

Follow-up from April 6-7, 2023 Commission meeting

Lake Roosevelt White Sturgeon Questions

Bill Baker, District 1 Fish Biologist
Chris Donley, Region 1 Fish Program Manager

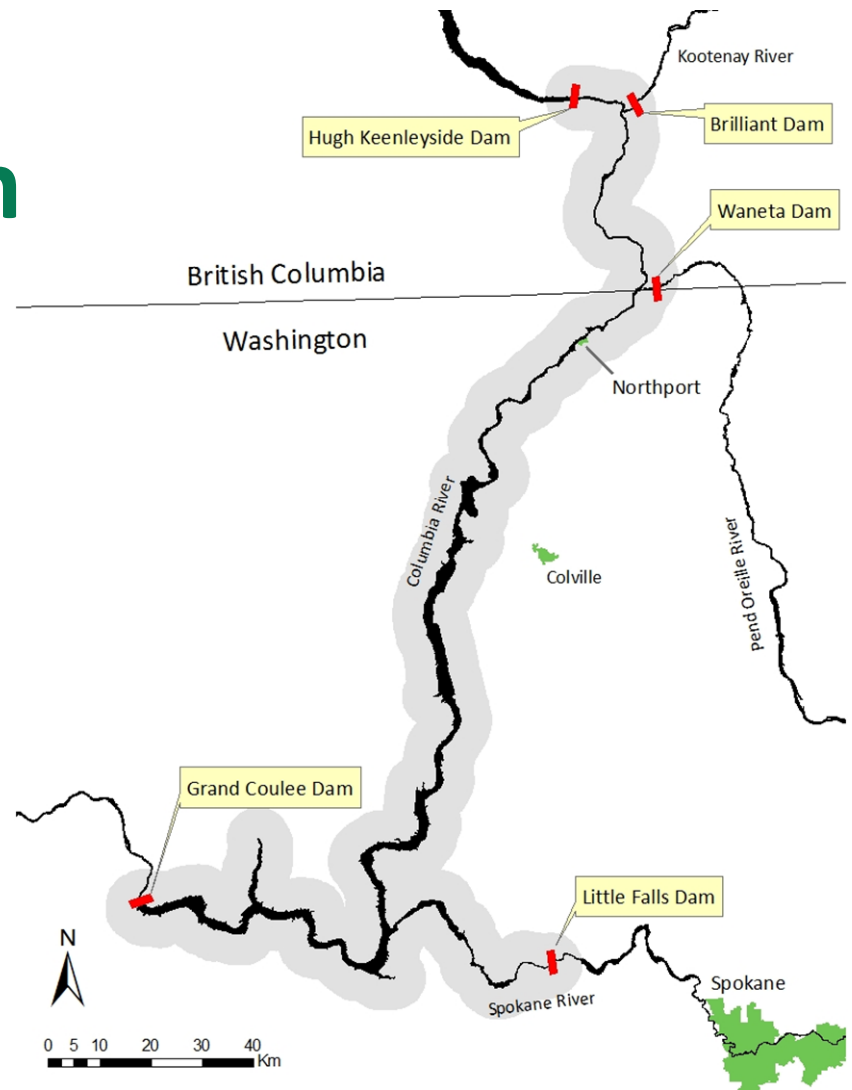


Presentation Overview

- Review of key points from the April Commission meeting Lake Roosevelt sturgeon presentation.
- Commissioner questions from the April meeting.
- UCWSRI Recovery Goals.
- Changes in sturgeon population size structure (1998 vs. 2020)
- Fisheries modeling and current program
- Conclusions



Lake Roosevelt and the Columbia River in BC, Canada (Transboundary Reach)

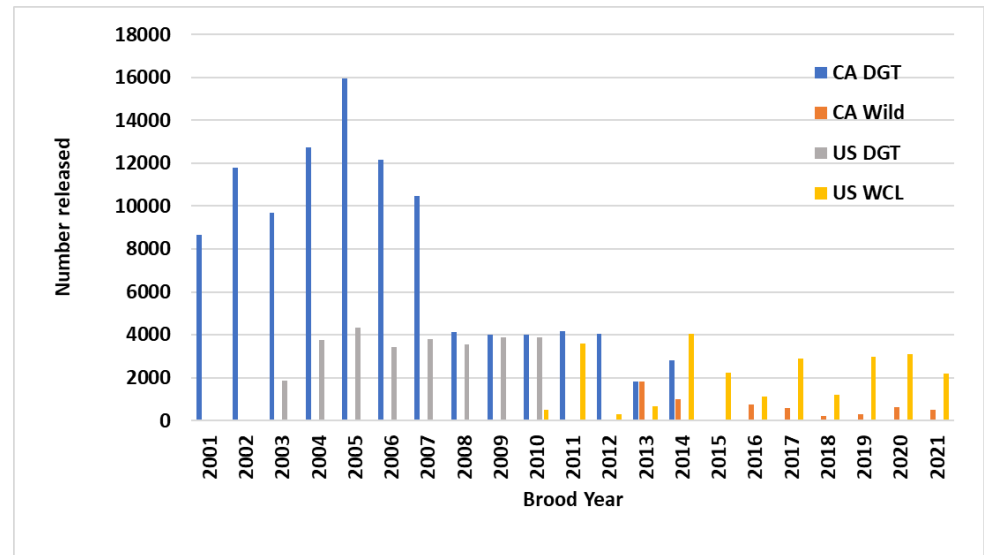


J. McLellan, WDFW 2011



April presentation summary

- Transboundary White Sturgeon population experiencing persistent recruitment failure that began sometime around the early 1970's.
- Conservation Aquaculture programs (US and CAN) implemented in the early 2000's as a stop-gap measure to prevent extirpation of the population.
 - Early years (DGT) - Over-represented year-classes.
 - 2011-present (WCL)
- Programs have been very successful at rebuilding population demographics (size and age structure).



