



Grant County
PUBLIC UTILITY DISTRICT
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Priest Rapids Fish Forum
White Sturgeon Subgroup Meeting
Conference Call

Wednesday, 1 July 2026
9:00 a.m. – 10:15 a.m.

FINAL MINUTES

PRFF Members

Michael Lucid, USFWS
Ralph Lampman, Keely Murdoch, YN
Nathan and Clayton Buck, Wanapum
Jason McLellan, Bret Nine, CTCR
Joseph LeMoine, Chris Mott, Grant PUD
Tracy Hillman, Chair

Patrick Verhey, Laura Heironimus, WDFW
Melissa Peterson, Chad Brown, Ecology
Aaron Jackson, Carl Merkle, CTUIR
Steve Lewis, BIA
Pete McHugh, CRITFC

Meeting Attendees

Joseph LeMoine, Grant PUD
Jason McLellan, CTCR
Melissa Peterson, Ecology
Chris Mott, Grant PUD

Cory Kamphaus, YN
Chad Jackson, WDFW
Laura Heironimus, WDFW
Tracy Hillman, Chair

Action Items:

- Jason McLellan will work with James Crossman and Laura Heironimus will work with Andrea Schreier on calculation of effective population size (N_e) for White Sturgeon in the project area.
- Chris Mott will contact WSP to see whether they have biomass data for each reservoir in the project area.
- Chris Mott will calculate the total abundance targets for Priest Rapids and Wanapum reservoirs based on surface area at low flows and the density estimate (0.43 fish/ha) from Bonneville pool.
- Grant PUD will begin updating and populating the White Sturgeon life-cycle model and will run the various stocking and harvest scenarios.

White Sturgeon Subgroup Recommendations:¹

- The Subgroup recommends using the LGL/CTCR life-cycle model for modeling White Sturgeon in the Priest Rapids project area. The model will be populated with monitoring and evaluation data from the Priest Rapids project area.
- The Subgroup recommends using densities of White Sturgeon in the Bonneville pool as a reference for the Priest Rapids project area. The Bonneville pool density to be applied to the Priest Rapids project area is 0.43 fish/ha. This density, multiplied by the water surface area of Priest Rapids and Wanapum reservoirs during lowest flow, will determine the abundance target for both reservoirs.
- The Subgroup recommends that an adult White Sturgeon be defined as a fish greater than or equal to 167 cm fork length.
- The Subgroup recommended the following modeling scenarios:
 - No stocking (this serves as a baseline for comparisons)
 - Current stocking rate (1,250 juveniles in Priest Rapids and 2,000 juveniles in Wanapum)
 - 10% greater than the current stocking rate (1,375 juveniles in Priest Rapids and 2,200 juveniles in Wanapum)
 - 25% greater than the current stocking rate (1,563 juveniles in Priest Rapids and 2,500 juveniles in Wanapum)
 - 10% less than the current stocking rate (1,125 juveniles in Priest Rapids and 1,800 juveniles in Wanapum)
 - 25% less than the current stocking rate (938 juveniles in Priest Rapids and 1,500 juveniles in Wanapum)
- The Subgroup recommended that the model runs will be projected out to 30 years.
- The Subgroup recommended that a harvest rate of 200-500 fish/year should be evaluated with harvest beginning in 2029. As a starting point, modeling can begin with an annual harvest of 250 fish/year.

I. Welcome and Introductions

Tracy Hillman welcomed everyone to the PRFF White Sturgeon Subgroup meeting and identified all attendees.

II. Agenda Review

The Subgroup reviewed and approved the White Sturgeon (WS) Subgroup agenda with no additions. Tracy noted that the objective of the meeting is to evaluate stocking levels in the project area based on monitoring and evaluation (M&E) data and life-cycle modeling. He reminded the group that the Subgroup is not a decision-making group. Rather, the PRFF convened the Subgroup to evaluate the best available information and make recommendations to the PRFF.

III. Review of Action Items

Tracy Hillman reviewed the action items from the December 2025 and June 2026 meeting notes. He said members discussed the consequences of overstocking within the project area and identified two management

¹ All final decisions will be made by the PRFF.

actions that need to be evaluated: (1) possibly reducing stocking rates and (2) targeted removals. He said members also began the process of defining what is meant by “adult” (i.e., the size of a sturgeon at which it is considered an adult) and identifying an appropriate adult abundance target for the project area. This included a discussion on density (e.g., fish per km or fish per surface area). Finally, members recommended adapting the LGL/CTCR model for the Priest Rapids project area. Here is a link to the model:

<https://analytics.lglsidney.com/chelan-sturgeon/>.

During the previous meetings, members identified the following action items ([blue font indicates text from the PRFF meeting notes](#)):

- **Laura Heironimus will compile adult White Sturgeon abundance (number per area and number per length) and biomass (weight per area and weight per length) data from Bonneville Reservoir. WDFW defines an adult sturgeon as >167 cm FL.**

Year	Abundance		Density (fish/ac)		Density (fish/ha)		Density (fish/RKM)		Media n Weight (kg)	Media n Weight (lbs)	Total Biomass (lbs)	Densit y (lbs/ac)	Densit y (lbs/ha)	Density (lbs/RKM)
	167+ cm FL	All 54+ cm FL	167+ cm FL	All 54+ cm FL	167+ cm FL	All 54+ cm FL	167+ cm FL	All 54+ cm FL						
1999	292	128,314	0.01	6.2	0.03	15.2	3.9	1711	4.3	9.5	1,216,400	58.5	144.5	16,219
2003	746	119,909	0.04	5.8	0.09	14.2	9.9	1599	3.6	7.9	951,674	45.8	113.1	12,689
2006	243	205,392	0.01	9.9	0.03	24.4	3.2	2739	2.8	6.2	1,267,872	61.0	150.6	16,905
2009	1,064	334,423	0.05	16.1	0.13	39.7	14.2	4459	4.2	9.3	3,096,558	148.9	367.9	41,287
2012	1,974	228,249	0.09	11.0	0.23	27.1	26.3	3043	3.3	7.3	1,660,568	79.8	197.3	22,141
2015	610	191,893	0.03	9.2	0.07	22.8	8.1	2559	3.0	6.6	1,269,153	61.0	150.8	16,922
2018	3,473	248,772	0.17	12.0	0.41	29.6	46.3	3317	3.3	7.3	1,809,877	87.0	215.0	24,132
2021	4,070	215,650	0.20	10.4	0.48	25.6	54.3	2875	5.3	11.7	2,519,759	121.1	299.3	33,597
2024	3,367	155,406	0.16	7.5	0.40	18.5	44.9	2072	4.9	10.8	1,678,795	80.7	199.4	22,384
Mea n	1760	203,112	0.08	9.8	0.21	24.1	23.5	2708	3.9	8.5	1,718,962	82.6	204.2	22,919

- **Jason McLellan will compile adult White Sturgeon abundance (number per area and number per length) and biomass (weight per area and weight per length) from the Rocky Reach project area.**

Jason contacted Lance Keller at Chelan PUD to acquire these data. Lance indicated that he would try to get Jason the data although no timeline was provided. Jason believes these data are in the Rocky Reach annual report currently being prepared by LGL.

- **Jason McLellan and Laura Heironimus will research effective population size (N_e) for White Sturgeon. They will evaluate whether N_e can be estimated for the project area.**

Jay, K., J. Crossman, and K. Scribner. 2014. Estimates of effective number of breeding adults and reproductive success for White Sturgeon. Transactions of the American Fisheries Society 143:1204-1216.

Korman, J., J. Crossman, J. McLellan, and A. Miller. 2025. The effectiveness of conservation aquaculture in meeting recovery objectives for an endangered White Sturgeon population. Transactions of the American Fisheries Society <https://doi.org/10.1093/tafafs/vnaf029>.

