FINAL

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ANCHOR QEA

Memorandum

To: Wells, Rocky Reach, and Rock Island HCP Hatchery Committees, and Priest Rapids Coordinating Committee Hatchery Subcommittee

Date: July 20, 2022

From: Tracy Hillman, HCP Hatchery Committees Chairman and PRCC Hatchery Subcommittee Facilitator

cc: Larissa Rohrbach and Kristi Geris, Anchor QEA, LLC

Re: Final Minutes of the June 15, 2022, HCP Hatchery Committees and PRCC Hatchery Subcommittee Meetings

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plan Hatchery Committees (HCP-HCs) and Priest Rapids Coordinating Committee's Hatchery Subcommittee (PRCC HSC) meetings were held in person at Douglas PUD Headquarters in East Wenatchee, Washington, on Wednesday, June 15, 2022, from 9:00 a.m. to 3:30 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

Long-Term Action Items

Joint HCP-HCs and PRCC HSC

- Mike Tonseth will distribute the analysis showing feasibility of the Methow spring Chinook Salmon Outplanting plan based on historical run size data (Item I-A). (*Note: This item is ongoing; expected completion to be determined.*)
- Kirk Truscott will work with Confederated Tribes of the Colville Reservation (CTCR) staff to develop a model that addresses the probability of encountering natural-origin Okanogan River spring Chinook Salmon at Wells Dam (Item I-A). (*Note: This item is ongoing; expected completion date to be determined.*)
- Kirk Truscott will determine the number of scales that should be collected from spring Chinook Salmon at Wells Dam for elemental signature analysis to discern Okanogan River spring Chinook Salmon from Methow River spring Chinook Salmon (Item I-A). (*Note: This item is ongoing; completion depends on the outcome of the previous action item.*)
- Keely Murdoch and Mike Tonseth will obtain estimates of pre-spawn mortality from Andrew Murdoch to update the retrospective analysis for Wenatchee spring Chinook Salmon (Item I-A). (*Note: This item is ongoing; expected completion date to be determined.*)

- Mike Tonseth and Greg Mackey will solicit input from hatchery managers on effective methods to count surplus fish (Item I-A). (*Note: This item is ongoing; expected completion by early 2022 for incorporation into Broodstock Collection Protocols.*)
- Members of the HCP-HCs and PRCC HSC will discuss potential hatchery management changes for rearing and release of Methow summer Chinook Salmon following completion of the 10-year Comprehensive Reports (Item II-A). (*Note: This item is ongoing.*)

Near-Term Action Items (to be completed by next meeting)

Joint HCP-HCs and PRCC HSC

- Todd Pearsons and Catherine Willard will revise Grant and Chelan PUD's draft Statements of Agreement on Sockeye Salmon Obligation for approval in an upcoming meeting (Item I-A). (*Note: This item is ongoing.*)
- Mike Tonseth will distribute updated interim draft Broodstock Collection Protocols no later than June 27, 2022, for email approval by the Committees.

Wells HCP-HC

- Greg Mackey will re-evaluate modeled release size for steelhead in the Twisp River to achieve proportion of hatchery-origin spawner (pHOS) targets established by the updated Hatchery and Genetic Management Plan (Item II-A).
- Brett Farman will reach out to Craig Busack (NMFS) to evaluate use of natural-origin fish in broodstock to meet the current production levels and the implications meeting steelhead Proportionate Natural Influence (PNI) targets in Methow Basin conservation areas (Item II-A).
- Tom Kahler will examine passive integrated transponder (PIT) tag records for overlapping distributions of spring Chinook Salmon and summer Chinook Salmon spawners in the Methow River (Item II-A).
- Tom Kahler and Greg Mackey will distribute additional information and initiate outreach to individual Wells HCP-HC members by June 24, 2022, to resolve outstanding concerns with Douglas PUD's recalculation implementation plan (Item II-A).

Rock Island/Rocky Reach HCP-HCs

- Bill Gale and Kirk Truscott will respond via email to indicate whether they approve *Chelan PUD's Draft Statement of Agreement on Hatchery Compensation, Release Years 2024-2033* (Item III-A).
- RI/RR HCP-HC will respond to Catherine Willard with feedback on the proposed Wenatchee Steelhead Escapement Modeling approach (Item III-B).
- Tracy Hillman will reach out to Brett Farman and Kirk Truscott to determine whether they support Chelan PUD's proposal to live spawn female Wenatchee steelhead at Eastbank Hatchery in 2023 (Item III-C).

PRCC HSC

- The Joint Fisheries Parties will prepare a draft Statement of Agreement for the recalculated hatchery compensation implementation plan for Grant PUD's programs by June 24, 2022.
- Tracy Hillman will distribute a draft set of questions for the PRCC and PRCC Policy Committee by June 30, for discussion in the July 20, 2022, meeting.

Decision Summary

- None.

Agreements

- None.

Review Items

- The 10-Year Comprehensive chapter addressing Objective 5 for spring and summer Chinook Salmon was distributed by Larissa Rohrbach for review on May 5, with comments due to her by June 30, 2022.
- The draft *2021 Chelan PUD and Grant PUD Monitoring and Evaluation Report* was distributed for 30-day review on June 16, with comments and edits due to Tracy Hillman by Thursday, July 14, 2022.
- A draft set of questions for the PRCC and PRCC Policy Committee were distributed on June 28, with suggested edits due to Tracy Hillman by Friday, July 15, 2022.

Finalized Documents

- None.

I. Welcome

A. Agenda, Announcements, Approval of Past Minutes

Tracy Hillman welcomed the HCP-HCs and PRCC HSC. In-person attendees announced themselves for attendees on the phone. Hillman reviewed the agenda and asked for any additions or changes to the agenda. In response to a request during the June 6 extra conference call, the agenda was divided to allow time for each PUD to discuss recalculation implementation plans individually.

The following additions were made to the agenda:

- An update on Goat Wall Acclimation Site outcomes for 2022 and next steps for planning activities in 2023.

- Update on Draft Interim Broodstock Collection Protocols for summer Chinook Salmon and steelhead.

The HCP-HCs and PRCC HSC reviewed the revised May 18, 2022, meeting minutes at the end of the meeting. Outstanding comments were reviewed and addressed. HCP-HCs and PRCC HSC representatives present approved the May 18, 2022, conference call minutes, as revised. Kirk Truscott and Brett Farman approved by email following the meeting.

Action items from the HCP-HCs and PRCC HSC meeting on May 18, 2022, were reviewed and discussed at the end of the meeting *(Note: Italicized text below corresponds to action items from the previous meeting*).

Joint HCP-HCs and PRCC HSC

Long-term

- Mike Tonseth will distribute the analysis showing feasibility of the Methow spring Chinook Salmon Outplanting plan based on historical run size data (Item I-A).
  This item is ongoing; expected completion to be determined.
- Kirk Truscott will work with CTCR staff to develop a model that addresses the probability of encountering natural-origin Okanogan spring Chinook Salmon at Wells Dam (Item I-A).
  This item is ongoing; expected completion date to be determined.
- Kirk Truscott will determine the number of scales that should be collected from spring Chinook Salmon at Wells Dam for elemental signature analysis to discern Okanogan spring Chinook Salmon from Methow spring Chinook Salmon (Item I-A).
  This item is ongoing; completion depends on the outcome of the previous action item.
- Keely Murdoch and Mike Tonseth will obtain estimates of pre-spawn mortality from Andrew Murdoch to update the retrospective analysis for Wenatchee spring Chinook Salmon (Item I-A).
  This item is ongoing; expected completion date to be determined.
- Mike Tonseth and Greg Mackey will solicit input from hatchery managers on effective methods to count surplus fish (Item I-A).
  This item is ongoing; expected completion by mid-2022 for incorporation into broodstock collection protocols (BCPs).

Near-term (to be completed by next meeting)

- Larissa Rohrbach will file and distribute 10-year Comprehensive Review chapters and comments to the HCP-HCs and PRCC HSC for review as they are completed (Item I-A).
  The final chapter addressing Objective 5 for spring and summer Chinook Salmon was distributed for review on May 5, 2022, with comments due by June 30, 2022.

- Todd Pearsons and Catherine Willard will revise Grant and Chelan PUD's draft Statements of Agreement (SOA) on Sockeye Salmon Obligation for approval in an upcoming meeting (Item I-A).
  This item is ongoing.
- The PUDs will note in the final implementation plan documents that production implemented by tribal partners (Yakama Nation [YN] and CTCR) to meet the PUDs No Net Impact (NNI) mitigation obligations will be identified separately in future sensitivity analyses and implementation plans in future recalculation efforts (Item II-A).
  This item is complete.
- Members of the HCP-HCs and PRCC HSC will discuss potential hatchery management changes for rearing and release of Methow summer Chinook Salmon following completion of the 10-year Comprehensive Reports (Item II-A).
  This item is ongoing; to be moved to the long-term action items.
- The Joint Fisheries Parties (JFP) will provide counterproposals for the respective PUD proposed implementation plans by May 27, 2022, the PUDs will review the counterproposals by June 3, 2022, and the HCP-HCs and PRCC HSC will convene by conference call on June 6, 2022, from 2:00 p.m. to 4:30 p.m., for further discussion (Item II-A).
  This item is complete.
- Douglas PUD and Chelan PUD will search for their respective Settlement Agreements for a full discussion of NNI mitigation, as cited in the Biological Assessment and Management Plan (BAMP)[1], and will post the agreements to the HCP-HCs extranet site for review (Item II-A).
  Catherine Willard noted that Chelan PUD's HCP Agreement has no definition of NNI mitigation. Douglas PUD's Wells Dam Settlement Agreement was distributed and filed on May 20, 2022. This item is complete.
- Douglas PUD will inquire about using Douglas PUD Headquarters in East Wenatchee, Washington, as the primary meeting place for the HCP-HCs and PRCC HSC monthly meetings (Item IV-A).
  The Douglas PUD Auditorium has been reserved for the next three meetings. This item is complete.

II. Wells HCP-HC

A. Hatchery Production Recalculation: Douglas PUD's Implementation Plan Revisions

Greg Mackey said for the steelhead and summer Chinook recalculated programs, fish numbers are not in question: 17,111 steelhead and 35,467 summer Chinook Salmon. This is a discussion about implementation rather than numbers.

[1] Biological Assessment and Management Plan: Mid-Columbia River Hatchery Program, April 1998.

Summer Chinook Salmon

Mackey said that the JFPs proposed amendments (dated 5/27/2022; Attachment B) were to move summer Chinook Salmon to Carlton Acclimation Facility for overwinter acclimation. Douglas PUD is not willing to do that but is willing to be flexible on implementation options. Since the June 6, 2022, conference call, Tom Kahler has spoken with Kirk Truscott, Keely Murdoch, and Bill Gale to try to resolve this issue. Douglas PUD has invested tens of millions of dollars into their facilities in recent years. It's difficult to convince the Douglas PUD Commissioners that fish should be reared in other facilities when Douglas PUD owns facilities that would allow a viable program to be operated for summer Chinook Salmon enhancement. Mackey said Douglas PUD wants to attempt to be flexible to come to agreement on this. Mackey then described potential options, as follows:

- The first option would be to rear the summer Chinook Salmon at Wells Hatchery, then drop plant them in an agreed-upon location, similar to how many other hatcheries operate. Drop planting allows for flexibility in location. This approach could also create an opportunity to compare fish reared at Wells Hatchery to Carlton-acclimated fish. Some of the Wells fish may return back to the Wells Hatchery. If they are marked independently (e.g., using coded-wire tags [CWT] only; all Chinook Salmon are ad-clipped with CWT), they could be returned to the river, or they could be used in broodstock in lieu of wild fish because they are only one generation removed from wild fish.
- Another option is to rear the juveniles at Wells Hatchery and acclimate them at Methow Hatchery. This would acclimate the fish farther upriver than a release in the vicinity of Carlton. Although there are concerns about summer Chinook Salmon moving up higher in the system (co-located with spring Chinook Salmon) spring Chinook Salmon home to that hatchery extremely well. Therefore, many summer Chinook Salmon are likely to home to the hatchery as well. The trapped summer Chinook Salmon could be removed or released; it would be a management decision how to use them.

Keely Murdoch said the YN do feel like Carlton Acclimation Facility is the most appropriate and responsible location to acclimate and release summer Chinook Salmon into the Methow Basin. Murdoch said they are open to rearing at Wells Hatchery and drop planting. Murdoch said she thought there are problems with the feasibility of rearing small groups of fish at Wells Hatchery, particularly if prioritizing the steelhead plan, and because of that, it was a choice to rear one or the other species at Wells Hatchery. Murdoch said that option would be more responsible than acclimating summer Chinook Salmon at Methow Hatchery because of concerns about overlap in spawning distribution with spring Chinook Salmon in the vicinity of the hatchery, even though numbers of summer Chinook Salmon spawners for the program would be low. Murdoch said she understands that the ladder to Methow Hatchery could be opened to let summer Chinook Salmon in, but this doesn't comport well with this being an NNI mitigation program to supplement wild

spawning. Murdoch said she doesn't fully appreciate why it's so complicated for Douglas to rear fish at Carlton Acclimation Facility.

Mike Tonseth said he agrees with Murdoch that Carlton Acclimation Facility is most appropriate for rearing the summer Chinook Salmon component that should be in the Methow River, but understands the complexities of entering into agreements between PUDs. Tonseth said he hopes to discuss more detailed implementation options if acclimation at Carlton Acclimation Facility is not an option. Summer Chinook Salmon may be the easier of the two species (summer Chinook Salmon vs. steelhead) to resolve, but the steelhead may be the priority conversation program to have.

Farman said his opinion is aligned with Murdoch and Tonseth.

Gale said figuring out the plan for steelhead is the priority. They are a listed fish and he would not want to sacrifice implementation for steelhead to avoid an agreement to rear fish at Carlton Acclimation Facility. Gale said he is open to drop planting summer Chinook Salmon into the Methow Basin but wants to have agreement on the steelhead piece first. Gale said he is not keen on rearing summer Chinook Salmon at Methow Hatchery.

Mackey said it does not make sense to have NNI programs that use wild broodstock when mitigating for passage losses to smolts released from safety-net hatchery programs, especially when the adult progeny need to be removed from the system upon return. Regarding steelhead rearing at Wells Hatchery, yes, there are limited spaces for rearing small groups. Douglas PUD would need to use the circular tanks for rearing the steelhead NNI programs or the summer Chinook NNI program. There is not space to accommodate both the JFP-proposed 40,000 steelhead and an additional 35,000 summer Chinook (but could accommodate 20,000 steelhead plus 35,000 summer Chinook).

Tonseth said he shares the concern about the potential overlap in the spawning distribution of summer Chinook Salmon and spring Chinook Salmon in the Methow River. In 2011, he produced a white paper for the PRCC HSC that showed very few natural origin (NOR) and hatchery origin (HOR) summer Chinook Salmon have spawned upstream of the Methow River bridge in Winthrop. This conclusion was based on a relatively short spring acclimation period at Carlton Pond as it was formerly operated by Chelan PUD. That does not reflect how summer Chinook Salmon acclimation at Carlton Acclimation Facility is being operated now. That analysis could be revised using more contemporary data with the overwintering program at Carlton Acclimation Facility to see if there has been a change in distribution of HOR spawners. That might help in understanding what a direct release option or a spring transfer to the Methow River might yield versus overwintering in the Methow Basin. Kahler said he has talked to Kirk Truscott about this. We can determine where fish end up or how they have travelled around the basin by reporting recoveries of CWT and recoveries and detection histories of PIT tags; although, surveyors have not been scanning carcasses for PIT tags throughout the duration of the carcass survey program. PIT tagging of the Carlton releases started with release year 2011. Approximately 300 PIT-tagged adult summer Chinook Salmon have returned

to the Methow from the Carlton releases. Tonseth asked if female carcasses are georeferenced, and if so, he could replicate the same work he did in 2011 to see how that comports with the PIT-tag data. Kahler said, looking at recent summer Chinook Salmon spawner reports, the average carcass collection in reach M6 is 1 fish, for reach M5 it's 11 fish, so most of the hatchery spawners do not move into M6. Kahler said, whatever the decision is for the summer Chinook Salmon and steelhead programs, Douglas PUD remains committed to monitoring those fish after they are released to alleviate concerns and evaluate where fish from various hatchery programs end up.

Steelhead

Mackey summarized that the number for NNI mitigation steelhead is 17,111. For Douglas PUD, that is the number of Methow Conservation Program fish. Douglas PUD also has the two steelhead safety-net programs in the Methow and Columbia rivers that are also at play. The big issue is somehow incorporating fish to allow the continuation of a comparison of Winthrop National Fish Hatchery (WNFH) S1 (age-1 smolt) and S2 (age-2 smolt) fish in the Twisp River (by supplying approximately 20,000 S1 fish for WNFH and release into the Twisp River). Mackey said Douglas PUD is willing to do different things, but they are not sure what the common ground will be to move forward. Mackey described the following potential options:

- Douglas PUD would be happy to supply Methow Safety Net program S1s to WNFH.
- Another approach could be to move the NNI mitigation component of Douglas PUD's production to WNFH to avoid putting any Conservation Program fish in the Twisp River.
- A third option is for WNFH to put a matching number in the Twisp River with Douglas PUD's release.

Gale asked about the comment that the Methow Conversation Program is made up of NNI mitigation fish, noting that he is not aware of language in any agreement (HCP or otherwise) that says NNI mitigation fish would only be used for conservation programs and inundation mitigation fish would only be used for fisheries, but it seems like that is Douglas PUD's position. The JFP are trying to decide what's needed and trying to assign fish to programs that make the most sense. Mackey said he has no knowledge of documentation to disagree with Gale's point. It is not well-defined, and those concepts were not in play at the time the HCPs were developed. There is nothing that clearly indicates that one type of mitigation fish (NNI or Inundation) be used for conservation or harvest. In the past, fish were managed as one huge harvest program that started to shift toward conservation with the incorporation of wild fish. As the objective of the programs has changed, it has created problems for the PUDs. Mackey agreed there is no clear correct answer to how mitigation fish are allocated. Gale said steelhead production in the Twisp River for conservation supplementation is a higher priority than harvest in the mainstem Columbia River or maintaining the size of the Methow Safety Net program, and why fish were re-allocated from the Methow Safety-Net Program to fill out the Methow Conservation Program. Gale said he agrees with Douglas PUD that the sizing of the program should be evaluated and wants to work with the PUD to develop an

evaluation and set a timeline for making a decision for potentially reducing the Twisp River production. At this time, the USFWS wants to maintain the S1 to S2 evaluation that we have already started.

Murdoch said she agrees with most of what Gale has said. The YN believes that how mitigation fish are used (whether in conservation programs, safety-net programs, or harvest supplementation) is really a management decision. Murdoch said she would like to see the Twisp releases remain at 40,000 fish and supports maintaining USFWS's S1 to S2 comparisons. The YN is not prepared to agree to reducing the Methow Conservation Program down to just 17,000 fish. Kahler said the Twisp Conservation Program would include the S2 component from WNFH, too, not just the 17,000 from Douglas PUD. Therefore, it would be at least 34,000 total released to the Twisp.

Gale said a paired release of S1s and S2s at WNFH and the Twisp River is needed to effectively evaluate the two release locations. While there are WNFH releases that could be shifted, a similar sized release of S1s and S2s is needed at both locations. Mackey said Douglas PUD can continue to do the Twisp River release, as it is done now. The crux is moving S1s to WNFH to continue the S1 to S2 comparison. Beginning in 2017, Douglas PUD moved half the S1s previously destined for the Twisp, to WNFH to address the Ryman-Laikre issue. Because there were Douglas PUD's S1s being released at WNFH, and USFWS's S2s were already there, it made sense to compare the two. In terms of looking at it as a study, it is confounded by rearing of the S1s at Wells Hatchery unless the comparison is really between Methow Conservation Program S1s reared at Wells Hatchery with S2s reared at WNFH. Gale said one of the questions driving the comparison is what's the value of releasing mixed age groups within a conservation program. The results may show that S1s at Wells Hatchery might have slightly better survival in some years, and in other years they might be the same, or, in some years the S2s from WNFH may perform better. It's probably a good thing to broaden the base of the adult returns and hedge bets on the risk to returning fish. Gale said he is worried about replacing the current WxW S1s at WNFH with Methow Safety-Net steelhead because of concerns about how much those fish may move into the upper basin conservation zones and looking to reduce the size of the safety-net program and move Wells S1s to WNFH for release.

Mackey said another option for setting up the S1 to S2 comparison, rather than to make a management action, could be to transport a PIT-tagged lot of about 5,000 S1 fish from Wells Hatchery for release. Because of the rearing space provided by the two circular tanks, up to 24,000 yearlings could be raised for a larger number of fish to be released in the Twisp River (17,000 to 19,000 steelhead), with the rest reserved for release as a PIT-tagged group in the Methow River for comparison. Douglas PUD would prefer to contain the Methow/Twisp Conservation Program to the two circulars tanks. The NNI mitigation obligation also tends to correspond with the tank rearing space. If the Twisp steelhead program is about 20,000, two of the circular tanks could be used for summer Chinook Salmon and two for the steelhead NNI mitigation/conservation program.

Kahler said there are relative reproductive success (RRS) study results pending that should inform what would be an appropriate release number in the Twisp River. In the meantime, when considering "conservation production" and how much of it to do in the Methow Basin, the Committee is effectively considering how many wild steelhead to exclude from the spawning grounds in order to meet broodstock targets, balanced by the need to meet the proportion of hatchery-origin spawners (pHOS) objectives, which have been talked about in the previous meeting. If we are truly interested in comparisons, it's really the PIT-tagged group size that is critical to consider if making comparisons between the S1 an S2 releases, rather than total release numbers.

Tonseth said rather than wait for pending genetic data that inform RRS, the programs should continue on the current course until the data suggest changing course, which is why the JFP's proposal suggested a 40,000-steelhead release in the Twisp River. This is lower than the current release of 48,000, but not a huge deviation. Tonseth said he has concerns about making a decision based on data that are not available yet. Farman supported Tonseth's position.

Mackey said based on this discussion, Douglas PUD does not have a path forward to resolve steelhead recalculation at this time. When designing the Twisp steelhead RRS study, Mackey said he modeled a release size for steelhead and came up with a number of about 25,000 to achieve a pHOS of 0.5 in the Twisp River without having to do adult management. On average, if 25,000 hatchery steelhead were released, about 50% hatchery and 50% wild fish would return. When releasing 48,000 wild-by-wild steelhead, there was a need to remove adult hatchery fish, and returning progeny of wild-by-wild fish were removed. The new pHOS objective with the recent Biological Opinion (BiOp[2]) and permit[3] is lower, at 0.20 for al conservation programs combined (5% is allowed for safety-net fish), suggesting that there will be a larger number of steelhead spawners that will need to be removed, which is a piece of information that should be considered. Without a comprehensive management plan designed to meet pHOS requirements, the Committee is relying on unavoidable dam mortality recalculation to drive program size rather than quantitative fisheries assessment of what is needed to achieve management objectives; however, this doesn't pan out ultimately because NNI is replacing both wild fish, which are a minority of the fish being mitigated for, and federal hatchery releases, which are the majority of fish being mitigated for. Tonseth suggested that the committee review the modeled release-size information Mackey mentioned that originally was developed to have enough returning hatchery fish to meet the evaluation requirements of the RRS study. If the RRS is done, there may be a need to reconsider what an appropriate hatchery program size should be for the Twisp River. Tonseth said he is not willing to back off of the 40,000-fish release now, but it would be informative for the committee to revisit those data. Mackey agreed to revise

[2] Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation. Two Steelhead Hatchery Programs in the Methow River. NMFS Consultation Number: WCR-2017-6986. October 10, 2017.

[3] NMFS Section 10(a)(1)(A) Permit for Takes of Endangered/Threatened Species. Wells Complex Summer Steelhead Program. Permit Number 23163. December 17, 2019.

and share the analysis of the optimal number of fish to be released in the Twisp River while maintaining pHOS targets.

Hillman asked about Kahler's comment that the wild steelhead population could be "mined" for broodstock to be used in hatchery programs and distributed elsewhere. Kahler said that for the upper Methow, Twisp, Libby-Beaver-Gold, and Chewuch spawning aggregates (conservation management areas), the pHOS targets are 0.20 (plus 0.05 for safety-net fish). The lower Methow Basin does not have a pHOS target as long as the overall basin has a PNI of 0.67 using the multi-population PNI model, and not more than 0.05 of spawners in the conservation areas should be of Methow Safety-Net Program origin. In the Twisp River, where there is a weir, WDFW has been doing a good job managing the number of spawners to maintain pHOS, but still the Methow Basin pHOS targets have been significantly exceeded for safety-net fish. In the initial years of the permit, there was a grace period that ends this year, understanding that returns would continue to arrive from the previous management approach. The challenge is that pHOS targets have not been met in the basin primarily because it's not met in the conservation management areas. Mitigating for steelhead production in the Methow River, most of which is mitigation for WNFH production, would dictate the use of wild broodstock, which would be removed from the natural spawning population and, depending on the program, their progeny may also be removed upon return. Of course, the goal of the conservation program is to produce more wild-by-wild progeny than if the broodstock remained on the spawning grounds, but at some point, we are definitely mining the naturally spawning population. In the steelhead population dynamics section of the 10-year Comprehensive Report, it was found that they are well below replacement. Adding more fish would not solve this problem given that finding, which is not new, but probably getting worse over the past 12 years.

Hillman asked Farman if this is a concern to NOAA. Farman said he would reach out to Craig Busack (NMFS) for his opinion on this since this veers strongly into genetics. The issues are very site specific for making a decision on whether to pull fish into broodstock versus keeping wild fish on the spawning ground. Mackey said he would be glad to talk with Busack, and that he, Gale, and Charlene Hurst worked together to develop that pHOS and PNI objective for the Hatchery and Genetic Management Plan and permit.

Kahler said, as an aside, incorporation of the reconditioned kelts has never been considered in the PNI model. Murdoch suggested that Matt Abrahamse (YN) could likely provide the number of reconditioned kelts in the system each year, and in the PNI model they would be assumed to be wild fish spawners. Murdoch said the naturally spawning kelts from the kelt reintroduction program should be considered in the pHOS equation. Depending on where they are released, they are not being included in the natural spawning equation. If they were collected at Rock Island Dam, they would be released far downstream. Kelts that are live-spawned and released into the Methow River may escape the detection points that are used to enumerate natural-origin spawner escapement. In years where there are very few natural-origin spawners, a small number of kelts actually can

contribute to the overall pHOS. The RRS data that have been shared by WDFW, but are not yet in reports, showed the kelts had higher reproductive success than first-time spawners and should be included in the pHOS equation. This may not make a difference on the whole basin PNI, but they could make a difference for spawning aggregates where there are small numbers of natural-origin spawners. Kahler said he appreciates the information about kelts. He said in the PIT-tag records, they observe fish with no evidence of them moving through the hydrosystem and then they contribute to spawning; those are the kelts. They are not being included in the various models based on PIT tagging at Priest Rapids and are not being accounted for.

Murdoch said, on the issue that steelhead productivity is below replacement rates and the position that there should be fewer hatchery fish, there is also a concern that until life-stage specific bottlenecks have been identified to better understand why replacement is not met, we cannot expect hatchery programs to fully replace those fish, but the hatchery programs buy us time to find those bottlenecks (for instance, whether they occur in the Methow River, at the hydro-projects, in the estuary, etc.). Murdoch said the YN has concerns about stopping supplementation when there is a lack of replacement, which could exacerbate a downward spiral for the population. The YN also has a desire to keep using broodstock that does not negatively affect the population, as much as possible. Kahler said there is some value to supplementing with hatchery fish to "buy time," but a concern from various RRS studies, particularly for steelhead, is that hatchery fish are not contributing because they have lower RRS, so much so that the Hood River supplementation programs have been discontinued. Of all the salmonids that have been studied, it seems that hatchery steelhead have lower productivity than natural steelhead. One of the bottlenecks in the Methow Basin could in fact be low RRS of hatchery fish. These programs are long-standing and the new NNI mitigation number is approximately double the previously calculated NNI number (8,000). With an increase in the number of Wells Hatchery steelhead, productivity of the hatchery-origin fish continues to be a concern.

