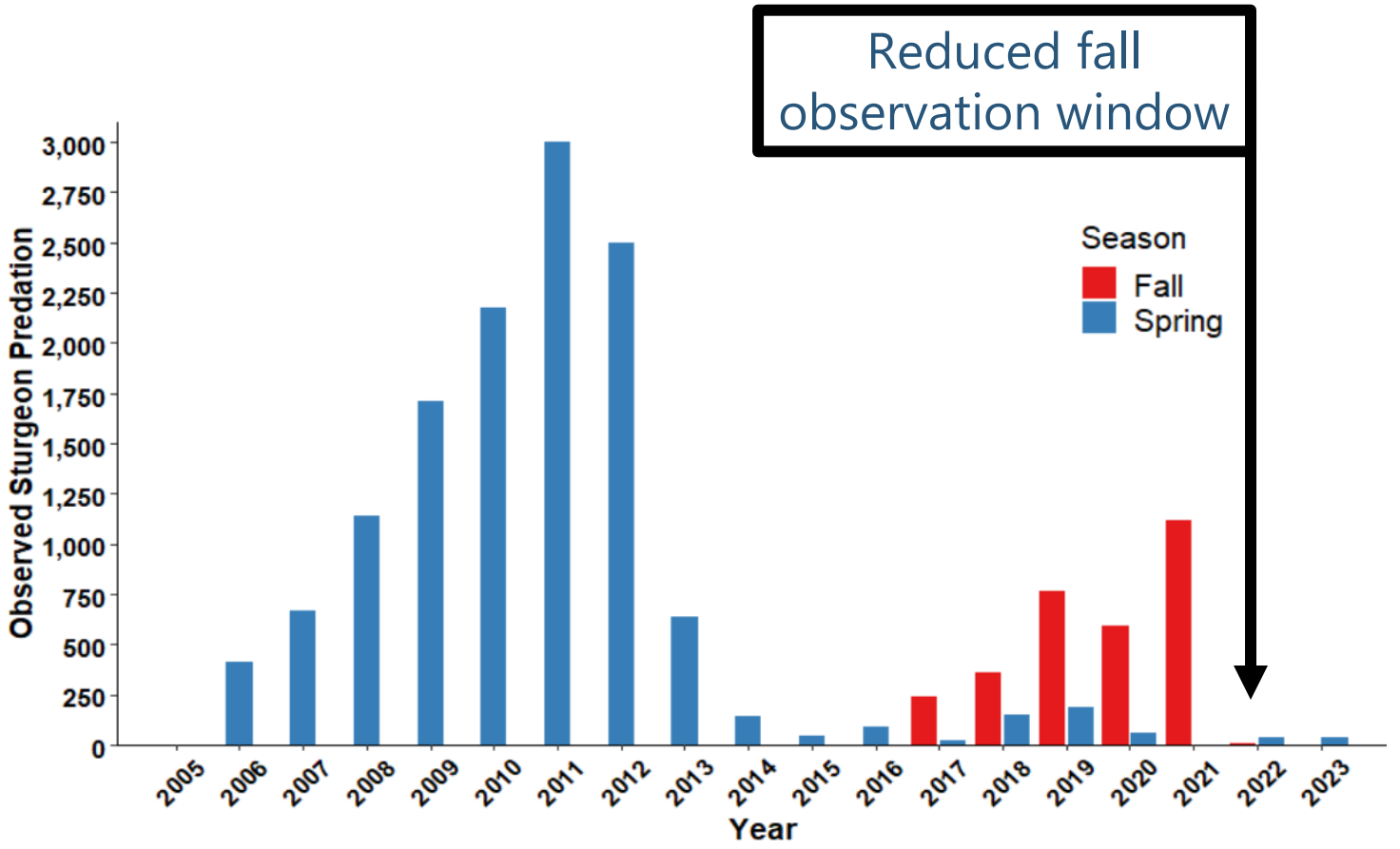
- Steller Sea Lions are the primary predator for White Sturgeon in the Columbia River.
- The abundance of Steller Sea Lions is a significant predictor of weak White Sturgeon recruitment.



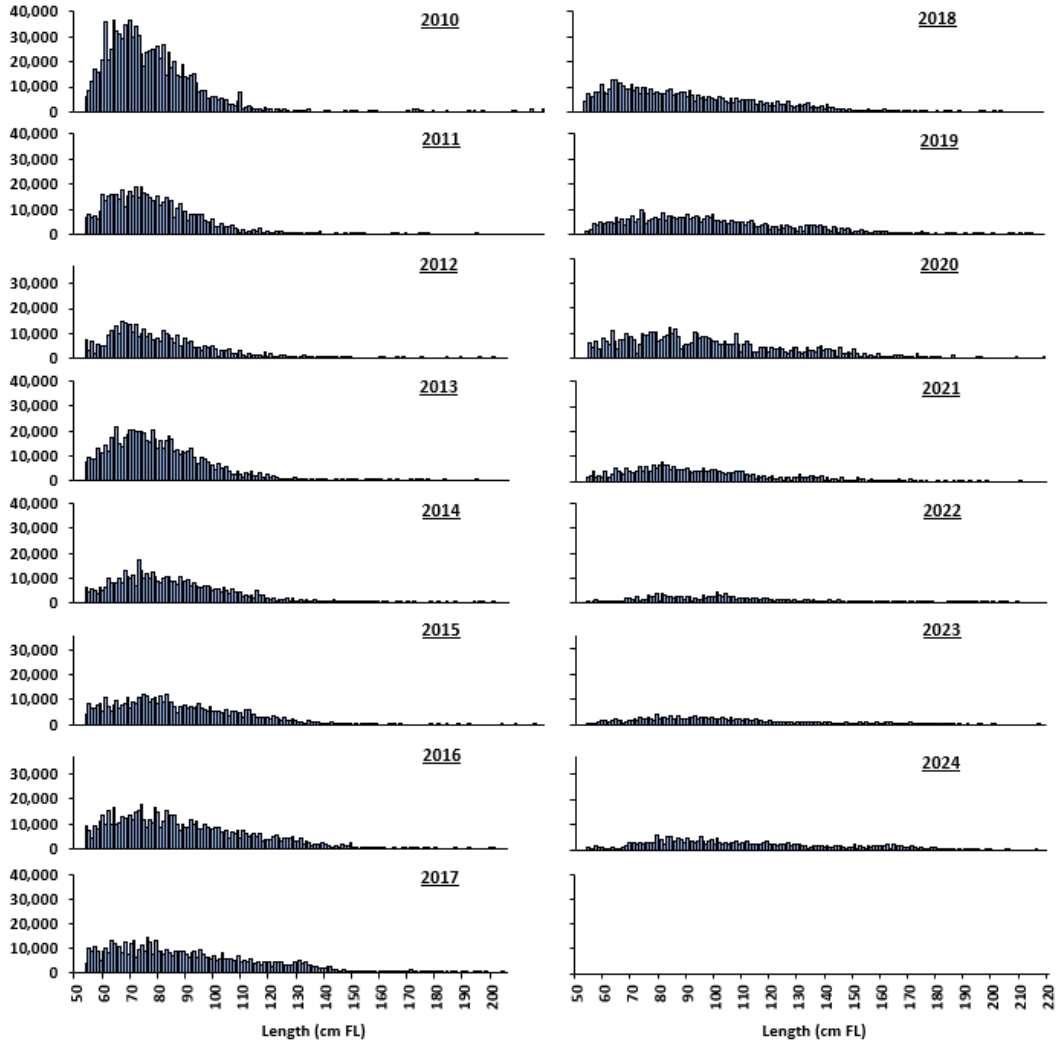
Source: Peter Stevens, ODFW 2019

Pinniped Predation at Bonneville Dam

- The US Army Corps of Engineers monitors sturgeon predation events in the tailrace of Bonneville Dam (Braun et al. 2024).
- Removal efforts have reduced the number present at Bonneville in the fall (J. Edwards, WDFW, pers. comm.):
  - 2019: 30–40 SSL per day
  - 2024: 3–4 SSL per day