Johnson, P., J. Crossman, A. Miller, B. Nichols, J. McLellan, M. Howell, and A. Schreier. 2025. Conservation aquaculture of wild-origin offspring preserves genetic diversity in an endangered

population of White Sturgeon. Conservation Genetics. <https://doi.org/10.1007/s10592-024-01670-2>

Crossman, J., J. Korman, J. McLellan, M. Howell, and A. Miller. 2023. Competition overwhelms environment and genetic effects on growth rates of endangered white sturgeon from a conservation aquaculture program. Canadian Journal of Fisheries and Aquatic Sciences [dx.doi.org/10.1139/cjfas-2022-0113](https://doi.org/10.1139/cjfas-2022-0113).

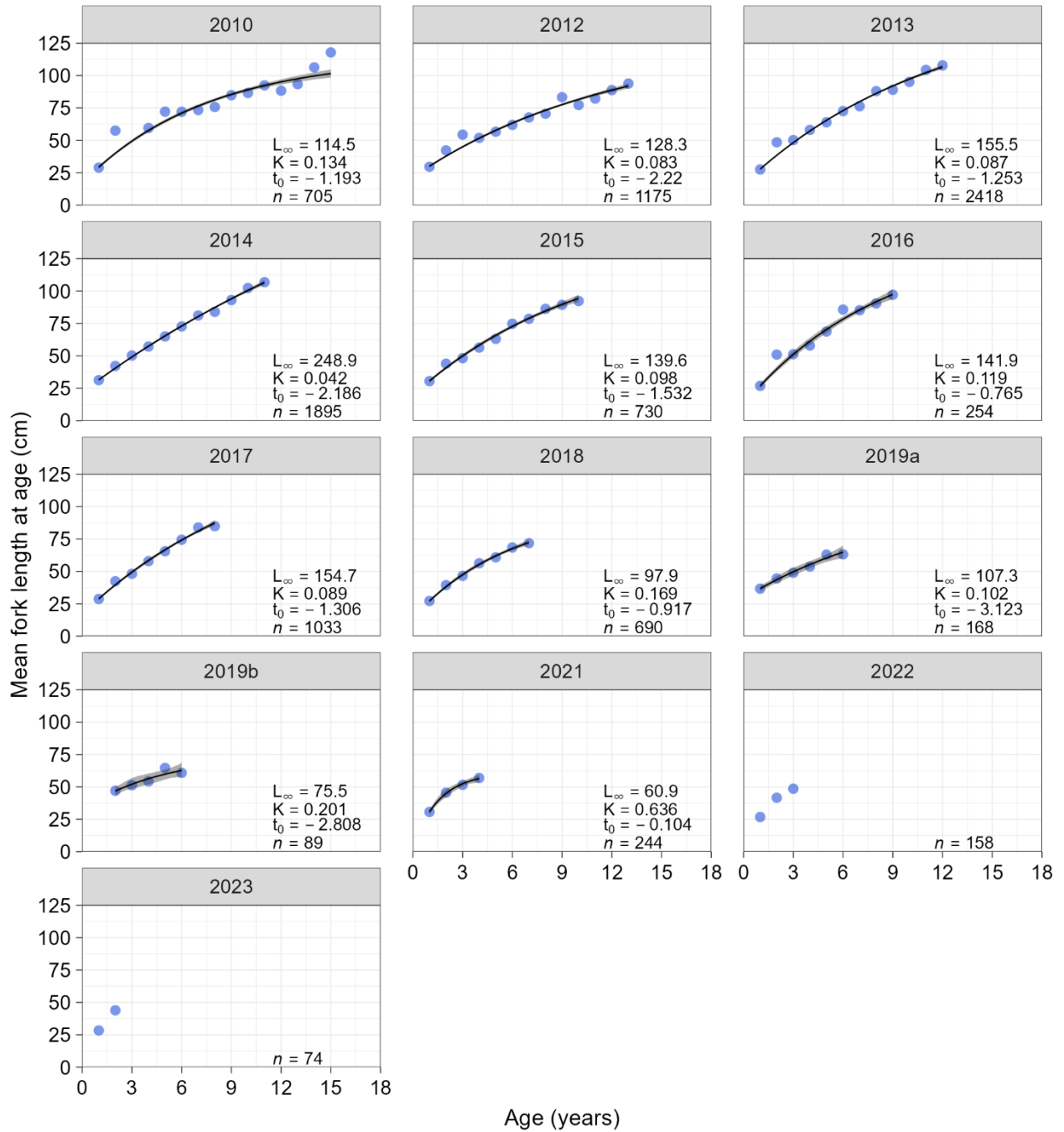
Crossman, J., J. Korman, J. McLellan, A. Miller, and M. Howell. 2025. High densities of hatchery-origin White Sturgeon suppress somatic growth rates of an endangered wild population. Ecological Applications <https://doi.org/10.1002/eap.70042>

Jason agreed to reach out to James Crossman and Laura agreed to reach out to Andrea Schreier on whether effective population size can be estimated within the project area.

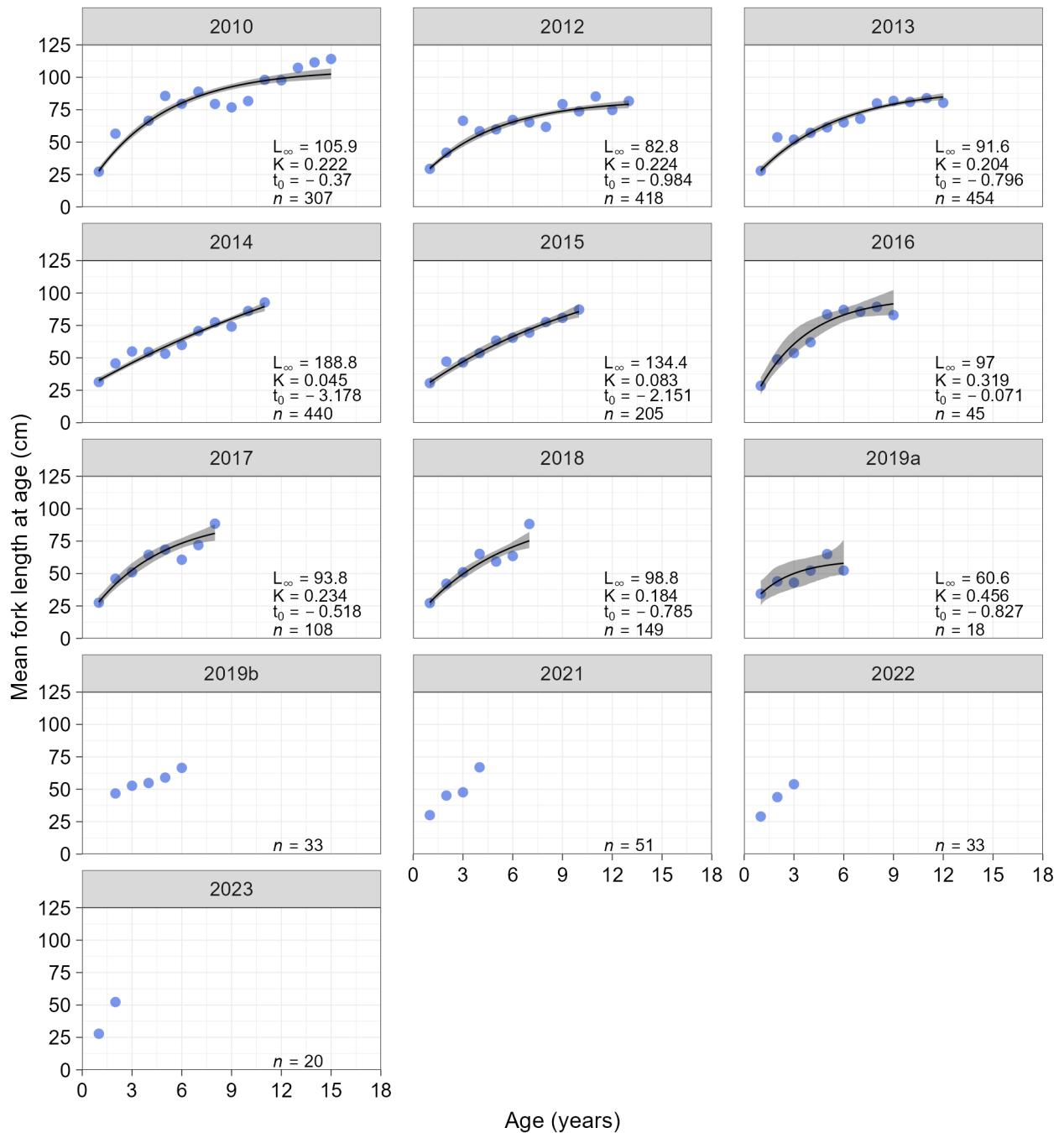
- **Paul Grutter will provide separate growth figures for each brood year in each of the Priest Rapids and Wanapum reservoirs. The figures will show the lengths by age, the fit of the von Bertalanffy growth curve to the data, precision of the model (e.g., PI or CI), the parameter estimates (i.e., L_{∞} , K , and t_0), and sample size. He will also evaluate the effects of juvenile sampling gear on growth data and consider ways to incorporate data from adult sampling gear.**