Mackey said he and Kahler will assemble the information needs discussed today, including the following:

- Greg Mackey will re-evaluate modeled release size for steelhead in the Twisp River to achieve current pHOS targets.
- Tom Kahler will examine PIT-tag records for overlapping distributions of spring Chinook Salmon and summer Chinook Salmon spawners in the Methow River.

Mackey and Kahler will coordinate outreach to individual members later next week. If necessary, a special conference call of the Wells HCP-HC may be convened. They thanked committee members for their input on the issue.

III. RI/RR HCP-HC

A. Hatchery Production Recalculation: Chelan PUD's Revised Implementation Plan for Approval

Hillman reviewed the progress in Chelan PUD's recalculation approach, noting that Chelan PUD essentially accepted the JFP's suggested amendments to their implementation plan. Willard showed the draft SOA associated with the implementation plan, the notes associated with conversions between smolts and subyearlings, and background information on the timeline through the recalculation process. Tonseth thanked Willard for including the footnotes to help people doing recalculation in the future to better understand those species trades. No other questions or comments were raised.

Tonseth, Farman, Willard, and Murdoch approved the draft SOA. Gale said he would provide his approval via email at the same time as Kirk Truscott, who is on vacation (Truscott approved the draft SOA via email, while Gale responded via email that the USFWS would be unable to approve the SOA until Grant PUD's recalculation implementation plans were more clear [Attachment C]).

B. Wenatchee Steelhead Escapement

Willard provided an introduction to Elizabeth Ng (Four Peaks Environmental) and Rebecca Buchanan (Columbia Basin Research), who developed a novel approach to estimate steelhead spawning escapement for the Wenatchee Basin using a multi-state mark-recapture model. A presentation was given by Willard, Kevin See (WDFW), Ng, and Buchanan entitled *Wenatchee Steelhead Spawning Escapement Mark-Recapture Model,* which described the past and proposed future approaches to escapement modeling (Attachment D).

Willard explained that steelhead spawner escapement estimates in the Wenatchee Basin has previously been estimated using a mark-recapture patch occupancy model in the tributaries and observer-efficiency corrected steelhead redd surveys in the mainstem Wenatchee River. Kevin See (WDFW) began the presentation by describing the current approach used by Chelan PUD with WDFW. See noted that not all fish that have escaped to the mainstem Wenatchee River will become spawners; the number of spawners is inferred from outputs from the observer-efficiency expanded redd count data and mark-recapture estimates in the tributaries. Spawner escapement is subtracted from total escapement estimated for the mainstem Wenatchee and the tributaries to derive pre-spawn mortality.

Ng described a new multi-state mark-recapture approach predominantly based on PIT-tag detections to estimate spawn escapement in the Wenatchee subbasin which would eliminate the reliance on spawning surveys in the mainstem Wenatchee. Buchanan described the analytical objective and stepwise description of the approach. Buchanan explained that the transition probabilities in the model can be thought of as a combination of where the fish would like to go and

how successful they have been in getting there. In other words, it is the probability of targeting a specific region and arriving there at the right time to spawn (with adjustments for overwinter survival). Once the probability of escapement to a target portion of the watershed is obtained, the final step is multiplying fish counts at Rock Island Dam by escapement probabilities to obtain final spawning escapement estimates in terms of fish counts. Ng showed comparisons of the resulting escapement estimates between the currently used approach and the multi-state mark-recapture approach.

Willard finished by describing some of the challenges of relying on redd surveys for estimating escapement. She said WDFW does a great job with redd counts but environmental conditions like high flows, high turbidity, and dangerous conditions can impair their ability to collect accurate redd counts. The observer-efficiency model does adjust for environmental conditions that are not conducive to counting redds; however, if no redds are observed in a given reach, spawn escapement is counted as 0 for that reach and prespawn mortality would be estimated as 100%. With that said, there is a need to account for overwinter survival in the Wenatchee subbasin. As opposed to other tributaries like the Entiat River, Wenatchee River steelhead enter the system in the fall and overwinter, and not all of them survive. The new approach uses radio telemetry based prespawn mortality estimates from Fuchs et al. (2021) to apply an overwinter mortality correction factor to the spawner escapement estimates.

Willard concluded that Ng and Buchanan hope to publish this approach by the end of the year. Chelan PUD will provide their program's 2023 hatchery monitoring and evaluation implementation plan in August, and plan to include this new method in their implementation plan. Spawner escapements are used to address Objective 1, Production. During this last Comprehensive Report process, some modifications were made to be able to make comparisons across different methods within a dataset that could be done again in the future. Willard asked if there were any questions.

Mackey asked whether the mainstem spawner escapement and the tributary spawner escapements are dependent on each other; there would be a finite pool of fish, so if one group is larger, then the other could be smaller than it should be? Buchanan said they do depend on each other. The probability of escapement to the mainstem between lower Wenatchee and Tumwater PIT-tag arrays is dependent on the route selection through the mainstem, which in itself depends on the probability of moving to the tributaries or the upper mainstem. There is a little bit of correlation there and a limit to how large the mainstem escapement can be. Mackey asked if the model was run for many years into the future, whether better estimates of overwinter survival could be generated, and recursively use those in the model in the future, or whether that is confounded by use of the radiotelemetry-based overwinter survival at the beginning. Buchanan said there would have to be some other estimate of escapement to make that estimate of overwinter survival an emergent source. The probability of escapement to the tributaries is not dependent on overwinter survival. Estimated escapement to all regions upstream of the lower Wenatchee is highly dependent on overwinter

survival. The overwinter survival is used to estimate escapement to the mainstem. That overwinter survival value can have a big effect on escapement estimates.

Keely Murdoch asked about a 2% overshoot estimate, suggesting that data are available now to show that overshoot is significantly higher than 2%. The fish are not detected going toward their natal tributary later because they don't actually make it back to their natal tributary. Murdoch asked how these overshoots are treated in the model, whether they are included in overwinter survival or as part of the mainstem survival? Buchanan said if they cross Rock Island Dam, they would be included in the run count. If they don't move into the Wenatchee River, the model accounts for that and they would not be included in the model. If they do move into the Wenatchee River and are not observed again, they would be included in the Wenatchee River escapement, either in the mainstem or tributary escapement depending on where their last detection was. If they are observed going into the Wenatchee River and back out to the Columbia River, the model accounts for them. If they are detected at Rock Island Dam and not detected again, it would reduce both transition probability parameters coming out of Rock Island and the model would not count those fish as successful spawners in the Wenatchee Basin. They would be spread across the components of loss and lower the estimated probably of entering the lower Wenatchee River. Murdoch asked if there is an estimate of loss from Rock Island Dam to upstream detection points. Buchanan said a probability could be generated to estimate that. That would include mortality and unobserved fall-back. Murdoch asked, among the three different probabilities being generated, whether there are constants being generated from all the PIT-tagging efforts or if they are generated separately each year. Buchanan said the probabilities are generated separately for each year

Murdoch asked if Chelan PUD foresees this model replacing just the mainstem estimate from spawning surveys or also replacing the estimates to the tributaries. Willard said they foresee replacing it all because the estimates for the mainstem depends on the tributaries.

Tonseth asked, regarding the exclusion of repeat spawners from the model, how are repeat spawners identified and how are they accounted for in spawning escapement on the backside? Ng said for the first approach, any detections of fish detected at Priest Rapids Dam (PRD) outside of a calendar year were excluded to simplify that process. A determination for repeat spawners is made that for a fish that was tagged in a given year, all detections after the spring spawning period would have been excluded. After talking to See about how they process that, it would be fairly straightforward to include those moving forward. Tonseth said there's not yet a kelt reconditioning program in place for Wenatchee steelhead, but there are plans for one (see discussion of Item III-C). Tonseth asked whether the model is able to accommodate for inclusion of reconditioned kelts. Ng said yes, it's mostly a data processing problem. Buchanan said there would need to be a review of certain assumptions, but they should be able to be included.

Tonseth asked what the confidence intervals are in very low escapement years like the most recent 3 years? Ng said the confidence intervals are fairly comparable between the previously used method and this new method. There are some differences that could be examined more closely such as the estimates for the Chiwawa in 2020. Ng said some of the uncertainty may not be accounted for due to zeros recorded in some reaches in some years. Buchanan added that the error bars not only depend on the escapement level, but also on the number of fish that are tagged at PRD. There are times when sparse data in the tributaries rolls back into a broader confidence interval in the mainstem. Tonseth said the current method and this new method rely entirely on adults PIT tagged at PRD, and in recent years, the number tagged has been relatively low. He asked whether they have evaluated what a more desirable sample size would be for tagging HOR and NOR steelhead to achieve tighter confidence intervals. Tonseth added that the permits limit them to tagging 15% of the run annually. Buchanan said they have not looked at the sampling rates. Buchanan added that pooling some of the data reduces that uncertainty.

Tonseth noted that as part of generating an estimate of overwinter survival, fish that have been removed at Dryden or Tumwater dams for adult management are being removed from the model. He asked if there had been thought to correcting for fish removed by harvest in conservation fisheries. For instance, there were conservation fisheries in 2014, 2015, and 2016 that might account for some of the error in those years. Willard said they had not thought about that, and they can make that correction. Buchanan said it may not affect the overwinter survival. Rather, it may be a function of modifying the escapement model to account for the loss to the fishery. Tonseth said one thing to keep in mind is those fisheries target ad-clipped hatchery steelhead, but there are also ad-present hatchery steelhead and NOR that are lost due to hooking mortalities. The fishery can remove several hundred HOR steelhead, which can be more than are removed at Dryden or Tumwater dams for management.

Today's presentation on the proposed model was distributed following the meeting for attendees to review, and Willard asked committee members to reach out to her with questions prior to the next regular meeting.

C. Live Spawning Wenatchee Steelhead

Willard said the YN have approached Chelan PUD to expand their kelt reconditioning program to incorporate the Wenatchee NOR brood at Eastbank Hatchery. The USFWS live spawn steelhead at WNFH using a hormone to stimulate final maturation. Right now, the YN kelt reconditioning facility is in the Methow Subbasin at WNFH. The YN has approached Chelan PUD about building out a facility located at the Rocky Reach Annex. The YN doesn't want to move forward with expanding their facilities for the Wenatchee brood until they know this is a direction the HC is comfortable with. Willard said she is asking the Rock Island and Rocky Reach HCP-HCs for approval to live spawn

steelhead at Eastbank Hatchery so that they could be incorporated into the YN kelt reconditioning program.

Murdoch said the kelts are mainly obtained at WNFH, and fish are collected at Rock Island Dam, transported to WNFH, and brought back to Rock Island Dam. They have considered the idea of tributary weir collection.

Tonseth asked if it would include males, too. Murdoch said this has primarily been done on females, but the YN doesn't want to limit the approval to female kelt reconditioning, only. Tonseth said his approval to live spawn males is conditional on WDFW's Fish Health staff review of the protocols. At this time, we have the ability to sample ovarian fluid, so he would be comfortable approving for live spawning females. Gale said he approves, but asked Matt Cooper to provide his opinion. Cooper said they've been doing this successfully at the WNFW and last year obtained the approval from USFWS Fish Health staff to live spawn males as well. Willard agreed to obtain more information from the fish health professionals. Megan Finley (WDFW Fish Health veterinarian for Eastbank Hatchery) has reached out to the USFWS for information.

Mackey asked how many of the wild females in the WNFH steelhead program get reconditioned. Murdoch said they try to recondition them all. Tonseth said within the context of a tributary, it is 50 to 55 females. Even if half of them are reconditioned, that can be a significant boost to PNI and pHOS depending on where they end up spawning.

All parties present approved moving forward with live spawning Wenatchee NOR steelhead at Eastbank Hatchery. Hillman will reach out to Brett Farman and Kirk Truscott to obtain their approval. He pointed out that they may have questions.

IV. PRCC HSC

A. Hatchery Production Recalculation:

JFP's response to Grant PUD's 6/6/2022 Revised Implementation Plan

Mike Tonseth said the JFP's response (Attachment E) did not appreciably change from the previously suggested amendments (Attachment B). Based on the language in the Priest Rapids Salmon and Steelhead Settlement Agreement (Settlement Agreement), inundation mitigation fish need to be replaced and need to be included in the NNI mitigation. The JFP did take a closer look at the Methow spring Chinook Salmon program, where fish were released and where they are expected to come back. The JFP modified Grant PUD's Methow Spring Chinook Salmon mitigation to maintain the current number of 134,000 fish total but changed where they are being released. There were small numbers of fish that were not included, and the JFP's proposal reallocated the difference to the Nason Creek Safety-Net program. Table 1 of the JFP's response shows this. Previously, approximately 197,000 were allocated to Nason Creek Hatchery and approximately 140,000 to the Methow

Hatchery. The JFP looked at the number from the Methow and Chewuch rivers as the primary management objectives. The JFP's response reduces the number in the Methow program to 134,000, with a smaller number (10,534) safety-net fish moved from the Nason Creek Hatchery and into the Methow Conservation Program. These were the only changes as a response to Grant PUD's latest proposal.

Todd Pearsons asked whether there would be text added to indicate this would not be precedent setting. Tonseth said that content is part of the second paragraph to ensure that an agreement made this time would not be precedent setting and recognizing that answers from the PRCC Policy Committee on the outstanding issues are not likely to be received in a timely manner. The JFP are recognizing that there is a need to obtain a response from the PRCC Policy Committee to resolve these issues. The JFP wanted to make it clear that we support obtaining clarification on those issues that are beyond the scope of the PRCC HSC. Pearsons said he appreciates that language on precedence being added here, which clarified things quite a bit for Grant PUD, and he would expect that type of language to be included in any SOA associated with this implementation plan. There is wordsmithing that is important to the different parties. A potential next step could be for the JFP to draft an SOA that incorporates the language and table from their response document.

Pearsons asked how JFP members decided that 195,000 Methow Composite (MetComp) spring Chinook Salmon were needed. Tonseth said the 195,000 is the MetComp program at Methow Hatchery (Methow and Twisp Conservation Program). The Twisp population doesn't really contribute to the MetComp or Methow Safety-Net Program, so they removed the Twisp program from the equation, recognizing that Douglas PUD's production goes into the Twisp River and Chelan PUD's production into the Chewuch River. Pearsons said one correction is that Grant PUD and Douglas PUD share their programs going into the Twisp River. Mackey said the confusion is historically the old NNI mitigation for Douglas PUD happened to be almost the exact same size as the Twisp River release. At that time, Douglas PUD had just entered into a new sharing agreement with Grant PUD. Douglas PUD's and Grant PUD's contributions are a mixed release into the Twisp River. Tonseth continued that some juveniles would be going into the YN acclimation program, some going into the Chewuch program, but that's the core component of the Methow Conservation Program that the JFP wanted to make sure it was maintained, including 134,000 at Methow Hatchery, and that is how they got to 195,000. Pearsons asked about the biological rationale. He asked is it being driven primarily by how many fish should be spawning in the natural environment or driven by the number that are needed for the WNFH program? Gale said it's not what is needed for WNFH program. We can meet the program needs. There are pHOS targets that are not being met, which means the 3-population PNI target it not met. If we reduce the Methow Conservation Program, WNFH won't be able to meet its broodstock targets with the preferred mixture that helps contribute to PNI goals that we've all signed off on for the basin. Pearsons said this is similar to the steelhead conversation. The concern is if too many NOR fish are taken from the natural environment to populate a safety-net program that

doesn't really contribute to conservation. It may be a population mining situation. Pearsons said he has a similar comment relevant to the Nason Conservation Program on the issue of whether too many NOR fish are being used for these conservation programs and whether the committees should consider reducing the NOR component of the production, relying not on descendants of NOR fish, but moving more fish into safety-net programs with fish that are a generation or more removed. The risk is in using more NOR fish than needed, which perform best on spawning ground, in order to make those safety-net programs whole. Gale said recalculation is not the place to initiate this conversation. Reallocating the entirety of the PUDs mitigation is not the time to do this. We all signed on to a paradigm of the multi-population PNI management only about 5 years ago and we don't have the results to respond to that at this time. We don't know if the results we see in the environment now are due to what we are doing now with this new model, or legacy issues from how we managed before. Now is not the time to make a change in management just because it's time to recalculate. Pearsons said a discussion on PNI and a commitment to resizing the programs has been suggested for both the Methow and Wenatchee for a long time. It's challenging because we can't get a lot of traction on this topic even though it has been on meeting agendas for years. So, the question is when is the right time to have these discussions if not during the time when program sizes are determined? Pearsons recommended that the JFP reconsider whether too many NOR fish are being used for the Methow Conservation Program and Methow safety-net programs. This is not something that will be a deal breaker for Grant PUD, but we haven't seen much change in the sizing of these programs, and we feel too many NOR fish are being used for these programs and not helping these populations recover.

Hillman asked if Grant PUD is disagreeing with the overall numbers, or disagreeing with the component of NOR fish that are being used to meet those numbers? Pearsons said we have questions about the numbers of fish being allocated to the Methow and Nason programs. There were requests that we provide information about numbers of fish needed to mitigate for Leavenworth National Fish Hatchery and WNFH, and a desire to reflect in-place in-kind mitigation. After allocating for the Entiat and Methow spring Chinook Salmon NORs with mitigation in the Methow, including the approximately 35,000-fish swap for steelhead, the in-place in-kind mitigation would be different than what the JFP are proposing, and Pearsons asked why that is. Tonseth said Pearsons is correct, that in-kind, in-place mitigation is not what the JFP are proposing. In-place, in-kind mitigation is always the starting point but not necessarily the end point. The JFP have to determine if any reallocation of fish is necessary to meet other obligations elsewhere. Pearsons said he is struggling because Grant PUD put forward a proposal, obtained suggested amendments, and not much of what Grant PUD proposed in response was retained. It doesn't feel like a consensus approach. It feels more like a take-it-or-leave-it counter proposal. Tonseth said the JFP started with in-kind in-place for spring Chinook Salmon mitigation and made adjustments to meet other objectives desired by other co-managers and also to meet funding agreements, including the funding agreements at Chief Joseph Hatchery (CJH) for 305,000 summer Chinook Salmon, even

though there was a strong position within the JFP that that production should be capped at 278,000. Pearsons said he understood that the summer Chinook Salmon and the steelhead are not in-place in-kind mitigation. Grant PUD was asked to provide numbers of spring Chinook Salmon coming out the Wenatchee and Entiat rivers, which seemed like moving toward in-place in-kind mitigation, but now the JFP have deviated from that. Tonseth said there was a fair amount of unavoidable project mortality mitigation for WNFH spring Chinook Salmon being allocated to Nason Creek Hatchery. The JFP's original proposal was close to in-place in-kind; mitigation for Entiat fish were placed into the Wenatchee River. We guessed that in Grant PUD's response the Entiat fish were placed in the Methow. Another reason to deviate from in-place in-kind was because of the steelhead numbers that were assigned to the Methow that were not in the original proposal. Pearsons asked how Grant PUD can potentially affect those numbers for allocating spring Chinook Salmon. Gale said some of the back and forth with the different amendments is how you've been engaged and how we allocated things. The JFP have moved things around but have also tried to respond to PUD concerns.

Gale asked if there is agreement on summer Chinook Salmon and steelhead, and if spring Chinook Salmon are really what the committee should be spending time discussing right now?

Pearsons said this amendment was only received on Monday and they are not prepared to respond on summer Chinook Salmon and steelhead at this time. Grant PUD still has questions about the spring Chinook Salmon at this time and have nothing new to discuss on summer Chinook Salmon and steelhead. Gale said those are the issues that are going to potentially cause this to be elevated to the PRCC Policy Committee and he does not want to spend more time than necessary talking about this if it needs to be moved up to policy. Pearsons said Grant PUD is trying to understand the sideboards of this process. Grant PUD is also trying to convey the message that the sizing of the conservation programs should be discussed, particularly because this is done every 10 years and it is hard within a 10-year period to make changes. We think it's important to have these kinds of discussions right now.

Pearsons said Grant PUD would like to see the in-place in-kind mitigation be split between Methow Hatchery and Nason Creek Hatchery for spring Chinook Salmon and asked if there's room for negotiation. Keely Murdoch said, as others have said, the JFP considered other management goals including spawning escapement and PNI goals. The YN also looked at what was happening in the Wenatchee River and would like to use any excess hatchery production in the Methow programs rather than having excess HOR fish be removed at Tumwater Dam. In the Methow River, they would go toward supporting the genetic connectivity between NOR and HOR populations. The JFP examined a lot of different things that made a lot of management and biological sense to us.

Hillman asked whether the question is about the number of fish or where the fish are reared? Pearsons said it's a bit more nuanced because the steelhead issue is being discussed within Grant PUD and he will not be able to discuss that until hearing back from others within Grant PUD.

The next tier down would be a discussion of how those fish are distributed. Hillman asked whether the distribution of fish will change if numbers change. He asked, is there a need to agree upon the numbers first? Pearsons said another way to ask this question is whether there is any room for adjustment of those allocations. Is there any room to move in the direction of in-place in-kind compared to the JFP's most recent response to the implementation plan for spring Chinook Salmon.

Tonseth said it's roughly 10,000 spring Chinook Salmon that is the component that is not being allocated as in-kind in-place mitigation. Pearsons agreed that is the number of fish being discussed. The JFP proposed a transfer of approximately 10,000 fish from the Nason Safety Net program to the Methow Conservation Program. Tonseth said this is where summer Chinook Salmon and steelhead come into the equation. If moving the Nason Safety-net component that were placed in the Methow back to Nason, that void in the Methow has to be filled at some capacity. The only way to do that would be convert some of the steelhead that were converted to summer Chinook Salmon at CJH to spring Chinook Salmon at Methow Hatchery. To achieve 134,000 spring Chinook Salmon at Methow Hatchery, the number of summer Chinook Salmon at CJH would have to drop to approximately 295,000. That is where flexibility is needed. Pearsons asked how the JFP's calculation of Grant PUD's obligation ended up at 134,000 as opposed to 124,000. Tonseth said part of that was maintaining a 61,000-fish release at Chewuch, which is what Chelan PUD contracts for. Pearsons said he sees that if the JFP needed to get to 195,000 and CPUD is producing 61,000, then 134,000 would need to be produced by Grant PUD or another party in the Methow.

Farman and Gale said they have nothing to add.

Pearsons suggested that the JFP draft an SOA, then Grant PUD would have to resolve at higher levels whether they can accept the suggested numbers. We know Grant PUD does not support the approach, which is why the language in the draft SOA cannot be precedent setting. Tonseth said it sounds like additional conversations are necessary for summer Chinook Salmon and steelhead. Pearsons said there has not been any real change in the organizations' positions. What it comes down to for Grant PUD is that this is not precedent setting, and we can deal with the policy issues in the future, but we just need to decide if we can deal with the numbers. Pearsons said an SOA can be developed and sent up to higher levels within Grant PUD with the language that this is not precedent setting and pointing to a process to resolve this. Tonseth said he expected that need for joint development of an SOA for the different parties to come to agreement on the language, but the JFP's perspective is that Kirk Truscott's input would be needed. Tonseth suggested presenting it as a draft JFP SOA, but it won't contain the full JFP position until Truscott returns after June 27, 2022. Pearsons said Grant PUD is not going to stop discussing the JFP's amendment while waiting for the SOA. An SOA will just help to make it more clear what they would be agreeing to.

Murdoch said she has one concern about the development of an SOA. In our JFP meetings, the YN has been very clear that YN does not support increasing Grant PUD's allocation of summer Chinook

Salmon to CJH (305,000 summer Chinook Salmon) until Carlton Acclimation Facility and Dryden Pond are full. There is still the moving piece of Douglas PUD's production for the Methow. This is why the JFP created a three-PUD implementation plan. In the JFP's suggested amendments, it was assumed the Carlton Acclimation Facility and Dryden Pond are full, so the YN approved. The YN will not allow that 305,000 summer Chinook Salmon be allocated to CJH unless the Methow is made full, and this issue may push out the timeline somewhat.

Tonseth agreed to prepare a draft SOA by June 24, 2022, and adjusting that timeline if necessary for the parties' internal discussions.

Farman raised a bigger picture issue with the frustration that Grant PUD didn't feel like they were as involved in discussions about the allocation of fish. Now we are talking about drafting an SOA from the JFP to Grant PUD. Farman said it seems like pushing the task off to the JFP is backwards if we are going to end up being hung up on this again. Pearsons said it seems to make sense to have the JFP draft the SOA because it is essentially their counterproposal. Pearsons said their frustration lies in not having much opportunity to make adjustments to the counterproposal. It feels like a take-it-or-leave-it offer with no opportunity for Grant PUD to be a part of adjusting those numbers. Murdoch said it took a long time to create the three-PUD joint proposal because the JFP were trying to meet so many needs, including fisheries management needs, management objectives, and needs of the PUDs. A lot of the things being shaped in that proposal were met by having many discussions with many people. Pearsons said creating the draft SOA will help to be able to communicate what Grant PUD is agreeing to. The JFP's suggested adjustments and Grant PUD's implementation plan counterproposal document are longer and have a lot of nuances that require a lot of explanation for communicating to higher levels within the PUD. Pearsons said the amendment was very useful for him at this level but is too much detail to pass up to higher levels. Farman said he understands what Pearsons is saying about making the message more succinct for communication. Pearsons said the numbers are not anticipated to change based on the JFP's position. The critical part is the exact language associated with the non-precedent setting and the next process that's going to occur to resolve these issues. Tonseth said he understands what Grant PUD would like to see.

Draft Request to the PRCC Policy Committee Recalculation for Grant PUD

Hillman said any policy-level questions regarding Grant PUD's recalculation would go first to the PRCC and then, if necessary, to the PRCC Policy Committee. Hillman projected a set of draft questions in the meeting that would go to the PRCC. The questions and discussion were as follows:

1. What stocks would be subject to mitigation?

Deanne Pavlik-Kunkel said she agrees that is the correct question to be asking. Hillman included details on potential projects and mitigation programs that would be subject to mitigation. Murdoch suggested making clearer what is meant by "inundation program mitigation." Hillman agreed to

include clarity around the details and perhaps a table showing the various programs that could be included. Pearsons said he likes the idea of the table, which would make it very clear but also not too general. Murdoch suggested adding the CJH mitigation for the component that is not Grant PUD's mitigation. Gale suggested that the table be not so specific to hatcheries, but types of hatchery programs, for example, Federal and mitigation for inundation, and Pearsons agreed. Gale suggested that it should be outlined at the beginning that there is a disagreement between the JFP and Grant PUD, and because of that we have these questions. Murdoch and Pavlik-Kunkel agreed that background with context will be very important.

Gale said we are not raising a dispute at this time. This will be raised as questions that need some clarity from the PRCC and PRCC Policy Committee. In the past when raising a dispute about an SOA, all the parties would have their party-position language attached to the SOA. Hillman agreed, if there is a dispute, the parties have to write a letter that would be attached with the SOA. Gale suggested including language in the background that by raising these questions, the HSC is trying to avoid a dispute.

Pearsons said the question is still getting at the definition of NNI mitigation. The language in the Settlement Agreement can be interpreted in a number of different ways. The clarification needed is what the language in the Settlement Agreement means as it relates to hatchery mitigation. The committees are trying to get away from using the sensitivity analysis.

2. What method should be used to estimate smolt-to-adult returns (SARs) for calculating NNI mitigation for natural-origin Covered Species?

Hillman reviewed some of the background and advantages and disadvantages of the various approaches. Hillman recognized the question needs to be rewritten to orient it toward policy-level decision-makers. Pearsons suggested reframing the question to what are the project effects that need to be mitigated.