April presentation summary

- Harvest fisheries (Recreational and Tribal) 2017-2023.
 - Reduction of over-represented year-classes (Family Equalization).
 - Risk of genetic swamping averted.
 - Moved to a fall fishing season in 2023.
 - Shortened fishing season.
 - Cooler water temperatures = less stress on non-harvested fish, including wild adults.
 - Slot and season scenarios for out-years to protect vulnerable year-classes.
- Requested and were granted delegated rulemaking authority (Director).
- Follow-up questions from Commissioners.



Lake Roosevelt Sturgeon Commission Questions

1. Can you tell me what the positive and negative effects of the fishery are with regard to recovery of the sturgeon population?

The fishery has provided a means of reduction for over-represented DGT hatchery-origin sturgeon which posed a genetic risk due to the low number of parents represented and higher abundances for specific year-classes than the entire adult population. The FDR sturgeon fishery is sustainable, extremely popular with anglers, and compatible with sturgeon population recovery goals.



Lake Roosevelt Sturgeon Commission Questions

2. Why are we fishing on this sturgeon population which has a distorted age structure and looks like it is in bad shape?

The Transboundary sturgeon population does have a distorted age structure due to decades of recruitment failure. However, the conservation aquaculture programs have been very successful at rebuilding the demographics of the population. The population is on track to reach recovery goals, and there is harvestable surplus. The fishery can be tailored and monitored to achieve adaptable annual harvest targets over time, depending on the level of harvestable surplus.



Lake Roosevelt Sturgeon Commission Questions

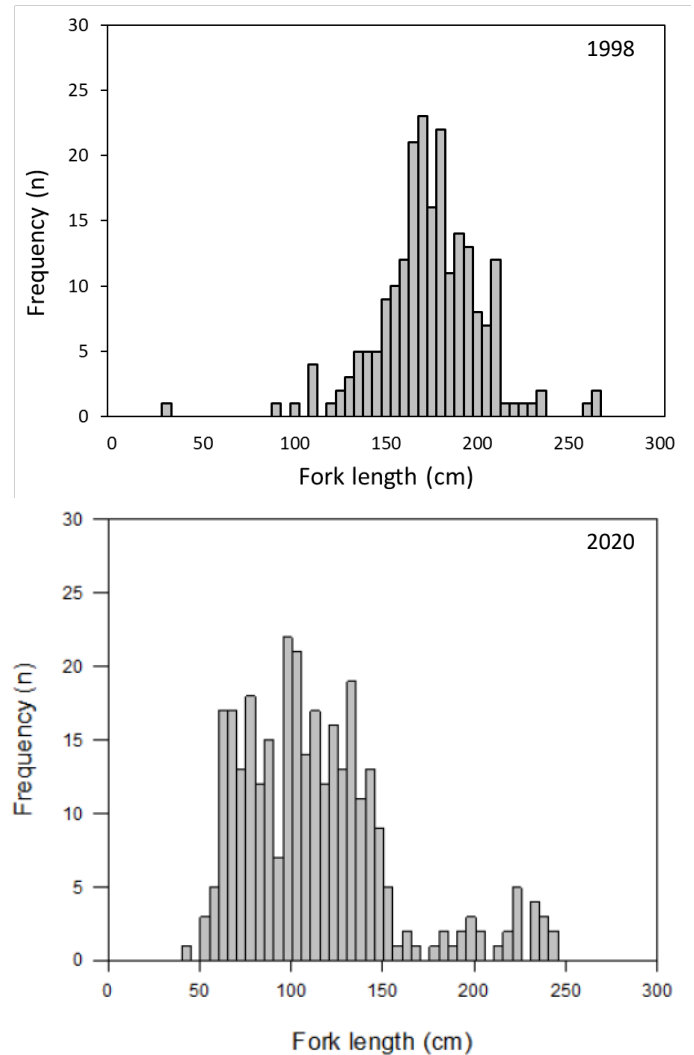
3. What does the current age distribution of the sturgeon population look like?

The age distribution of the Transboundary sturgeon population looks better than it did in the 1990's. In 1998, the population was composed primarily of adult fish with very few juvenile or subadult fish. The conservation aquaculture programs have rebuilt the size and age structure of the population with age classes representing the last 22 years present in Lake Roosevelt and the Upper Columbia River. Currently, sturgeon stocked from the conservation aquaculture programs since 2002 make up about 89% of the population. Please see Length Frequency Distributions on Slides 9 and 10.