Paul provided the following figures:

Wanapum:



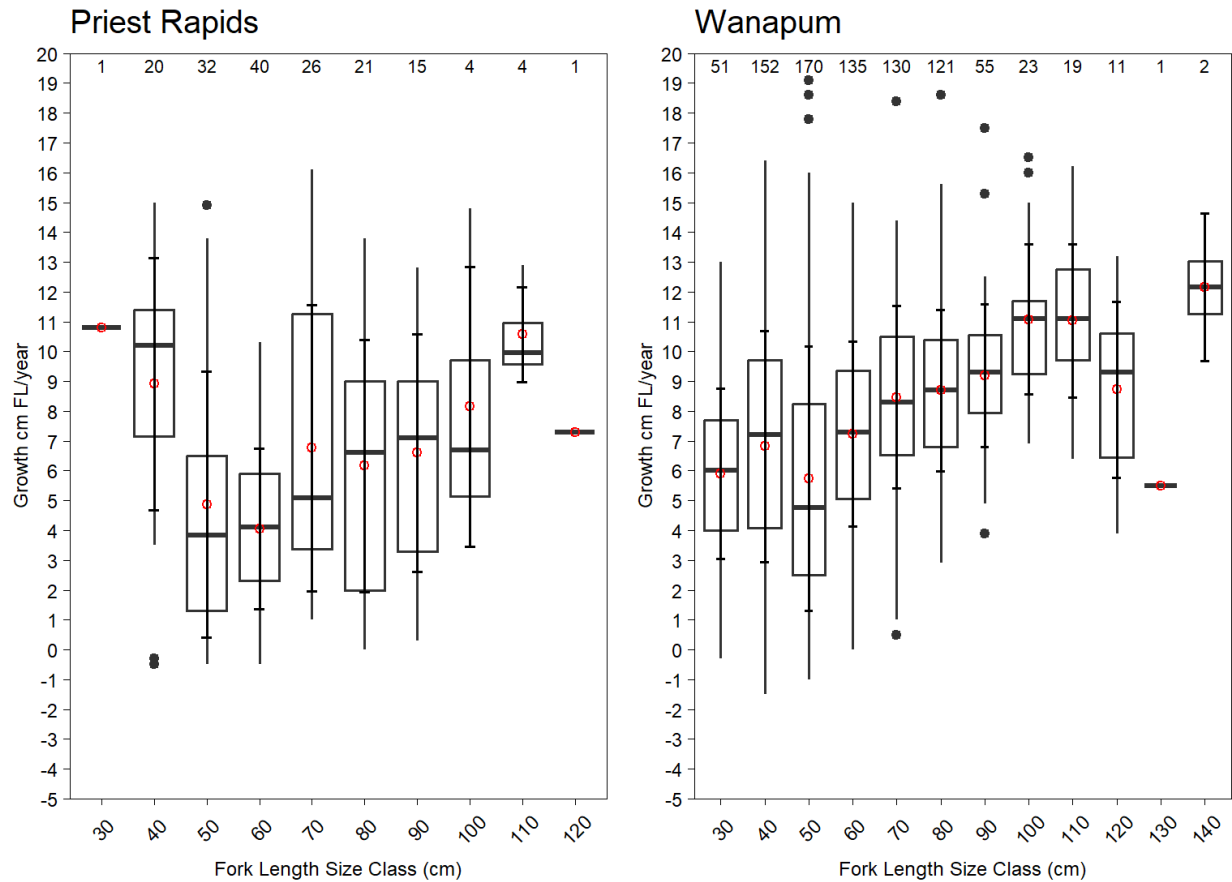
Priest Rapids:



Jason McLellan noted that L_{∞} should be close to 250 cm, which is the size of the largest sturgeon in most populations. Sima Usvyatsov responded that the lower L_{∞} are likely because there are few to no large adults included in the analysis. Nevertheless, there remain differences in the L_{∞} between the two reservoirs. Sima believes the parameters of the growth model will change as adults grow and larger fish are included in the model.

- Paul Grutter will generate figures showing the relationship between length classes (X-axis) and mean annual growth rates (mean cm/yr on Y-axis) for sturgeon in the project area (Laura will provide Paul with an example figure).