Murdoch said we need to be careful with this line of questioning because this is where we get into mixing the calculation of juvenile project mortality (with the BAMP formula) and measurable project effect on adults, that language comes from the 2% and adult mortality. The YN position has always been that the fish need to be replaced for its entire life cycle, not just the juvenile portion of the life cycle. Murdoch asked to spend some time revising the language outside of the meeting. Depending on what happens with the SOA, these questions could be appended with the SOA or taken to the PRCC separately from the SOA. Willard said one thing to consider is that the HCPs dictate that the BAMP would be used initially but the committees would not necessarily be tied to it forever. This would be tied to the second question, whether it's necessary to use the BAMP.

Hillman will work on the questions and send an initial draft for review by the end of next week, with the opportunity to make adjustments to the language through the July meeting. Pearsons and

Pavlik-Kunkel said they will not be able to meet that timeline. Pearsons said it will be important to craft this carefully with a series of potential answers for the PRCC Policy Committee to respond to, so the Hatchery Subcommittee doesn't receive policy-speak that we still struggle to implement.

Hillman asked Gale to prepare a table showing the various types of hatchery programs that could be included in NNI mitigation. Gale suggested Tracy provide a draft of the document background material, then he will include the table. Gale said he thinks getting these questions correct is very important but does not want to prioritize this ahead of moving recalculation forward. Gale said he would not want to invest a lot of time in this document if they will ultimately need to prepare a dispute resolution statement.

Murdoch said it's also the responsibility of the HSC to be communicating these issues to their PRCC representatives to help them understand the details.

V. Joint HCP-HC and PRCC HSC

A. Goat Wall Acclimation Site Update

Keely Murdoch summarized recent juvenile acclimation activities at the Goat Wall site in the Methow Basin. On March 21, 2022, 24,642 spring Chinook Salmon at 22.2 fish per pound (fpp) were transferred to the Goat Wall acclimation site. There was no unusual mortality with a 99.5% survival. Release started the morning of April 25, 2022, the same day of the Methow Hatchery release of fish at 18.9 fpp, and the release continued to May 3, 2022, when YN employees determined that all fish had left the pond, based on PIT-tag detections and visual observations. YN staff plan to bring a new proposal for future acclimation activities based on 6 years of data. This proposal will be affected by final recalculated numbers, but the YN will have an initial proposal for consideration in July. There will need to be some consideration for the timing of the decision around marking, although there will be some time for additional discussion on implementation.

Pearsons asked if the timing and end date for outmigration was similar to fish emerging from the Twisp River program. Mackey said yes, the fish were a bit smaller than the target because it was such a cold winter. In the Methow River, flows were so low and clear there was not a strong pulse for outmigration, so the hatchery delayed the release date, and the end date was a bit later than typical. Willard said they have similar results for the Chewuch River releases.

B. Draft Interim Broodstock Collection Protocols

Greg Mackey said he has reached out to Mike Tonseth to revise the draft interim BCPs to include summer Chinook Salmon and Wenatchee summer steelhead. Once polished, it will be distributed, using numbers from the last recalculated values. They have added the new 35,437 NNI program for summer Chinook Salmon initially reared at Wells Hatchery. Mackey said it will be distributed to Wells HC members soon to allow broodstock to be collected with language to change those

numbers if recalculated numbers are agreed upon after fish are collected. Tonseth will seek approval for the revised draft interim BCPs by email, then decide whether a full BCP should be submitted to NMFS at that time. This version of the draft interim BCPs will not require HCP-CC approval because trapping operations were approved in May with the first interim draft version.

VI. Administrative Items

C. Next Meetings

The next regular HCP-HCs and PRCC HSC meetings will be held on Wednesday, July 20; Wednesday, August 17; and Wednesday September 21, 2022. Meetings will be held in person at Douglas PUD Headquarters and online with Webex.

VII. List of Attachments

Attachment A List of Attendees
Attachment B 05/27/22 – JFP Proposed Amendments to Chelan, Douglas, and Grant PUDs Recalculation Implementation Plans
Attachment C Email from Bill Gale to the Rock Island and Rocky Reach HCP Hatchery Committees regarding Chelan PUD's recalculation implementation Statement of Agreement, 6/21/2022
Attachment D *Wenatchee Steelhead Spawning Escapement Mark-Recapture Model*
Attachment E 06/13/22 - JFP Revised Proposed Amendments to Grant PUDs Recalculation Implementation Plan – Response to Grant PUD's 6/6/22 Counter Proposal

Attachment A
List of Attendees

Name	Organization
Larissa Rohrbach	Anchor QEA, LLC
Tracy Hillman	BioAnalysts, Inc.
Scott Hopkins*º	Chelan PUD
Catherine Willard*	Chelan PUD
Rebecca Buchananº	Columbia Basin Research
Shane Bickfordº	Douglas PUD
Tom Kahler*º	Douglas PUD
Brandon Kilmerº	Douglas PUD
Greg Mackey*	Douglas PUD
Josh Murauskasº	Four Peaks Environmental, LLC
Elizabeth Ngº	Four Peaks Environmental, LLC
Rod O'Connor‡	Grant PUD
Deanne Pavlik-Kunkel	Grant PUD
Todd Pearsons‡	Grant PUD
Tim Taylorº	Grant PUD
Brett Farman*‡º	National Marine Fisheries Service
Jeremy Cramº	Washington Department of Fish and Wildlife
Clint Deasonº	Washington Department of Fish and Wildlife
Ben Goodmanº	Washington Department of Fish and Wildlife
Alf Haukenesº	Washington Department of Fish and Wildlife
Mike Hughesº	Washington Department of Fish and Wildlife
Chris Moranº	Washington Department of Fish and Wildlife
Andrew Murdochº	Washington Department of Fish and Wildlife
Kevin Seeº	Washington Department of Fish and Wildlife
Katy Shelbyº	Washington Department of Fish and Wildlife
Mike Tonseth*‡º	Washington Department of Fish and Wildlife
Keely Murdoch*‡	Yakama Nation
Matt Cooper*‡º	U.S. Fish and Wildlife Service
Bill Gale*‡º	U.S. Fish and Wildlife Service

Notes:
* Denotes HCP-HCs member or alternate
‡ Denotes PRCC HSC member or alternate
º Joined by phone

Attachment B
05/27/22 – JFP Proposed Amendments to Chelan, Douglas, and Grant PUDs Recalculation Implementation Plans

06/13/22 - JFP Revised Proposed Amendments to Grant PUDs Recalculation Implementation Plan – Response to Grant PUD's 6/6/22 Counter Proposal

The Joint Fisheries Parties (JFP) appreciates Grant PUDs review and consideration of the amendments we proposed in our 5/27/22 document to the Chelan, Douglas, and Grant PUDs. We also appreciate you having conversations with the various JFP members in advance of developing/providing your counter proposal.

After a thorough review of your 6/6/22 counter proposal and internal conversations, the JFP cannot see where, by exclusion of mitigating for summer Chinook and steelhead inundation programs, Grant PUD's proposal achieves No Net Impact (NNI) for covered species (the Priest Rapids Project Salmon and Steelhead Settlement Agreement defines "Covered Species" to mean spring, summer, and fall Chinook [*Onchorynchus tshawytscha*], sockeye salmon [*O. nerka*], steelhead [*O. mykiss*], and coho [*O. kisutch*]), consistent with the JFPs interpretation of the language in the Salmon and Steelhead Settlement Agreement (Section 7.7, "*No Net Impact*" *refers to the condition whereby the Project does not produce unmitigated project related mortality of Covered Species*.). It is the JFPs continued position that our 5/27/22 amendments allow Grant PUD to achieve NNI under the JFPs interpretation of the language in the SSSA. While the overall numbers of fish for each covered species detailed in our 5/27/22 amendments have not changed. We did take a closer look at and make a couple of minor adjustments to the Methow Hatchery and Nason Creek spring Chinook programs (refer to the spring Chinook section and Table 1) which will still allow for Methow co-manager objectives to be achieved.

The JFP acknowledge that while the Committees agreed to the general process used in the 2013 recalculation, the JFP did not agree to the same outcome as the 2013 recalculation (i.e., no agreement that we would arrive at low/medium/high mitigation levels for covered species). The JFP, during initial discussions of the sensitivity analysis template and data set, insisted we were not interested in considering any proposal which did not include mitigation for inundation.

The JFP recognizes (as we have stated on multiple occasions during this recalculation phase) that there are continued differences in interpretation of the language in the SSSA related to NNI/recalculation and have been supportive of having Policy provide the HSC with clarification on the matter prior to the 2033 recalculation as has been discussed in Committee (this is just part of the Committees desire and commitment to develop a plug-and-play approach in the next ten years prior to the 2033 recalculation). The JFPs position and commitment on the matter has not changed.

The JFP have heard and recognize Grant's concern about setting precedence in agreeing to mitigating for inundation (the concerns are a little broader than this but Unavoidable Project Mortality [UPM] for inundation has been at the crux of HSC discussions and is hence being used as the primary example). The JFP is equally concerned about setting precedence by not including mitigation for inundation this recalculation when it can be achieved with no new infrastructure. Even though we agreed to not include it in the 2013 recalculation implementation plans, we only came to that conclusion because we believed that there were sufficient constraints in the variables to implementation to not press for inclusion of inundation during the 2013 recalculation.

To be able to move forward with having an approved 2024-2033(release year) implementation plan, the JFP propose, that as part of the Statement of Agreement (SOA) for Grants implementation plan, to include language that agreement of this implementation plan does not set a precedence for inclusion or exclusion of mitigation for inundation or other potential programs which could arise in the future, in the

2033 recalculation until further clarification can be provided. To address this now, the JFP also support including language formally committing the parties to pursuing clarification (including development of the question[s]) from Policy related to our NNI discussions prior to the next recalculation. The exact language and timelines would be established by the HSC.

Spring Chinook

Okanogan Subbasin

Under this proposed plan, Grant PUD's spring Chinook (SPC) production cost-share agreement with the CCT for the Okanogan Basin would remain as proposed in the 4/13/22 Grant PUD RIP.

Methow Subbasin

Under this revised proposed plan, Grant PUD's SPC production for the Methow Subbasin would be maintained at the current level of 134,000 smolts at Methow Hatchery. GPUD's Methow SPC production will be comprised of Methow and Entiat impacts, 35,051 steelhead converted to Methow SPC, and 10,534 Nason safety SPC moved to Methow.

The movement and/or conversion of fish is to meet a co-manager production objective consistent with the current Methow Composite production of approximately 195,000 from the conservation program to meet upper Methow spawner escapement and Winthrop safety net broodstock program needs in most years.

Wenatchee Subbasin

Under this revised proposed plan, Grant PUD's SPC production for the Wenatchee Subbasin would be 203,650 smolts at Eastbank Hatchery/Nason Creek Acclimation Facility. GPUD's Wenatchee (Nason) SPC production will be comprised of Wenatchee impacts minus 10,534 Nason safety SPC moved to Methow. Under current allocations agreed to within the HSC, the Nason conservation program is maintained at 125K with the safety net program reduced to 72,567 smolts. The number of conservation-to-safety net smolts in the Nason program may be changed within the next 10-year period depending on the outcome of conservation program re-sizing evaluations.

Summer Chinook

Okanogan Subbasin

Under this revised proposed plan, Grant PUDs summer Chinook (SUC) production cost-share agreement with the CCT for the Okanogan Basin would remain as proposed in the 4/13/22 Grant PUD RIP.

Methow Subbasin

Under this revised proposed plan, Grant PUD's summer Chinook production for the Methow Subbasin would remain as outlined in the JFPs 5/27/22 amendments to the Chelan, Douglas, and Grant PUD's RIPs. This is achieved through a combination GPUD's 4/13/22 proposed value plus 37,778 SUC UPM and 35,570 steelhead UPM converted to SUC. This combination is to achieve a co-manager target release into the Methow subbasin of 200K smolts.

Wenatchee Subbasin

Under this revised proposed plan, Grant PUD's summer Chinook production for the Wenatchee Subbasin would be remain as outlined in the JFPs 5/27/22 amendments to the Chelan, Douglas, and Grant PUDs RIPs. This is achieved through a combination GPUD's 4/13/22 proposed value plus 48,000 SUC UPM. This combination is to achieve a co-manager SUC target release from Dryden Pond into the Wenatchee River of 500K smolts.

Steelhead

Okanogan Subbasin

Under this revised proposed plan, Grant PUD's summer steelhead (SHD) production for the Okanogan Subbasin would remain as outlined in the JFPs 5/27/22 amendments to the Chelan, Douglas, and Grant PUDs RIPs and is consistent with the program as described in the SSSA (100K). The remaining 72,621 UPM smolts were converted to Methow SPC and Methow SUC.

Fall Chinook

Under this plan, Grant PUD's fall Chinook production would remain as proposed in the 4/13/22 Grant PUD RIP including the fry conversion which occurred following the previous recalculation.

Table 1. JFP revised Proposed implementation of Grant PUD's NNI spring, summer, and fall Chinook and steelhead hatchery production for the 2024-2033 release years.

Facility	Spring Chinook	Summer Chinook	Fall Chinook	Steelhead	**Total**
Chief Joseph Hatchery	110,000	305,000	-	-	**415,000**
Methow Hatchery	134,000	-	-	-	**134,000**
Wells Hatchery	-	-	-	100,000	**100,000**
Carlton Acclimation Facility	-	164,533	-	-	**164,533**
Dryden Pond	-	206,224	-	-	**206,224**
Nason Creek Acclimation Facility	203,650	-	-	-	**203,650**
Priest Rapids Hatchery	-	-	5,401,267	-	**5,401,267**
Total	**447,650**	**675,757**	**5,401,267**	**100,000**	**6,624,674**

Attachment C
Email from Bill Gale to the Rock Island and Rocky Reach HCP Hatchery Committees regarding Chelan PUD's recalculation implementation Statement of Agreement, 6/21/2022

From: Gale, William
To: Catherine Willard; Larissa Rohrbach
Cc: Tracy Hillman; Cooper, Matt; Craig, Jim L
Subject: Re: [EXTERNAL] HCP-HC and PRCC HSC approvals needed
Date: Tuesday, June 21, 2022 7:01:51 AM

Catherine,

I completely understand and sympathize with the concerns you outline. My intent is not to reject the current proposal but simply delay its approval until other conversations have had a chance to further develop. Unless there is something completely unforeseen that occurs, I anticipate that the current SOA and proposal can be brought forward at the July HC meeting and that we will have consensus among the parties to approve it in its current state.

In a later email you suggested that I could approve the summer Chinook and steelhead portions of the SOA (to facilitate planning for BY 22 broodstock collection), while I agree that my concerns are focused on spring Chinook I do not think I can (from a HCP process point of view) approve a portion of an SOA. In practice you can consider this email my approval for the numbers in that portion of the SOA, and hopefully this will provide the certainty to move forward with needed planning efforts related to broodstock collection. However. from a process point the SOA has failed with the Service's "No" vote and will need to be brought forward for another round of voting at the next HC meeting for it to be truly approved.

Tracy and/or Larissa, I would ask that you forward this email chain and to the rest of the Rocky Reach and Rock Island HC. Also, (and just a thought do what you will with this comment) perhaps we should hold the HSC portion of the July meeting early to give the Grant PUD conversation the most time to develop. Grant could then be excused from the meeting and we could work on the much less contentious issues associated with recalculation for Douglas and Chelan PUDs.

Bill

William Gale, Project Leader
US Fish and Wildlife Service
Mid-Columbia Fish and Wildlife Conservation Office
(509) 548-2991 (office)
(509)393-4172 (cell)

From: Catherine Willard <Catherine.Willard@chelanpud.org>
Sent: Friday, June 17, 2022 4:37 PM
To: Gale, William <william_gale@fws.gov>; Larissa Rohrbach <lrohrbach@anchorqea.com>
Cc: Tracy Hillman <tracy.hillman@bioanalysts.net>; Cooper, Matt <matt_cooper@fws.gov>; Craig, Jim L <jim_l_craig@fws.gov>
Subject: RE: [EXTERNAL] HCP-HC and PRCC HSC approvals needed

Chelan is very disappointed in USFWS's no vote. Agreements made under the RI and RR HCPs are

completely separate from GPUD's Anadromous Fish Agreement. To be clear, Chelan will not change the production level for the Methow spring Chinook program that the JFP proposed, and Chelan agreed to, regardless of what decision is made for GPUD. Fortunately, USFW's decision to delay agreement to Chelan's recalc SOA does not affect our Chiwawa and Methow spring Chinook brood collection efforts that are already occurring because the new production levels have not changed from the previous ten years.

Catherine

From: Gale, William <william_gale@fws.gov>
Sent: Thursday, June 16, 2022 11:36 AM
To: Larissa Rohrbach <lrohrbach@anchorqea.com>
Cc: Tracy Hillman <tracy.hillman@bioanalysts.net>; Cooper, Matt <matt_cooper@fws.gov>; Craig, Jim L <jim_l_craig@fws.gov>; Catherine Willard <Catherine.Willard@chelanpud.org>
Subject: Re: [EXTERNAL] HCP-HC and PRCC HSC approvals needed

At this point the FWS cannot approve Chelan PUD's Recalculation Implementation SOA. We are supportive of the SOA but concerned about connections between the Chelan programs and the obligations of the other PUDs. Namely whether the pending discussions concerning Grant PUD's obligations may or may not alter the size of the Methow FH spring Chinook program.

While we are supportive of Chelan PUD's SOA this is largely based on the assumption that the allocation of Grant's production remains unchanged from the current JFP proposal, Given the tenure and uncertainty of the conversation that occurred during the PRCC-HSC meeting the FWS has concerns that this assumption may not be warranted. I am happy to discuss this with any of the parties but for now I feel I must vote no on this proposal. I am hopeful that we can bring this back forward at the July meeting and get to consensus at that point.

Bill

William Gale, Project Leader
US Fish and Wildlife Service
Mid-Columbia Fish and Wildlife Conservation Office
(509) 548-2991 (office)
(509)393-4172 (cell)

From: Larissa Rohrbach <lrohrbach@anchorqea.com>
Sent: Wednesday, June 15, 2022 3:33 PM
To: Brett Farman <brett.farman@noaa.gov>; Gale, William <william_gale@fws.gov>; kirk.truscott@colvilletribes.com <kirk.truscott@colvilletribes.com>
Cc: Tracy Hillman <tracy.hillman@bioanalysts.net>

Subject: [EXTERNAL] HCP-HC and PRCC HSC approvals needed

Hi Brett, Bill and Kirk-
There were a couple of items the HCP-HCs and PRCC HSC are seeking your approval on. These were approved by the other members in attendance to today's meeting. Please respond to Tracy and I on whether you are able to approve the items below.

Revised 5/18 mtg mins: Kirk and Brett, please indicate whether you approve of the attached revisions which were added to (with minor revisions) in today's meeting.

Chelan PUD's Recalculation Implementation Plan SOA: Kirk and Bill, please indicate whether you approve of the most recent version is in the attached email which incorporates the JFP suggested amendments.