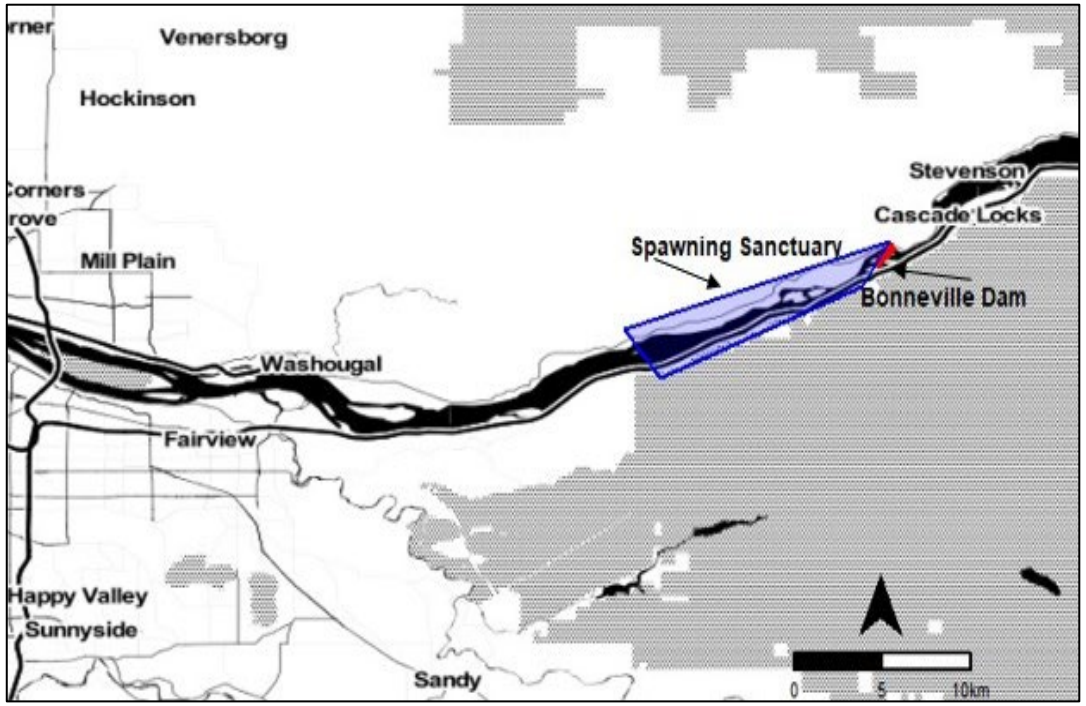
Population Status Summary



- Over the last decade we've documented a decline in the overall population abundance in the Lower Columbia River.
- The size-class most affected is the juvenile portion of the population, which has begun to create a decline in the legal-size portion of the population.
- Steller Sea Lions are observed directly preying upon sturgeon at Bonneville and may have a larger impact throughout the lower Columbia River.

Lower Columbia River Harvest Management

- The continued prolonged recruitment shortfall has reduced the abundance of legal-size fish, impacting our ability to prosecute meaningful retention fisheries. No retention fisheries are recommended for 2025 in the Lower Columbia downstream of Bonneville Dam.
- A spawning sanctuary goes into effect annually to limit handling stress to adult spawning sturgeon. This area is closed to all sturgeon fishing, May 1–August 31.
- ODFW implements a similar sanctuary closure downstream of the Willamette Falls.



Upcoming sturgeon projects

Pending: Lower Columbia River Sturgeon Recruitment Survey

- Awaiting funding, tentative Spring 2026 start.
- Joint project with Oregon Department of Fish and Wildlife.
- Goal: To evaluate the recruitment potential and possible factors impacting recruitment success below Bonneville Dam.
- Survey Questions:
  - How many adult sturgeon (>6 ft) are within the spawning sanctuary?
  - What are the sex ratios and stage of maturity of sampled adults?
  - Can we find fertilized eggs within the spawning sanctuary?
  - What is the adult sturgeon diet and could this impact reproductive potential?

New: Statewide Sturgeon Conservation Plan

Why?

Currently there is no unifying statewide sturgeon plan, and we believe this is an important step in guiding the conservation of sturgeon in Washington.

WA Statewide Sturgeon Conservation Plan

Plan Goals:

- To engage with tribes, bordering states, federal agencies, and the public on sturgeon conservation concerns and management needs across the state of Washington.

- To work with these entities to develop consistent and transparent strategies and policies to support:
  - Mitigation and recovery efforts.
  - Sustainable harvest opportunities.
  - Research to fill critical information gaps.

- To complete this plan and begin working on prioritized actions by Summer 2026.

Thank you!

White Sturgeon: Bonneville Dam to McNary Dam

Andrea Carpenter

Sturgeon Project Leader

Oregon Department of Fish and Wildlife

Project 1986-050-00
Evaluate Sturgeon Populations in the Lower Columbia River

Stock Assessment – rotate reservoirs, three-year basis

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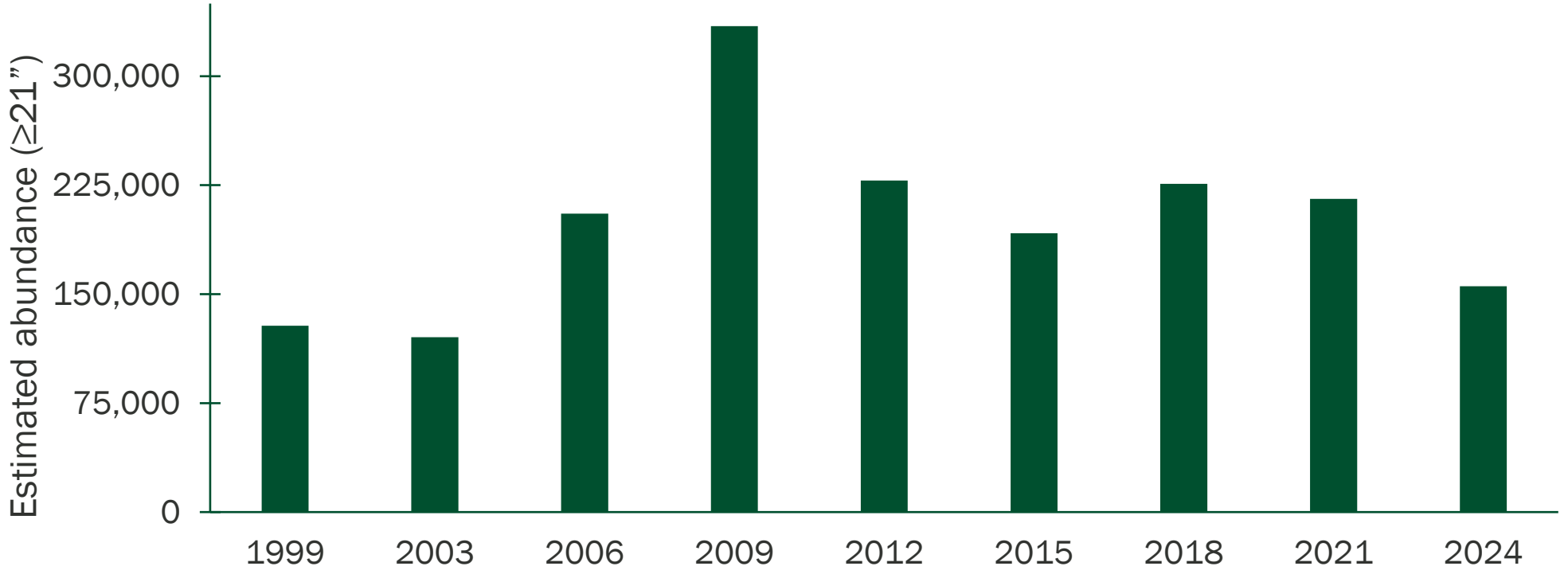
Bonneville Reservoir - Abundance



- Interpret general trend (abundances are point estimates with variability)
- Abundance is relatively stable, some up and down cycles
- Highest abundance of any of the lower Columbia reservoirs

