Federal and State Agencies

AGENCY NAME	FIRST NAME	LAST NAME	DATE
DNR	Elizabeth	O'Neal	11/14/2016
NOAA Fisheries	Michael	Grady	11/14/2016
USFWS	Steve	Liston	11/9/2016
WDFW	Justin	Allegro	11/14/2016
WSDOT	Erin	Gardner	11/14/2016

From: O NEAL, ELIZABETH (DNR) <ELIZABETH.ONEAL@dnr.wa.gov> on behalf of DNR RE SEPACENTER <SEPACENTER@dnr.wa.gov>
Sent: Monday, November 14, 2016 4:29 PM
To: 'info@chehalisbasinstrategy.com'
Subject: DNR Comment regarding the Chehalis Basin Strategy PEIS
Attachments: Chehalis Basin PEIS comment.pdf

Attached please find, The Department of Natural Resources (DNR) comment regarding the Chehalis Basin Strategy Programmatic Environmental Impact Statement.

Elizabeth L O'Neal
External Affairs Program Lead
Environmental and Legal Affairs Section
Washington State Department of Natural Resources
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WASHINGTON STATE DEPARTMENT OF
Natural Resources
Peter Goldmark - Commissioner of Public Lands

Caring for
your natural resources
... now and forever

November 14, 2016

Chehalis Basin Strategy EIS
C/O Anchor QEA
720 Olive Way, Suite 1900
Seattle, WA 98101

To Whom It May Concern:

Please accept these comments from the Washington State Department of Natural Resources (DNR) regarding the Chehalis Basin Strategy Draft Programmatic Environmental Impact Statement (PEIS). DNR is the manager of over 3 million acres of state trust lands comprised of forest, range, commercial, and agricultural lands, and 2.6 million acres of state-owned aquatic lands. In addition, DNR administers the state Forest Practices Rules on more than 12.7 million acres of non-federal, public, and private lands.

DNR is committed to sustainably managing the state's resources, relying on sound science, and making transparent decisions in the public's interest and with the public's knowledge throughout the environmental review process.

Given the encompassing nature of a programmatic EIS and DNR's broad and diverse authorities, we are providing more general comments below regarding DNR's role and responsibilities in the Chehalis Basin and more specific, section by section comments on the draft PEIS in the attached table.

State Trust Lands

DNR manages over 3 million acres of Trust Lands across the state which generate over $170 million in non-tax revenue annually, providing necessary funds for construction of public schools, universities, prisons and other state institutions, as well as county services. Management of Trust Lands is governed by state statutes adopted by the legislature in Title 79 RCW Public Land. Other legislative authority flows from RCW 43.12 Commissioner of Public Lands and RCW 43.30 Department of Natural Resources. As a trust land manager, DNR is obligated to follow the common law duties of a trustee which include generating revenue, managing trust assets prudently and acting with undivided loyalty to trust beneficiaries (Washington Supreme Court: Skamania vs. State of Washington, 1984)

Trust lands encompass approximately 170,000 acres in the Chehalis Basin, nearly 90% of which is in the Upper Chehalis WRIA; much of this acreage is managed for sustainable harvest of timber and other forest products. DNR is concerned with any proposal, including Alternative 4, which seeks to convert managed forest uplands to other uses. Washington State cannot disadvantage the trusts to accomplish other public purposes, no matter how worthy. Any disposition of Trust Lands must be in the best interest of the specific trusts and is at the

discretion of the Board of Natural Resources (BNR). These over-riding legal and procedural mandates must be recognized when discussing the future of Trust Lands in the Chehalis Basin.

In addition to the constraints identified above, DNR must also comply with its State Lands Habitat Conservation Plan (HCP). The State Lands HCP provides habitat restoration and avoids take of listed species on approximately 1.5 million acres of DNR managed lands in Western Washington, including the Chehalis Basin. The State Lands HCP has two riparian conservation objectives: 1) to maintain or restore salmonid freshwater habitat on DNR-managed lands; and 2) to contribute to the conservation of other aquatic and riparian obligate species. Any alternative proposing conversion of forested uplands needs to take this into consideration. Finally DNR cannot be placed in a situation of having to mitigate for forestland taken out of the HCP covered land base and converted to more intensive land uses.