Thank you,
Larissa

Larissa Rohrbach | ANCHOR QEA, LLC

Wenatchee Steelhead Spawning Escapement Mark-Recapture Model

HCP Hatchery Committee

June 15, 2022

Rebecca Buchanan

Elizabeth Ng

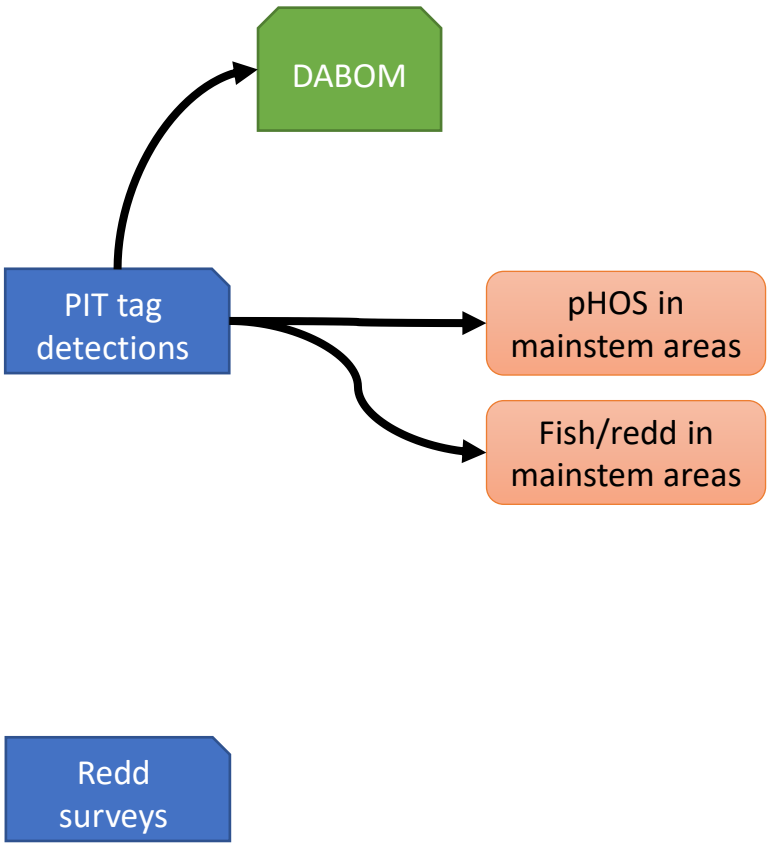
Catherine Willard

Kevin See

Current Approach

PIT tag detections

Redd surveys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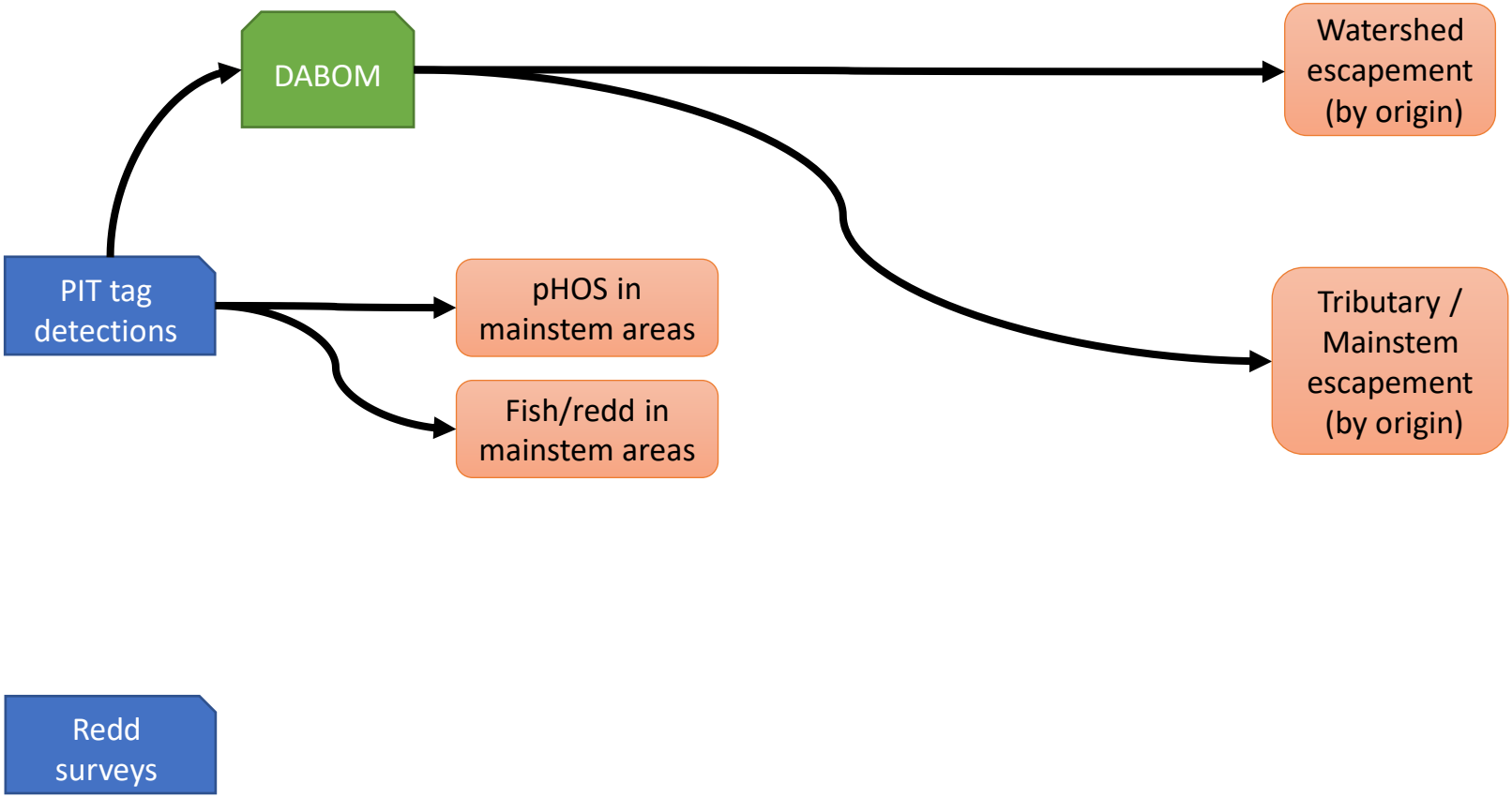
Fish/redd in mainstem areas
Redd surveys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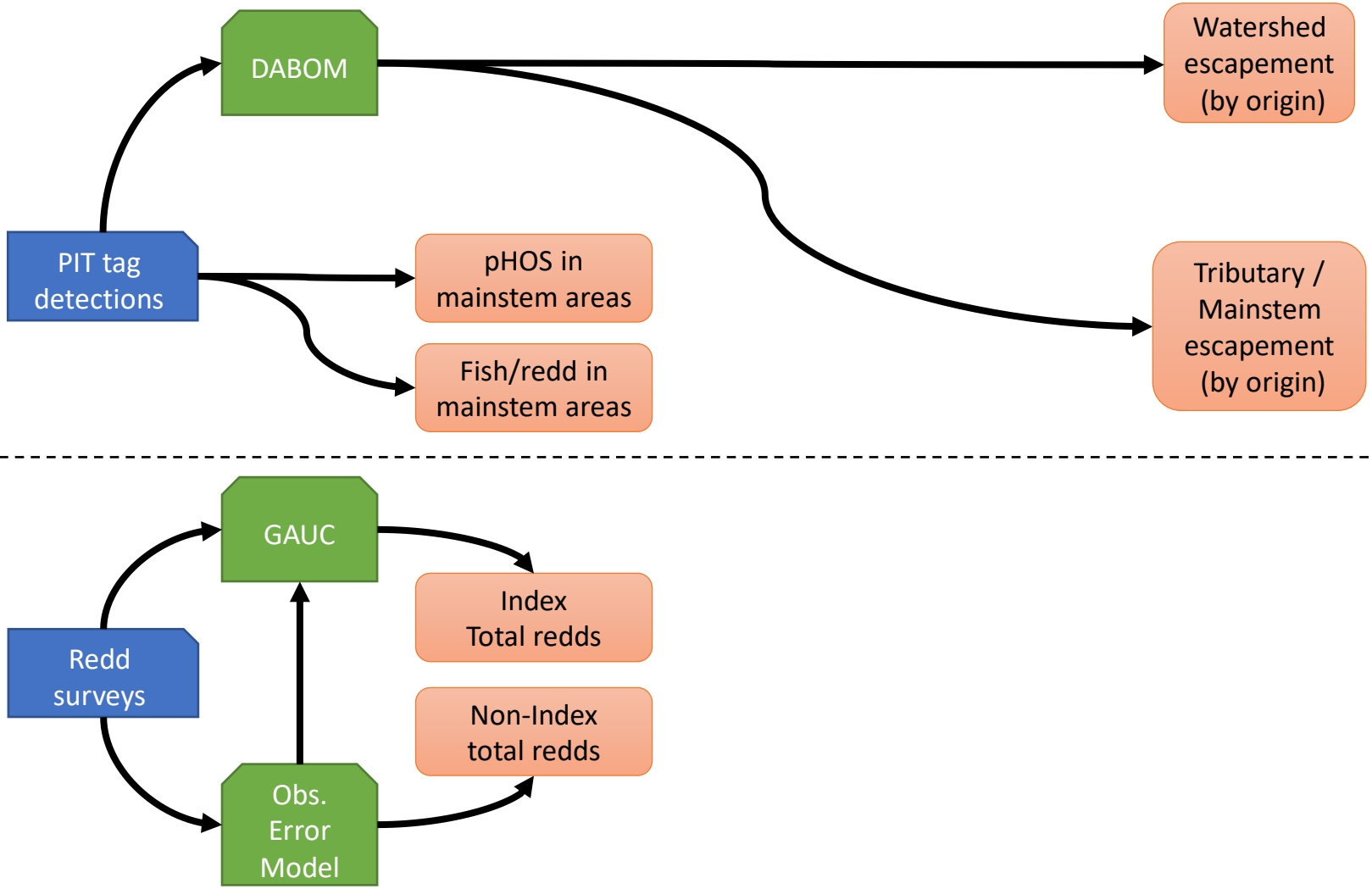
Redd surveys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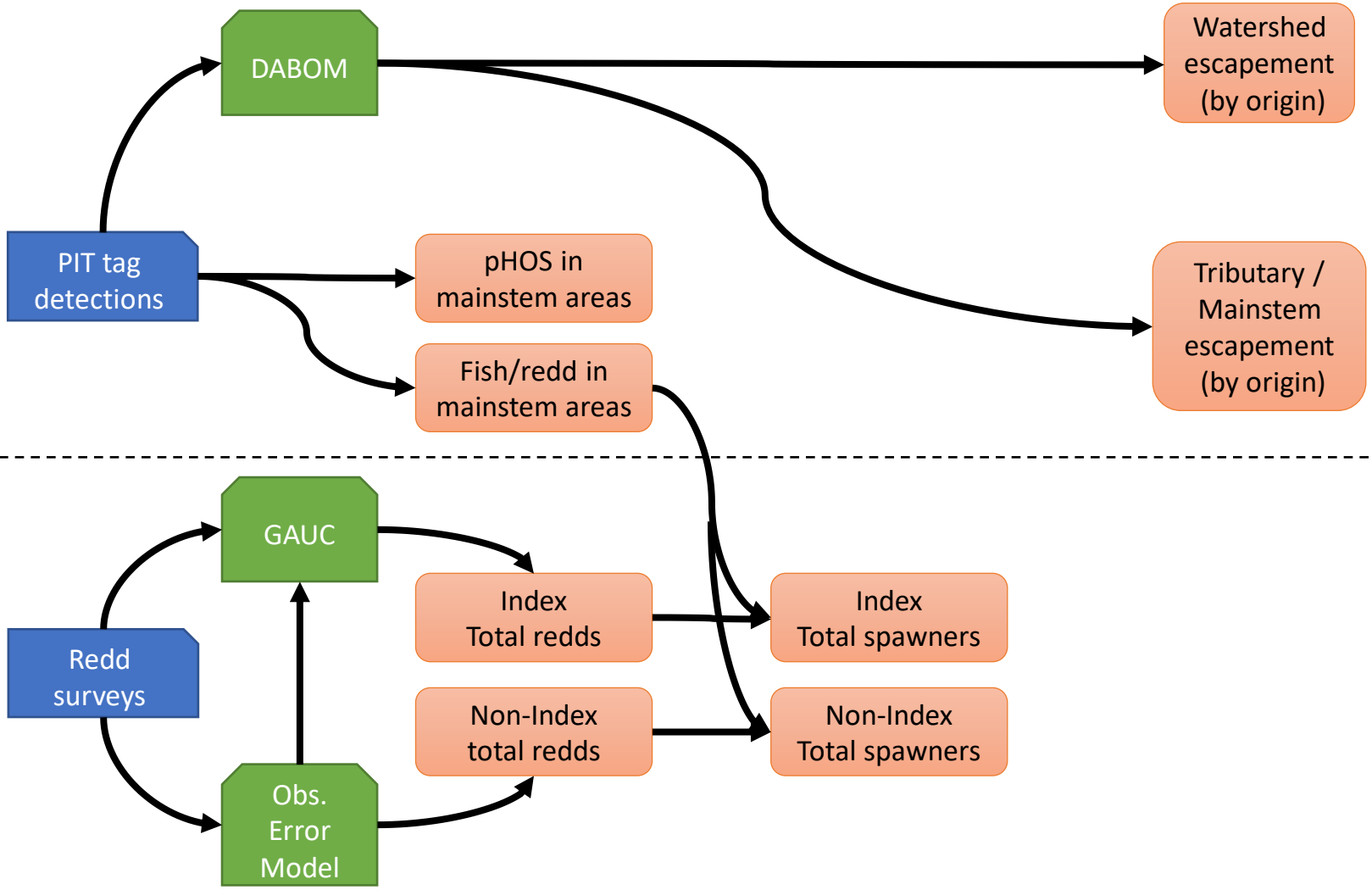
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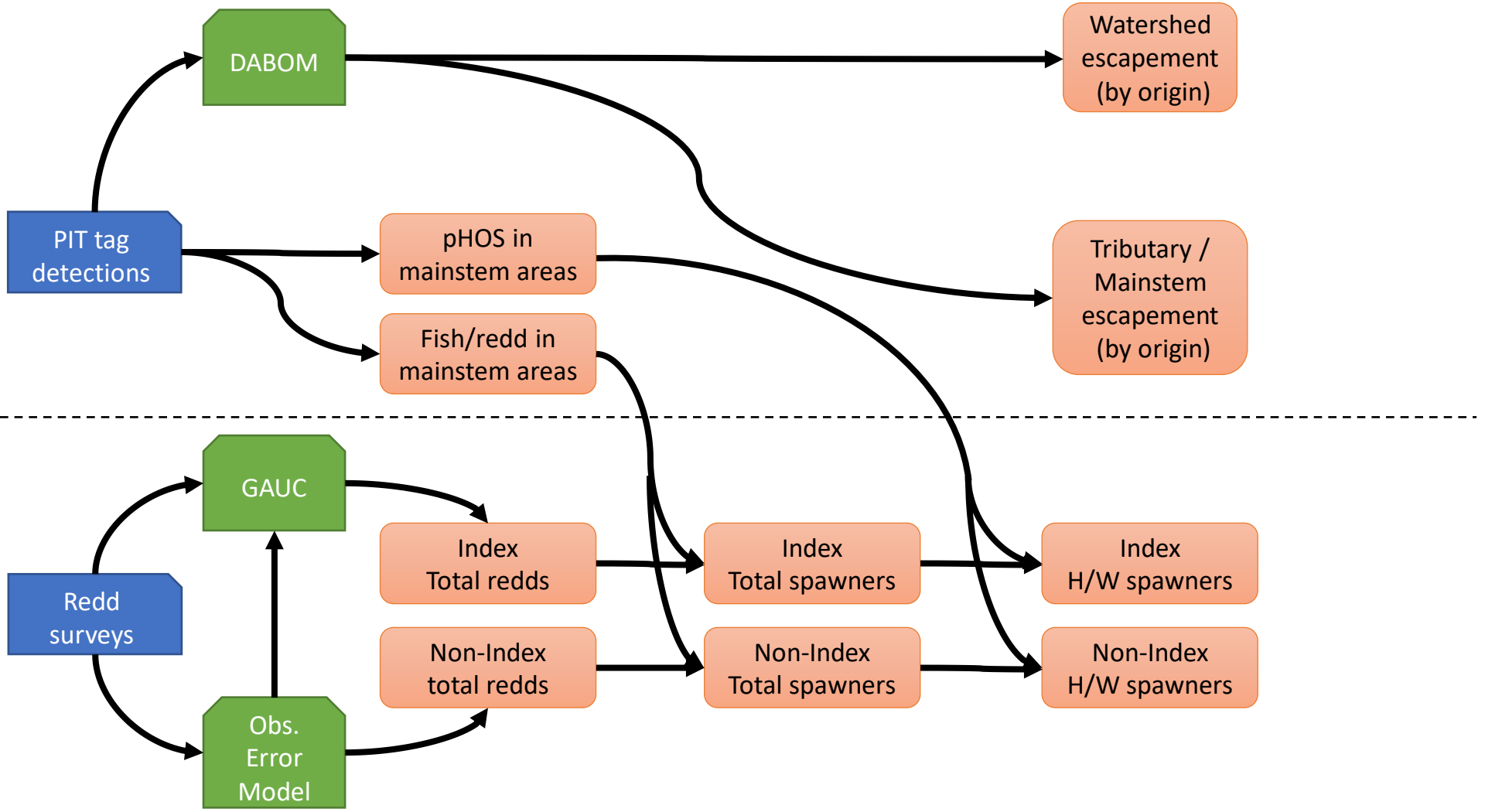
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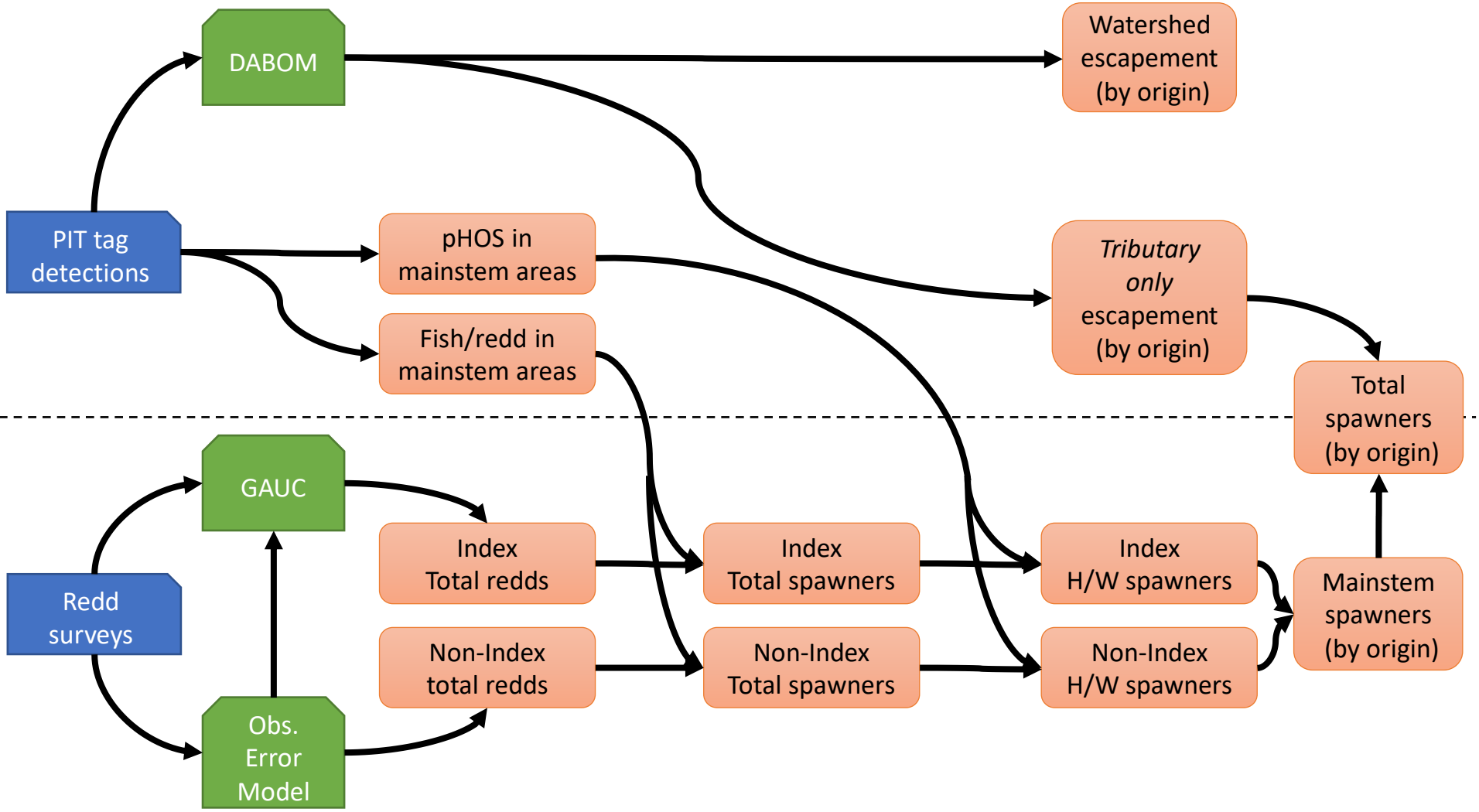
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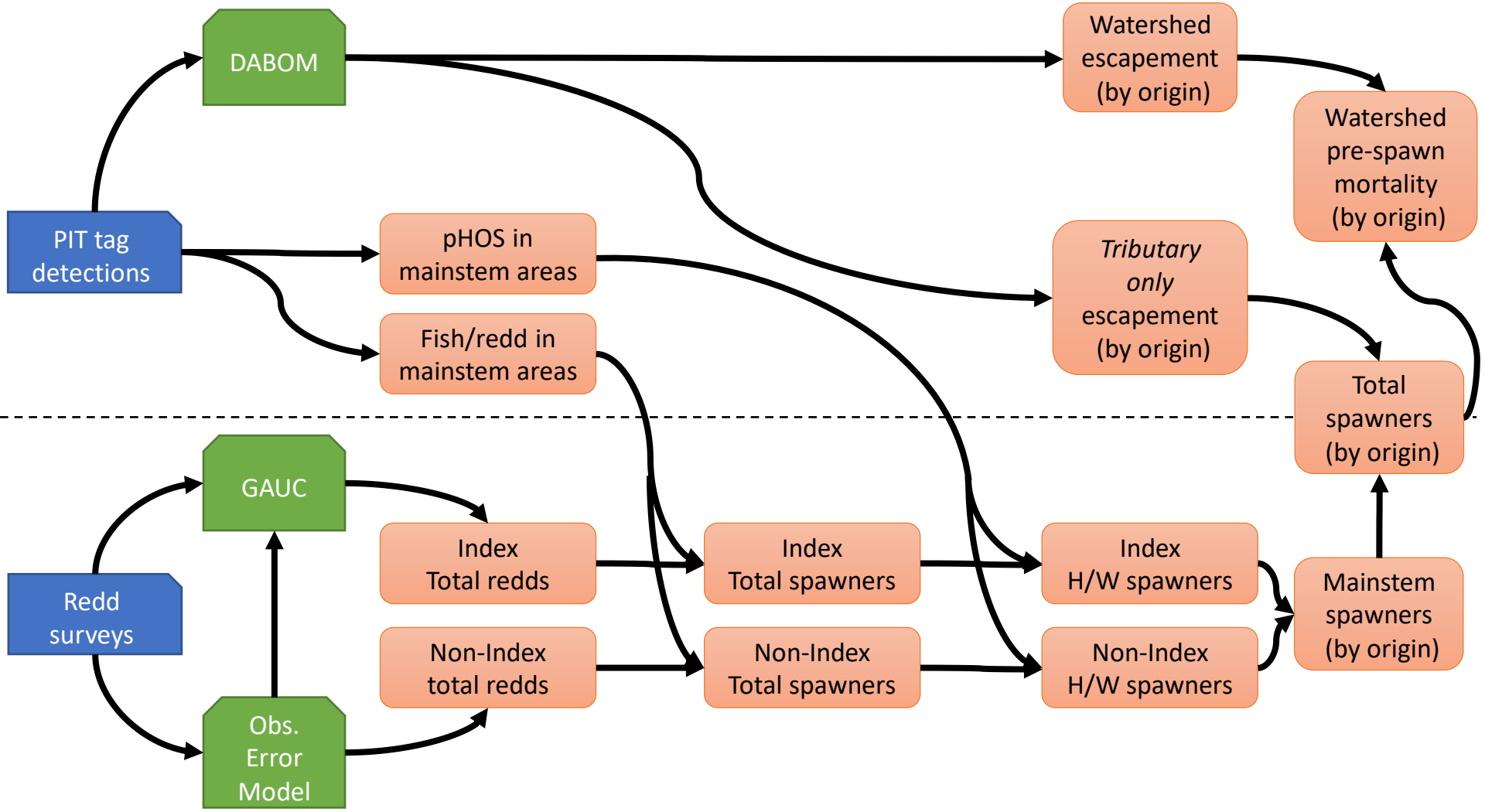
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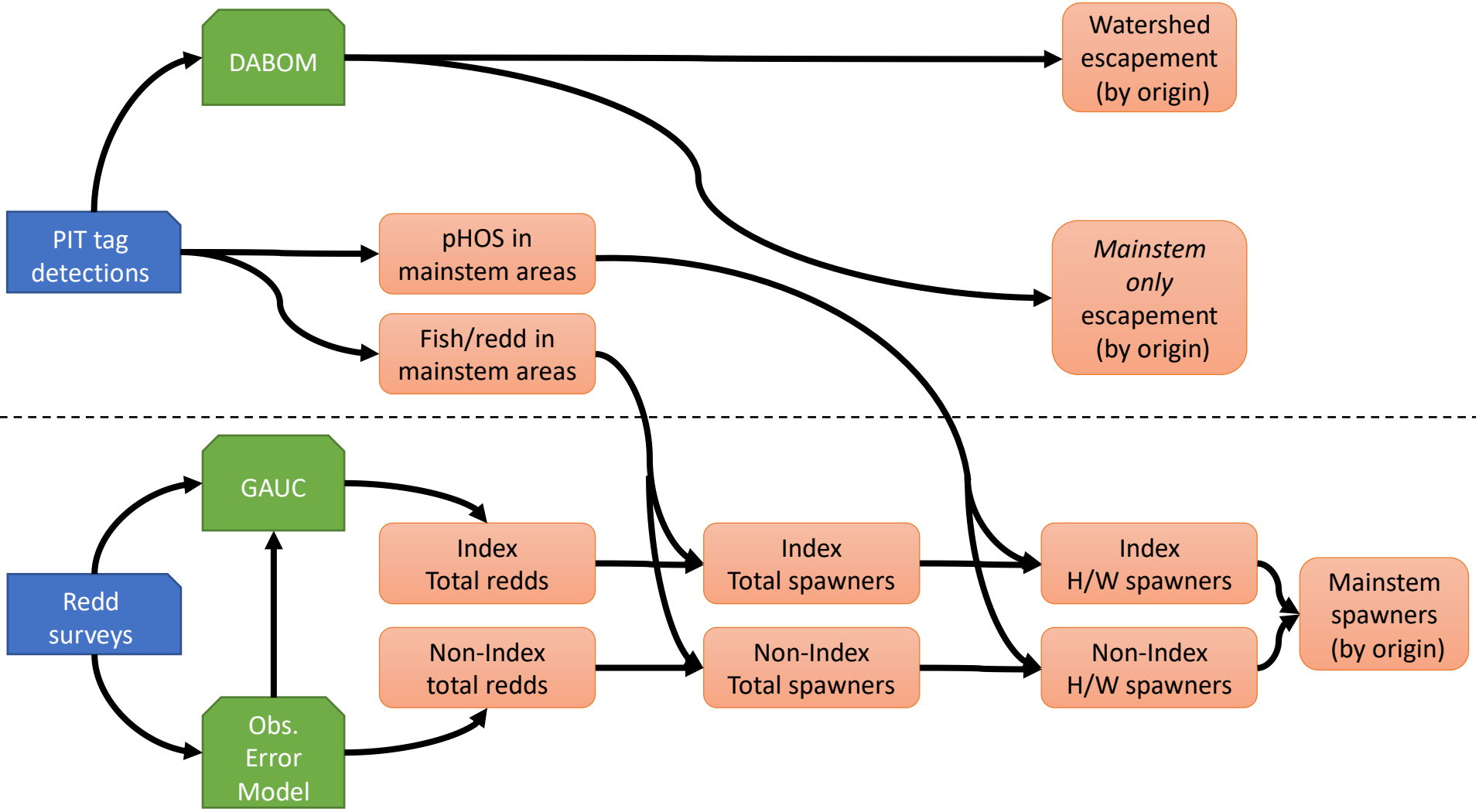
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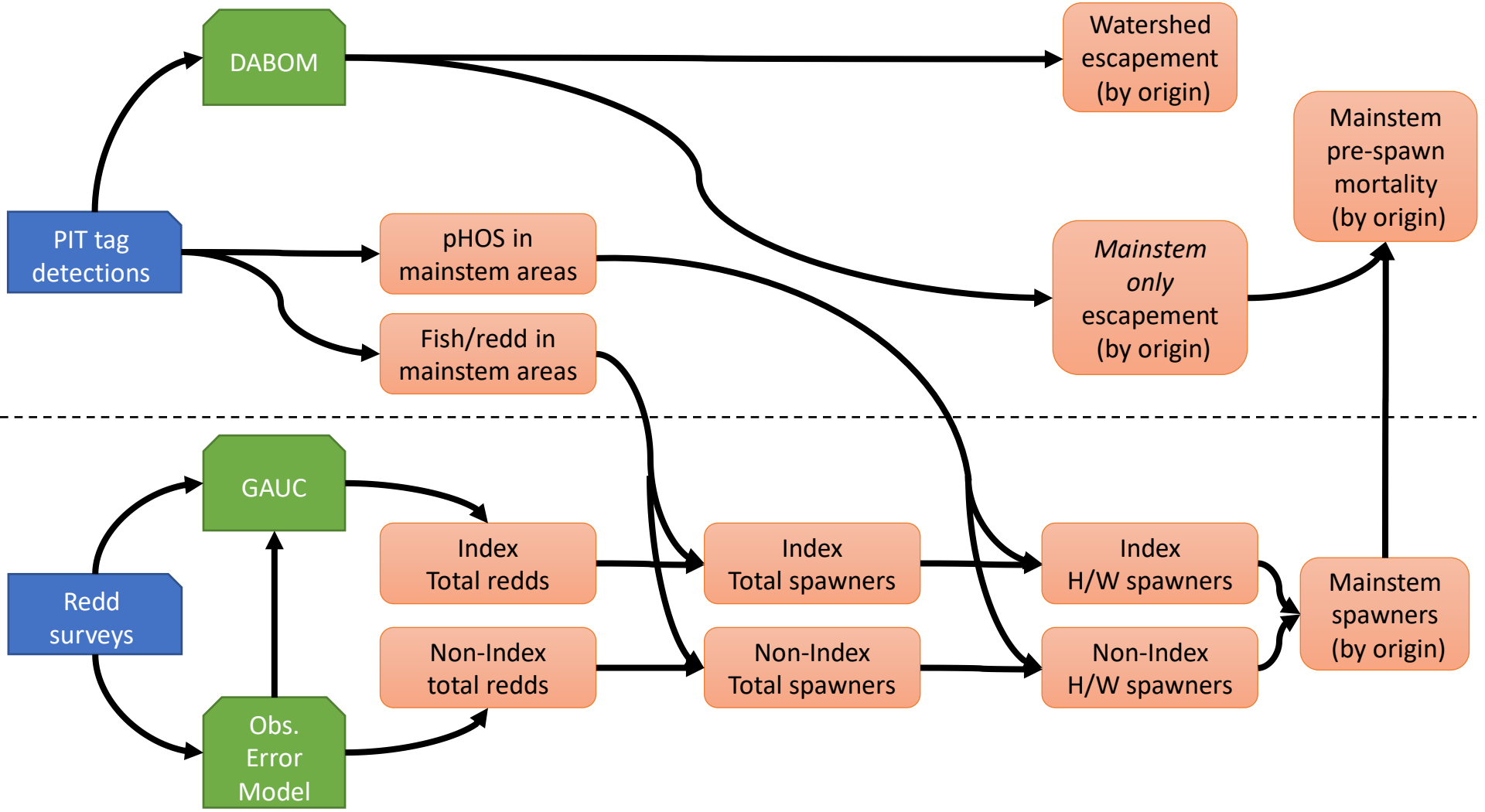
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Non-Index Total spawners
Non-Index H/W spawners
Obs. Error Model

Introduction

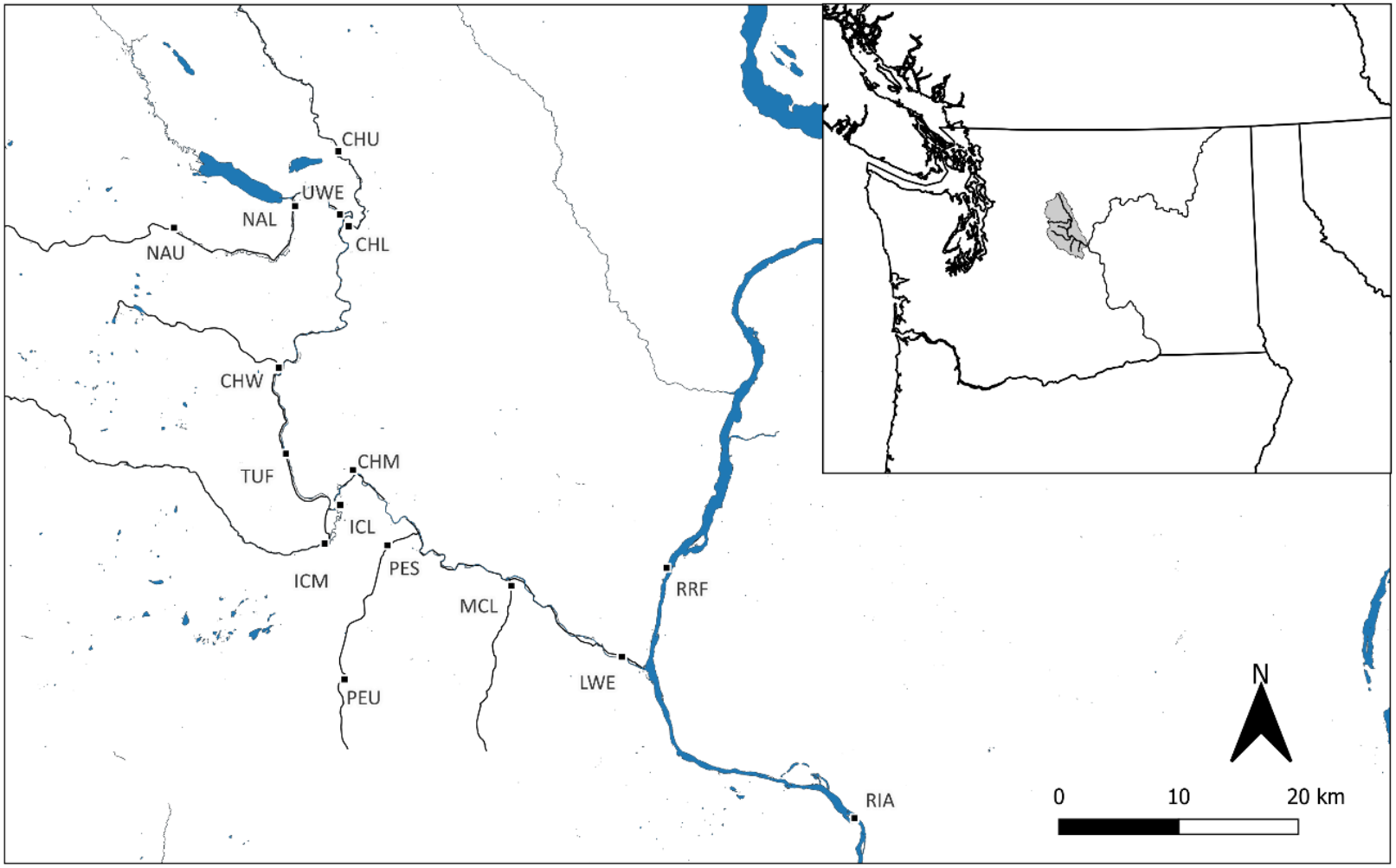
- Upper Columbia River (UCR) summer-run steelhead
- Complex life history and migratory patterns
- Traditional redd surveys present challenges and uncertainty
- Use passive integrated transponder (PIT) network to develop mark-recapture model
- Study goals:
  - Develop reach-specific spawning escapement estimates (2014–2020)
  - Compare to current approach