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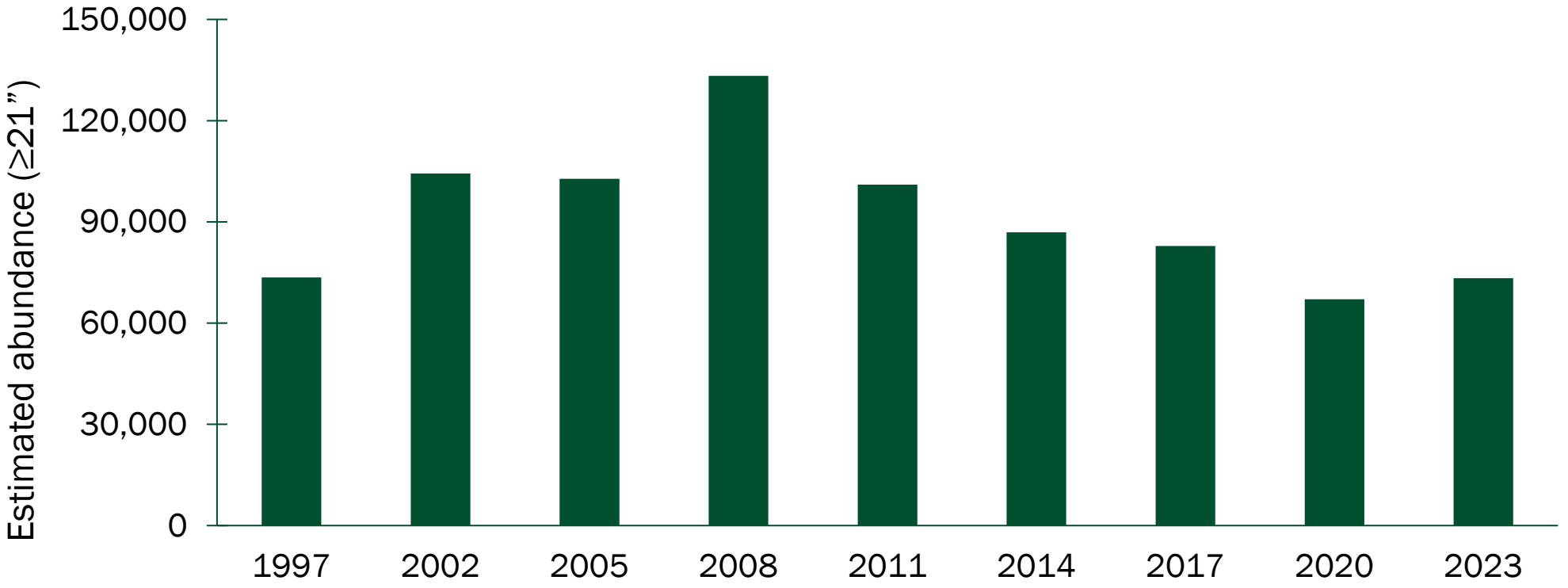
The Dalles Reservoir - Abundance



- Interpret general trend (abundances are point estimates with variability)
- Lower abundance than Bonneville, also smaller geographic area

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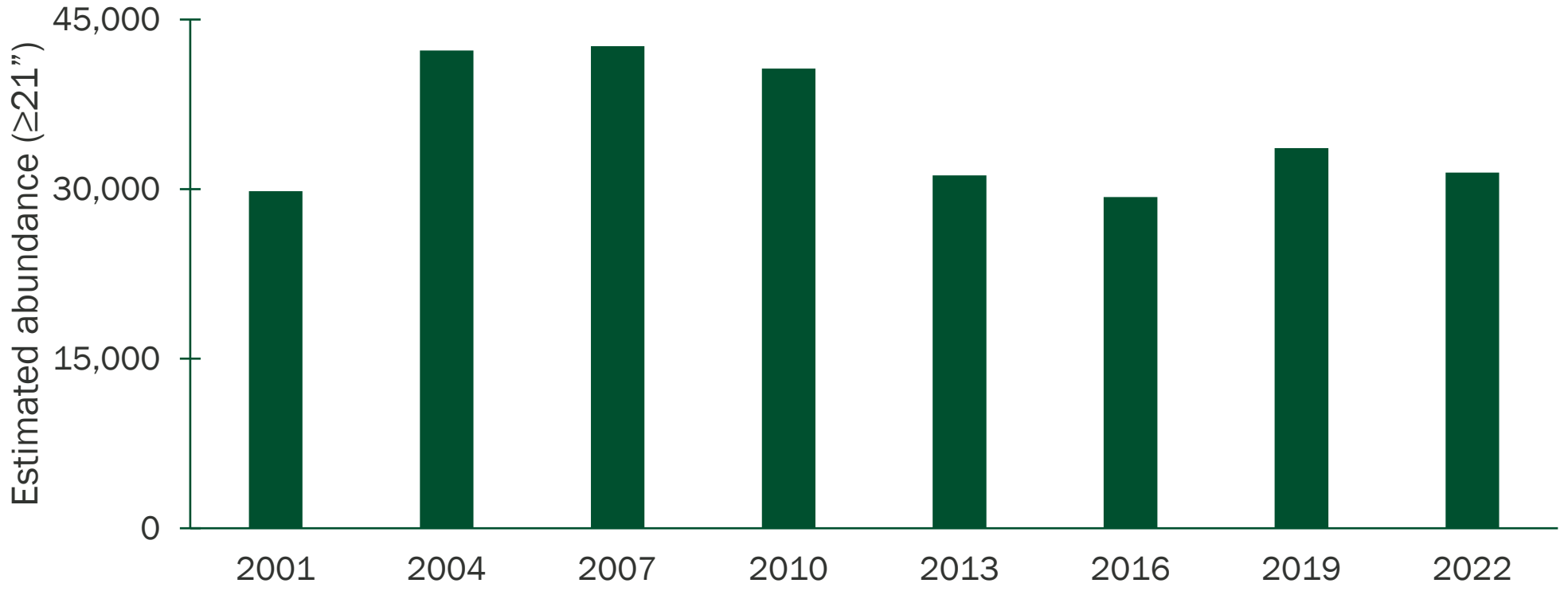
John Day Reservoir - Abundance



- Interpret general trend (abundances are point estimates with variability)
- Lowest abundance of the reservoirs, one of the larger geographic areas

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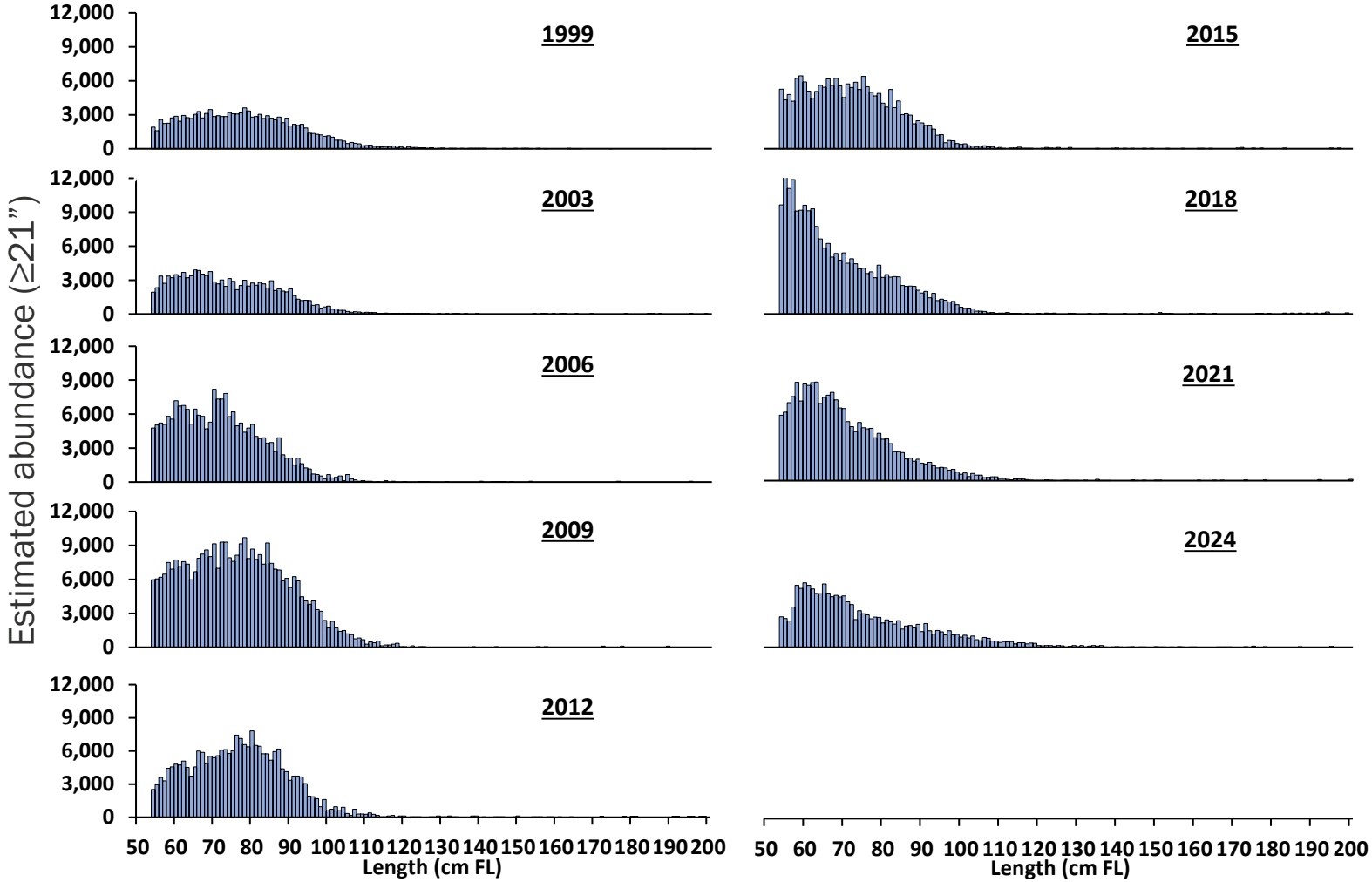
Bonneville Reservoir – Size distribution