State-Owned Aquatic Lands

DNR manages over 2.6 million acres of State-owned Aquatic Lands (SOAL), including navigable rivers in the Chehalis Basin. Aquatic land management is directed by Article XV of the Constitution as well as RCWs 79.100 – 79.145. DNR manages state owned aquatic lands as a public trust and manages these lands on behalf of the people of the state. Statutory guidance directs DNR to provide for a balance of benefits, which include:

(1) Encouraging direct public use and access;
(2) Fostering water-dependent uses;
(3) Ensuring environmental protection;
(4) Utilizing renewable resources.

In addition, DNR is directed to generate revenue from management of aquatics lands in a manner which is consistent with these four public benefits.

In balancing these objectives, DNR requires use authorizations for work and/or projects occurring on SOAL. In order to obtain a use authorization, project proponents must apply to and work with DNR in order to ensure uses are in the best interest of the state. Any alternative that requires use of SOAL requires a use authorization in advance.

Forest Practices

The legislature adopted the Forests and Fish Report as part of the Salmon Recovery Act in 1999 with a focus on aquatic resources, the provisions codified in the Forest Practices Act RCW 76.09. Rule changes involving aquatic resources such as water quantity and quality, and fish habitat, need to be brought to the Forest Practices Board through the adaptive management system to show that change is needed. There are suggestions within the PEIS that forest management needs review for its impact to water quantity in the Chehalis basin. The best avenue for this to occur would be through the adaptive management system, if it becomes a priority for

the basin. We are also concerned that any study of the basin would have to involve a spatially explicit model and that it reflects how forest practices implementation under the current rules.

DNR appreciates the opportunity to submit comments on the PEIS which are provided in the attachment to this letter. Should you have any questions regarding this letter, please do not hesitate to contact me at 360-902-1744.

Sincerely,

Lenny Young
Department Supervisor

Item No.	Sect. No.	Review Comment
1		The terms “managed forest,” “managed Forest Practices,” and “managed forestland” are throughout the document. Examples include: • Appendix C Page 23 “managed forestland (e.g. Managed Forest Practices) • Section 3.10.2 Page 196 provides a definition “Managed forests” defined as lands outside of federal management that are more than 80 contiguous forested acres. • Page 432 states “active timber management (managed forestland)”. • Section 2.2 page 22 and the Executive Summary state “54% classified as managed forests” The term is sometimes capitalized, sometimes not. Consider evaluating the term format and provide a clear and consistent understanding of the terms use for the reader. The document may unknowingly discount the value of smaller parcels that are being managed by smaller landowners for forestry based on the definition provided. If the document intents to refer to all lands that fall under forest practices rules to be labelled “managed forestry” the definition on page 196 should be clarified. Forest Practices rules apply to properties that meet the definition of forest land regardless of the properties size or county zoning. Forest land definition: all land which is capable of supporting a merchantable stand of timber and is not being actively used for a use which is incompatible with timber growing…… See complete definition in WAC 222-16-010 or RCW 76.09.020(15). <u>Recommendation:</u> “managed forest” defined as undeveloped land capable of growing timber, excluding federal management. See forest land defined in WAC 222-16-010.
2	Chapter 1 overview	First paragraph. Identifies “Further research and modeling would be needed to understand this interaction in the Chehalis Basin. However, the literature review found <u>*consistency*</u> in scientific research for small basins, forest harvest increases magnitude…” The literature review (Appendix A) does not indicate a consistent finding; it does indicate that in <u>*some instances*</u>.