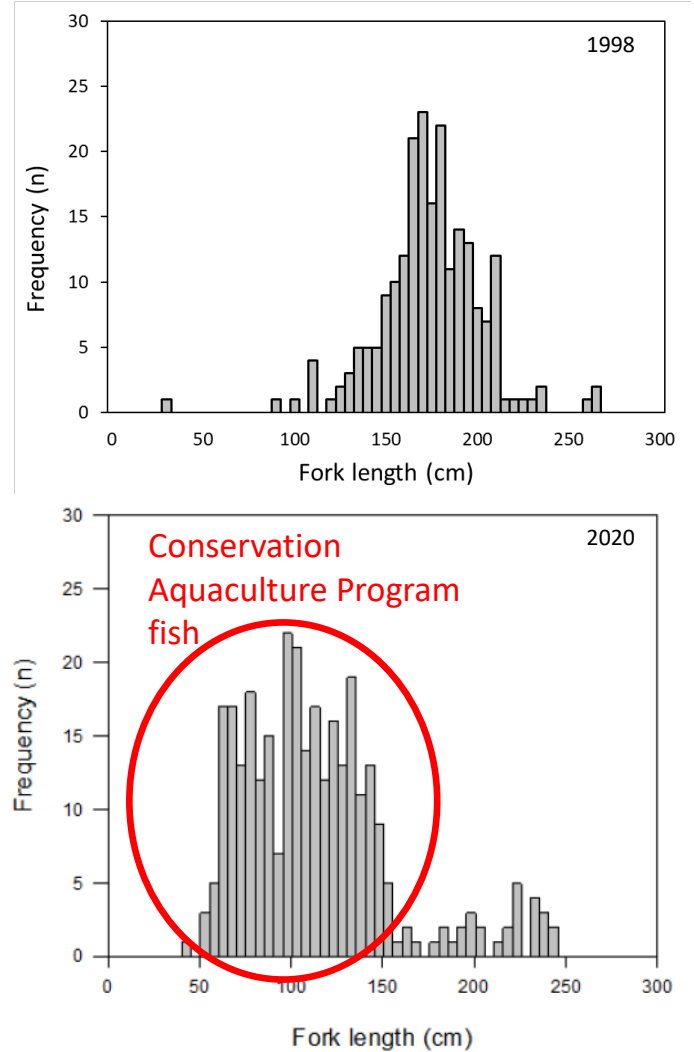
Lake Roosevelt White Sturgeon Length Frequency Distributions

1998 vs 2020 Comparison



Lake Roosevelt White Sturgeon Length Frequency Distributions

1998 vs 2020 Comparison



Lake Roosevelt Sturgeon Commission

Questions

4. Do you think that DGT fish are competing with WCL fish? Why do they pose a risk?

DGT fish in the US represented a genetic risk to the long-term viability of the Transboundary sturgeon population due to over-representation of a number of year-classes. Family equalization for those year-classes has largely been accomplished by the fishery, but there are certain locations which still harbor relatively high numbers of over-represented fish. However, there does not appear to be a competition issue between those fish and stocked WCL in the US. In Canada, there likely is a competition issue between previously stocked DGT fish vs. more recently stocked wild-origin fish.



Lake Roosevelt Sturgeon Commission Questions

5. What about non-target fish (adult sturgeon) C&R impacts?

From the literature, C&R-related mortality for sturgeon is low...somewhere around 1-3%. But, stress from C&R can have negative non-lethal effects. For the past several years, we have managed the fishery boundaries in Lake Roosevelt during the summer fishery to provide a spawning sanctuary upstream of China Bend where spawning takes place. In 2023, we instituted additional protections by moving to a fall fishery, further reducing non-lethal impacts to adult spawners, as the fishery season does not coincide with staging or spawning.



Lake Roosevelt Sturgeon Commission Questions

6. What is the recovery target abundance and timeline for Lake Roosevelt sturgeon? Why is the timeline so long?

The UCWSRI Recovery Plan specifies the target abundance for adult sturgeon in the Transboundary Reach (7000 adults; 5000 in the US and 2000 in Canada) and timeline for recovery (by 2080). Sturgeon population recovery is a slow process because they are long-lived and require many years to reach maturity (12-15 years for males and 20-25 years for females).