- New juvenile sturgeon joining the population on left side of X-axis
- As animals grow, they move to the right and mature
- While we don't see large pulses every year, there are enough additions to the population to sustain

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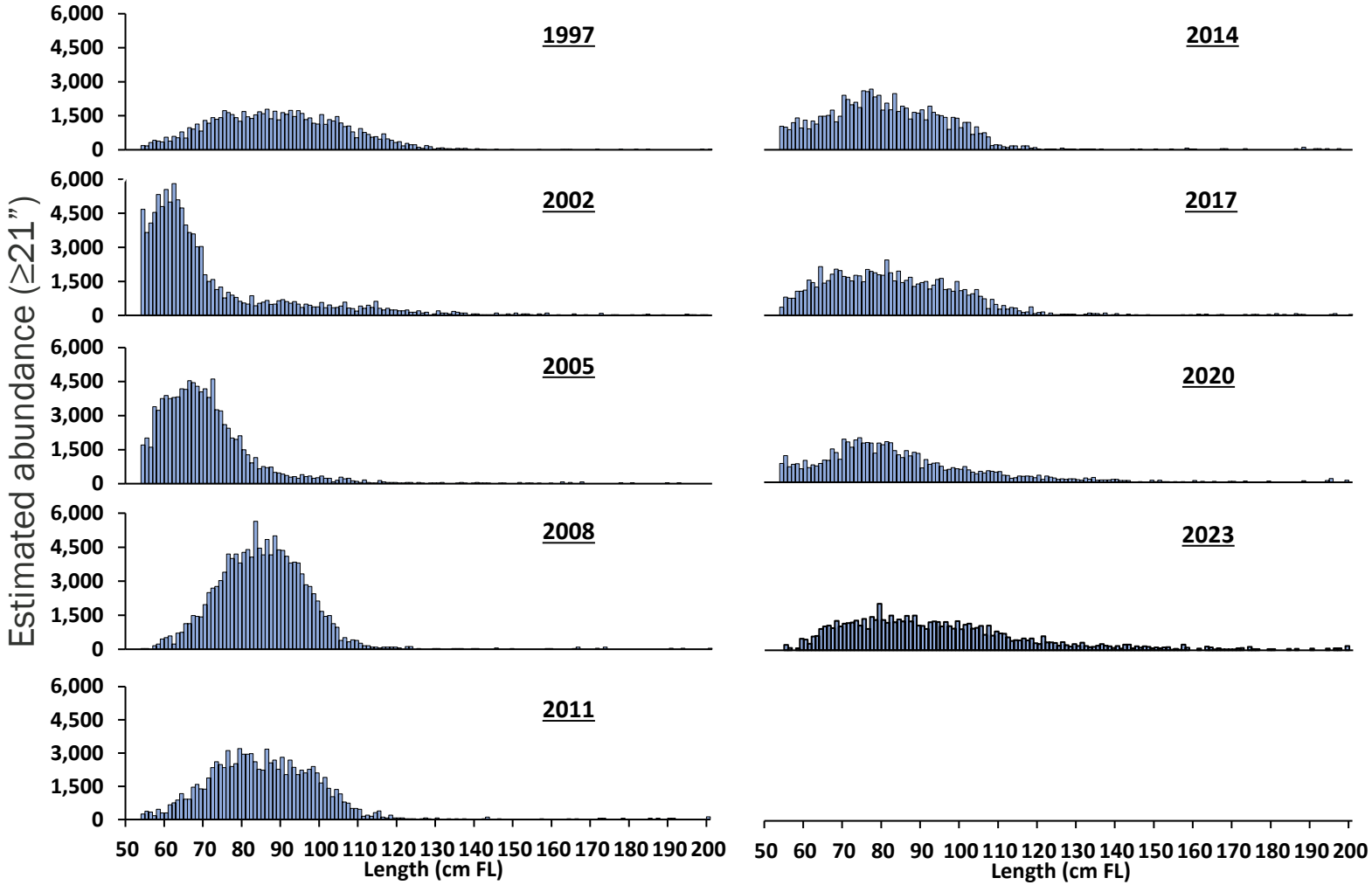
The Dalles Reservoir – Size distribution



- Fewer juvenile pulses added to The Dalles (last good recruitment observed 2005)
- As animals grow, they move to the right side as they grow and mature
- While we don't see large pulses every year, there are enough additions to the population to sustain it

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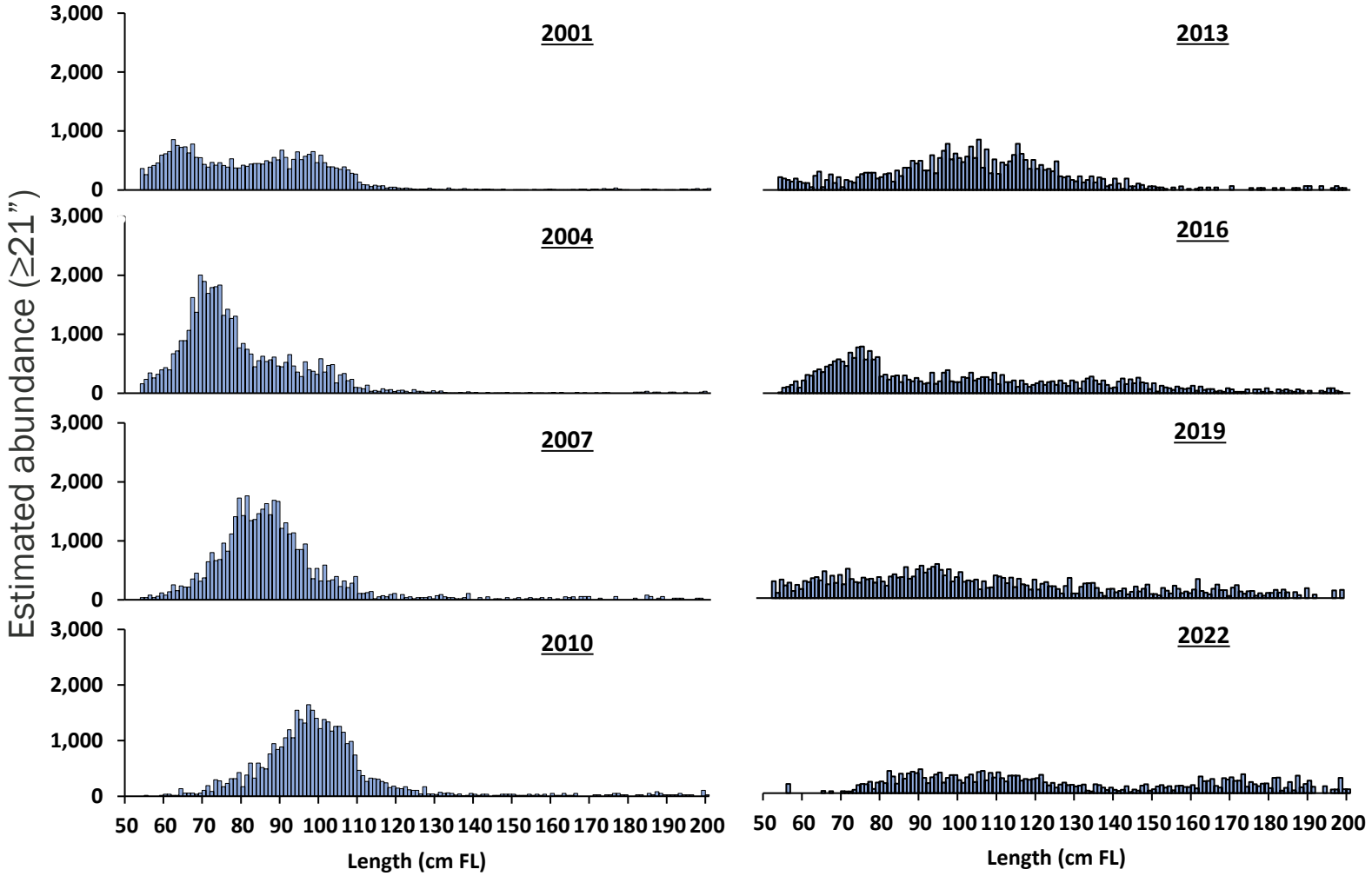
John Day Reservoir – Size distribution



- Last good addition of juveniles likely in 2002-03
- Individuals are growing, but not being replaced with smaller animals
- Plenty of broodstock individuals