		Recommendations: 1. Replace the term “consistency” with “in some cases” 2. The literature review does not consider the implementation of current-day forest practices. There are many buffers left under the current rules for fish and non-fish bearing streams, wetland buffers, leave areas associated with unstable slopes, and in areas of rain-on-snow, hydrologic maturity is taken into account. DNR can understand that need for basin modelling to understand the impact of all the alternatives on flow. However, if the intent of a study on forest practices and its impact on flows to suggest forest practices rules need to be changed, then it is recommended that such a study be proposed to go through the adaptive management process associated with the Forest Practices Board, which is required to develop recommendations based on best available science, monitoring, and peer review per RCW 76.09.370(7). A majority of the existing studies cited in the literature review are from areas outside of Washington in areas with different geography and climatic conditions or regulations that are not represented by current day forest practices regulations. Without the modeling, you would have to make many overarching assumptions that may or may not reflect actual conditions. To predict future scenarios in the basin you would need to understand the age/class for the current forests and then grow them out to the future. This is proprietary data and can only be guessed at using remotely sensed data and harvest rates would have to be assumed based on certain market conditions.
3	2.3.4.1	Consider including the following addition forest and timber programs implemented by DNR include: • Forest Riparian Easement (FREP) can purchase 50 year riparian easements from small forest landowners. The program is available to a qualifying landowner as defined in WAC 222-21-010(6). • Rivers and Habitat Open Space Program (RHOSP) is available for qualifying landowners wishing to sell permanent easements for some channel migration zones and critical habitat for state listed threatened or endangered species. Qualifying properties are classified as “designated forest land” (RCW 84.33) or “open space” (RCW84.34).
4	3.2.4.3	First paragraph. Identifies that “forest practices can increase channel-forming flows, which could cause erosion and siltation”. Appendix A page 19 Section 3.5 reference Watson & Adams 2010; does not support this conclusion.

		Additional clarification is needed linking increase channel forming flows and erosion. The literature cited was inconclusive and based on a set of rules that were very different from current rules. The Appendix A report failed to address Statement of Purpose (2) entirely, "Review existing state rules and regulations regarding forest management and timber harvest and how these related to changed forest conditions over time as described in literature reviewed."
5	3.3	• This section is lacking an analysis of acres of wetlands lost in the basin. This is important for identifying one of the root causes of flooding, which therefore cannot be adequately addressed in the development of alternatives. • This section is lacking an analysis of land-cover change, including change from one vegetated type to another and from vegetated to un-vegetated or impervious. This is important for identifying one of the root causes of flooding, which therefore cannot be adequately addressed in the development of alternatives.
6	3.4.1	• Priority habitat areas for fish species are not identified. If these are not identified then an accurate assessment of the impacts from alternatives cannot be made. • Information on bull trout, green sturgeon, white sturgeon, Pacific lamprey, river lamprey, eulachon, and Olympic mud minnow is absent. All of these species potentially reside in the basin and are species of interest and potentially affected by the proposed alternatives. Potential impacts to these species are not considered and need to be.
7	3.4.2.1	While ongoing study of amphibian usage in the basin is identified, there is currently inadequate information presented to identify priority habitat areas nor potential impacts from the alternatives. Potential impacts to amphibians from the alternatives are not considered and need to be.
8	4.1	The mitigation actions are not thoroughly discussed, E.g., Table 4.1-1. It is hard to evaluate the benefits of the mitigation effort without more specifics.
9	4.2.2.2.2	Last paragraph. Identifies that sediment entrapment of up to 1 foot could occur in the FRO footprint following activation and drawdown. The potential for additional sediment deposition should be included in the vegetation planning process. Vegetation retained during initial clearing for the FRO footprint should be capable of tolerating sediment deposition as well as water inundation. Consideration in the future should include not just the tree and brush species that remain by the potential changes from insect and diseases that will target vegetation weakened by the effects of FROs activation. Additional resources that may be helpful include: http://www.extension.umn.edu/environment/trees-woodlands/flooding-effects-on-trees/ and Silvics of North America - http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm

		Recommendation: Re-evaluate vegetation management within FRO and FRFA footprints for sediment entrapment impacts to vegetation survival.
10	4.2.4.2.1	Indicates the Option 1 (FRO & FRFA) will result in "periodic or permanent inundation of the area upstream of the dam" and "…the impact could cause changes to fish population levels that are observable at a Basin-wide scale, particularly for migratory fish such as salmon and steelhead." "Flood retention with a dam would cause inundation that would similarly displace fish from the stream channel and suffocate redds." So essentially all salmon spawning habitat in the upper Chehalis River would be lost. Knowing this, the PEIS should include these impacts in the calculations that went into estimating the impacts of fish recovery in table estimated in table 4.8-3. In other words, how much will the loss of the unique spawning habitat in the Chehalis river that will be inundated effect or offset the estimated benefits of the restored downstream (below the dam) habitat if there are fewer fish available to benefit from the restored habitat? For example; how do the estimates in table 4.2-7 effect the results of table 4.8-3?
11	4.2.13.2	Last paragraph. Identifies that damage to the FR 1000 road may occur during FRO activation. Damage of the road surface, culverts, and existing bridges affected should be evaluated for short and long term impacts. Road construction and maintenance techniques (meeting Forest Practices standards) have been implemented to protect existing wetlands and streams from surface erosion; typically, road segments having the potential to direct water into a stream. Areas outside this zone may provide a previously unidentified sediment source. Depending on the type (light vehicle vs. dump truck or logging truck) and frequency of vehicles on the road surface immediately prior to FRO activation vary amounts of additional sediment would be available for transport within the FRO or downstream during drawdown. Heavy vehicle and truck traffic soften the road surface a few inches during the fall and winter rainy season. Softened road segments will provide immediate sediment source during FRO activation. The existing bridge or large culvert structures and associated road approaches may trap large wood that is mobilized by the FRO pool then caught on the bridge structure or approaches during FRO drawdown. Additional mitigation may be necessary to minimize sediment delivery from all roads within the FRO and FRFA footprint. Include who would be responsible for maintenance needs and the associated cost. Recommendation: Abandon all roads within all FRO and FRFA zones (Table H-1) per WAC 222-24-052(3) during FRO or FRFA construction.
12	4.3.1.2.	Acknowledges the positive long term effects of restoring the floodplain, unfortunately limited information is provided regarding long-term impacts from conversion of 16,000 acres of forest land. "The additional runoff from converted upland areas is anticipated to be minor; many of these area are currently in use as managed forestland and has been previously disturbed by vegetation removal and soil compaction." Statement appears to conclude that environmental

		effects of managed forestland outweigh those of conversion activities. Additional analysis needed to support or provide clarification for this conclusion and Section 4.3.10. Recommendation: Analysis should include changes in hydrology resulting from conversion to agriculture, residential, commercial, and related infrastructure such as: • Increased soil compaction from increased activity frequency, lowered water holding capacity resulting in potential increased runoff, changes in stream flows velocity • Changes in runoff patterns and effects of runoff moving offsite more rapidly. • Effects on groundwater • Potential increase impervious surfaces as compared to current condition.
13	4.8.4.2.1	Clarification requested: "There is uncertainty as to the long-term effectiveness of riparian maturation in managed forestland." Additional clarity is needed as a basis of this statement. What does this statement intend to say?
14	5.2.2.1	3rd paragraph. "Forest practices would continue to affect stream flow and landslides… Clarification requested to support this conclusion. DNR is not aware that this analysis has been completed. "…changes to forest management practices are not anticipated to reduce the frequency of extreme flooding..." Appendix A literature review does not support this conclusion. Recommendation: See recommendation in Chapter 1.
15	5.3	Presenting the reduction of flooding achieved by the alternatives during the 100 year flood only is an inadequate metric of benefit from the alternatives. The largest and most impactful floods in the region were over 100 year events. Only by providing an evaluation of the effects of the alternatives on larger than 100 year floods in particular, but also smaller than 100 year floods would the PEIS adequately compare the benefits of the alternatives.
16	5.7.1	Table 5.7-1: The terms used in the table are not clear. The data for Alternative 4 is confusing. If 462 structures are "relocated", they should also not be flooded, yet they are not counted in that category which gives the impression of an impact to the community without a benefit. Further, it's indicated that there would be 598 "remaining structures flooded", because it's unknown whether property owners would be willing to relocate. Why is this number different than the 462