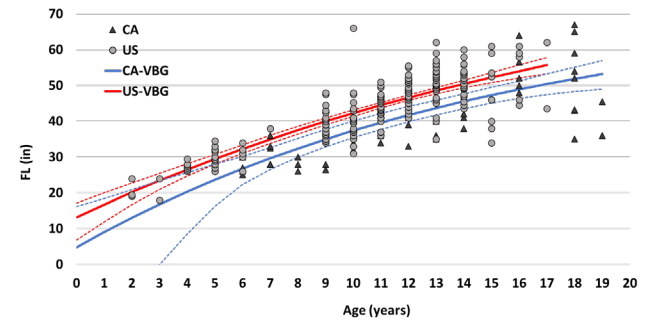
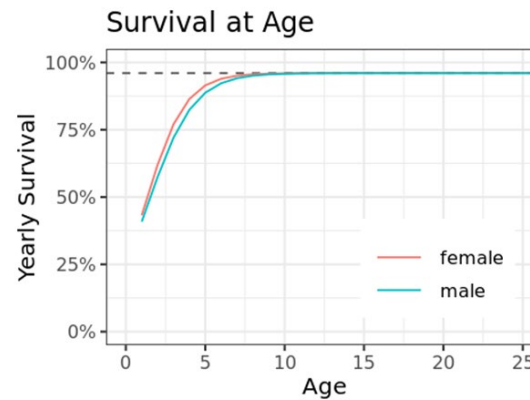
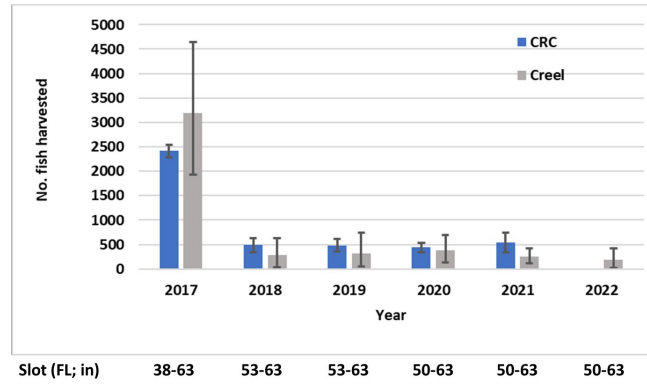
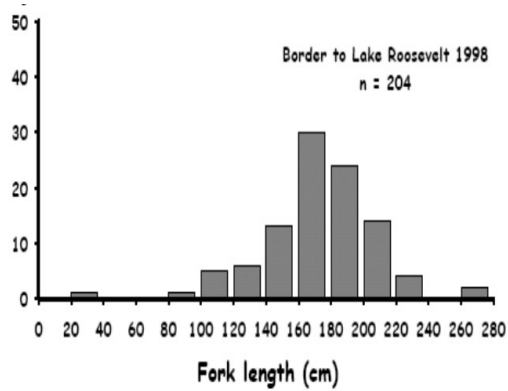
2012 UCWSRI Recovery Plan Goals

Between 2060-2080:

1. Total Adult Population size for Transboundary Reach: Min. 7000
 - Canada – Min. 2000
 - US – Min. 5000
2. Naturally-produced recruitment and juvenile population sizes sufficient to support adult population sizes in 2 of 3 potential recovery areas (US and Canadian portions of Transboundary Reach).
3. Stable size and age distributions in each population.
4. Genetic diversity (including rare allele frequencies) is preserved and is similar to that measured during the late 2000's.



Monitoring and Research



Monitoring and Research

Survey/Action	Frequency of data collection (years)	Data uses	Entity
Stock assessment	Every 2-5 years	Abundance, growth, survival, movement	CTCR, STI, BC Hydro
Juvenile monitoring (gill net surveys)	Annual	Abundance, growth, dispersal	CTCR, STI, BC Hydro
Creel	Annual	Angler effort, catch, and harvest	STI, WDFW, CTCR
Catch Record Cards and Sturgeon Angler Diaries	Annual	Angler catch rates, abundance, growth, survival, movement	WDFW
WCL collection	Annual	Larval production	CTCR, STI, BC Hydro
Conservation Aquaculture	Annual	Size, age, and number of fish stocked	WDFW and FFSBC
RF Research	Annual	Identify causes of recruitment bottleneck	CTCR, STI, BC Hydro, BC MFLNRO, and others



Upper Columbia Sturgeon Population Model (Shiny App)

- Developed by the Confederated Tribes of the Colville Reservation
- Data sources specific to Lake Roosevelt and Upper Columbia River (e.g., growth, survival, movement, current abundance, etc.)
- Population model to inform conservation aquaculture stocking and management actions (e.g., harvest).

The screenshot shows the 'Upper Columbia Sturgeon Population Model' Shiny App interface. The main panel is titled 'GENERAL SETTINGS' and contains two sections: 'Model Details' and 'Simulation Parameters'. The 'Model Details' section includes a 'Run Name' text input field and a 'Description' text area with a placeholder: 'Short description of goals and setting used in the trial.' The 'Simulation Parameters' section includes a 'Start year' input field (set to 2020), a 'Random Seed' input field (set to 4000), a 'Number of years to simulate' input field (set to 10), and a 'Number of simulations' section with radio buttons for 1, 10, 50, 100, and 250. A 'Run Model' button is located at the bottom of the simulation parameters section. Below the main panel are four expandable sections: 'RESULT SUMMARIES', 'HATCHERY RELEASES', 'REMOVAL & HARVEST PROGRAMS', and 'TARGETS & TRIGGERS', each with a plus sign icon.