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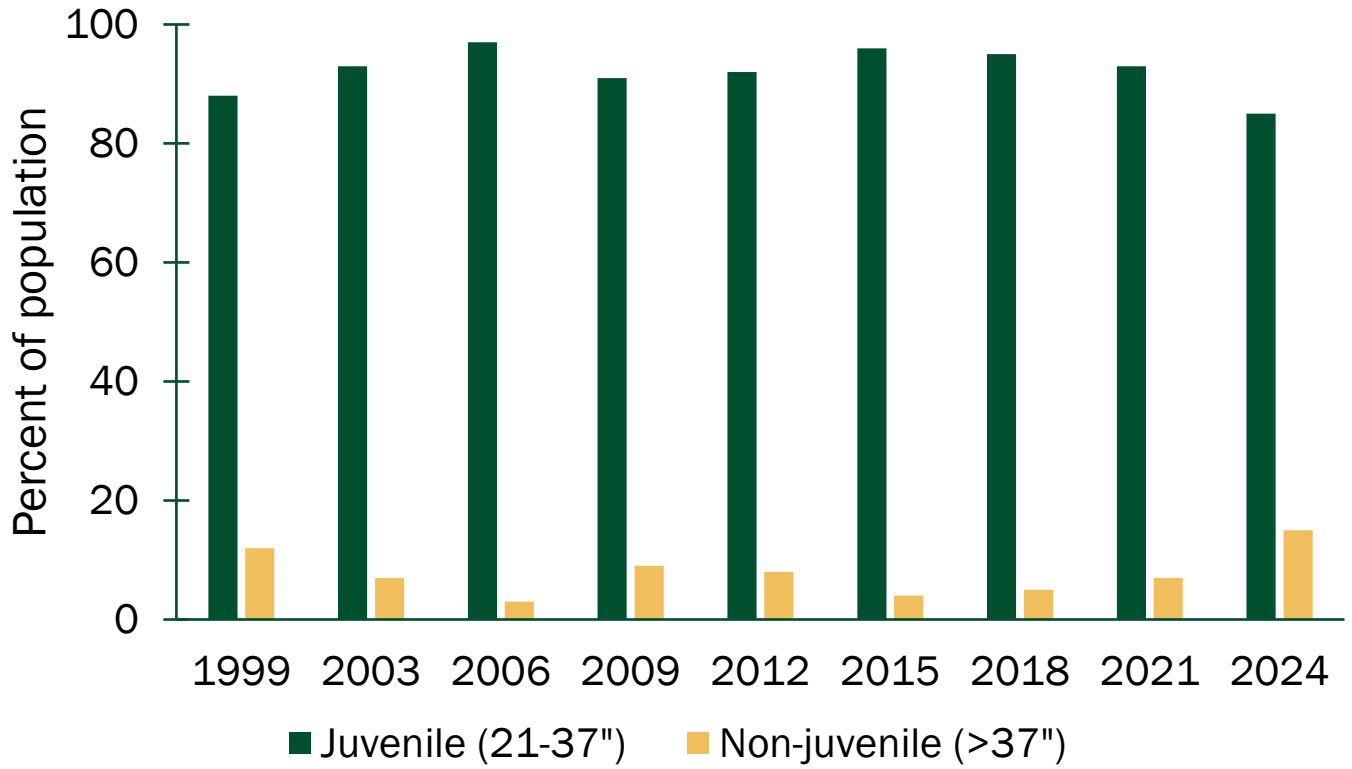
Bonneville Reservoir - Population



- High percentage of population are juveniles, good balance
- Unlike lower Columbia River, we have not determined desired levels

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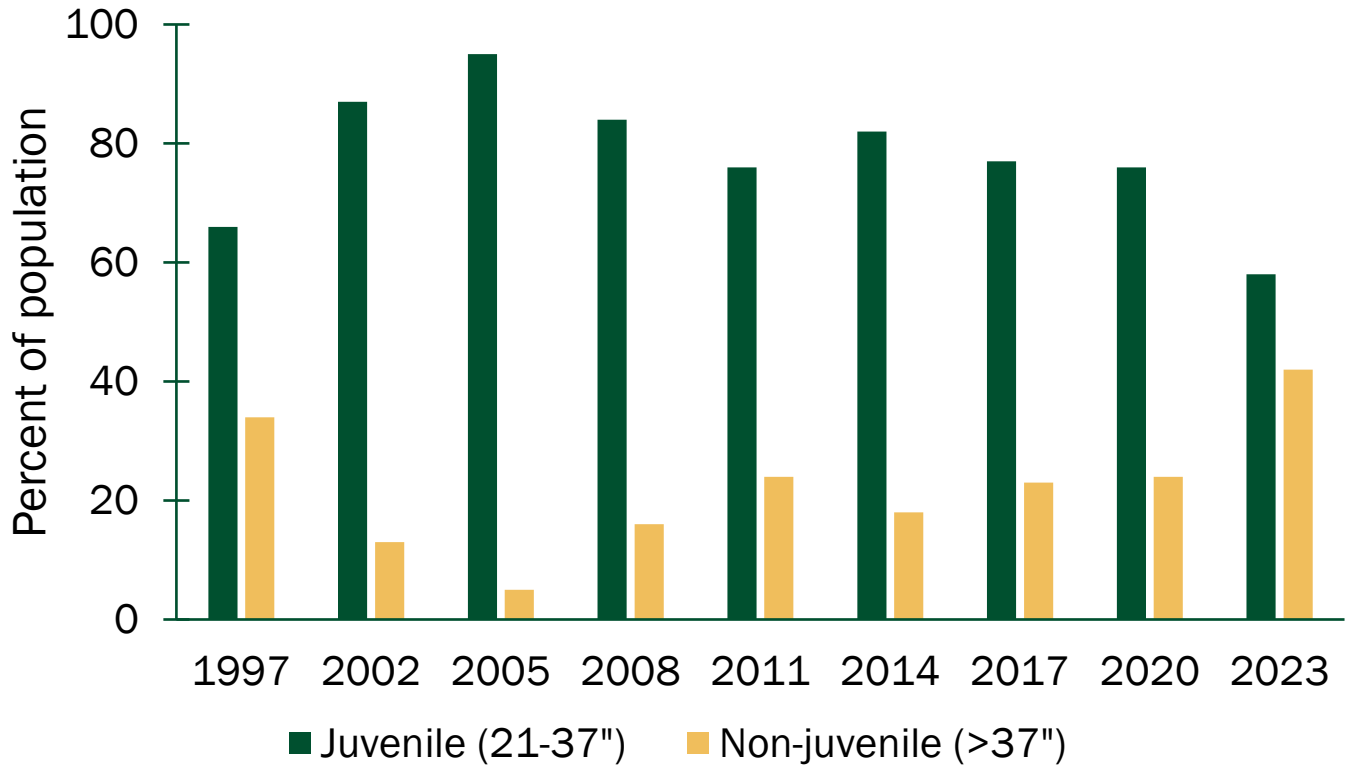
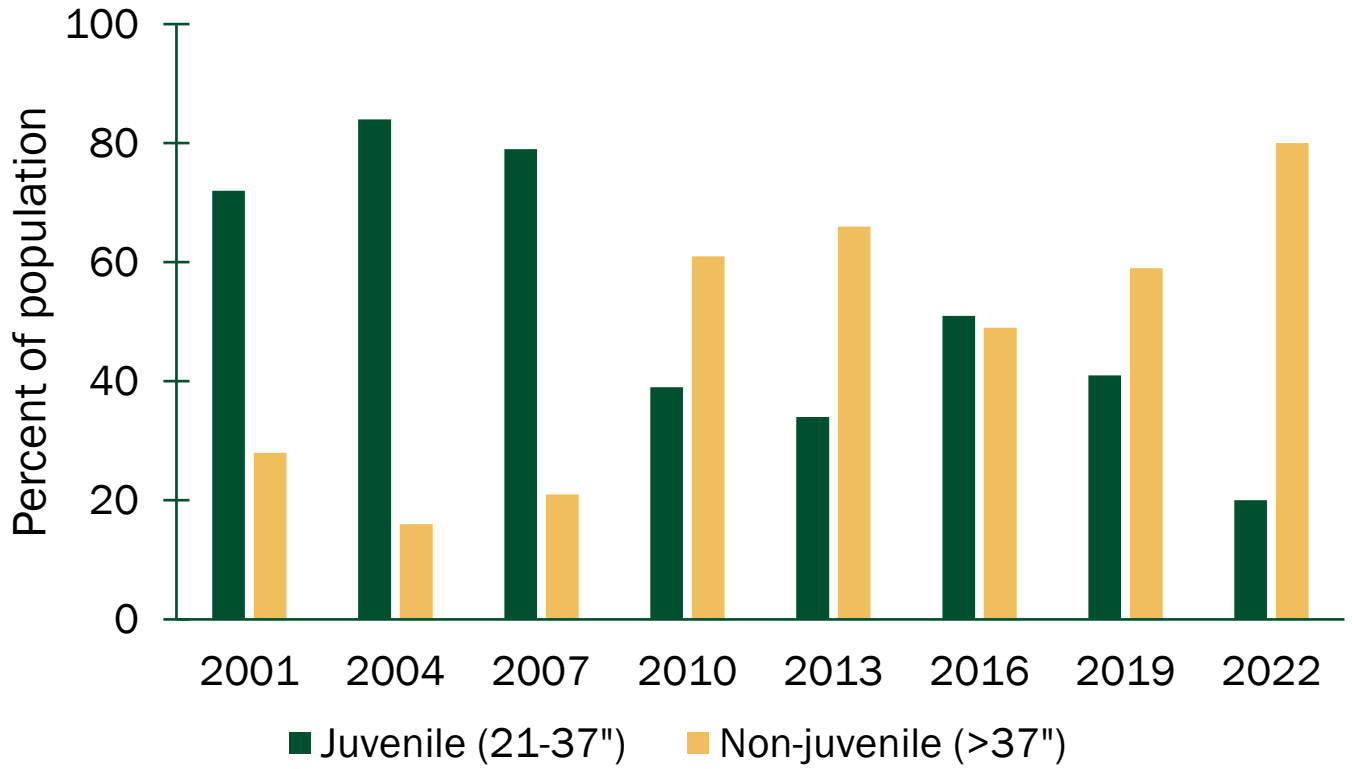
The Dalles Reservoir – Population