Methods

- Study Fish
  - Trapped and tagged adults at Priest Rapids Dam
  - Brood years 2014–2020 included
  - Average of 1,800+ adults tagged at Priest Rapids Dam annually

- Detection Points
  - Mainstem Columbia River dams: Rock Island, Rocky Reach, Wells
  - Mainstem Wenatchee River: Lower Wenatchee (LWE), Tumwater (TUF), Upper Wenatchee (UWE)
  - Tributaries: six tributaries, ten sites, multiple dual arrays

Study Area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UWE
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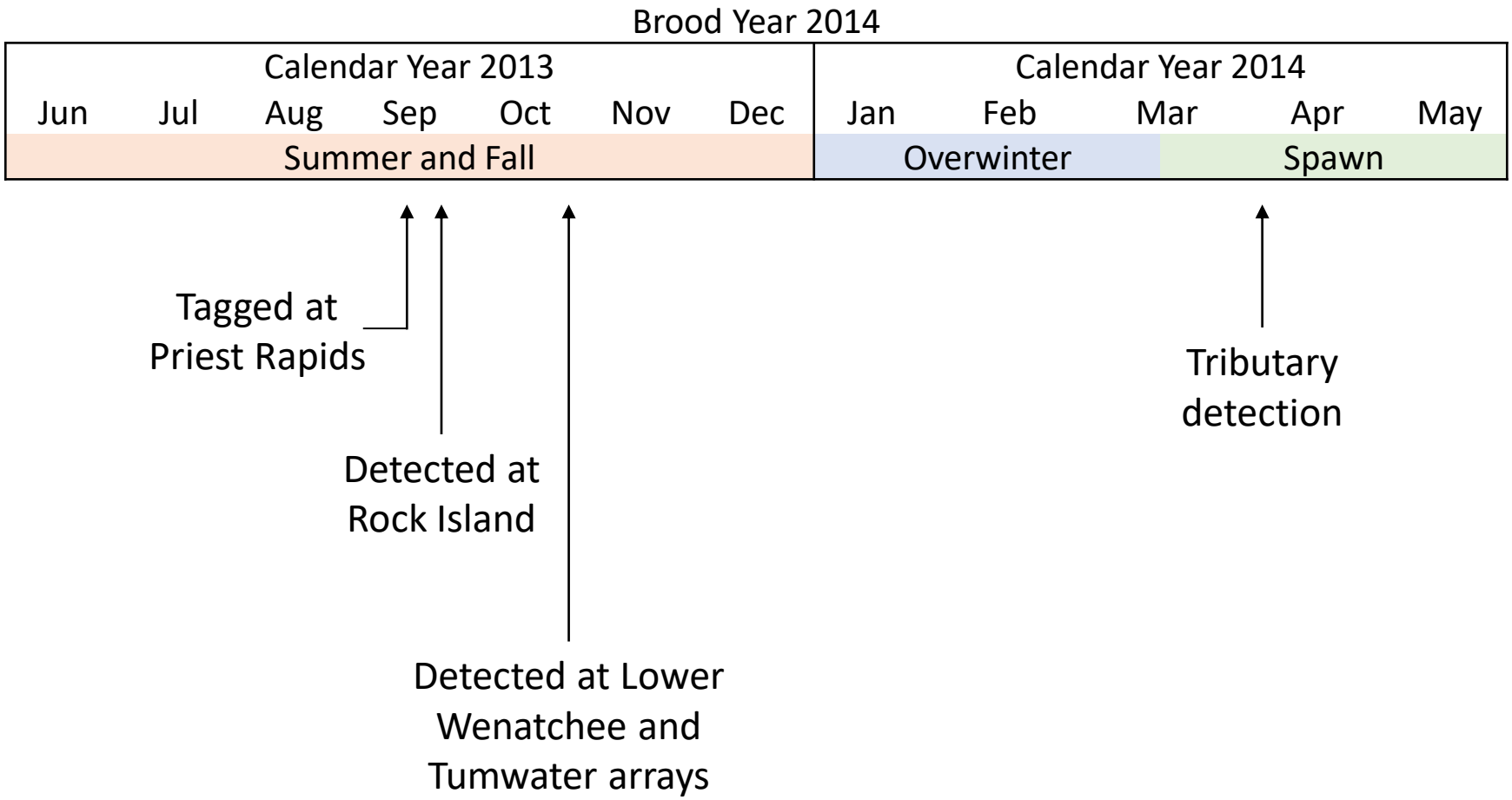
NAU
CHL
CHW
TUF
CHM
ICL
ICM
PES
MCL
PEU
LWE
RRF
RIA
N
0
10
20 km

Detection Histories

- PTAGIS tagging detail and interrogation detail query
- Brood year from June 1 to May 31
  - Overwinter period is January 1 through March 14
  - Spawning period is March 14 through May 31
  - Summer and fall are June 1 through December 31
- Spawning tributary assignment was made based on first tributary detection after March 14

Detection Histories



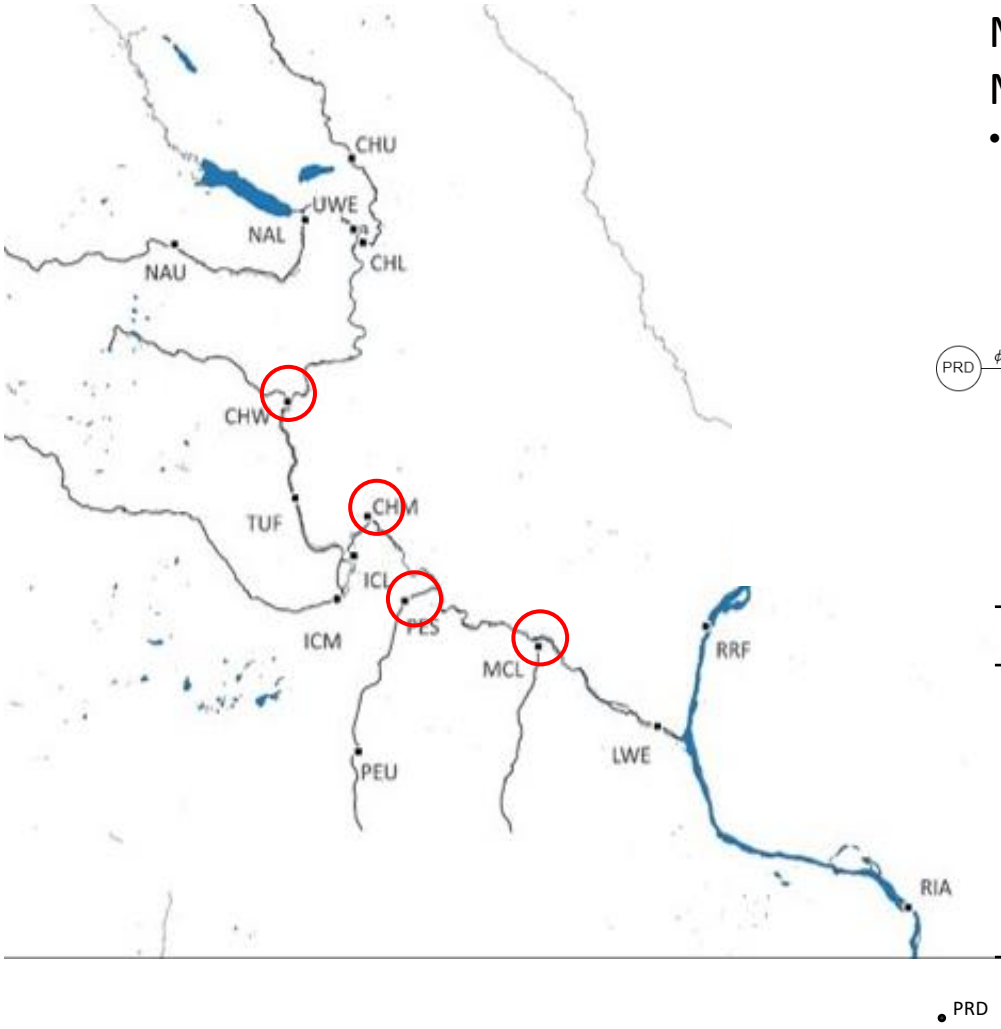
Quality Control

- Excluded post-spawn detections (after May 31; 2% of all detections)
- Excluded repeat spawners (2% of all detections)
  - Current iteration only used detections within one year of tagging
- Excluded out-of-basin spawners (10 fish across all years)
  - Removed fish that overwintered in the Wenatchee River but spawned elsewhere (i.e., fish that were detected in the spring in the Methow River, Entiat River, etc.)
- Removed overshoot detections (2% of all detections)
  - Simplified detection histories by removing downstream detections that occurred during the overwinter period
  - e.g., fish that overwintered above Rocky Reach but were detected in the Wenatchee River in spring had intermediate detections removed
  - e.g., fish that overwintered above the Upper Wenatchee array but were detected in Chiwawa River in spring had intermediate detections removed

Analytical Objective and Approach

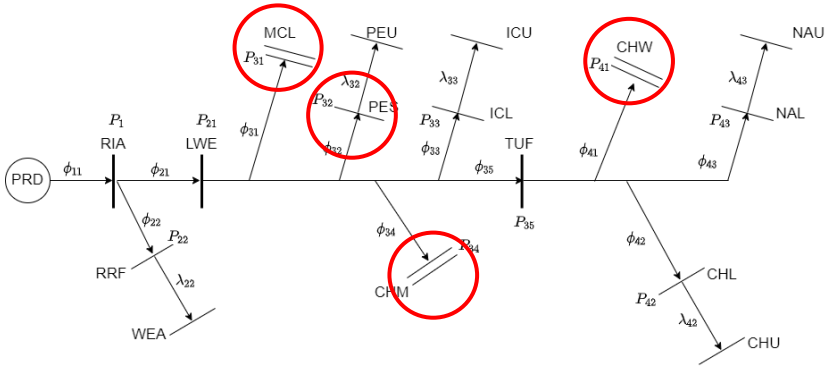
- Objective: estimate spawning escapement counts of adult steelhead in the Wenatchee River basin
- Approach
  - Estimate **transition probabilities** using a multi-state mark recapture (MSMR) model
    - Probability of moving from one site to another
  - Extract estimates of **overwinter survival** from the literature
  - Combine transition probabilities and overwinter survival to produce estimates of **escapement probabilities**
    - Probability of being in spawning area in the spring
    - Conditional on presence at Rock Island Dam in previous calendar year
  - Multiply escapement probabilities by estimate of run size at Rock Island Dam to generate estimates of **escapement counts**

Mark-Recapture Model (1)



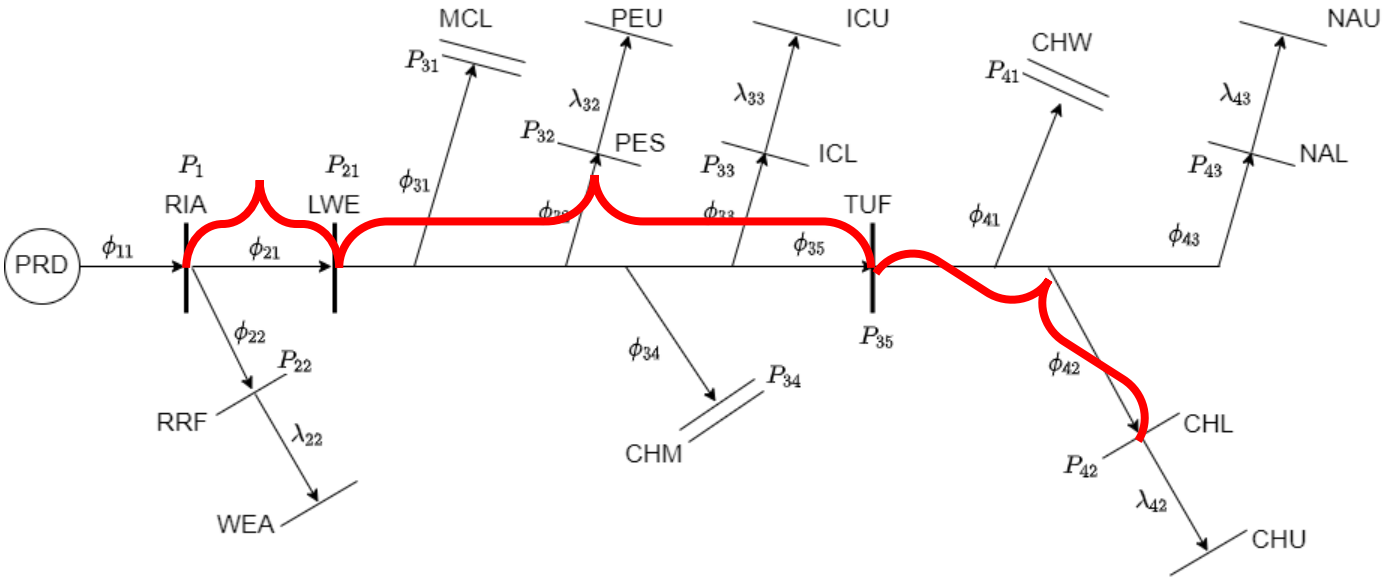
Multi-state Mark-Recapture (MSMR) Model

- State = tributary



Multi-line PIT-tag sites	Single-line PIT-tag sites
MCL	LWE, TUF
CHM	PES, PEU (2016 – 2018, 2020)
CHW	ICU, ICL (2016 – 2018, 2020)
PES (2014, 2015, 2019)	CHL, CHU
	NAL, NAU

Mark-Recapture Model (2)



Parameters:

ϕ_{ij} = transition probability in reach i to target j

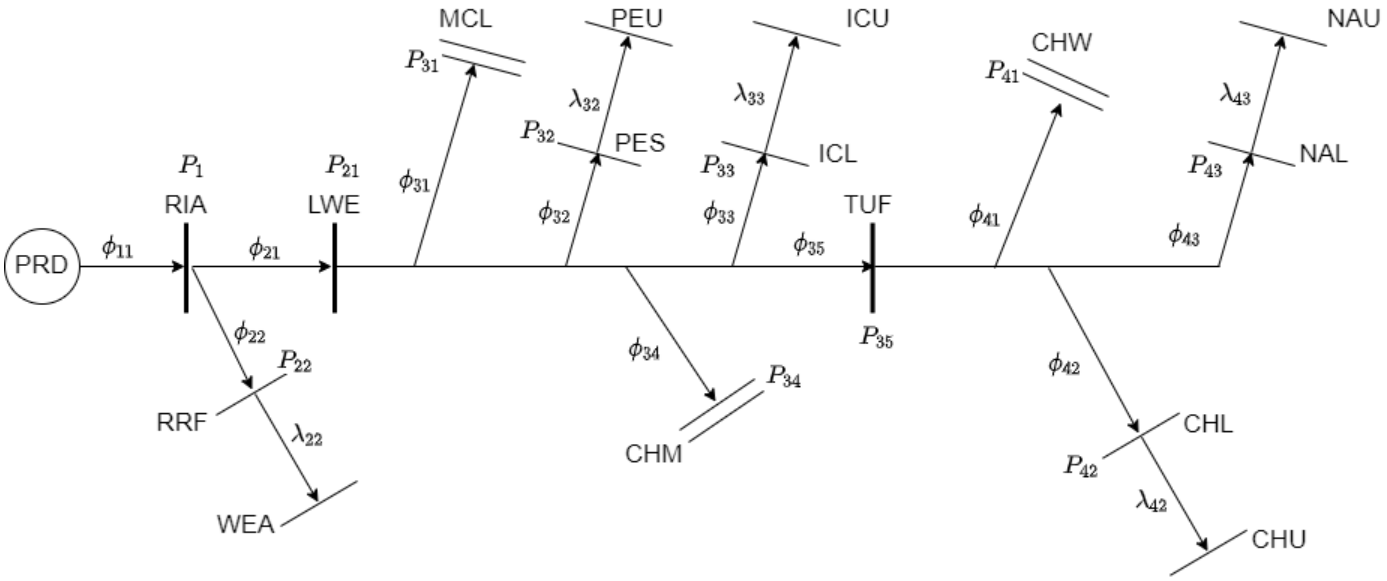
P_i = detection probability at site i conditional on presence

λ_{ij} = joint probability of transition and detection in reach i to final site in stream j

Combine reach-specific transition probabilities to define transition probability on wider spatial scale, e.g.:

$$\Pr(\text{Move from } RIA \text{ to } CHL) = \phi_{21}\phi_{35}\phi_{42}$$

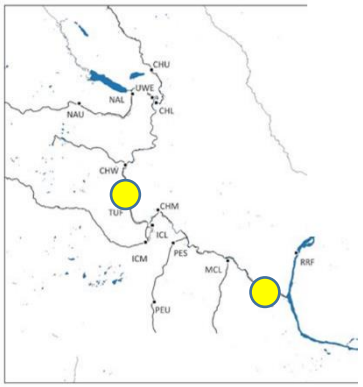
Mark-Recapture Model (3)



- Step 1: Fit MSMR model using Maximum Likelihood in Program USER (cbr.washington.edu)
- Step 2: MSMR model gives estimates of transition probabilities: target, movement, and survival
- Step 3 (& 4): Convert to escapement probabilities (and then counts)
  - Spatial component
  - Temporal component
  - Overwinter survival

Converting from Transition Probabilities to Escapement Probabilities

Regional Definition of Escapement (1)



- Regional escapement to
  - Individual tributaries
  - Tributaries combined
  - Mainstem reaches (defined by PIT antenna locations)
    - LWE to TUF
    - Above TUF

- All regions upstream of:
  - TUF
  - LWE

Recursive definition of escapement probability:

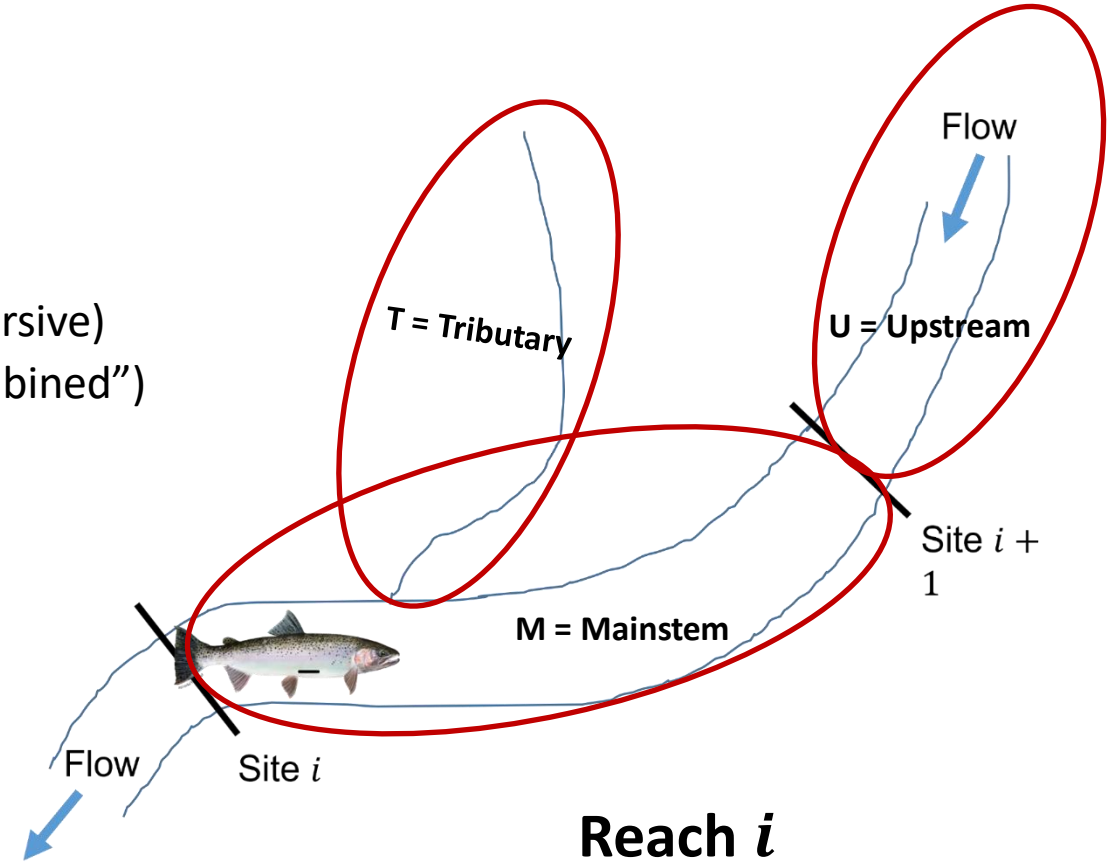
Escapement to TUF

→ Escapement to LWE

Regional Definition of Escapement (2)

- For individual reach
  - To tributary: e_{iT}
  - To mainstem reach: e_{iM}
  - To region upstream: e_{iU} (recursive)
  - To any of these regions ("combined")
    - $e_{iC} = e_{iT} + e_{iM} + e_{iU}$

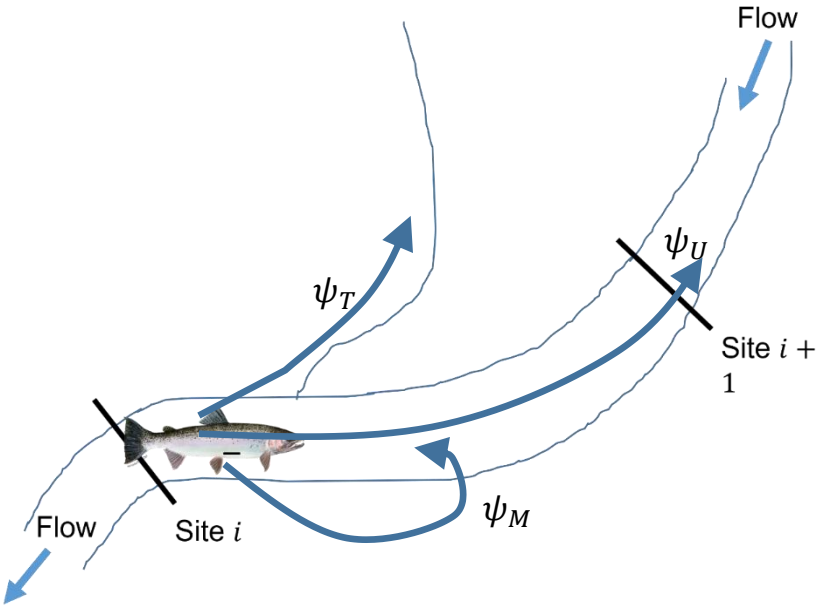
- Escapement to T, M, U, C depends on:
  - Probability of targeting that region
  - Getting there at the right time – overwinter survival



Assumptions: Target Route Selection

- Adult steelhead select target route out of reach immediately upon entry into reach
  - Tributary that enters reach
    - Specific tributary: ψ_{trib_j}
    - All tributaries: $\psi_T = \sum \psi_{trib\_j}$
  - Location upstream of reach: ψ_U
  - Mainstem spawning in reach: ψ_M

- $\psi_T + \psi_U + \psi_M = 1$



Overwinter Survival

North American Journal of Fisheries Management
© 2021 American Fisheries Society
ISSN: 0275-5947 print / 1548-8675 online
DOI: 10.1002/nafm.10585

ARTICLE

Overwintering Distribution and Postspawn Survival of Steelhead in the Upper Columbia River Basin

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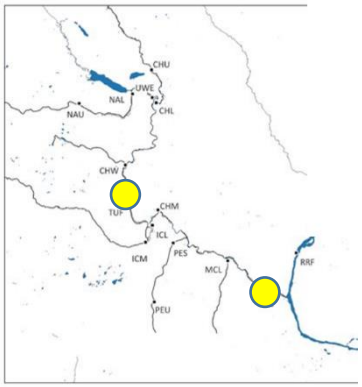
Year	No. fall*	No. spring*	Overwinter survival (SE)
2015	45	40	0.88 (0.05)
2016	16	12	0.75 (0.11)
Total	61	52	0.85 (0.05)

* Hatchery + Natural-origin

Fuchs et al. 2021 (NAJFM)

- Radiotelemetry, PIT-tag study
- Behavior, distribution, survival of adult summer-run steelhead
- Fall, overwintering, spawning, post-spawning
- N=807 tagged at Priest Rapids, 2015 and 2016
- Did not distinguish among regions within Wenatchee basin

Assumptions: Steelhead Overwintering

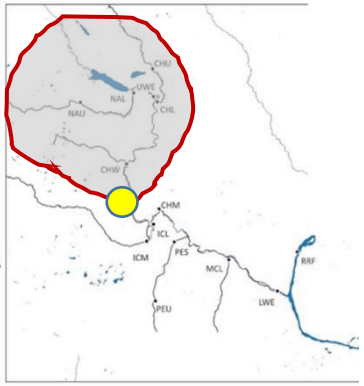


- Adult steelhead …
  - … pass LWE, TUF in fall
  - … enter tributaries in spring

- Tributary spawning: overwinter in mainstem reaches where tributary enters
- Mainstem spawning: overwinter in spawning reach

→ Method used to incorporate overwintering depends on reach

Reach: Upstream of TUF



$$e_{TUF(T)} = \phi_{4T} = \psi_{4T} s_4$$

Chiwaukum Creek
Chiwawa River
Nason Creek

Target Tribs — fall → s_4 → Survive winter in MS — spring → 1 → Exit to Tribs — spring

ψ_{4T}

TUF — fall

ψ_{4M}

Mainstem Wenatchee
Unmonitored tribs –
White River & Little Wen River

Target MS reach above TUF — fall → s_4 → Survive winter in MS — spring

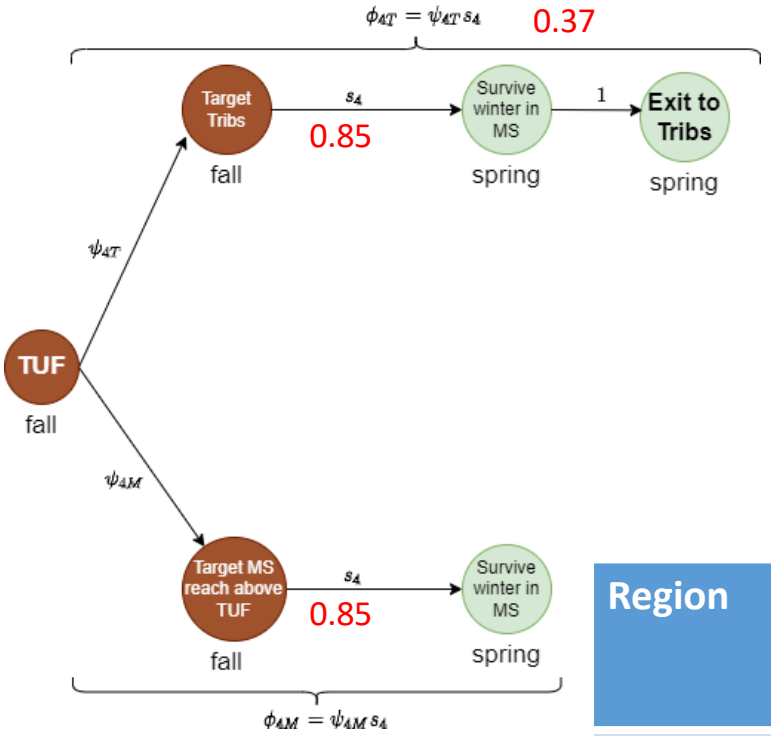
$$e_{TUF(M)} = \phi_{4M} = \psi_{4M} s_4$$

$$\psi_M = 1 - \psi_T = 1 - \frac{\phi_T}{S_{winter}}$$

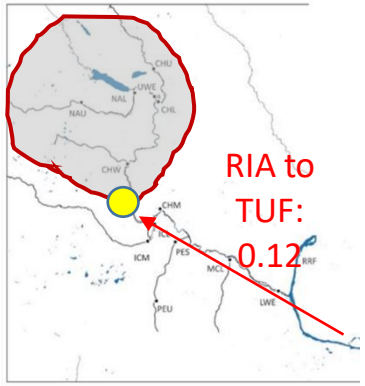
$$e_{TUF(M)} = \psi_M S_{winter} = S_{winter} - \phi_T$$