Stocking and Harvest

Hatchery Program

Year.start	Year.end	Zone	Releases	Releases.CV	Age	Weight (g)
2023	2080	1	200	0	2	200
2023	2080	6-9	3000	0	2	200

Recreational Harvest

Year.start	Year.end	Zone	Slot Min (FL; in)	Slot Max (FL; in)	Type	Removals
2023	2024	6-9	53	63	both	100
2025	2026	6-9	55	63	both	100
2027	2028	6-9	57	63	both	100
2029	2034	6-9	-	-	both	0
2035	2080	6-9	53	63	both	350

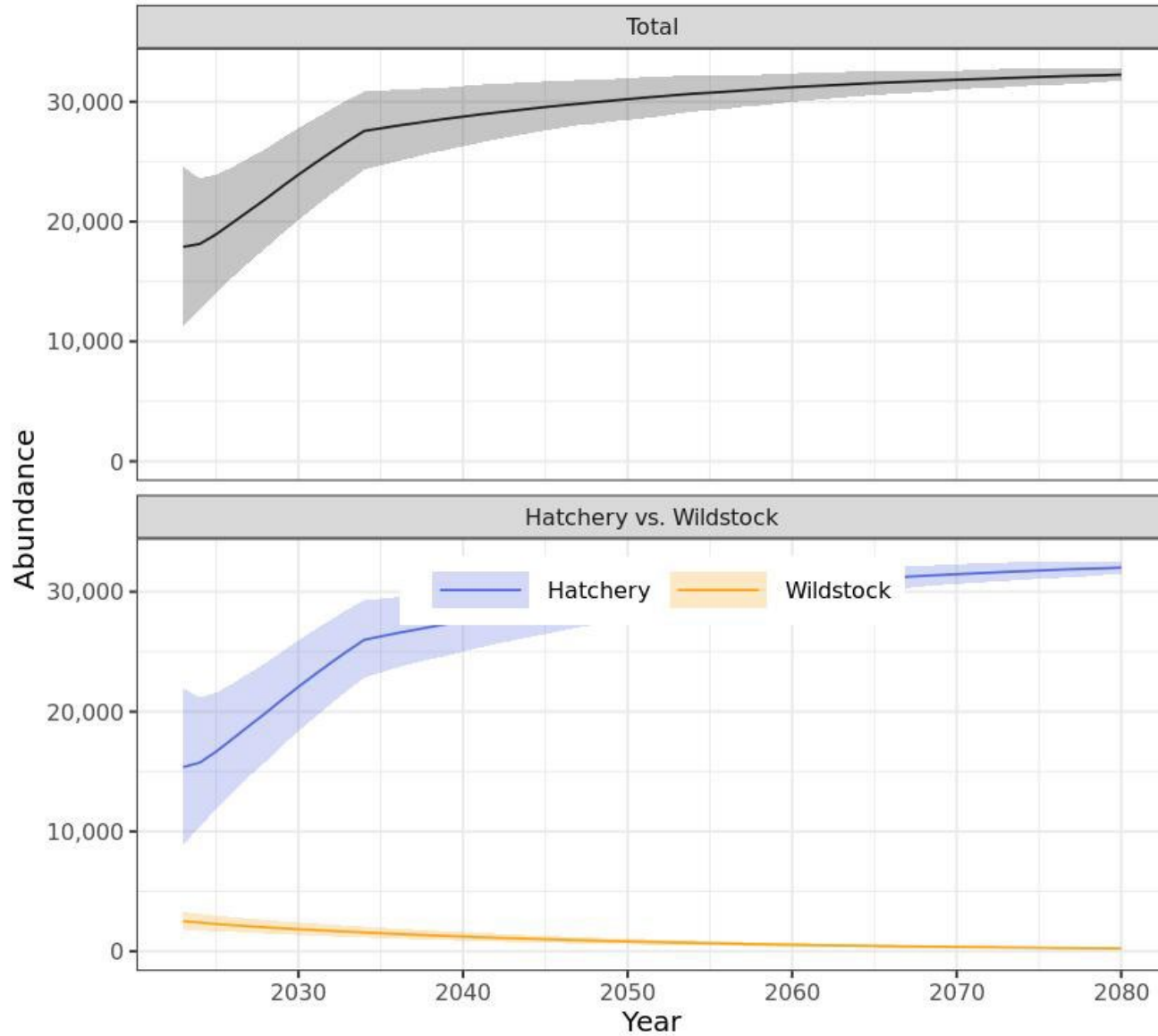
Tribal Harvest

Year.start	Year.end	Zone	Slot Min (FL; in)	Slot Max (FL; in)	Type	Removals
2023	2028	6-9	38	63	both	100
2029	2034	6-9	-	-	both	0
2035	2080	6-9	38	63	both	350