- Less balanced than Bonneville
- Juvenile percent of population is decreasing
- Unlike lower Columbia River, we have not determined desired levels

John Day Reservoir - Population



- Population comprised of lots of large sturgeon
- Trend of non-juveniles comprising more of population starting in 2010
- Unlike lower Columbia River, we have not determined desired levels

Take home messages

Abundance is down

Missing additions to population

Reservoirs are different

Population dynamics

Not enough juveniles in The Dalles and John Day reservoirs

Broodstock susceptible to stress

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Project 1986-050-00
Evaluate Sturgeon Populations in the Lower Columbia River

Young-of-Year – All three reservoirs, each year

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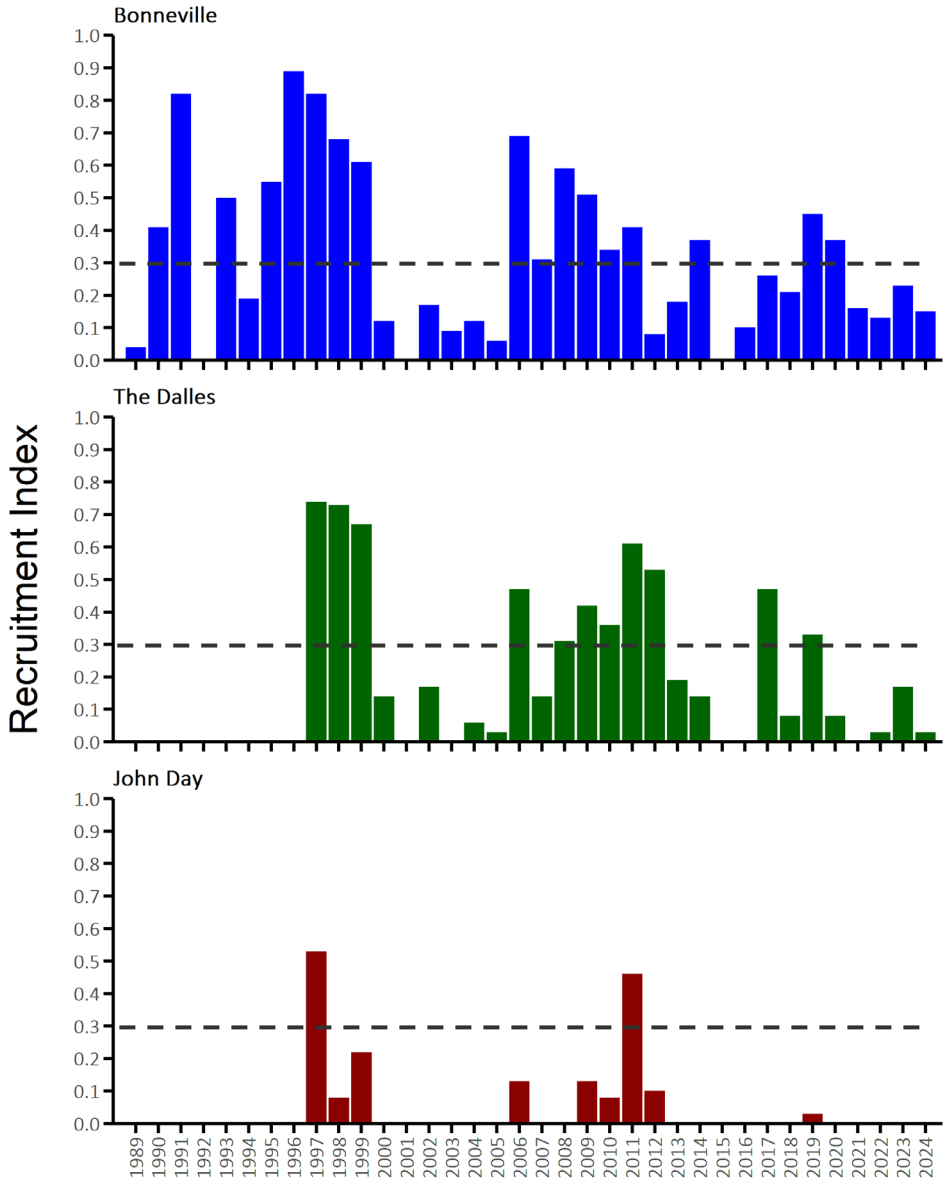
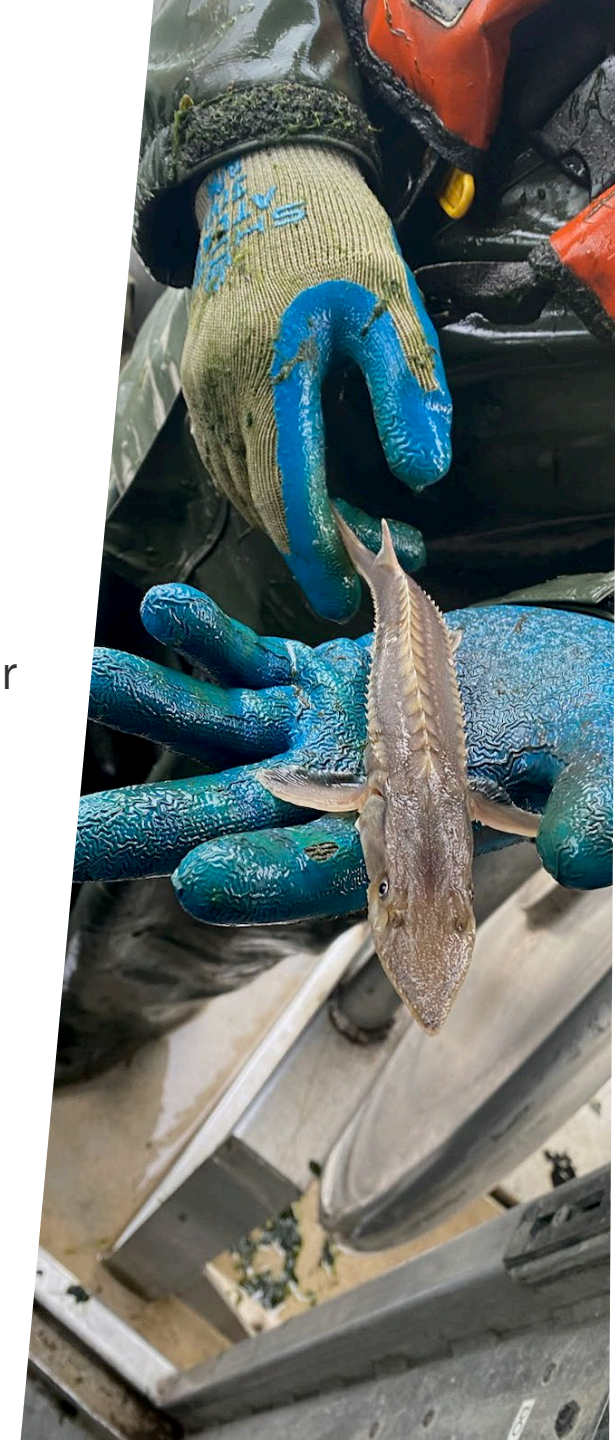
Young-Of-Year recruitment



- Recruitment is down in all reservoirs
- A relatively good level is 0.3 (meaning 30% of nets had at least one White Sturgeon)
- Varying recruitment levels across all reservoirs
- John Day has been lacking for quite a while