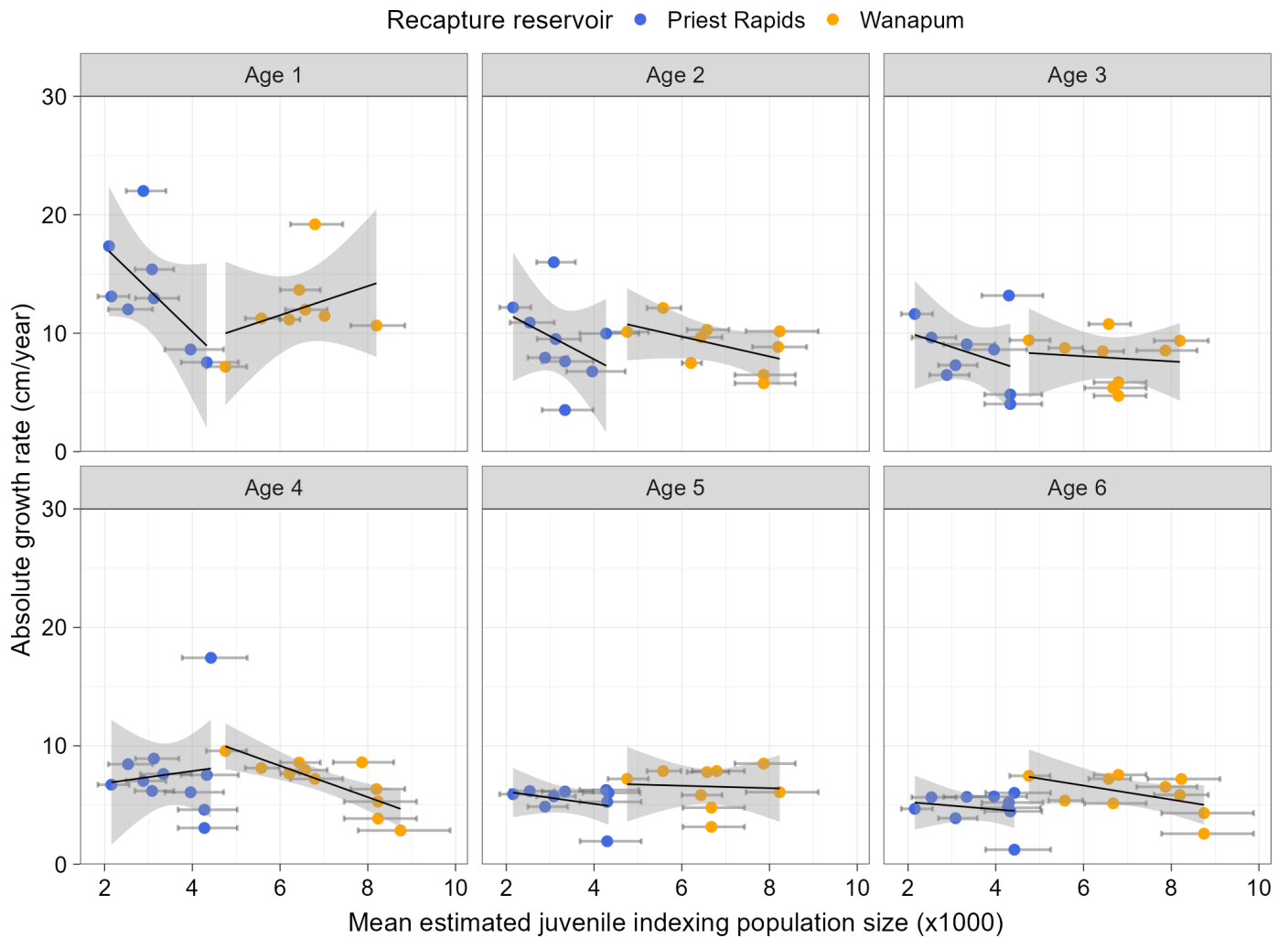
Paul provided the following figures:



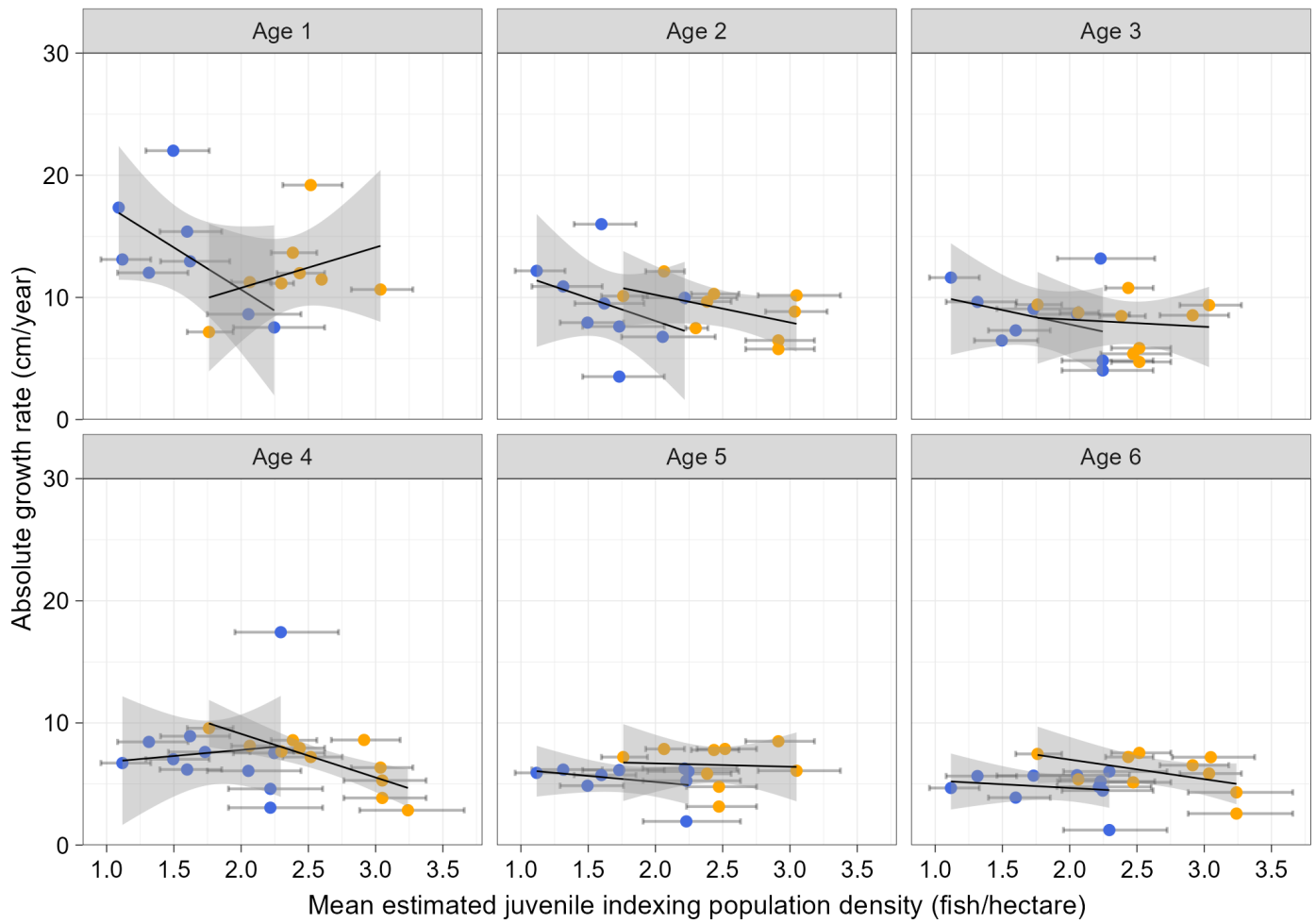
Annual growth rate based on change in fork length (FL cm/year) of hatchery White Sturgeon ranging in size between 30 and 140 cm FL in Priest Rapids and Wanapum reservoirs. Annualized growth rates were calculated based on change in FL of recaptured fish, with time between capture and recapture events from 1 to 2 years based on adult and juvenile White Sturgeon indexing data from 2010 to 2025. Red circles represent the mean, the short thin horizontal line represents standard deviation around the mean, the solid thick horizontal line represents the median, the box represents 25 and 75 percentiles, the whiskers represent 10 and 90 percentiles, and the black circle represents outliers. Numbers along the top equal recaptures in each size class.