		relocated structures? Further, there are 1,243 "total damages reduced to structures", which is the sum of structures affected in rows pertaining to 'no longer flooded, relocated, and flood-proofed'. What does "total damages reduced to structures" mean if there are 598 structures "still flooded"?
17	5.8	Cumulative Impacts • Based on the following comments under **Land Use** in the City of Chehalis October 19, 2015 scoping comment letter, it appears that the city is interested in how much more of the floodplain will be available for development under option 1. "… the City is not opposed to responsible development with the floodplain," and "…the City just has a perspective that the Levee and Dam should be first and then follow with other programs that would reflect the new floodplains…" This section should assess how each alternative would promote an increase of residential and commercial development in the floodplain where it is currently prohibited (i.e. make more of the floodplain open to development due to reduction in the extent of flooding) and what are the resulting impacts to important fish and wildlife habitat as well as increased risk to additional flooding of these newly developable areas of the floodplain. Finally, the PEIS should clarify if the flood control facilities described in alternative 1 (FRFA and FRO) are designed to reduce flooding at current development levels or to open up more of the floodplain to development? • This section should assess how the current amount of floodplain fill and future (planned and permitted) fill plans for development of the floodplain in Centralia/Chehalis area are contributing to increasing flooding in other parts of the basin, particularly the I-5 corridor, airport and other (non-filled) areas of the Centralia/Chehalis area? How much will this offset the modeled increase or decrease of flood protection for the FRFA and FRO alternative?
18	5.8.1	1st paragraph. "there is consensus that timber harvesting results in an increase in rain-induced channel-forming flows up to 20 or more years post-harvest". The cited reference does not support a consensus or that channel-forming flows will occur 20 years or more following harvest. Appendix A Section 3.5 states that most studies show an increase in channel-forming flows. Most studies does not appear to be a consensus. The 20 year prediction of increased channel-forming flows for 20 years is in the Executive Summary but not supported in the literature review itself. Recommendation: See recommendation in Chapter 1.
19	6.5.5	Last sentence. Consider quantifying the provided list of permits as not a complete list. Additional examples of permits that may be necessary include: Forest Practices Application/ Notification, Surface Mine Reclamation permit, or an authorization to access or cross over state owned uplands.

20	Appendix E	2nd bullet correction. The Upper Skookumchuck should be added to the list of watersheds (Stillman and Chehalis) that were not reviewed or updated in 2011.
21	Appendix E	1st bullet correction- Board Manual Section 16 updated May 2016.
22	Appendix E	2nd bullet correction- Forest Practices Application (version dated June 1, 2016) questions 11 and 12 pertain to potential unstable slopes.
23	Appendix E	3rd bullet clarification -Specific list of activities that trigger SEPA review for unstable slopes are listed in WAC 222-16-050(1)(d). Recommendation: Add a list of all activities or a WAC reference. In addition the following bold text should be added for accuracy: the qualified expert prepares information regarding the likelihood the action will ***cause or*** contribute to movement…debris to a public resource, ***should movement occur***, and possible mitigation….. .
24	Appendix H	Flood Retention Facility Long-Term Impacts and Mitigation • How much and what type of fish habitat will be permanently lost (cannot be mitigated) under each alternative? What is the relative cost of mitigation, or inability to mitigate and to the loss to commercial and recreational fisheries in relation to the cost of each alternative? How much will each alternative contribute to the permanent loss and degradation of habitat (estimated to be between 54% and 87% (PEIS, page 519)? • Based on the WDFW research presented at the September workshops only one season (2015) of fisheries monitoring was conducted for the PEIS. Page H-33-34 states; "With an FRO facility, a single, temporary inundation event is expected to result in a complete loss of any incubating salmon embryos that are in the inundation area at the time of the flood, eliminating this proportion of the annual cohort of salmon originating from the upper Chehalis Basin. Permanent inundation of stream habitat with an FRFA facility Draft Chehalis Basin Strategy Programmatic EIS represents a permanent loss of spawning habitat for salmonids that require flowing water to oxygenate eggs." Also, the magnitude of impact to the loss of lamprey upstream of the FRFA is uncertain (page H-34). Only one monitoring season does not seem adequate considering the drought conditions in 2015 as well as the potential magnitude of effects of the FRFA & FRO. We suggest additional fish and wildlife monitoring be conducted, as prescribed by USFWS, WDFW and NMFS, to get a more comprehensive understanding of the magnitude of effects of the FRFA & FRO on fish and wildlife.