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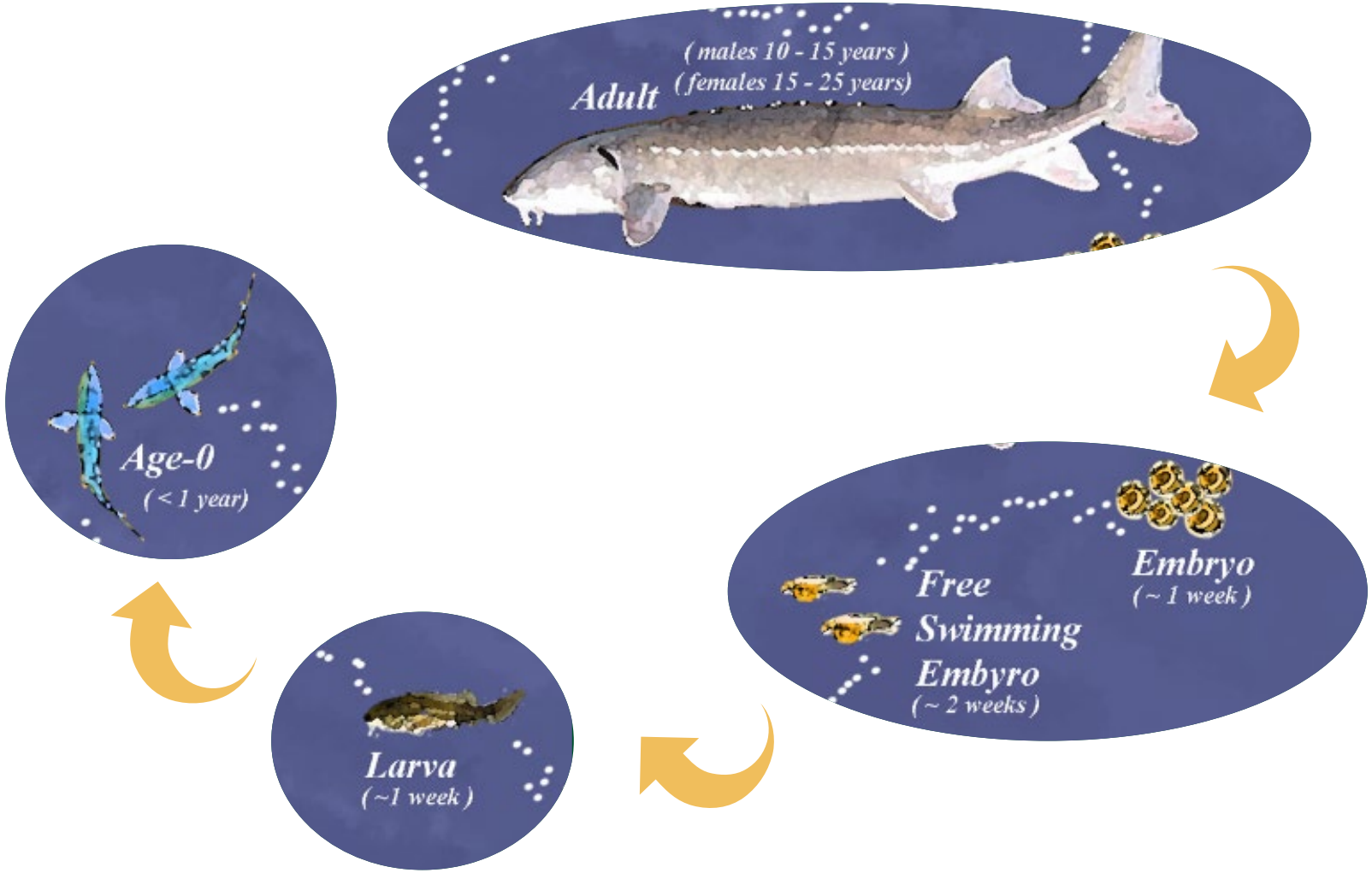
Recruitment index – where is the failure?

Encompasses several processes, difficult to narrow down limiting factor(s)



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Discharge and temperature affect recruitment

From Counihan & Chapman (2018)

Dam	Reservoir	Timeframe	Life stage	Significant factors
McNary	John Day	05/01 – 07/31	Early, mid, and late spawn	Discharge
John Day	The Dalles	05/01 – 06/15	Early spawn	Discharge
The Dalles	Bonneville	06/16 – 07/31	Mid to late spawn	Discharge
The Dalles	Bonneville	08/01 – 09/07	Late and post larval	Water temperature

- Timeframe (representing different life stages in development) and corresponding significant environmental factors
- Each reservoir differs in life stage and tie to environmental factors

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Recruitment issues

- Conditions favorable for spawning for several years shown
- Need to investigate other factors limiting recruitment success

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Other work

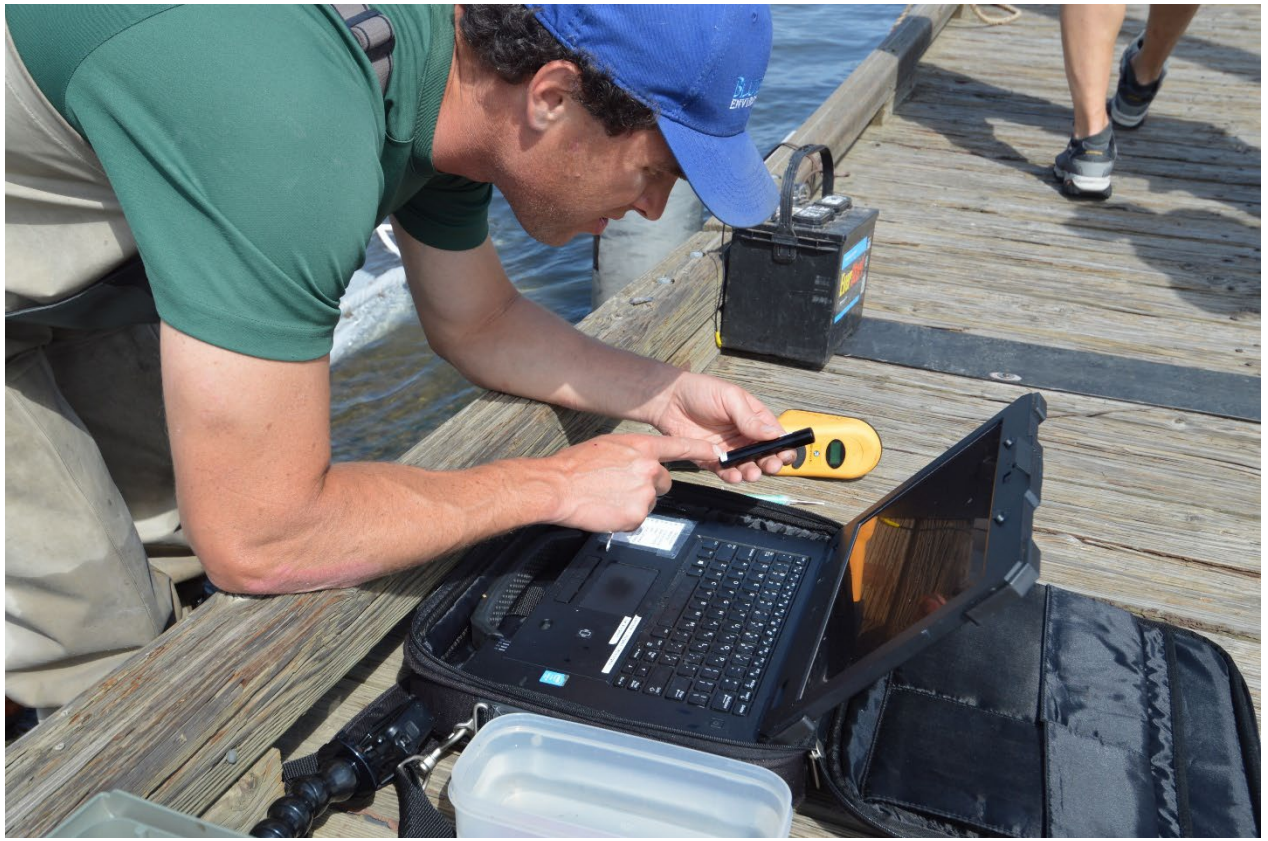
Marking small sturgeon with PIT tags

- Young-of-year sturgeon tagged using 9-mm PIT
- Add to growth info (68 tagged in two years)

- In 2023, 2 of 18 tags (11% of marked) deployed in The Dalles Reservoir were detected in cormorant nests at John Day Dam

Thanks to Laura Ricketts (USACE) for reporting!