Bold font = detections

Reach: Upstream of TUF



$$\psi_M = 1 - \psi_T = 1 - \frac{\phi_T}{S_{winter}}$$

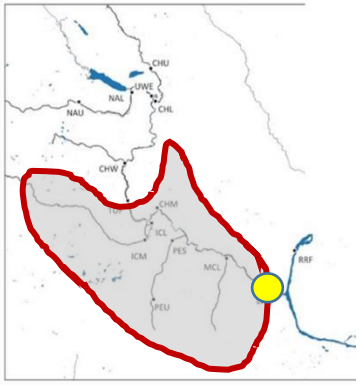


$$e_{TUF(M)} = S_{winter} - \phi_T = 0.85 - 0.37 = 0.48$$

$$e_{RIA-TUF(M)} = \phi_{RIA-TUF} \times e_{TUF-M} = 0.12 \times 0.48 = 0.06$$

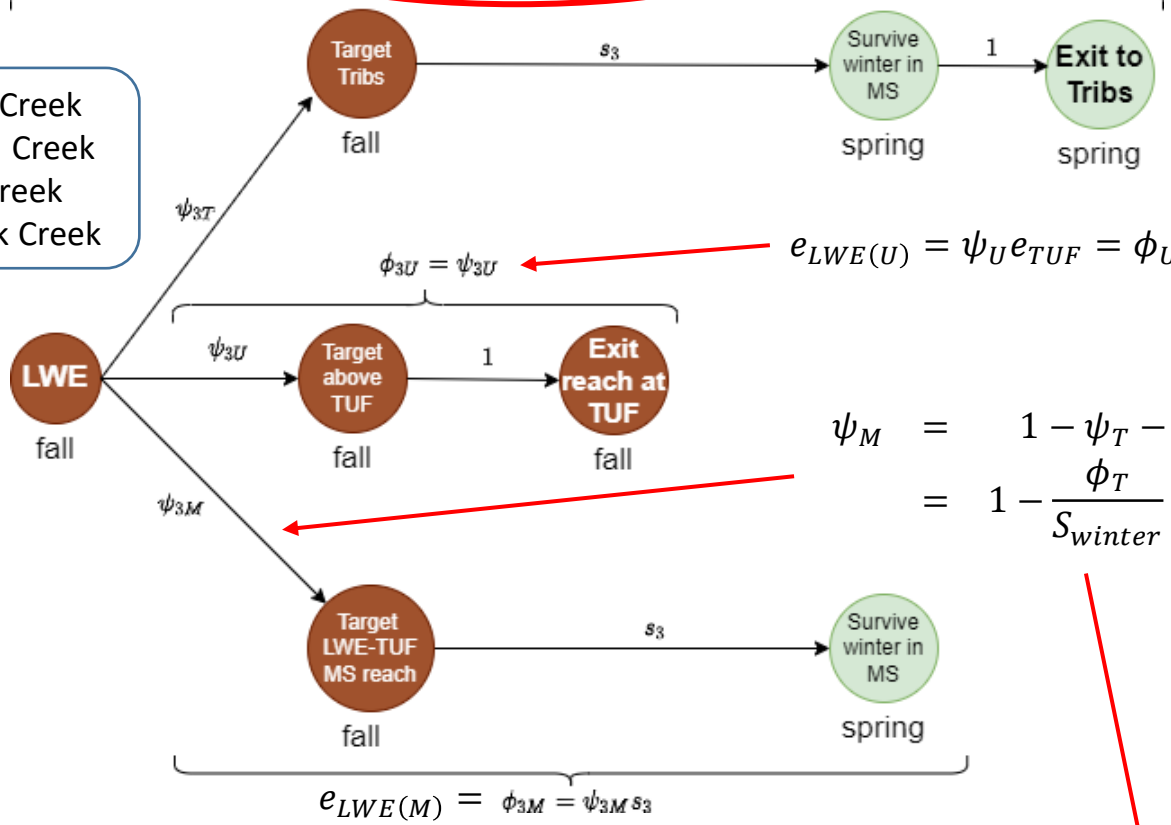
Region	Using route selection parameters	Using MSMR (transition) parameters	Example: 2014
From TUF to tributaries	$\psi_T S_{winter}$	$\phi_{TUF-T} = \sum \phi_{TUF-trib}$	0.37
From TUF to mainstem	$\psi_M S_{winter}$	$S_{winter} - \phi_{TUF-T}$	0.48
From TUF: combined	$e_{TUF} = S_{winter}$	$e_{TUF} = S_{winter}$	0.85
From RIA to TUF + upstream	$\phi_{RIA-TUF} S_{winter}$	$\phi_{RIA-TUF} S_{winter}$	0.10

Reach: LWE to TUF



$e_{LWE(T)} = \phi_{3T} = \psi_{3T} s_3$

Mission Creek
Peshastin Creek
Icicle Creek
Chumstick Creek



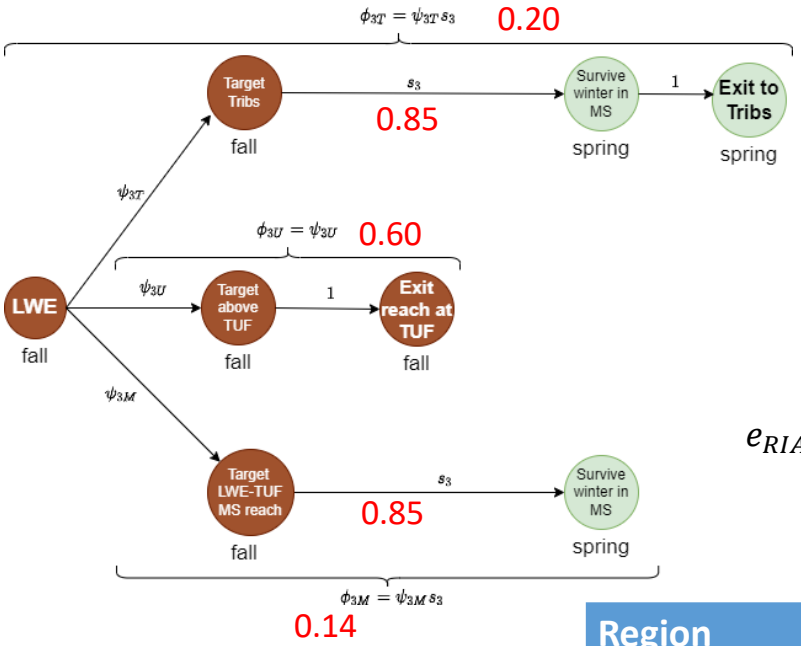
$e_{LWE(U)} = \psi_U e_{TUF} = \phi_U S_{winter}$

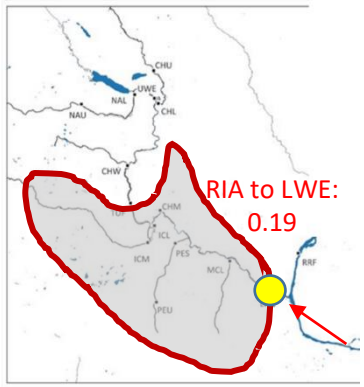
$$\psi_M = 1 - \psi_T - \psi_U = 1 - \frac{\phi_T}{S_{winter}} - \phi_U$$

$$e_{LWE(M)} = \psi_M S_{winter} = S_{winter}(1 - \phi_{LWE-TUF}) - \phi_{LWE-T}$$

Bold font = detections

Reach: LWE to TUF





$$
\begin{aligned}
e_{LWE(M)} &= S_{winter}(1 - \phi_{LWE-TUF}) - \phi_{LWE-T} \\
&= 0.85 \times (1 - 0.60) - 0.20 \\
&= 0.14
\end{aligned}
$$

$$
\begin{aligned}
e_{RIA-LWE(M)} &= \phi_{RIA-LWE} \times e_{LWE-M} \\
&= 0.19 \times 0.14 = 0.03
\end{aligned}
$$

$$
\begin{aligned}
\psi_M &= 1 - \psi_T - \psi_U \\
&= 1 - \frac{\phi_T}{S_{winter}} - \phi_U
\end{aligned}
$$

Region	Using route selection parameters	Using MSMR (transition) parameters	Example: 2014
From LWE to tributaries	$\psi_T S_{winter}$	$\phi_{LWE-T} = \sum \phi_{LWE-trib}$	0.20
From LWE to upstream	$\psi_U e_{TUF}$	$\phi_{LWE-TUF} S_{winter}$	0.60*0.85 = 0.51
From LWE to mainstem	$\psi_M S_{winter}$	$S_{winter}(1 - \phi_{LWE-TUF}) - \phi_{LWE-T}$	0.14
From LWE: combined	$e_{LWE} = S_{winter}$	$e_{LWE} = S_{winter}$	0.85
From RIA to LWE + upstream	$\phi_{RIA-LWE} S_{winter}$	$\phi_{RIA-LWE} S_{winter}$	0.16

Escapement Estimates

- Spawning escapement = Probability of escapement x Number detected at Rock Island Dam
- Used total calendar year counts from Rock Island
- Corrected counts at Rock Island for fallback (Buchanan and Skalski 2013)
- Corrected for known removals at Dryden and Tumwater, after adjusting for overwinter survival

Results – Tagging at Priest Rapids Dam

Release year	Hatchery-origin	Wild-origin	All
2013	1,320	736	2,056
2014	2,107	1,156	3,263
2015	1,715	916	2,631
2016	1,049	307	1,356
2017	748	404	1,152
2018	677	303	980
2019	354	406	760
All	**7,970**	**4,228**	**12,198**

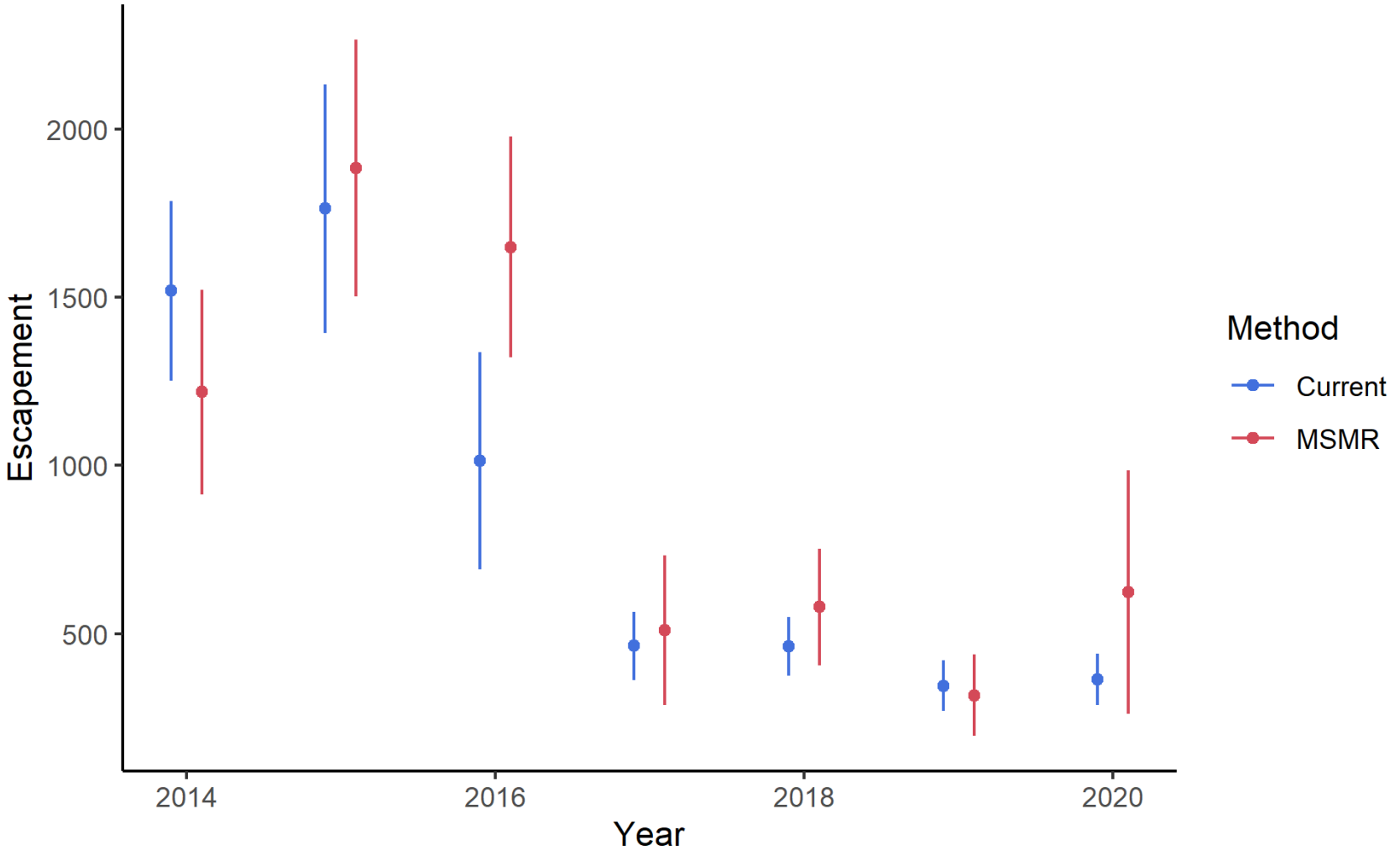
Results – Detections at PIT Arrays

Location		Type	N
Priest Rapids Dam		Columbia	12,198
Rock Island		Columbia	8,998
Rocky Reach		Columbia	7,671
Wells Dam		Columbia	6,884
Lower Wenatchee		Mainstem	1,172
Mission		Tributary	50
Peshastin	Lower	Tributary	120
	Upper	Tributary	18
Chumstick		Tributary	43
Icicle	Lower	Tributary	67
	Middle	Tributary	13
Tumwater		Mainstem	1,003
Chiwaukum		Tributary	28
Chiwawa	Lower	Tributary	103
	Upper	Tributary	66
Upper Wenatchee		Mainstem	258
Nason	Lower	Tributary	103
	Upper	Tributary	53

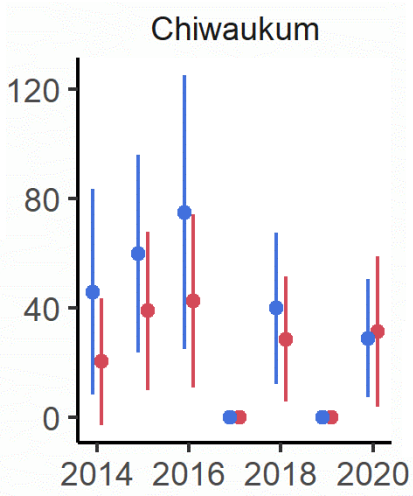
Results – Window Counts

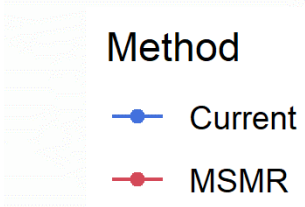
	Rock Island window counts		Removals	
Brood year	Raw	Corrected	Dryden	Tumwater
2013	15,454	14,788	19	465
2014	11,505	11,097	20	708
2015	15,037	14,374	34	403
2016	14,041	13,708	30	137
2017	7,166	6,884	13	112
2018	5,265	4,924	41	120
2019	5,229	4,933	68	56
2020	4,360	4,211	73	64