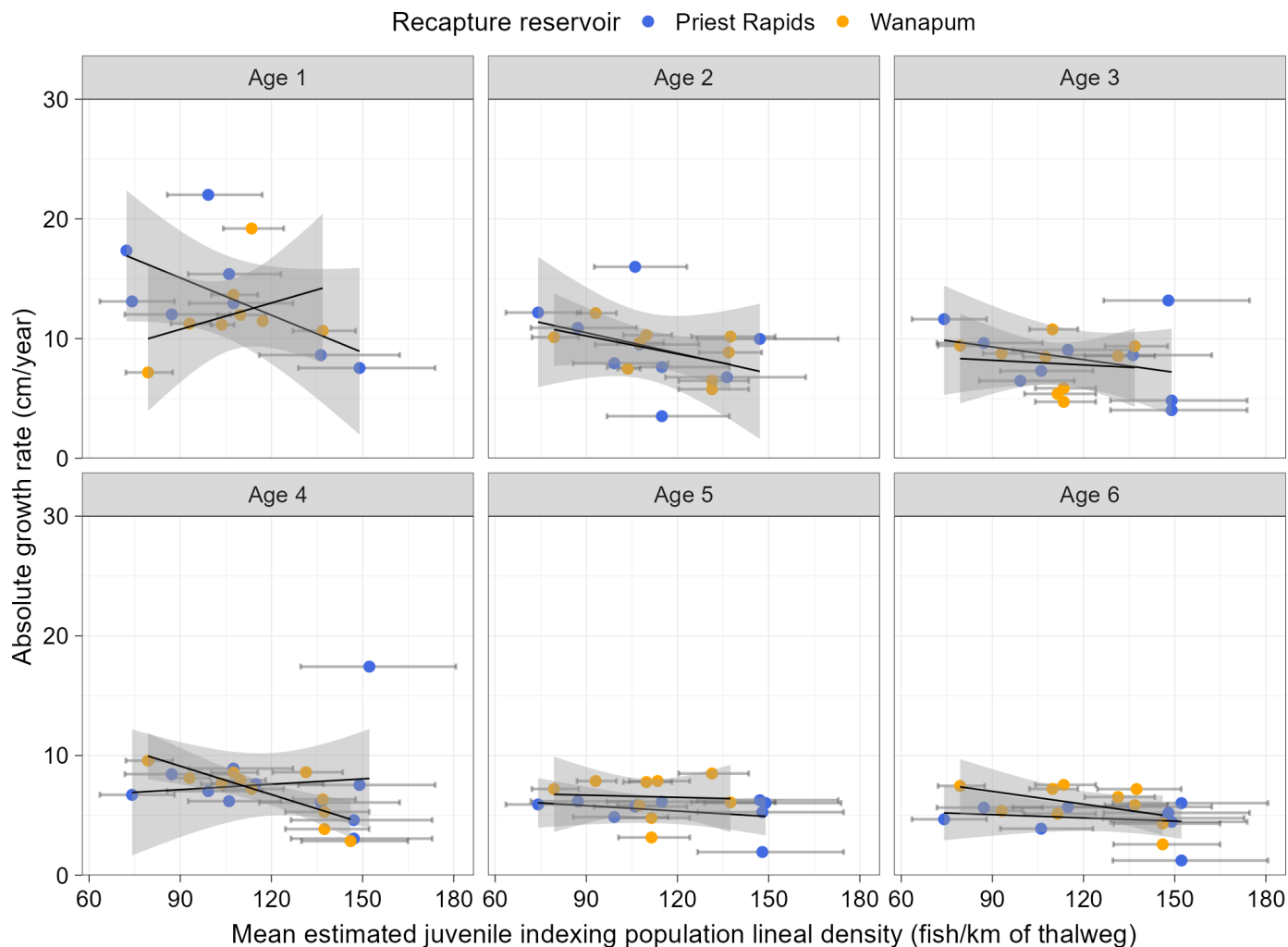
- **Sima Usvyatsov will generate figures showing the relationship between White Sturgeon growth and sturgeon density (fish/area and fish/linear distance) in the project area.**

Sima provided the following figures:



Recapture reservoir ● Priest Rapids ● Wanapum

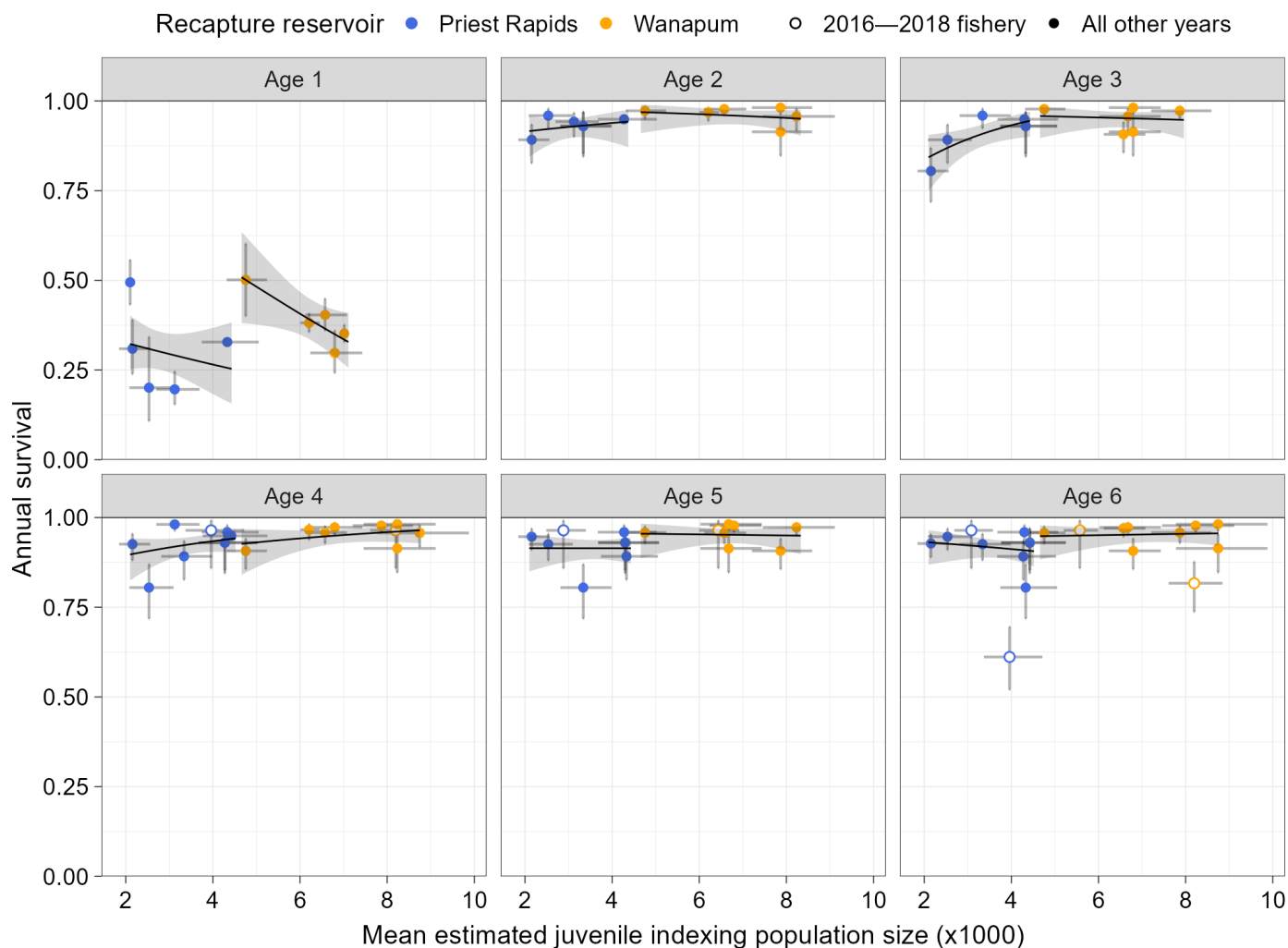




Sima notes that while some of the relationships (like for age-1) may seem informative, keep in mind that the uncertainty is so large that we are not able to interpret those with any level of confidence. Given the slopes and uncertainty, you cannot distinguish the slope from 0 (flat line), which means that the relationship is not significant and we cannot be sure it is actually present.

- **Sima Usvyatsov will generate figures showing the relationship between White Sturgeon survival and fish abundance (numbers and density).**

Sima provided the following figures:



Sima notes that when calculating the relationships, she omitted the years/brood years affected by a fishery; thus, they are comparing apples to apples. The omitted years/brood years are still shown as empty circles. They are not seeing anything that looks like density dependence; while the age-1 relationships are negative, they are driven by a single data point within each reservoir, and the uncertainty is too high to draw any conclusions about negative effects of abundance on survival.