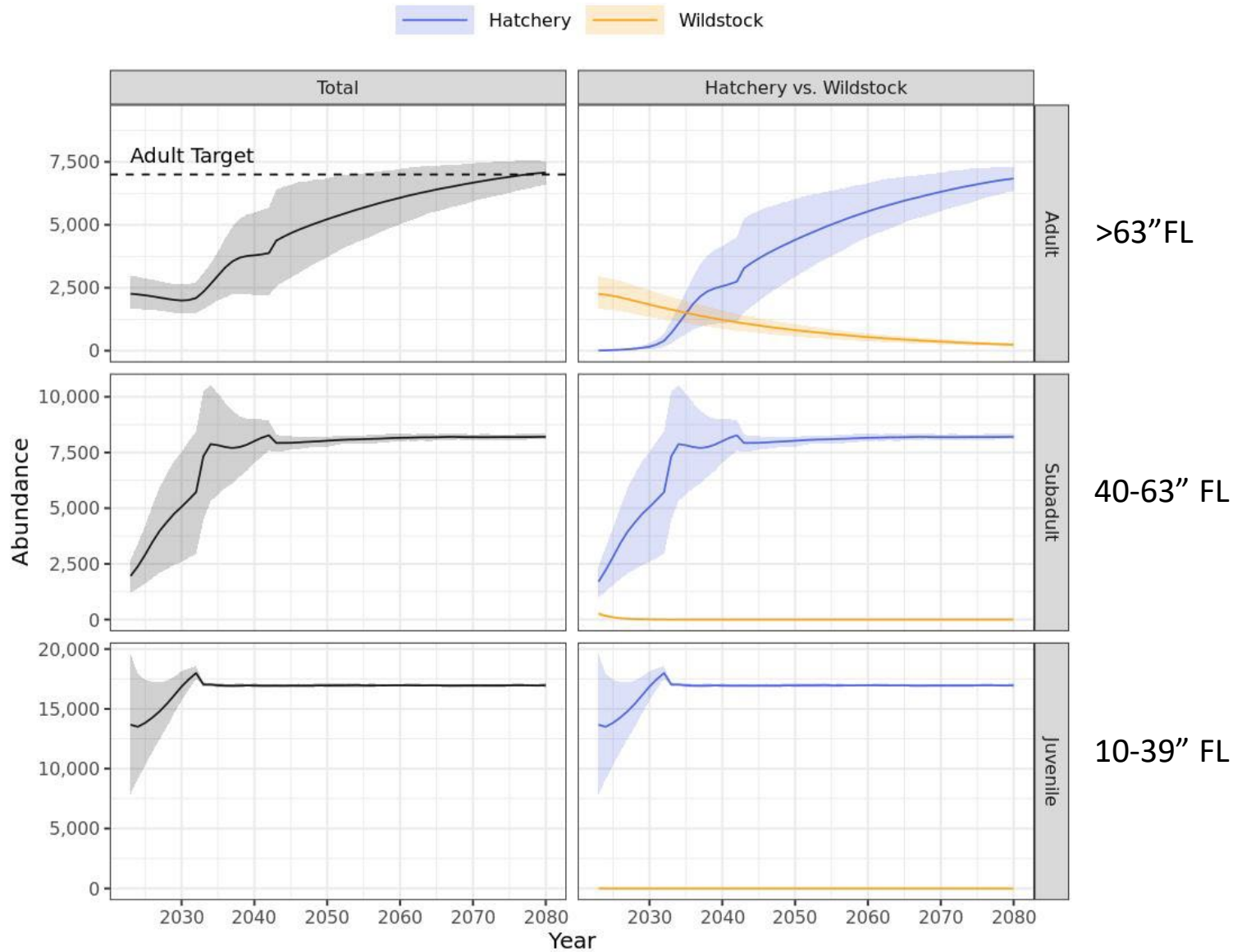
Total Abundance

2023-1129a



Abundances by Life Stage

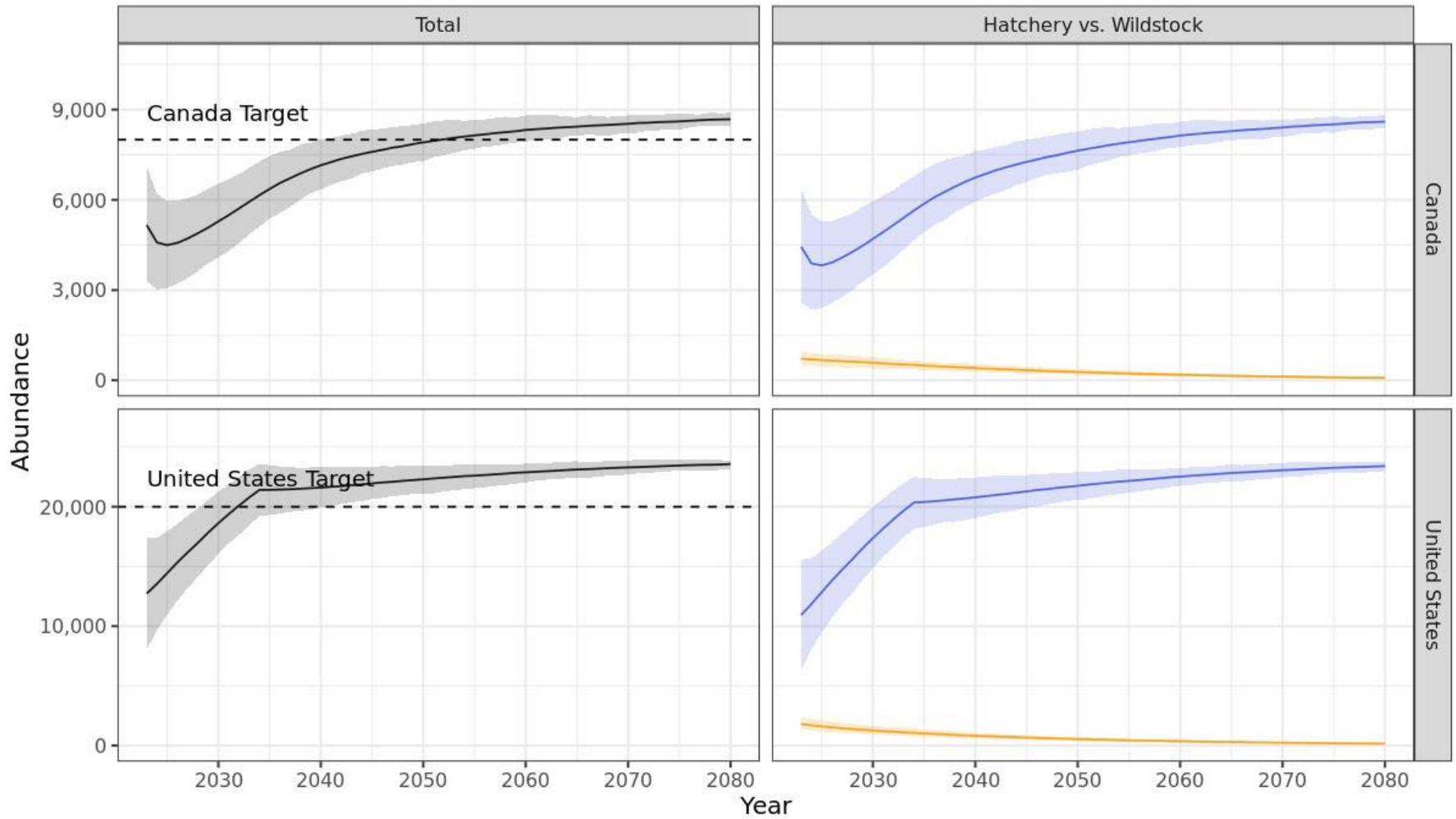
2023-1129a



Country-specific Abundances

2023-1129a

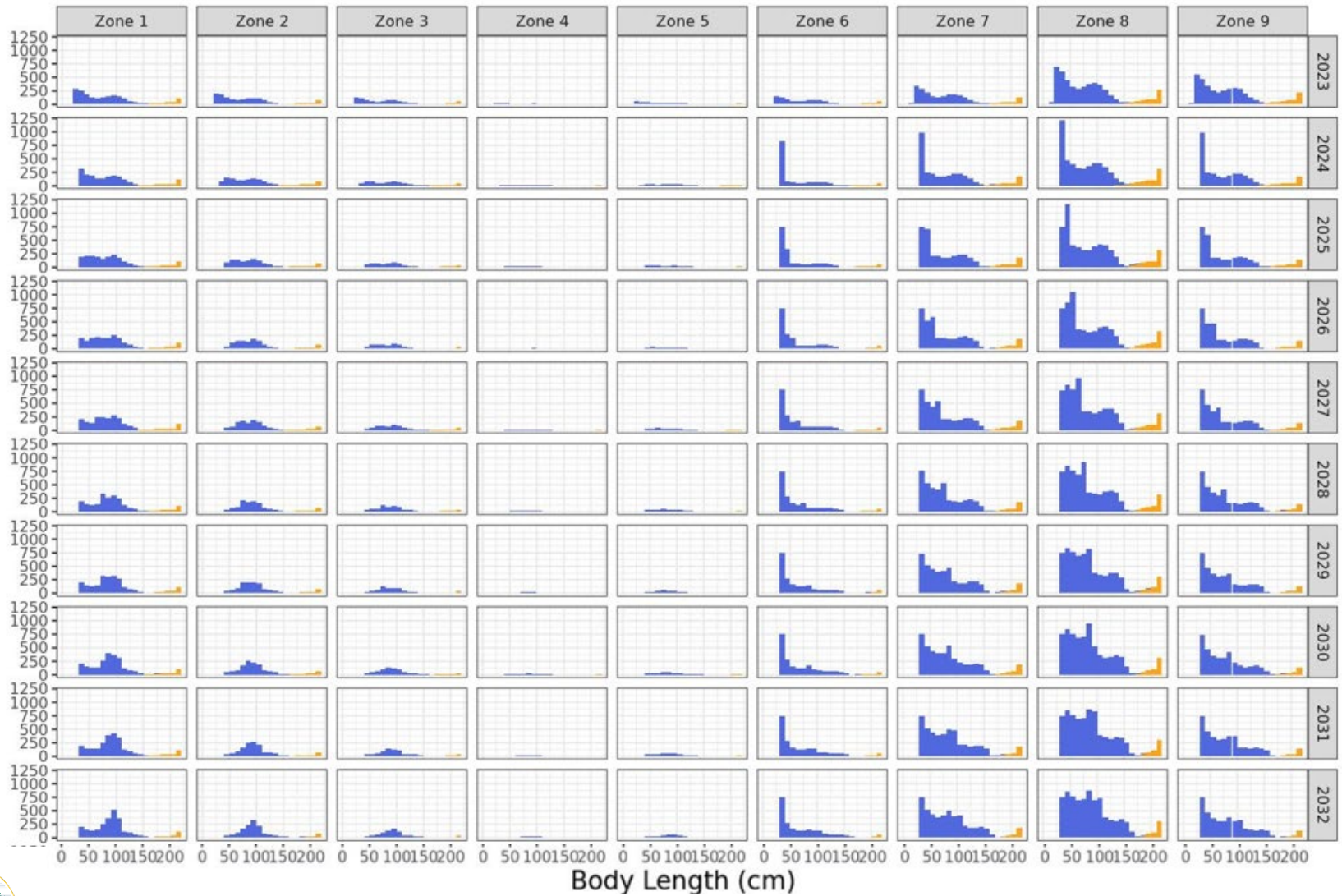
Hatchery Wildstock

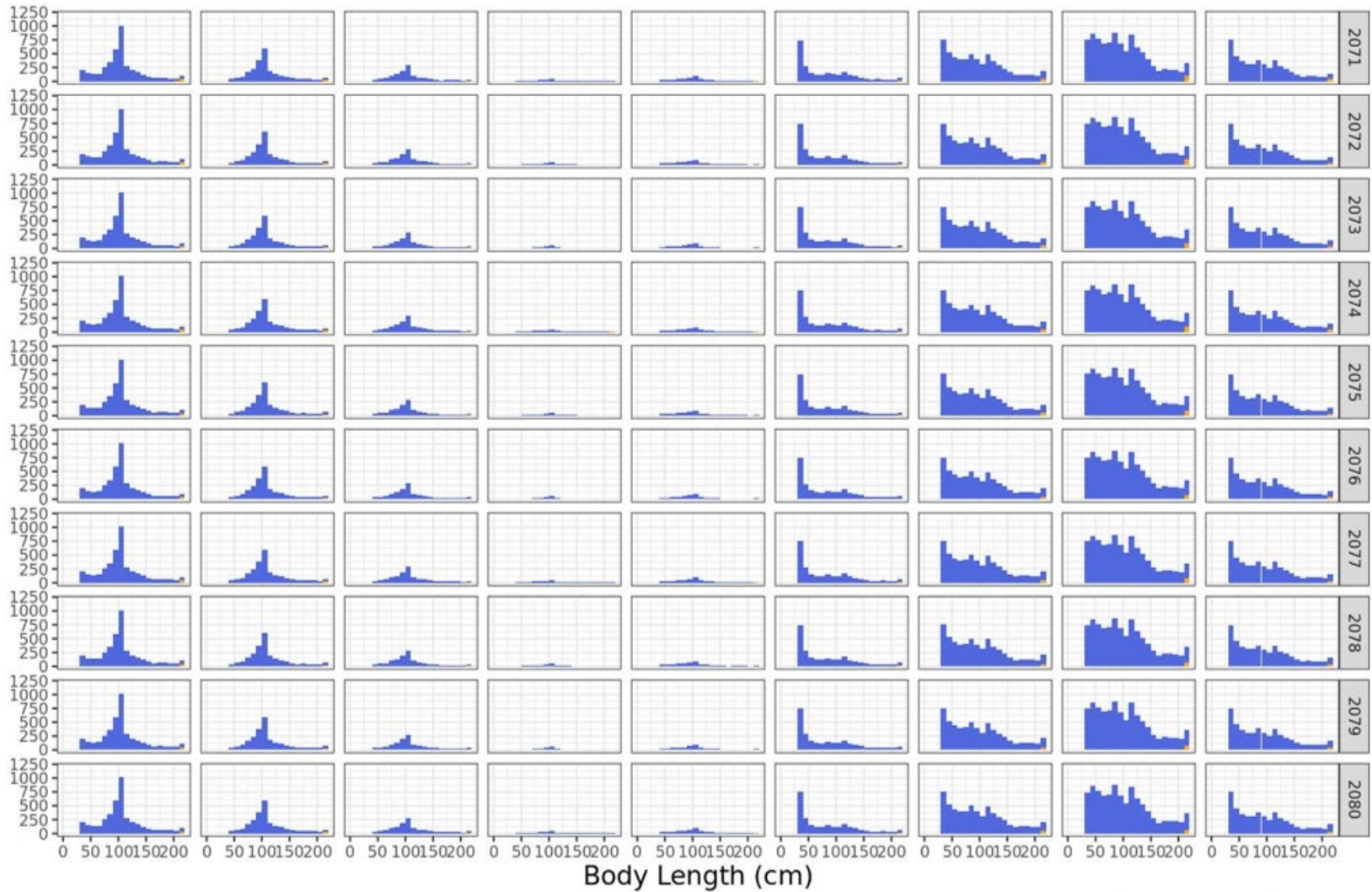


Size Distribution by Year and Zone

2023-1129a

■ Total
 ■ Hatchery
 ■ Wildstock





Conclusions

- Robust data collection amongst the various entities to inform modeling and fisheries management actions reduces uncertainty.
- Modeling indicates that the conservation aquaculture programs are releasing adequate numbers of sturgeon to achieve Transboundary population recovery goals and provide recreational and tribal fisheries in the US.
- Recovery will take a long time because sturgeon are long-lived and take many years to mature.