25	Appendix J	Correction needed: Forest Practices Rules WAC 222-30-021 prohibits the harvest of trees within the riparian management zone of Type F water required to meet Desired Future Condition or shade requirements. Additional coordination will be necessary with the local government (LGE) to obtain approval of trees after the conversion of forest land has occurred. Recommend coordination between DNR, WDFW, ECY, local government, and affected tribes early in the process.
26	Appendix J	Correction needed: Note #4 footnote for Tables 2 and 3 -see comment from page 3 regarding WAC 222-30-021.
27	Appendix J, 4.2.3.2.2	Throughout Appendix J, bases for the type of vegetation that will survive following inundation are based solely on the species tolerance to water. Section 4.2.2.2.2 bottom of page 268 indicates that sediment deposition within the FRO or FRFA will occur following large storm events. Anticipated sediment deposition should be included in Appendix J and 4.2.3.2.2 Long term vegetation impacts. Vegetation species identified for retention should be reviewed for soil deposition tolerance. Sand and silt deposits can seal tree roots, limiting oxygen supplies, and smother the tree. Suggest additional research to identify those tree and brush species to provide the highest long term benefit. http://www.extension.umn.edu/environment/trees-woodlands/flooding-effects-on-trees/ , also "Understanding the Effects of Flooding on Trees" (ISU University Extension) Recommendation: Vegetation management should acknowledge the potential consequences additional sediment may have on the trees and woody vegetation that remains after the initial FRO and FRFA construction.

From:	Michael Grady - NOAA Federal
To:	info@chehalisbasinstrategy.com; Fawn Sharp; Tyson Johnston; Junior Goodell; Mark White; Duff, Robert (GOV); Jim Kramer; Bailey, Chrissy (ECY)
Cc:	Kim Kratz; Jeffrey Brown - NOAA Federal; Scott.Anderson; elizabeth babcock; Keith Kirkendall - NOAA Federal; Grady, Michael; Michael Pollock - NOAA Federal
Subject:	NOAA Fisheries review comments for the Chehakimlis Basin Strategy Draft Programmatic Environmental Impact Statement
Date:	Monday, November 14, 2016 5:38:15 PM

Dear Governor's Work Group Members and the State Department of Ecology,

Thank you for the opportunity to participate in the Chehalis Basin Strategy Committees and to review and provide comments on the recently released Chehalis Basin Strategy Draft SEPA Programmatic Environmental Impact Statement (PDEIS). We at NOAA Fisheries conducted a thorough review of the PDEIS and have outlined our comments, below, to help with the future development of a comprehensive strategy to reduce flood damage and restore aquatic species habitat in the Chehalis Basin. Our review and comments have been completed in accordance with our Secretarial Order to protect tribal treaty rights and obligations, as well as are responsibility to implement the provisions of the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Marine Mammal Protection Act (MMPA) and the Fish and Wildlife Coordination Act (FWCA).

In addition, we have attached the PDEIS review comments from Michael Pollock of the NW Fisheries Science Center at Montlake.

We hope you will find our comments useful as you proceed to work with the tribes and numerous local, state, and regional public and private stakeholders. We remain committed to helping you develop a basin-wide plan that is agreed-upon by all the members of the Work Group and committees.

Currently, there are no ESA-listed species in the Chehalis Basin. However, our review of the PDEIS analyzed the impacts and effects to fish and marine mammals consistent with our statutory authorities, as outlined above. We also analyzed the effects of the PDEIS per our federal treaty- trust obligations to protect and uphold the treaty rights of the Quinault Indian Nation and the Confederated Tribes of the

Chehalis Reservation. Our review focused on the following PDEIS alternatives:

- No Action Alternative
- Alternative 1: The Governor's Work Group Recommendation that consists of a flood retention facility (either a Flood Retention Only (FRO) or Flood Retention and Flow Augmentation (FRFA)), and levees around the airport and the Aberdeen/Hoquiam north shore.
- Alternative 2; Structural Flood protection (without a flood retention facility) that consists of I-5 flood protection and levees around the airport and Aberdeen/Hoquiam north shore.
- Alternative 3: Nonstructural flood protection that includes local flood protection actions like buy-outs and floodproofing structures.
- Alternative 4: Restorative Flood Protection that includes buy-outs, easements, or regulations to restore and enhance floodplain functions to slow and store floodwaters in the floodplain.