Importantly, none of the relationships shown are taking into account the uncertainty around the population estimate, which means that the uncertainty shown as grey bands in the figures is underestimated. This will be rectified in this year's report.

- **Members will familiarize themselves with the White Sturgeon life-cycle model.**
Members have access to the model and some have started exploring the model.
- **Members will consider different slot limits for harvest.**

To be discussed today in the Subgroup meeting.

Tracy Hillman asked members whether additional information is needed before identifying modeling scenarios. Laura Heironimus asked whether there are relationships between biomass (pounds/ha) and absolute growth rate. She added that the relationships would be useful but also knowing the biomass of sturgeon in each reservoir over

time would be important and can be compared to the biomass estimates in Bonneville pool. Chris Mott said he will contact WSP to see whether they have biomass data for each reservoir in the project area. No other data or analyses were requested.

IV. Modeling and Analysis

Tracy Hillman said it appears the Subgroup has information necessary to fine-tune and populate the life-cycle model for the Priest Rapids project area. He asked how the Subgroup would like to move forward with modeling. Jason McLellan recommended that the Subgroup address two questions before identifying modeling scenarios: (1) what is an appropriate abundance target for the project area? and (2) what is the size of a sturgeon at which it is considered an adult?

Identify Abundance Targets: The Subgroup recommended using densities of White Sturgeon in the Bonneville pool as a reference for the Priest Rapids project area. This is consistent with the approach used to develop the 2016 SOA (see Attachment 1). Here, however, the Subgroup recommended using the average of the last three years of data collection in Bonneville pool (0.41 fish/ha in 2018, 0.48 fish/ha in 2021, and 0.40 fish/ha in 2024). Thus, the abundance target for the Priest Rapids project area will be based on 0.43 fish/ha. This density, multiplied by the water surface area of Priest Rapids and Wanapum reservoirs during lowest flow, will determine the abundance target for both reservoirs. Chris Mott said he will calculate the total abundance for each reservoir based on surface area at low flows and the density estimate from Bonneville pool.

Identify the Size of an Adult: The Subgroup recommended that an adult sturgeon be defined as a fish greater than or equal to 167 cm fork length. This is consistent with the definition used by WDFW.

Modeling Scenarios: Jason recommended that there should be no more than 5-6 modeling scenarios. The Subgroup recommended the following scenarios:

1. No stocking (this serves as a baseline for comparisons)
2. Current stocking rate (1,250 juveniles in Priest Rapids and 2,000 juveniles in Wanapum)
3. 10% greater than the current stocking rate (1,375 juveniles in Priest Rapids and 2,200 juveniles in Wanapum)
4. 25% greater than the current stocking rate (1,563 juveniles in Priest Rapids and 2,500 juveniles in Wanapum)
5. 10% less than the current stocking rate (1,125 juveniles in Priest Rapids and 1,800 juveniles in Wanapum)
6. 25% less than the current stocking rate (938 juveniles in Priest Rapids and 1,500 juveniles in Wanapum)

Model runs will be projected out to 30 years.

Harvest Scenarios: The Subgroup also discussed harvest scenarios. For each stocking rate analyzed, the Subgroup recommended that a harvest rate of 200-500 fish/year should be evaluated with harvest beginning in 2029. As a starting point, Laura recommended beginning with an annual harvest of 250 fish/year.

Chris Mott indicated that Grant PUD will begin updating and populating the life-cycle model and will run the various scenarios. He will provide an update on progress during the August PRFF meeting.

V. Next Steps

Tracy Hillman summarized next steps and identified the following action items:

- Jason McLellan will work with James Crossman and Laura Heironimus will work with Andrea Schreier on calculation of effective population size (N_e) for White Sturgeon in the project area.

- Chris Mott will contact WSP to see whether they have biomass data for each reservoir in the project area.
- Chris Mott will calculate the total abundance targets for Priest Rapids and Wanapum reservoirs based on surface area at low flows and the density estimate (0.43 fish/ha) from Bonneville pool.
- Grant PUD will begin updating and populating the White Sturgeon life-cycle model and will run the various stocking and harvest scenarios.

VI. Adjourn

With no additional business to discuss, Tracy Hillman adjourned the meeting at 10:15 am.

VII. Next Meeting

The White Sturgeon Subgroup will meet after action items are complete and as directed by the PRFF.

Attachment 1

2016 White Sturgeon Statement of Agreement

Statement of Agreement: Priest Rapids Project White Sturgeon Stocking Program for Population Rebuilding, Mitigation, and Enhancement

Background

In accordance with the Priest Rapids Project White Sturgeon Management Plan, beginning in year three (2011) of the new FERC license, Grant Public Utility District (GPUD) released between zero to 6,500 yearling hatchery White Sturgeon into the Priest Rapids Project Area (PRPA) annually in years three to seven (2011-2015). Subsequent years stocking (2016 and beyond) will be determined by the Priest Rapids Fish Forum (PRFF). In 2015, GPUD fulfilled its annual White Sturgeon stocking requirements for years three through seven.

To determine future releases of yearling hatchery White Sturgeon into the PRPA, the PRFF and PRFF Policy Committee (PRFF-PC) identified a target population size to rebuild towards and used a population growth model to develop a stocking strategy for Priest Rapids and Wanapum reservoirs. Described below is the approach used to identify a target population size and model inputs used to develop a stocking strategy.

Approach

The PRFF-PC identified adult abundance as the population metric upon which to develop a stocking strategy from. The PRFF-PC selected the 2012 White Sturgeon adult density (adults per river kilometer) estimate from Bonneville Reservoir to identify rebuilding targets for Priest Rapids and Wanapum reservoirs. Bonneville Reservoir was selected because the White Sturgeon population there is abundant, stable-aged, appears to exhibit some level of density dependence, and allows for a non-treaty and treaty harvest fishery. The 2012 adult density estimate for Bonneville Reservoir is 40 adults per river kilometer and the highest density estimate observed. Using this estimator, adult abundance targets for Priest Rapids and Wanapum reservoirs are 1,200 and 2,440, respectively.

With an adult abundance target identified and agreed to by the PRFF-PC, the PRFF used a population growth model to develop a stocking strategy. The population growth model uses age and growth, age-specific survival rates, existing wild population abundance, and past hatchery release data to evaluate the effects of different stocking and harvest rates on rebuilding White Sturgeon populations in Priest Rapids and Wanapum reservoirs. For age-specific survival, stocking, and harvest rates, a variety of inputs were used in the model. Inputs used in the model are as follows:

1. Survival Rates: Upper estimate (86% year 1, 98% year 2, and 98% year 3+) based on data from sturgeon populations above Grand Coulee Dam, Lower estimate (70%, 80%, and 95%) based on data from sturgeon populations below McNary Dam, and a Median value (78%, 89%, and 96.5%) between the upper and lower estimates.
2. Harvest Rates: 10%, 20%, and 30% exploitation rates; Bonneville Reservoir-based slot length limit of 38-54 inches and "liberal" slot length limit of 31-54 inches
3. Stocking Rates: 500 to 5,000 fish per year (500 fish intervals) for Wanapum and 500, 1,000, 1,500, 3,000, and 4,500 for Priest Rapids reservoirs.

Using the model to develop a stocking strategy that perfectly builds the White Sturgeon population towards and sustains it at the Bonneville Reservoir-based adult abundance targets is nearly impossible. Past hatchery releases are projected to exceed those adult abundance targets for short period of time. Future releases are intended, in most instances, to slow the effects of natural mortality so the population eases and hopefully sustains itself around the adult abundance target. Interpreting the various model runs graphically can be difficult. To more easily identify an appropriate stocking strategy, a different approach was employed.