Results – Total Escapement

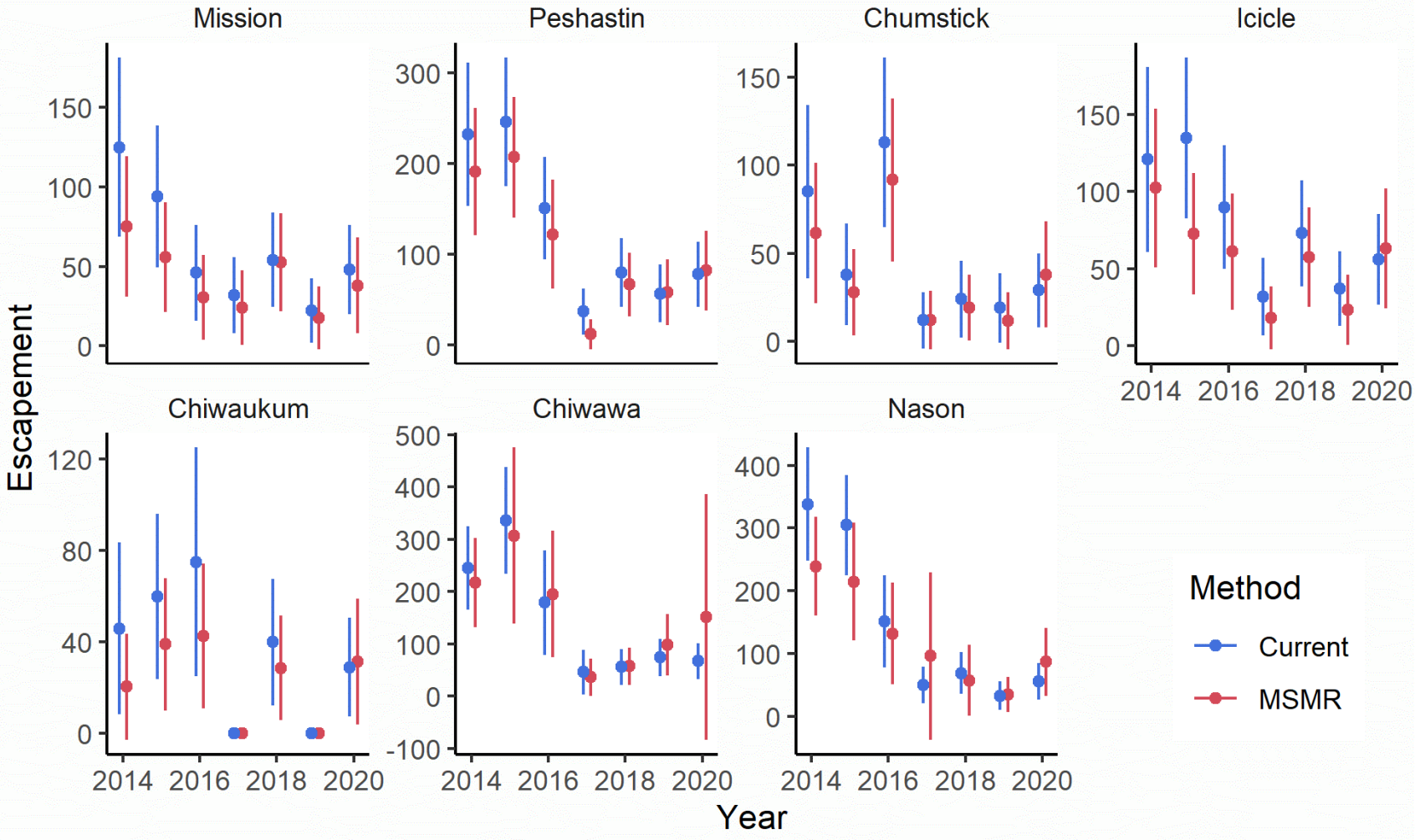


Results – Tributary Escapement

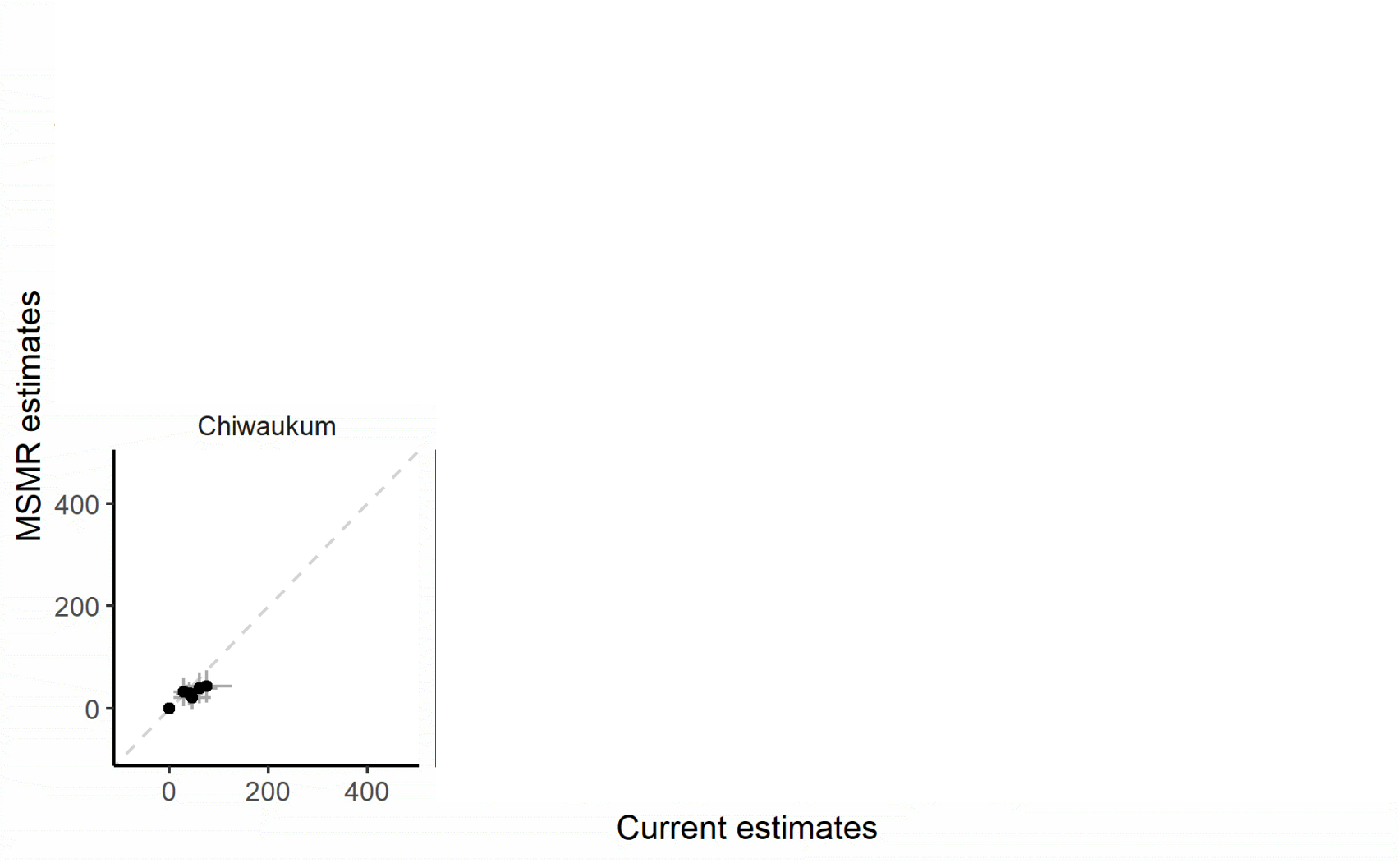




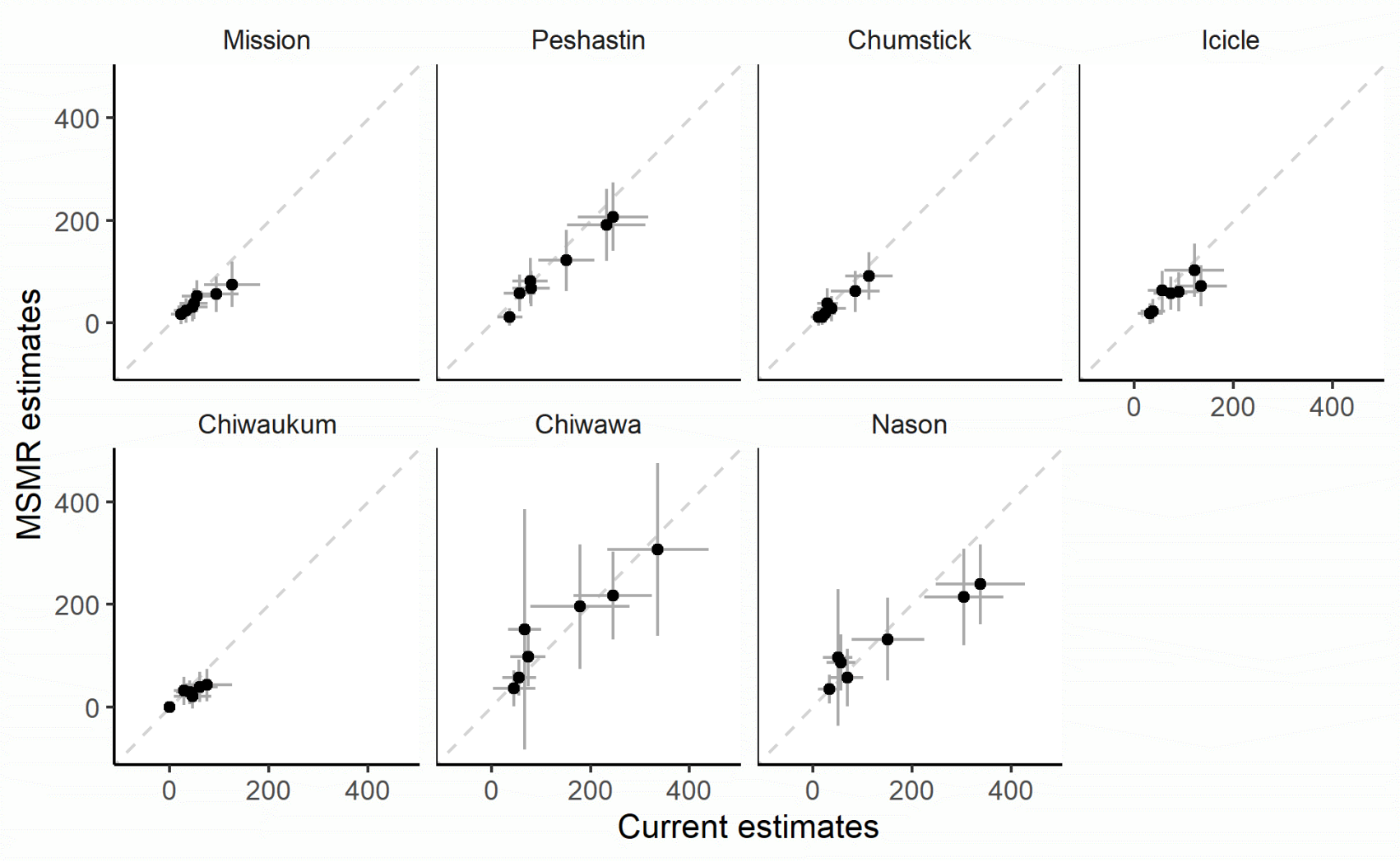
Results – Tributary Escapement



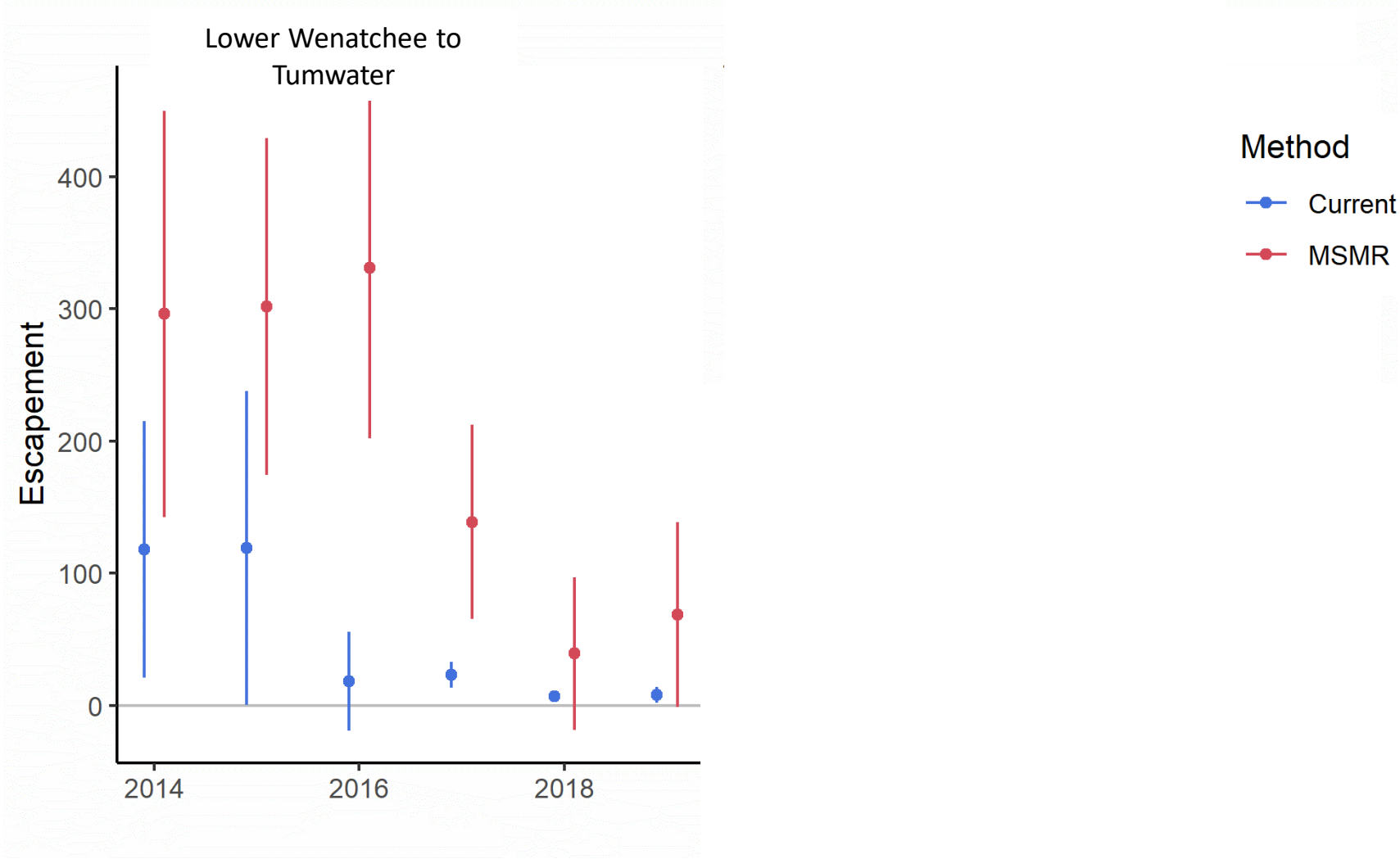
Results – Tributary Escapement



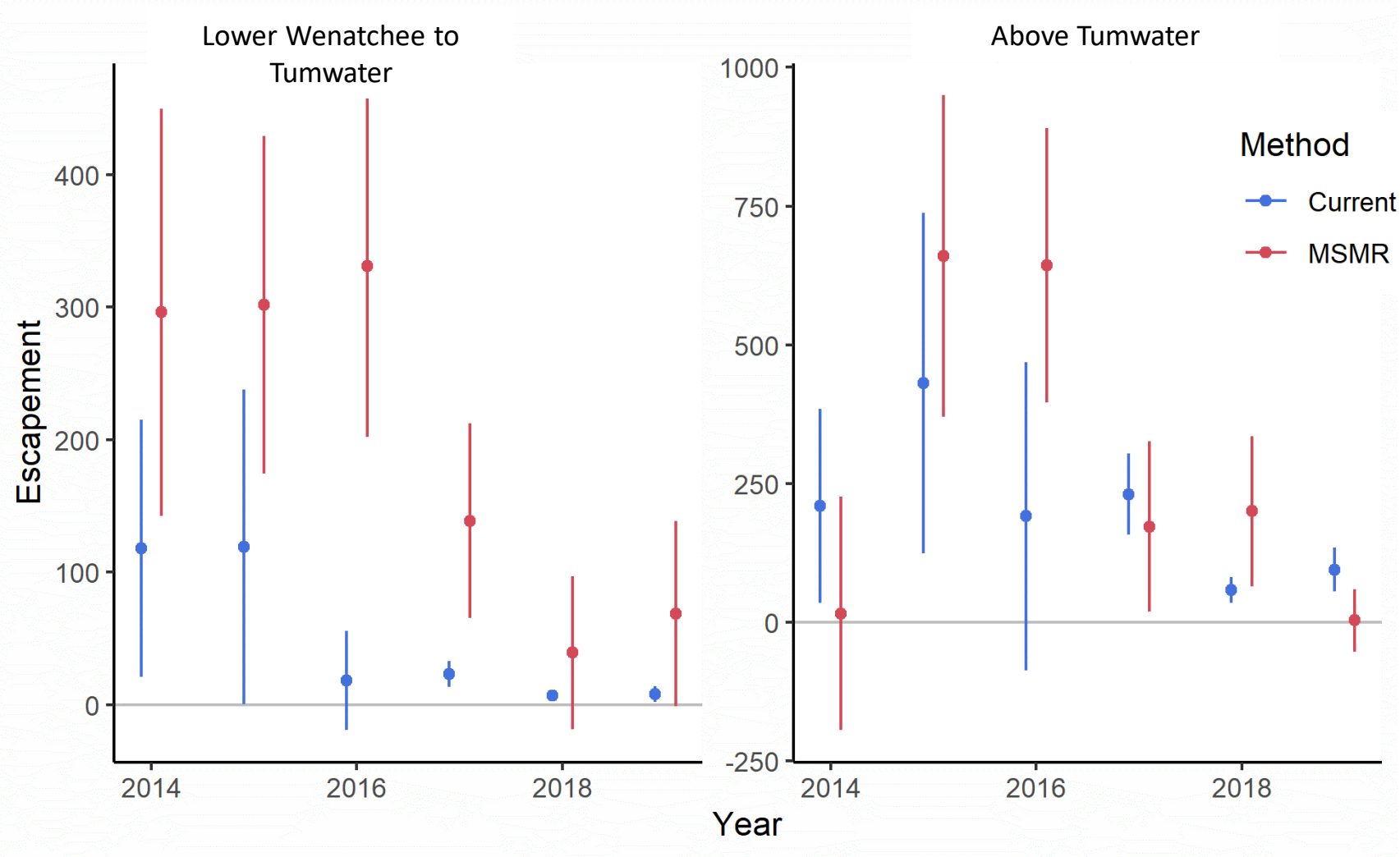
Results – Tributary Escapement



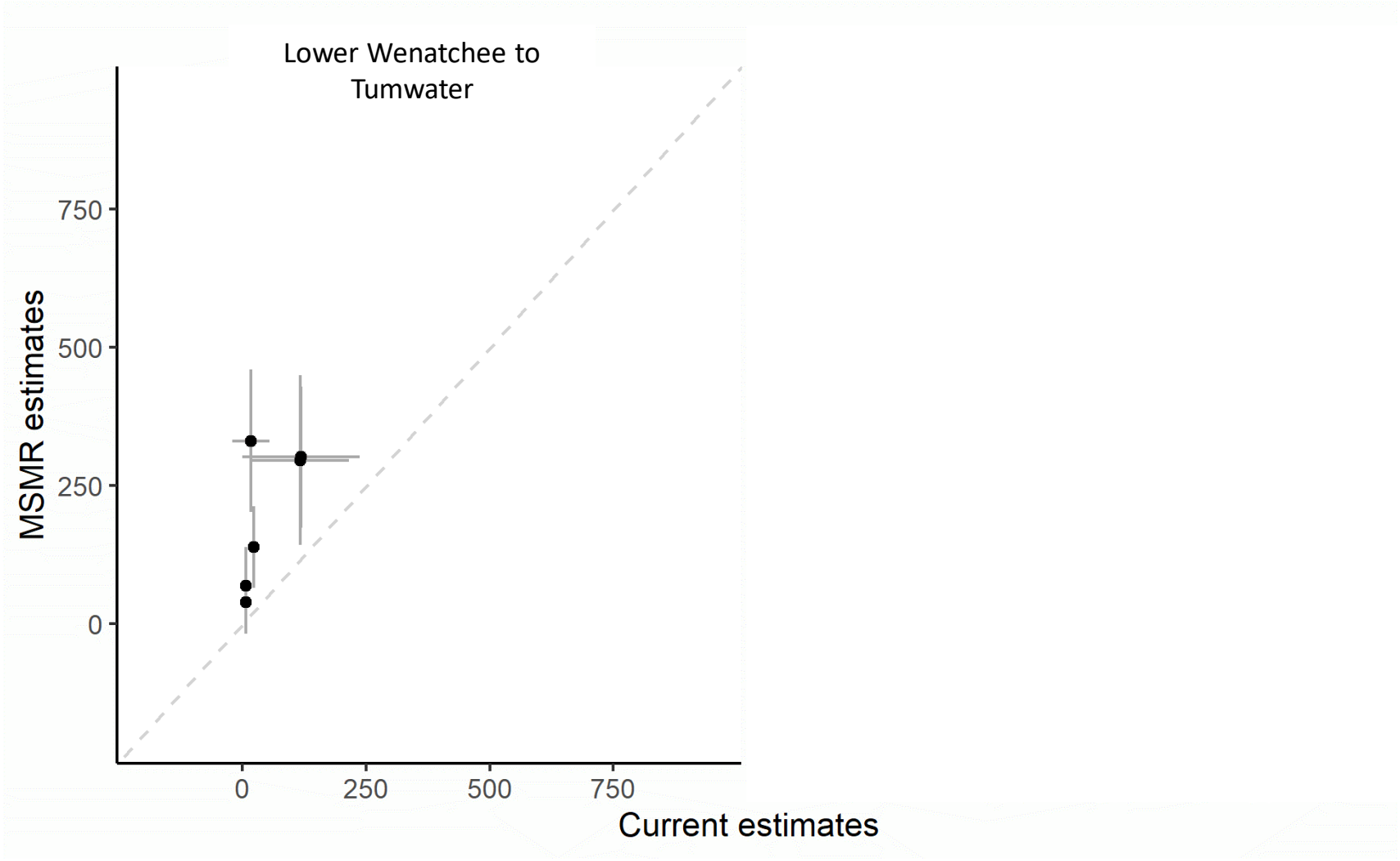
Results – Mainstem Escapement



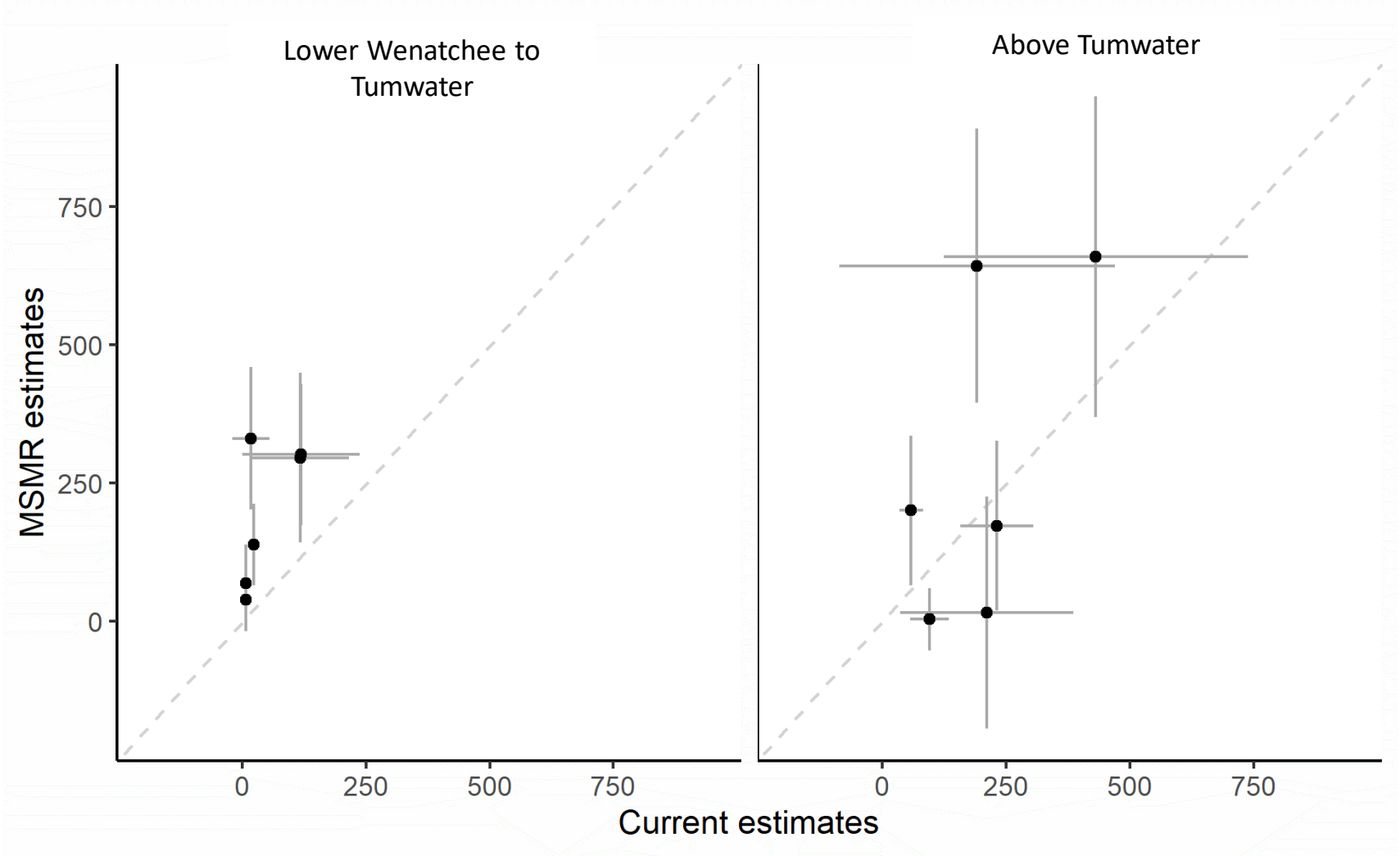
Results – Mainstem Escapement



Results – Mainstem Escapement



Results – Mainstem Escapement



Differences in Mainstem Estimates

Current method:

- Relies on visual redd counts, observation error and GAUC models
- Pre-spawn mortality is estimated annually (i.e., total escapement-spawners)
- Propagate uncertainty using Delta method

MSMR method:

- Relies on PIT-tag detections and known removals
- Uses overwinter survival estimates from Fuchs et al. 2021
- Propagate uncertainty using Delta method

Discussion

- Uncertainty associated with redd surveys
  - No correction when zero redds observed
- Overwinter survival
  - New model uses Fuchs et al. 2021

Year	No. fall*	No. spring*	Overwinter survival (SE)
2015	45	40	0.80 (0.05)
2016	16	12	0.75 (0.11)
Total	61	52	0.85 (0.05)

* Hatchery + Natural-origin

Year	NO Prespawn Mortality (CV)	HO Prespawn Mortality (CV)
2015	0.16 (0.0013)	0.25 (0.0016)
2016	0.26 (0.0009)	0.09 (0.0077)

- Prespawn mortality
  - Estimated by total escapement-spawner escapement

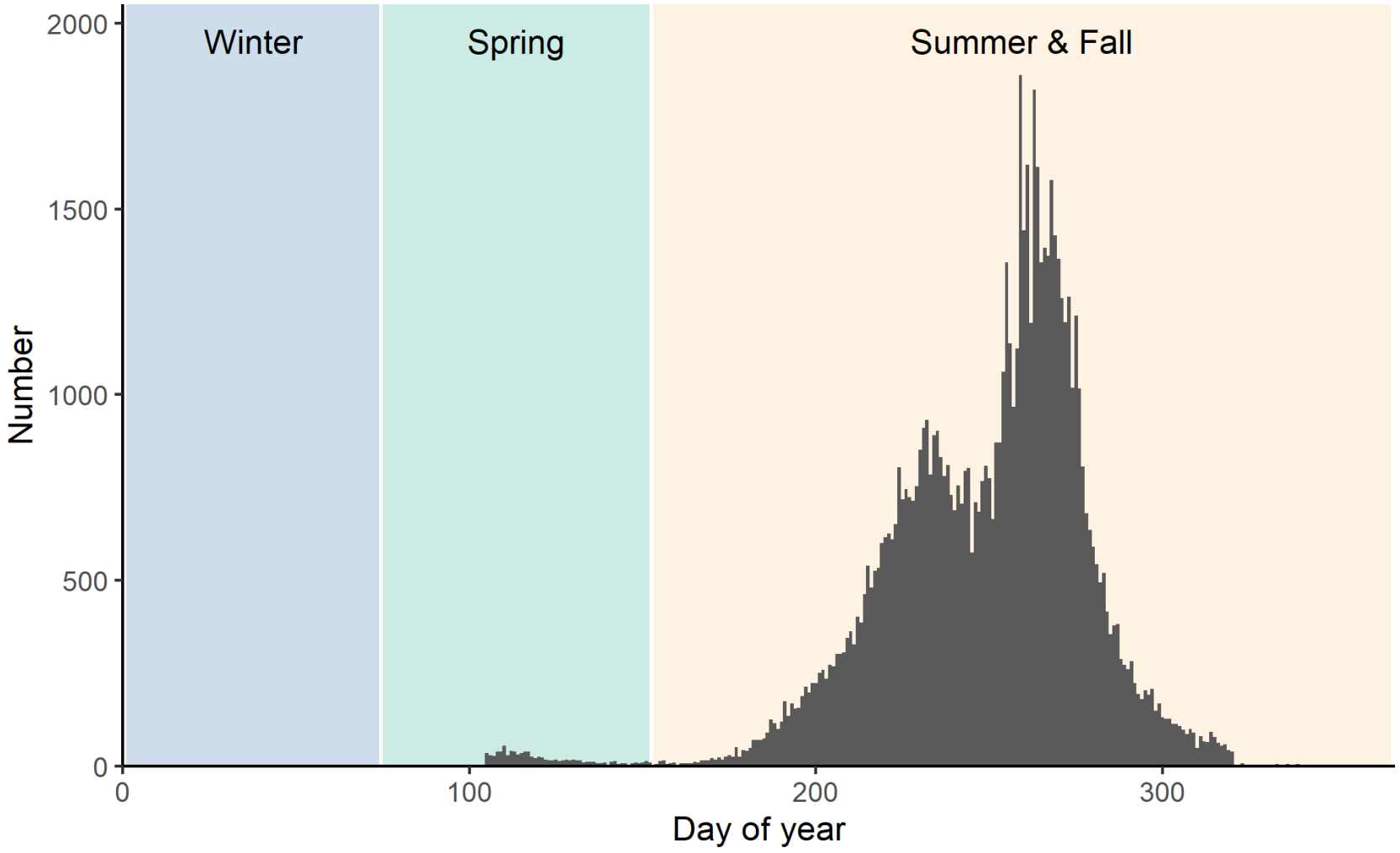
Year	Reach	NO Prespawn Mortality (SE)	HO Prespawn Mortality (SE)
2019	Above Tumwater	0.000 (0.000)	0.000 (0.000)
2019	Below Tumwater	0.000 (0.000)	0.664 (0.460)
2021	Above Tumwater	0.219 (0.316)	0.437 (0.199)
2021	Below Tumwater	0.810 (0.515)	0.994 (0.003)

Next Steps

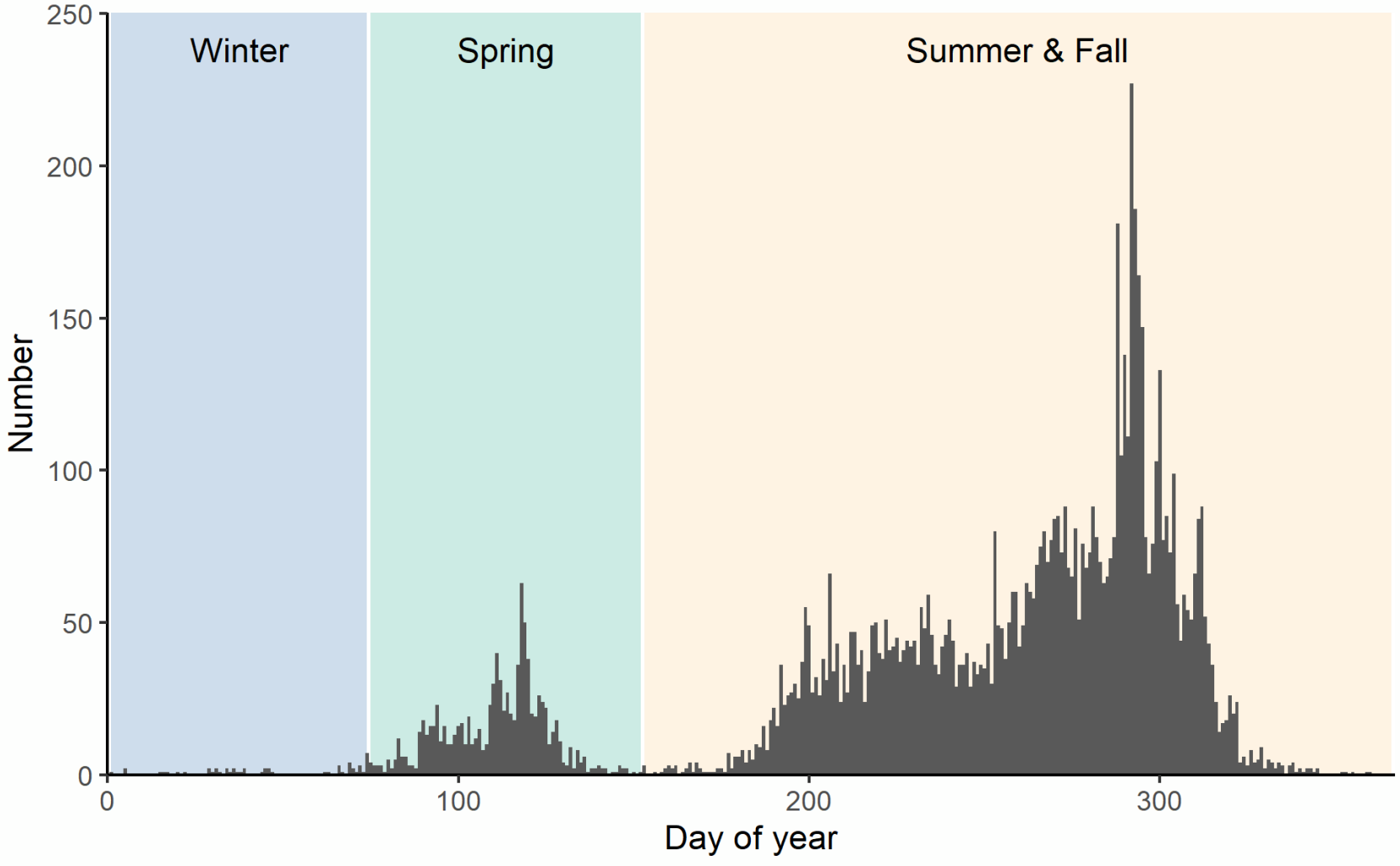
- Request the HC provide feedback on the model for any needed modifications
- Future iterations will include a breakdown of hatchery- and natural-origin escapement estimates
- Plan to publish by the end of the year
- Replace spawning surveys with new model in CPUD's 2023 Hatchery M&E Implementation Plan
- All M&E objectives can still be addressed with new methodology