Completing movement study in John Day Reservoir



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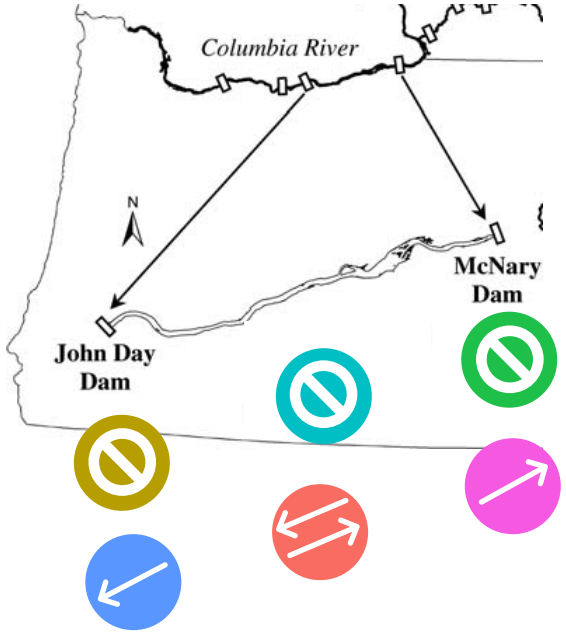
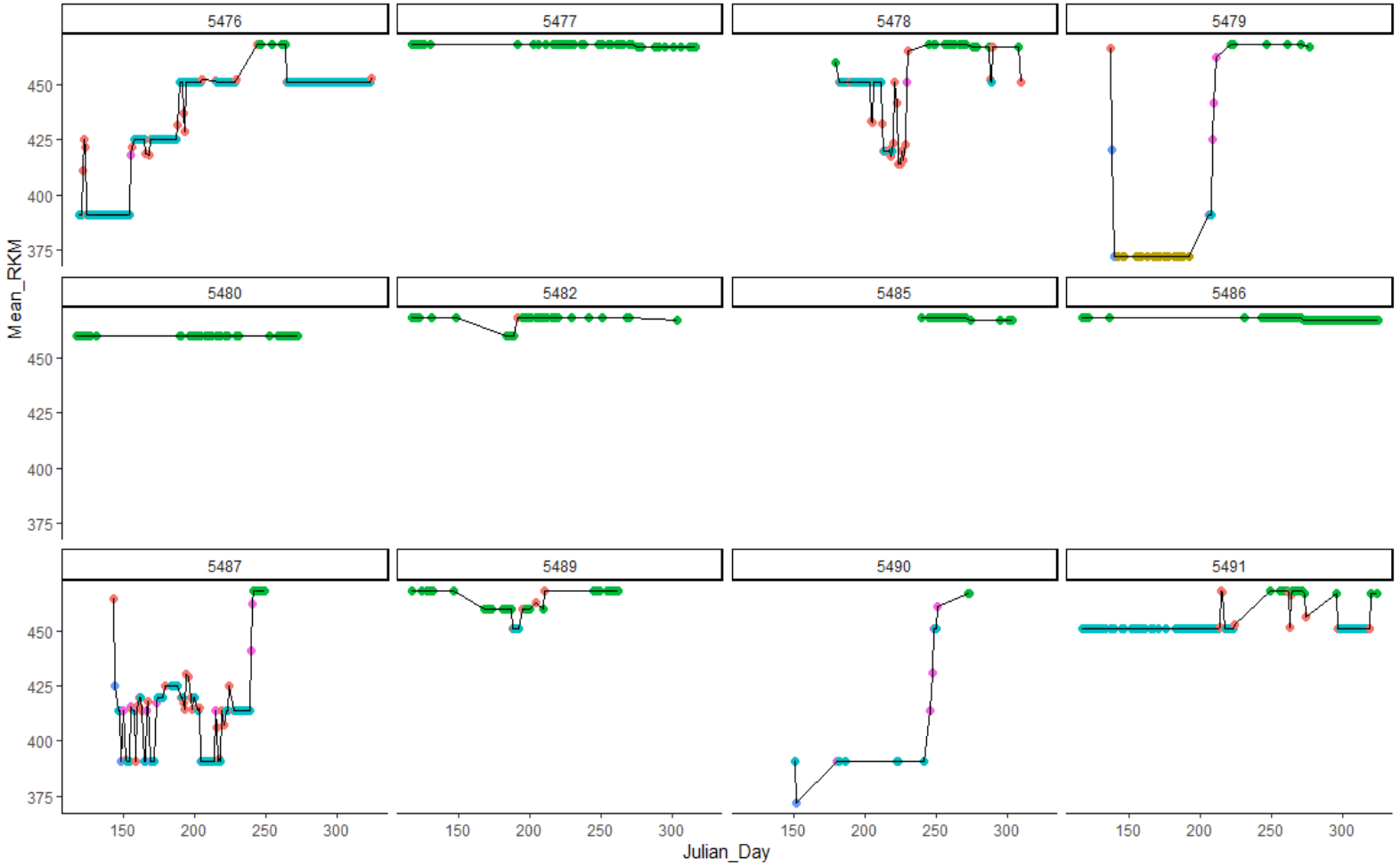
Long range movement within John Day Reservoir

Behavior



- Individual behaviors across sturgeon
- Lots of individuals holding at McNary tailrace (green dots)



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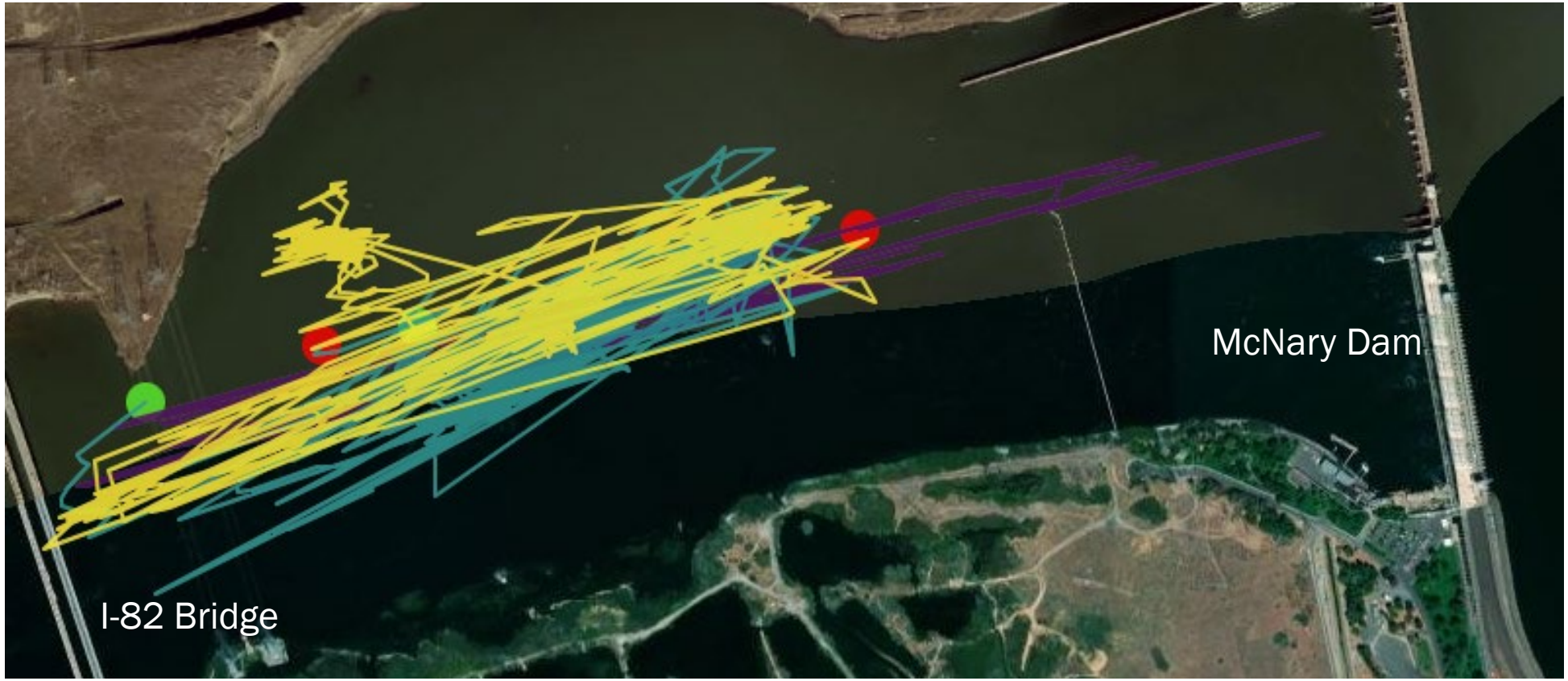
Fine-scale movement in spawning area



- Individual sturgeon movement tracks, difference in patterns of use by individuals and by sex
- Still analyzing results

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Questions?

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