Each model run calculates the number of adults in the White Sturgeon population per year. To determine whether a specific stocking and harvest rate model run is achieving rebuilding objectives (i.e., meeting adult abundance targets), adult abundance averages from years 2035 to 2065 were calculated for each model run. This time period is when hatchery releases affect adult abundances. Year 2035 is when the first stocked fish (release year 2011) reaches maturity; whereas year 2065 is when the last stocked fish (release year 2040) reaches maturity. The assumption is stocking and harvest rate model runs that result in long-term average adult abundances "falling around" the Bonneville Reservoir-based adult abundance target are considered to be achieving White Sturgeon population rebuilding objectives. Specifically, long-term average adult abundances within $\pm 20\%$ of the Bonneville Reservoir-based adult abundance target are considered an acceptable stocking and harvest rate scenario. Long-term average adult abundances within $\pm 30\%$ are considered cautionary, and greater than 30% are considered inappropriate stocking and harvest rate scenarios. Further, long-term average adult abundances considered acceptable, cautionary, or inappropriate are also color coded as green, orange, and red, respectively. Over 400 model runs were completed, evaluated, summarized in matrices, and color coded to indicate appropriate stocking and harvest rate scenarios.

Recommendation

The PRFF-PC recommends the following:

1. The most appropriate stocking rate is based off a model run using the median survival rates, a 20% exploitation rate, and the Bonneville Reservoir slot length limit
2. Based off this model run, maximum stocking rates that best achieve the Bonneville Reservoir-based adult abundance targets for Priest Rapids and Wanapum reservoirs is 1,250 and 2,000 yearling hatchery White Sturgeon, respectively
3. Recommended stocking rates will be in effect for release years 2016 through 2020
4. White sturgeon brood stock (and/or wild larvae) collection, spawning, and release guidelines affecting release years 2016 through 2020 include:
 - a. If white sturgeon larvae are available for stocking, they will be used first towards the yearling release target to the extent possible. Brood stock origin yearlings would then be used to make up the program balance if necessary and in accordance with guidelines (b.) through (f.) listed below.
 - b. A minimum of 18 unique (one male and one female) crosses, produced from a partial or full factorial breeding strategy, must be achieved during spawning in order to release the maximum number yearlings.
 - c. If >18 unique crosses are produced the number of yearling white sturgeon released will not exceed 1,250 for Priest Rapids and 2,000 for Wanapum reservoirs, respectively.
 - d. If only brood stock origin fish are available and <18 unique crosses are produced then a reduced and pro-rated release strategy will be employed as described below: Example: 3,250 (Priest Rapids + Wanapum) fish/18 unique crosses = 180 fish/cross, thus if 10 unique crosses are produced the stocking rate would be $10 \times 180 = 1,800$ yearlings release between Priest Rapids and Wanapum reservoirs
 - e. Regardless of how many unique crosses are produced, family (cross) equalization will be reflected in the release to the greatest extent possible.
 - f. All entities involved in brood stock collection on behalf of GPUD agree to fish the entire contracted length of time and collect as many potential brood stock as possible as opposed to ceasing collections once six males and six females have been collected.

5. GPUD will continue to implement the monitoring and evaluation activities as defined in the White Sturgeon Management Plan and 401 Certification, as modified via the annual white sturgeon report and study plan per the review and approval by the PRFF, and additional activities agreed to by the PRFF-PC (November 6, 2015).
6. A healthy sturgeon population commensurate with the available habitat includes a population sustaining a reasonable level of harvest of hatchery White Sturgeon released into Priest Rapids and Wanapum reservoirs is acknowledged by all PRFF-PC members as a beneficial outcome of this hatchery supplementation program.
7. Following termination of this SOA the PRFF and PRFF-PC will re-evaluate the model runs using empirical data collected from Priest Rapids and Wanapum reservoirs, in particular site specific survival estimates, to determine if changes in stocking should be made.

Terms and Conditions:

1. Effective dates of this SOA begin the month and day in 2016 of unanimous approval by the PRFF through December 31st, 2020
2. This SOA reflects an entirely voluntary commitment between members of the PRFF. However, all parties agree to work in good faith to adhere to the guidelines listed above.
3. Post 2020 stocking may be increased or decreased depending on then-current information including relevant survival estimates, ecological impacts, and potential harvest capabilities.
4. There will be a three year check in during the life of the SOA in order that Parties to this agreement may introduce significantly new information that may alter the reasoning or intent of the SOA. If the parties agree, the SOA may then be amended or replaced.

Submitted to Priest Rapids Fish Forum – Policy Representatives on: **March 9, 2016**

Approved by the Priest Rapids Fish Forum – Policy Representatives on: **March 11, 2016**



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Honor. Protect. Restore.

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March 17, 2016

Dr. Tracy Hillman, Chair
Priest Rapids Fish Forum

Re: Letter for the record regarding the PRFF sturgeon SOA

Dear Tracy,

Thank you for your skillful facilitation of the process leading to a successful conclusion of the Statement of Agreement regarding sturgeon stocking levels in the Priest Rapids Project Area for 2016-2020. The willingness of parties to collaborate in developing a consensus model is a long step in moving to a rational decision-making process that considers the interests of all parties, especially those of the resource we are charged to preserve.

These comments are not an attempt to reinterpret or alter any terms of the SOA. I am writing only to clarify my understanding of certain terms of the SOA and what they imply for its implementation. This seems advisable to avoid potential future disagreements over what was meant or understood by Forum members when a decision was taken. Documented understandings serve as a record of the assumptions under which a party agreed to a proposed action, and they may also illuminate a need to further reconcile what other parties took to be implicit in a decision.

My understandings pertain to the Recommendations and are **bolded** below:

1. **The location of larval collection is not specified.** Part 4.a. indicates that larval collection will be used first towards meeting release targets to the extent possible. It is not specified where suitable larvae can be collected. It is my understanding that some Forum members are reluctant to release fish from Lake Roosevelt into the PRPA. This should be clarified in follow-up discussions. As an aside, the members assume that larval collections incorporate a broad diversity of families, but this is not regularly verified to my knowledge – another topic for discussion.

2. **Grant will continue to fund brood stock collection at an adequate level to ensure more than 18 unique crosses are produced.** Part 4.d. describes how juvenile releases may be reduced pro-rata if fewer than 18 unique crosses are produced by brood stock collection. Given the greatly diminished stocking levels agreed to in the SOA and the

harvest interests of the fishery co-managers, collecting an adequate number of brood stock to support full stocking is a priority. The SOA does not describe whether and how brood stock collection will be implemented to back up larval collection. Part 4.f. indicates that Grant's agents will fish the "entire contracted length of time", but there is no commitment to what that time period is. It is assumed that brood stock collection will be adequate to reliably provide enough juveniles to fill any deficit in the larval collection up to the full juvenile stocking level.

3. **Grant ensures that M&E will produce the information needed to determine population status and condition in 2020.** Removal of the qualifier, "annually", from the statement in Part 5 creates ambiguity in Grant's commitment to produce all data that may be needed to address the technical questions raised in the deliberation of this SOA. As much of the difficulty in reaching agreement was based on the absence of empirical data, it is assumed that Grant commits to an M&E program that is sufficient to produce the empirical data needed by Forum members to determine new stocking levels in 2020.

4. **The check-in at year 3 is advisory only and does not alter the terms of the SOA unless agreed to by all members.** The term of the SOA is five years and continues for that duration unless new information obtained at year 3, or any other time, warrants a change in terms that is agreed to by all Forum members.

Thanks for the opportunity to offer these thoughts and clarifications. I welcome any responses to the record if it is thought I have misunderstood or mischaracterized the terms of the sturgeon SOA.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Steven S. Parker', with a stylized flourish at the end.