Questions

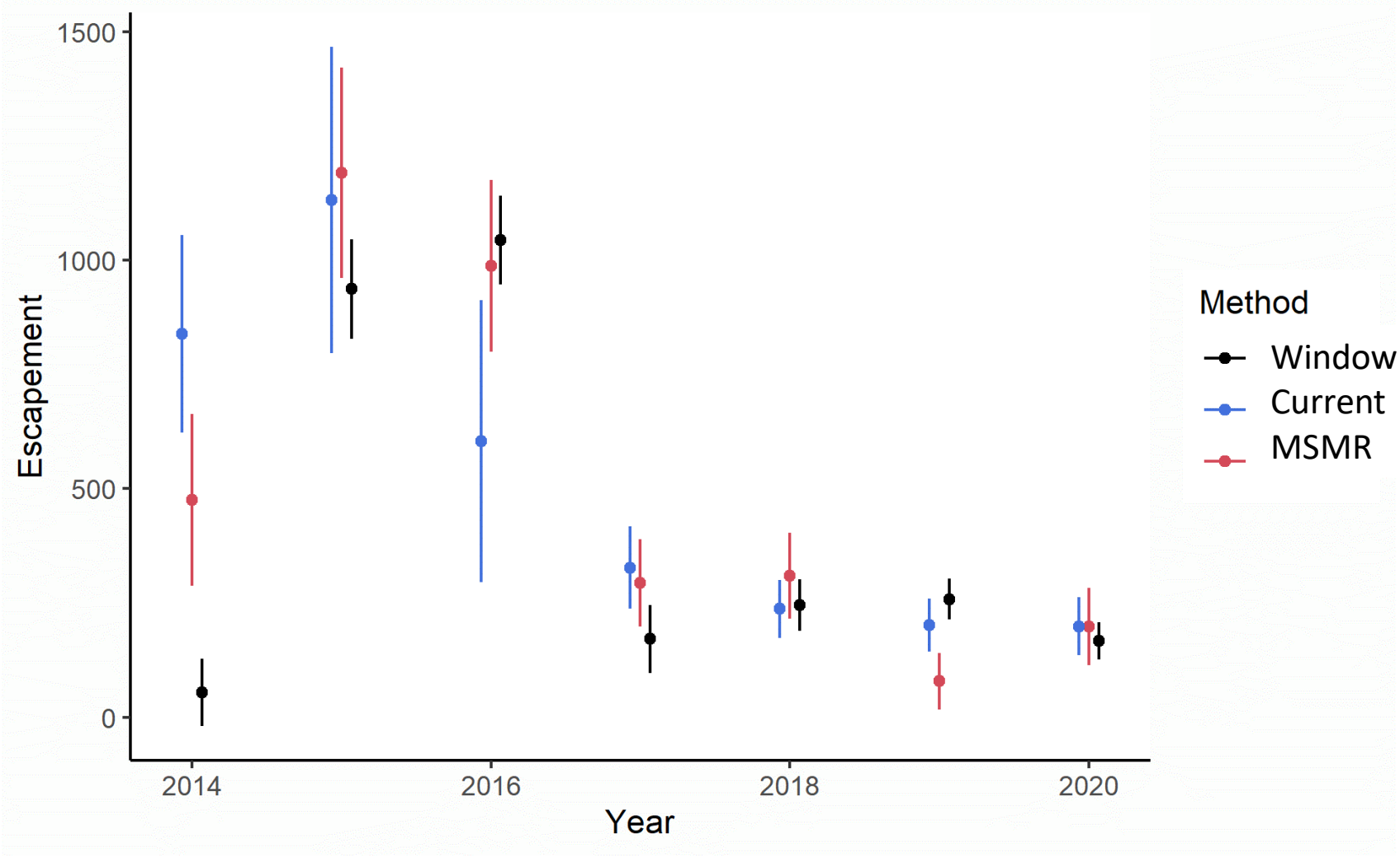
Run Timing – Rock Island Dam



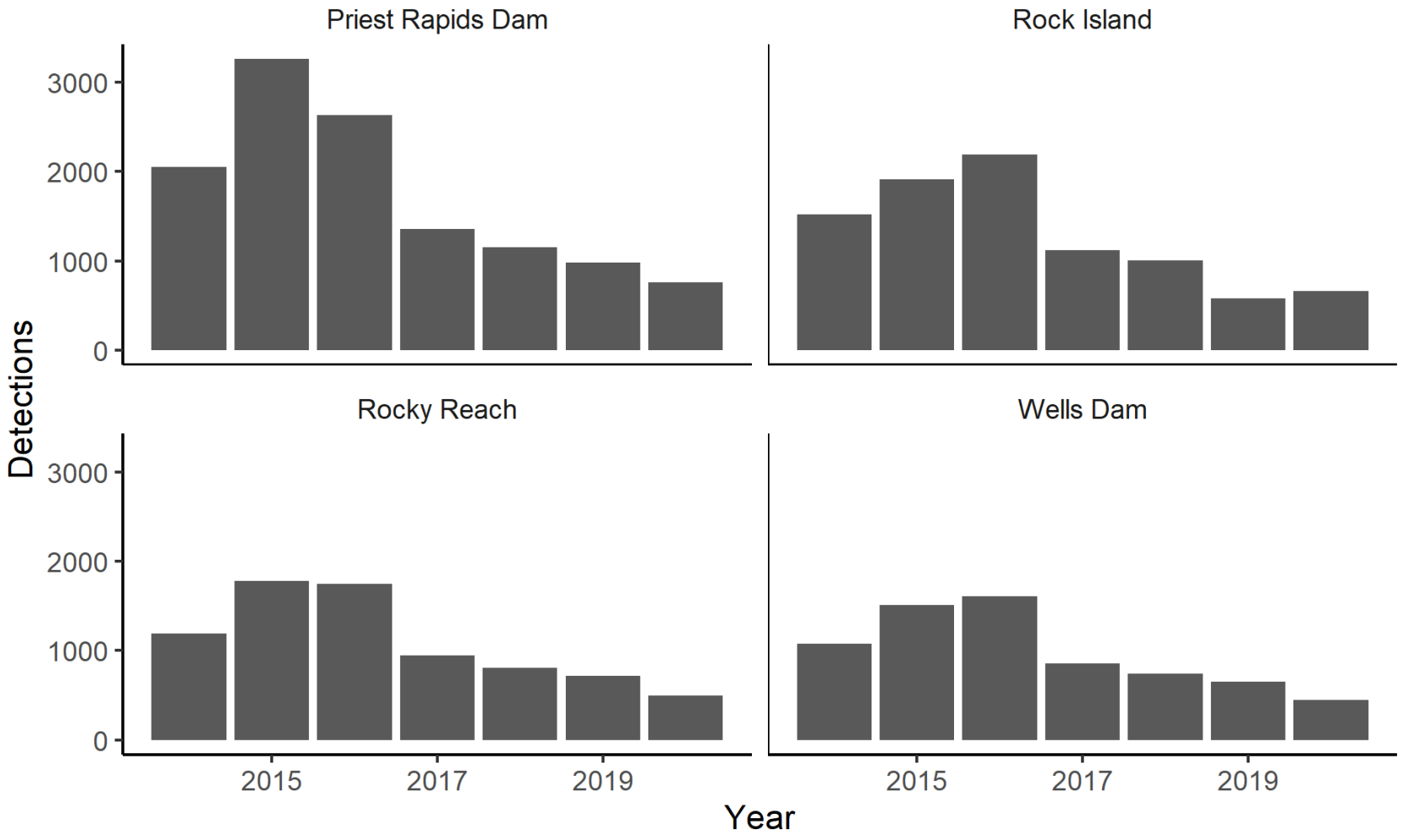
Run Timing – Tumwater Dam



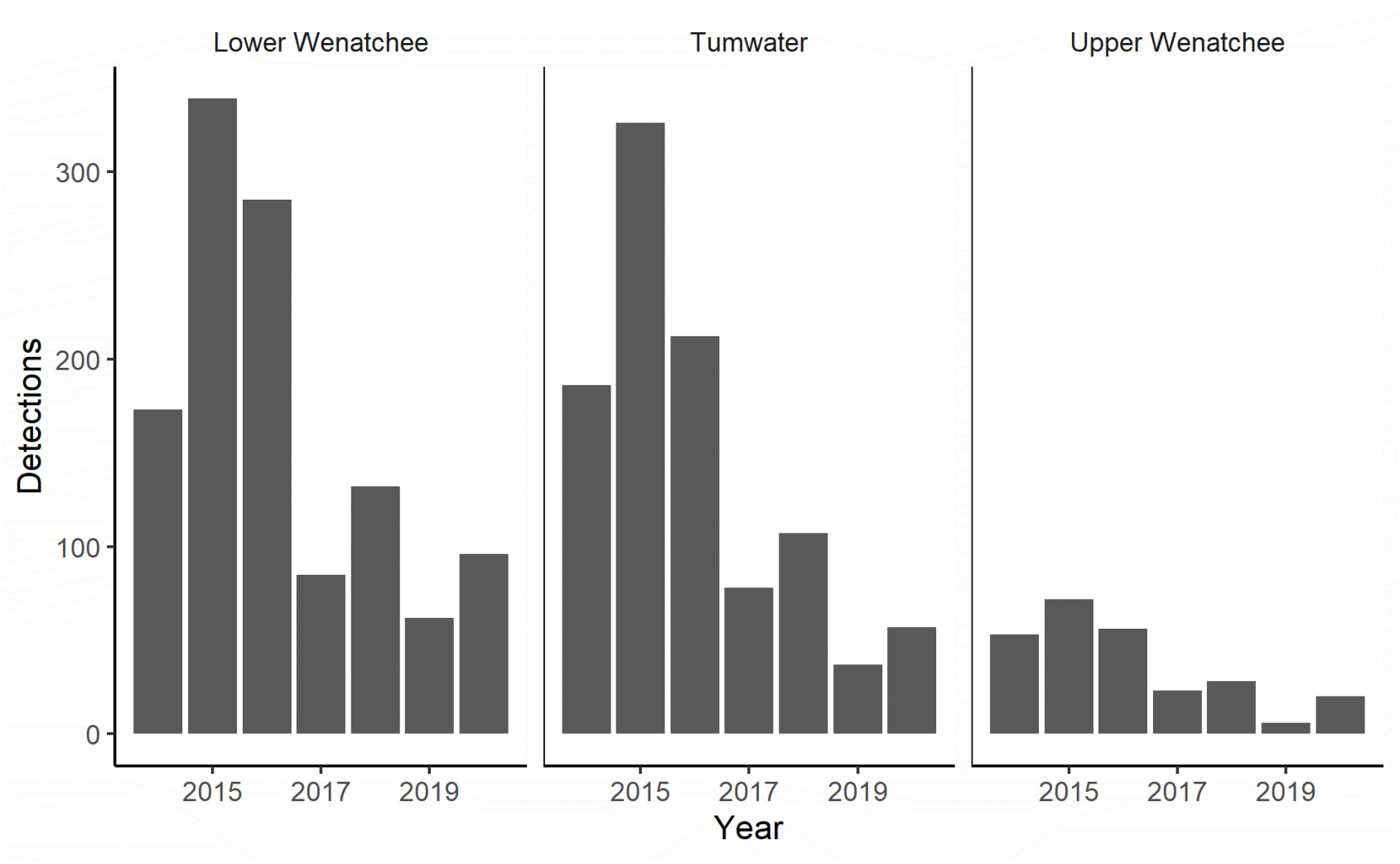
Comparison to Tumwater Counts



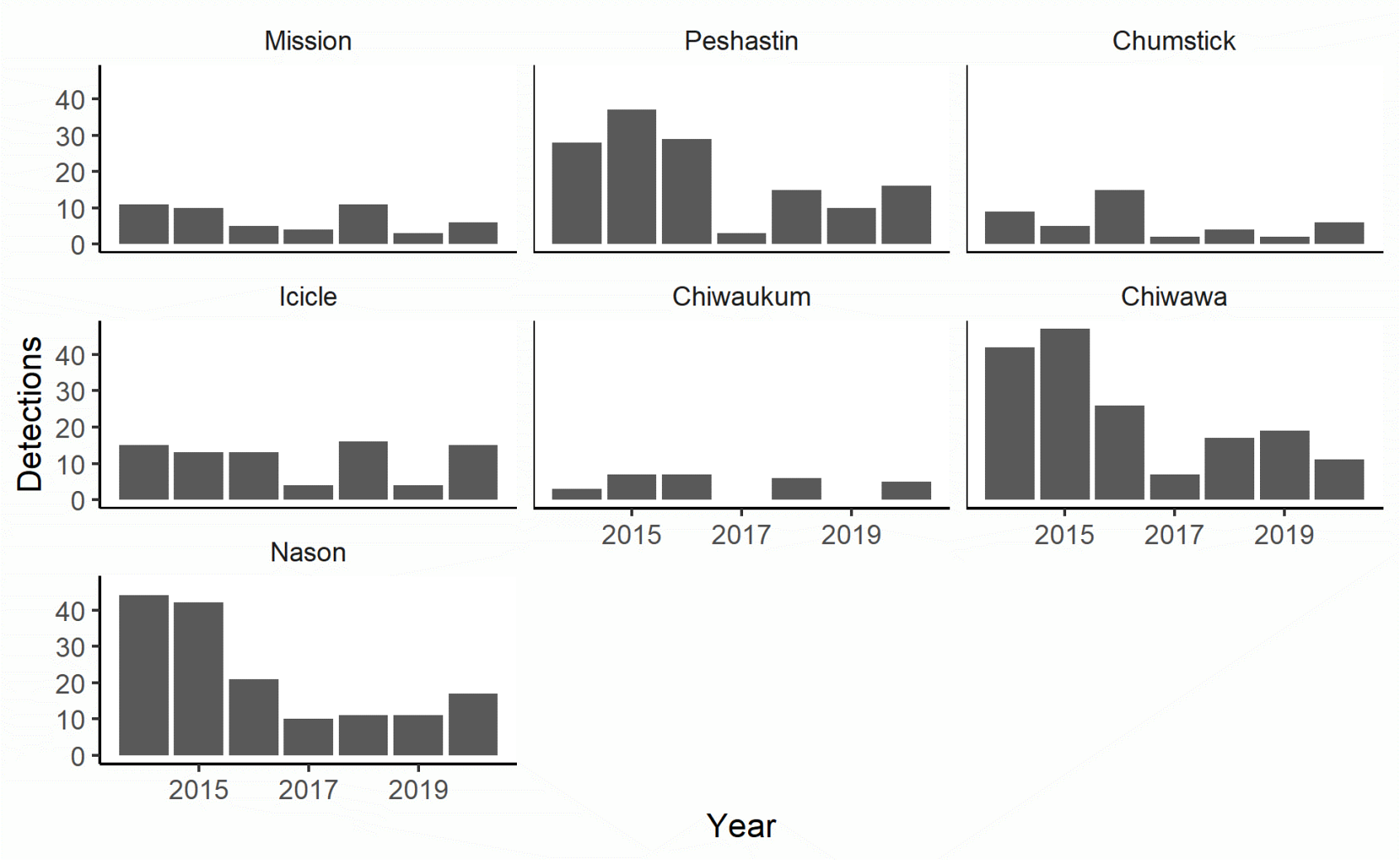
Columbia River PIT Detections



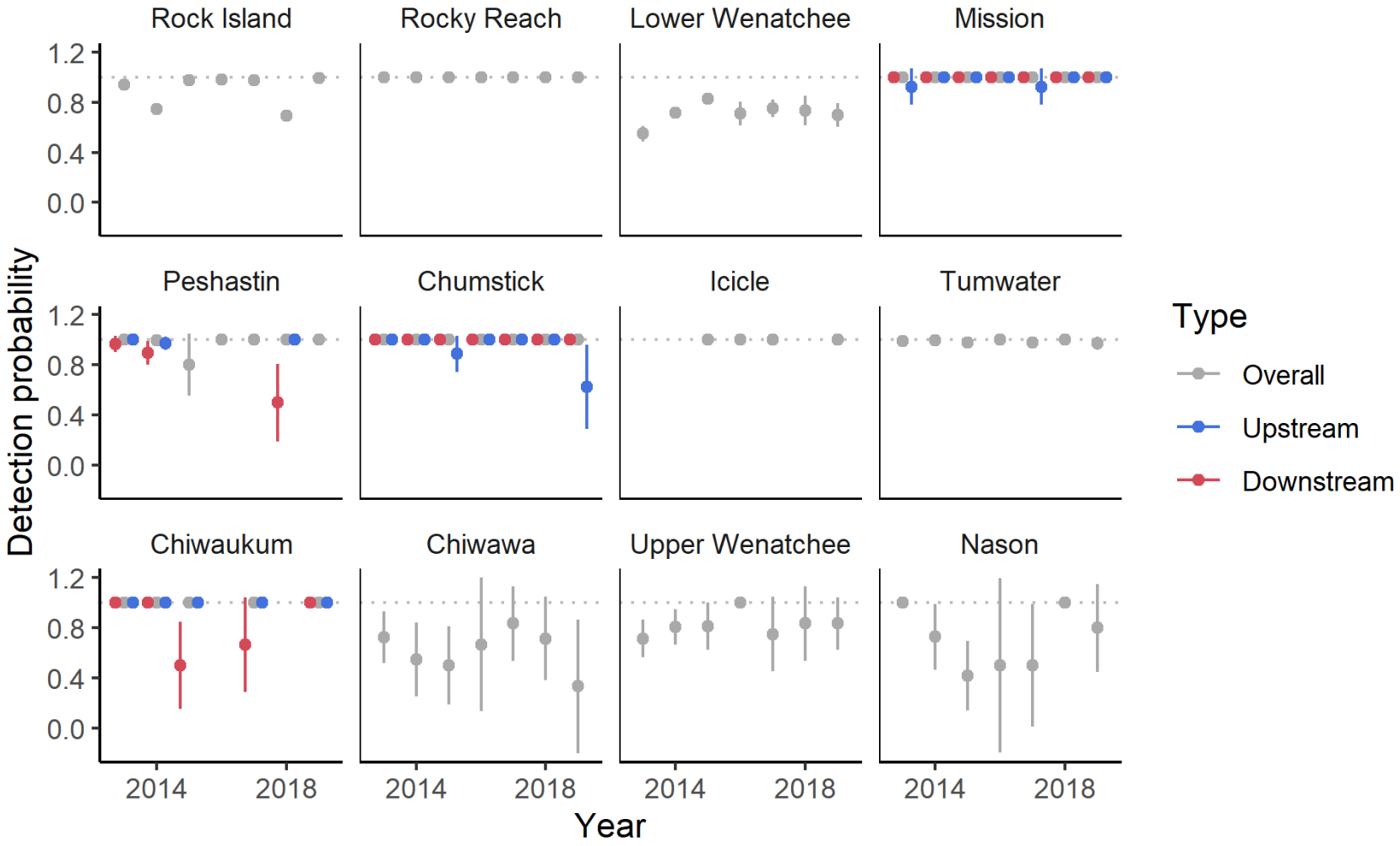
Mainstem PIT Detections



Tributary Detections



Results – Detection Efficiency



Mainstem Reach Locations

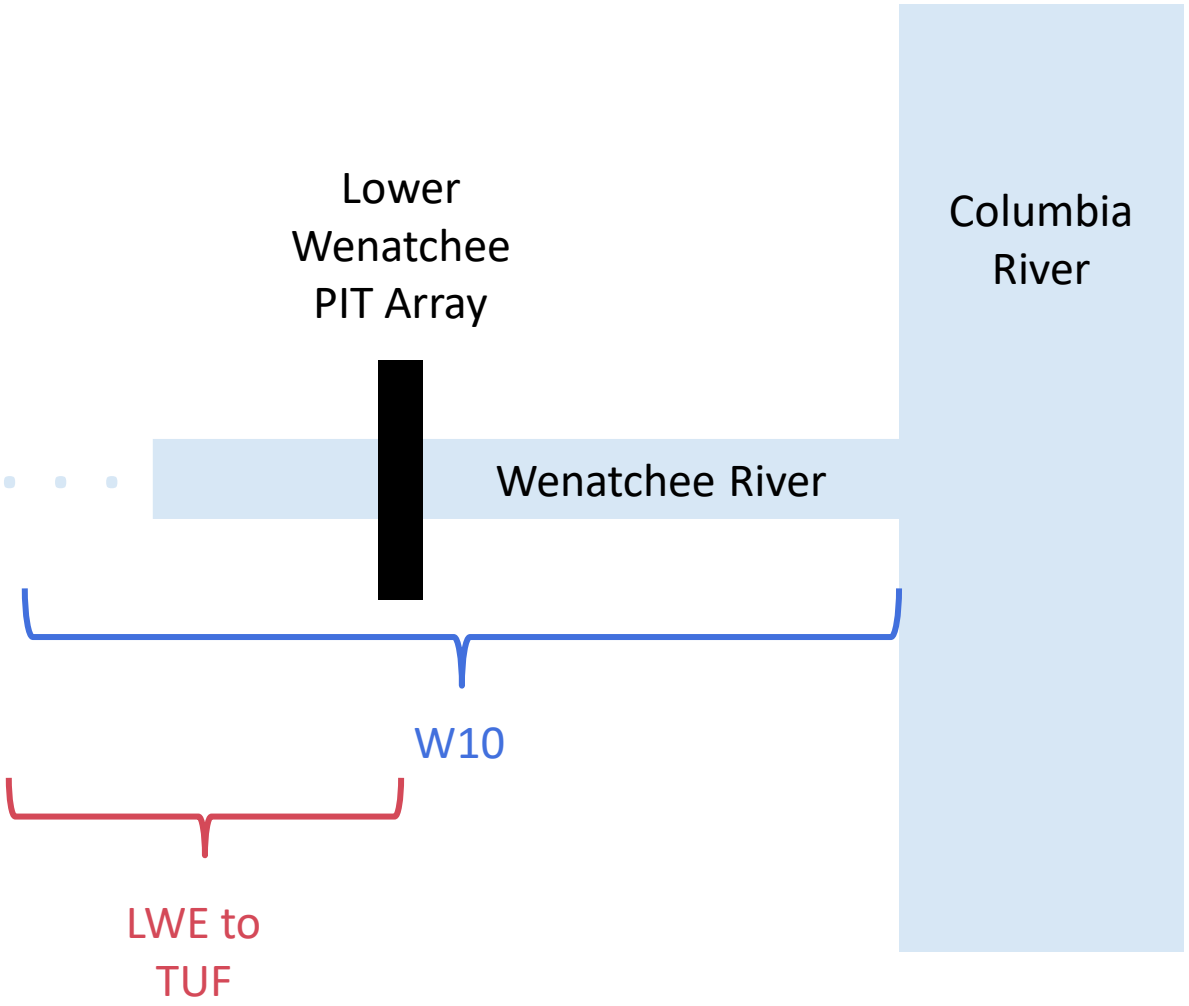
Code	Current reach	River mile	MSMR reach
W1[a]	Mouth to Sleepy Hollow Br	0.0 - 3.3	Lower Wenatchee to Tumwater
W2	Sleepy Hollow Br to L. Cashmere Br	3.3 - 9.5	Lower Wenatchee to Tumwater
W3	L. Cashmere Br to Dryden Dam	9.5 - 17.8	Lower Wenatchee to Tumwater
W4	Dryden Dam to Peshastin Br	17.8 - 20.0	Lower Wenatchee to Tumwater
W5	Peshastin Br to Leavenworth Br	20.0 - 23.9	Lower Wenatchee to Tumwater
W6	Leavenworth Br to Icicle Rd Br	23.9 - 26.4	Lower Wenatchee to Tumwater
W7[b]	Icicle Rd Br to Tumwater Dam	26.4 - 30.9	Lower Wenatchee to Tumwater
W8	Tumwater Dam to Tumwater Br	30.9 - 35.6	Above Tumwater
W9	Tumwater Br to Chiwawa River	35.6 - 47.9	Above Tumwater
W10	Chiwawa River to Lake Wenatchee	47.9 - 54.2	Above Tumwater

[a]MSMR excludes LWE to mouth

[b]Never surveyed

W1 Reach Detail

W1 Reach Details



Attachment E
06/13/22 - JFP Revised Proposed Amendments to Grant PUDs Recalculation Implementation Plan – Response to Grant PUD's 6/6/22 Counter Proposal

06/13/22 - JFP Revised Proposed Amendments to Grant PUDs Recalculation Implementation Plan – Response to Grant PUD's 6/6/22 Counter Proposal

The Joint Fisheries Parties (JFP) appreciates Grant PUDs review and consideration of the amendments we proposed in our 5/27/22 document to the Chelan, Douglas, and Grant PUDs. We also appreciate you having conversations with the various JFP members in advance of developing/providing your counter proposal.

After a thorough review of your 6/6/22 counter proposal and internal conversations, the JFP cannot see where, by exclusion of mitigating for summer Chinook and steelhead inundation programs, Grant PUD's proposal achieves No Net Impact (NNI) for covered species (the Priest Rapids Project Salmon and Steelhead Settlement Agreement defines "Covered Species" to mean spring, summer, and fall Chinook [*Onchorynchus tshawytscha*], sockeye salmon [*O. nerka*], steelhead [*O. mykiss*], and coho [*O. kisutch*]), consistent with the JFPs interpretation of the language in the Salmon and Steelhead Settlement Agreement (Section 7.7, "*No Net Impact*" *refers to the condition whereby the Project does not produce unmitigated project related mortality of Covered Species*.). It is the JFPs continued position that our 5/27/22 amendments allow Grant PUD to achieve NNI under the JFPs interpretation of the language in the SSSA. While the overall numbers of fish for each covered species detailed in our 5/27/22 amendments have not changed. We did take a closer look at and make a couple of minor adjustments to the Methow Hatchery and Nason Creek spring Chinook programs (refer to the spring Chinook section and Table 1) which will still allow for Methow co-manager objectives to be achieved.

The JFP acknowledge that while the Committees agreed to the general process used in the 2013 recalculation, the JFP did not agree to the same outcome as the 2013 recalculation (i.e., no agreement that we would arrive at low/medium/high mitigation levels for covered species). The JFP, during initial discussions of the sensitivity analysis template and data set, insisted we were not interested in considering any proposal which did not include mitigation for inundation.

The JFP recognizes (as we have stated on multiple occasions during this recalculation phase) that there are continued differences in interpretation of the language in the SSSA related to NNI/recalculation and have been supportive of having Policy provide the HSC with clarification on the matter prior to the 2033 recalculation as has been discussed in Committee (this is just part of the Committees desire and commitment to develop a plug-and-play approach in the next ten years prior to the 2033 recalculation). The JFPs position and commitment on the matter has not changed.

The JFP have heard and recognize Grant's concern about setting precedence in agreeing to mitigating for inundation (the concerns are a little broader than this but Unavoidable Project Mortality [UPM] for inundation has been at the crux of HSC discussions and is hence being used as the primary example). The JFP is equally concerned about setting precedence by not including mitigation for inundation this recalculation when it can be achieved with no new infrastructure. Even though we agreed to not include it in the 2013 recalculation implementation plans, we only came to that conclusion because we believed that there were sufficient constraints in the variables to implementation to not press for inclusion of inundation during the 2013 recalculation.

To be able to move forward with having an approved 2024-2033(release year) implementation plan, the JFP propose, that as part of the Statement of Agreement (SOA) for Grants implementation plan, to include language that agreement of this implementation plan does not set a precedence for inclusion or exclusion of mitigation for inundation or other potential programs which could arise in the future, in the

2033 recalculation until further clarification can be provided. To address this now, the JFP also support including language formally committing the parties to pursuing clarification (including development of the question[s]) from Policy related to our NNI discussions prior to the next recalculation. The exact language and timelines would be established by the HSC.

Spring Chinook

Okanogan Subbasin

Under this proposed plan, Grant PUD's spring Chinook (SPC) production cost-share agreement with the CCT for the Okanogan Basin would remain as proposed in the 4/13/22 Grant PUD RIP.

Methow Subbasin

Under this revised proposed plan, Grant PUD's SPC production for the Methow Subbasin would be maintained at the current level of 134,000 smolts at Methow Hatchery. GPUD's Methow SPC production will be comprised of Methow and Entiat impacts, 35,051 steelhead converted to Methow SPC, and 10,534 Nason safety SPC moved to Methow.

The movement and/or conversion of fish is to meet a co-manager production objective consistent with the current Methow Composite production of approximately 195,000 from the conservation program to meet upper Methow spawner escapement and Winthrop safety net broodstock program needs in most years.

Wenatchee Subbasin

Under this revised proposed plan, Grant PUD's SPC production for the Wenatchee Subbasin would be 203,650 smolts at Eastbank Hatchery/Nason Creek Acclimation Facility. GPUD's Wenatchee (Nason) SPC production will be comprised of Wenatchee impacts minus 10,534 Nason safety SPC moved to Methow. Under current allocations agreed to within the HSC, the Nason conservation program is maintained at 125K with the safety net program reduced to 72,567 smolts. The number of conservation-to-safety net smolts in the Nason program may be changed within the next 10-year period depending on the outcome of conservation program re-sizing evaluations.

Summer Chinook

Okanogan Subbasin

Under this revised proposed plan, Grant PUDs summer Chinook (SUC) production cost-share agreement with the CCT for the Okanogan Basin would remain as proposed in the 4/13/22 Grant PUD RIP.

Methow Subbasin

Under this revised proposed plan, Grant PUD's summer Chinook production for the Methow Subbasin would remain as outlined in the JFPs 5/27/22 amendments to the Chelan, Douglas, and Grant PUD's RIPs. This is achieved through a combination GPUD's 4/13/22 proposed value plus 37,778 SUC UPM and 35,570 steelhead UPM converted to SUC. This combination is to achieve a co-manager target release into the Methow subbasin of 200K smolts.

Wenatchee Subbasin

Under this revised proposed plan, Grant PUD's summer Chinook production for the Wenatchee Subbasin would be remain as outlined in the JFPs 5/27/22 amendments to the Chelan, Douglas, and Grant PUDs RIPs. This is achieved through a combination GPUD's 4/13/22 proposed value plus 48,000 SUC UPM. This combination is to achieve a co-manager SUC target release from Dryden Pond into the Wenatchee River of 500K smolts.

Steelhead

Okanogan Subbasin

Under this revised proposed plan, Grant PUD's summer steelhead (SHD) production for the Okanogan Subbasin would remain as outlined in the JFPs 5/27/22 amendments to the Chelan, Douglas, and Grant PUDs RIPs and is consistent with the program as described in the SSSA (100K). The remaining 72,621 UPM smolts were converted to Methow SPC and Methow SUC.

Fall Chinook

Under this plan, Grant PUD's fall Chinook production would remain as proposed in the 4/13/22 Grant PUD RIP including the fry conversion which occurred following the previous recalculation.

Table 1. JFP revised Proposed implementation of Grant PUD's NNI spring, summer, and fall Chinook and steelhead hatchery production for the 2024-2033 release years.

Facility	Spring Chinook	Summer Chinook	Fall Chinook	Steelhead	**Total**
Chief Joseph Hatchery	110,000	305,000	-	-	**415,000**
Methow Hatchery	134,000	-	-	-	**134,000**
Wells Hatchery	-	-	-	100,000	**100,000**
Carlton Acclimation Facility	-	164,533	-	-	**164,533**
Dryden Pond	-	206,224	-	-	**206,224**
Nason Creek Acclimation Facility	203,650	-	-	-	**203,650**
Priest Rapids Hatchery	-	-	5,401,267	-	**5,401,267**
Total	**447,650**	**675,757**	**5,401,267**	**100,000**	**6,624,674**