Steven S. Parker, Policy Committee representative
Yakama Nation Fisheries



Colville Confederated Tribes

Fish and Wildlife Program

P.O. Box 150

Nespelem, WA 99155

Phone: (509) 634-2110 / Fax: (509) 634-2126



March 21, 2016

Tracy Hillman, Ph.D.
Priest Rapids Fish Forum Chair
4725 N. Cloverdale Rd; Ste 102
Boise, ID 83714

RE: LETTER FOR THE RECORD Regarding The 11 March 2016 Approved White Sturgeon SOA.

On March 11, 2016 the Priest Rapids Fish Forum Policy Committee (Committee) members unanimously approved the "Statement of Agreement: White Sturgeon Stocking Program for Population Rebuilding, Mitigation, and Enhancement" (SOA) drafted by the Washington Department of Fish and Wildlife (WDFW). We consider our vote in support of the SOA a compromise intended to promote consensus building. Our vote represents our acceptance of the release numbers and the stipulations associated with Recommendation section items 4a-f. However, we have outlined the following concerns with regard to the remainder of the SOA:

- The Background, Approach, and Terms and Conditions sections, as well as items 5, 6, and 7 of the Recommendations section, are not necessary to describe the terms of the agreement.
- The Recommendations section of the SOA is misnamed, as it consists of the agreement terms and not recommendations.
- The SOA suggests that the Committee used the model to develop the stocking strategy. For clarification, members of the Priest Rapids Fish Forum (PRFF) utilized the population model to generate adult abundance and harvest estimates for consideration by the Committee during their dialogues regarding the stocking strategy (see next bullet).
- The Approach section is not representative of the process employed to make our determination, nor does it reflect our rationale for agreeing to the SOA.
- The SOA language stating, *[t]he PRFF-PC selected the 2012 White Sturgeon adult density (adults per river kilometer) estimate from Bonneville Reservoir to identify rebuilding targets for Priest Rapids and Wanapum reservoirs* [period deleted] implies the Committee explicitly selected the method by which the target density was calculated. While the Committee did agree to use the Bonneville Reservoir adult¹ White Sturgeon densities to calculate target abundances for the project reservoirs during the modeling exercises², it did not provide guidance as to the

¹ The Committee meeting notes do not explicitly state that the target referred to adults although it is implied throughout.

² Final November 6, 2015 Committee Meeting Notes (page 8) state: *The Forums will use densities of sturgeon in Bonneville Reservoir as an initial estimate for carrying capacity within the project areas.*

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method by which the density was to be calculated. Moreover, the density calculation method was not considered within the PRFF.

- Reservoir area should have been used instead of reservoir length to calculate the target density of adult White Sturgeon. Fish habitat is a function of the amount of area within the reservoir and not the reservoir's length, thus the most common method for calculating reservoir fish densities is to divide the abundance by the surface area of the reservoir (e.g., fish/ha). White Sturgeon densities have been generated for the lower Columbia River reservoirs (John Day, The Dalles, and Bonneville) using this method (Beamesderfer et al. 1995). The CCT raised this issue with WDFW during a February 24, 2016 phone conversation regarding the draft SOA.
- The SOA lacks a description of the defining characteristics of an adult White Sturgeon in reference to the target density³. According to Beamesderfer et al. (1995), the mean FL of a mature female White Sturgeon in the Bonneville Reservoir was 168 cm FL. If White Sturgeon >166 cm FL⁴ were considered adults, the resulting target density would have been 26 fish/km – a roughly 34% reduction relative to the SOA target density. When applied to Priest Rapids (29 km) and Wanapum (58 km) reservoirs, the abundance targets would have been 754 and 1,508 adults, respectively.
- Further examination of the 2012 Bonneville Reservoir White Sturgeon abundance values in Cox and Schade (2014)⁵, suggest that the SOA adult abundance targets were derived with White Sturgeon 138 cm FL and larger. The abundance estimates provided in Cox and Schade (2014) are length group specific and do not specify life stage (i.e., juveniles, sub-adults, adults) or age. As demonstrated in the previous bullet, the more liberal length characterization of an adult resulted in a higher target density value and ultimately greater release numbers. There is no record of discussion within either the PRFF or Committee regarding the appropriate consideration of what constitutes an adult within the context of deriving target densities despite these large implications. Future modeling efforts should clearly define what constitutes an adult White Sturgeon.
- For clarification, the SOA and the Hildebrand Memo⁶ incorrectly indicate that the low survival rate values that the PRFF agreed to use in the model were based on data from sturgeon populations below McNary Dam. The low year one survival rate value used in the modeling was the mid-point between the broodyear (BY) 2012 (75%) and BY2013 (65%) year one survival estimates for hatchery sturgeon released in Rocky Reach Reservoir⁷. The low year two survival rate value was the approximate BY2012 (82%) year two survival estimate for hatchery sturgeon released in Rocky Reach Reservoir.
- The use of mean adult abundance between 2035 and 2065 under the model assumptions of consistent annual stocking for 25 years following program inception and no natural recruitment results in inflated annual release numbers. Since the range of adult abundance values used to

³ Within the context of the modeling, adult sturgeon are age 25 and older. Using the model Life Table age 25 White Sturgeon are 192.5 cm FL.

⁴ Maximum length group in Cox and Schade (2014) abundance estimates and corresponds with mean size at maturity in Beamesderfer et al. (1995).

⁵ Table A-6 in Cox and Schade (2014).

⁶ Hildebrand Memo to Hillman titled Updated white sturgeon adult abundance projections in the Wanapum, Priest rapids, and Rocky Reach reservoirs and dated February 4, 2016.

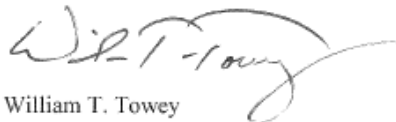
⁷ See Table 1 in Beamesderfer and Anders Technical Memorandum to Yakama Nation Fisheries dated January 8, 2016.

generate the mean extends beyond the period after which fish are recruiting to the population, the cumulative abundance declines⁸. Their inclusion in the calculation drives the mean lower providing for higher release numbers.

- The yearly cumulative adult abundance values are not normally distributed and no statistical justification is provided for the use of arithmetic mean adult abundance.
- The SOA assumption that the proposed stocking will result in *...long-term average adult abundances "falling around" the Bonneville Reservoir-based adult abundance target...* will only happen if stocking is discontinued within 25 years of the program's start and natural recruitment is not restored. In addition, the decline to the target abundance occurs only after the abundance has peaked at levels substantially greater than the target.
- The SOA states that *... long-term average adult abundances within ±20% of the Bonneville Reservoir-based adult abundance target are considered an acceptable stocking and harvest rate scenario*. The appropriateness of this range was not agreed upon by the PRFF or Committee.
- The abundance of hatchery White Sturgeon originating from the Columbia River Inter-Tribal Fish Commission releases conducted in 2003 in the Rock Island Reservoir that are currently residing in the Wanapum and Priest Rapids reservoirs were not accounted for in model runs. Had they been included, the projected abundance values would have been reached with lower release numbers. They were excluded from the modeling because WDFW intends to remove substantial numbers of them within the near future. There is considerable uncertainty associated with the implementation and effectiveness of this program.
- The size of the fish at release and release timing (i.e., late spring) should be specified along with the release number in Item 2 of the Recommendations. The high survival rate value modeled was associated with a 200 g size at release.

This letter summarizes our primary concerns associated with the SOA. Despite all parties' best intentions, the SOA was crafted without a thorough discussion of some important factors that influenced the stocking rates. Our expectation is that future agreements related to the release numbers of hatchery White Sturgeon associated with the Priest Rapids project will address our concerns.

Respectfully,



William T. Towey
PRFF Policy Representative

⁸ See Figures 3-5 in Hildebrand Memo.