All but the No Action Alternative includes local-scale flood damage reduction actions and aquatic species habitat actions at either the high or low scenarios.

The Chehalis Basin is within the reservation of the Confederated Tribes of the Chehalis and within the Quinault Indian Nation's usual and accustomed fishing areas, for which it reserved a right to take fish when its predecessors signed the Treaty of Olympia in 1856.

What Objectives and Actions We Support in the Draft Programmatic EIS:

- The Strategy Objectives to reduce flood damages while reducing the potential for future ESA listings and enhancing tribal fisheries.

- A basin-wide, ecosystem approach.
- Improved flood warning systems for local communities.
- The option to blend alternatives for the final EIS
- Structural and non-structure actions to address flooding issues.
- In-stream, near shore and floodplain habitat improvements.
- Extensive out-reach and collaboration with the tribes and local, state, and federal leaders.
- Including the Aquatic Species Restoration Plan (ASRP) -low and high scenarios, and local flood reduction actions through all alternatives.
- Improvements to wetlands and floodplain functions in most of the alternatives.
- For the No Action Alternative: restoration and flood protection projects will continue to be implemented.
- For Alternative 1: provides the greatest flood protection to structures and infrastructure and includes ASRP actions for species habitats.
- For Alternative 2: achieves the best protection for I-5 and the Centralia-Chehalis area.
- For Alternative 3: uses local floodproofing for homes, businesses and infrastructure.
- For Alternative 4: over time, enhances floodplain storage and species habitats to avoid ESA listings.

We are supportive of the efforts to implement the Restorative Flood Protection Alternative 4, which seeks to rebuild the natural flood storage capacity of the Chehalis Basin through easements, buy-outs or regulatory oversight of the floodplain. It would restore habitat and increase the flood storage capacity of the Chehalis Basin by adding bio-engineered structures, that include floodplain fencing, in-stream logjams, and vegetation planting. This alternative would create "roughness" (or resistance to flow)

to river and stream channels that serve to slow or obstruct the high flow of rivers and streams in the Chehalis Basin during large flood events. This decrease in floodwater velocity will "backs-up" high flows which in-turn will activate the adjacent floodplains with floodwaters that overtop river or stream banks. The vegetation planting and bioengineered structures within the floodplain will then serve to temporarily store floodwaters and further decrease floodwater velocity. These natural means to attenuate flooding will have beneficial effects to fish populations and to floodplain habitats that are limited in the floodplain now, due to intense land-uses permitted by local governments.

Some Concerns We Have with the PDEIS

<u>What we recommend for additional clarification:</u>

- For the no Action Alternative: please explain the extent and future funding for floodplain restoration projects in the Basin.

- For Alternative 1: please describe what level of restoration will be implemented--low or high scenario. Please also provide detailed species and habitat impacts from the Flood Retention Only (FRO) and the Flood Retention and Flow Augmentation (FRFA) structures on coho, Chinook, steelhead and lamprey. Please clarify the description of the operation of the FRO (flood retention only) structure during flood-operations. It is not clear that the temporary fish passage structure (trap and haul) used during retention events would provide upstream passage only, despite the statement reading: With the FRFA dam, and when the tunnels in the FRO dam are closed for flood retention, engineered structures and mechanisms for the passage of juvenile and adult fish through or around the dam would be provided. (see page 285 in section 4.2.4.2.1).

- For Alternative 2: please identify any key infrastructure that will not be protected and the scenario for habitat restoration projects.

- For Alternative 3: please explain the frequency and extent of

future flooding and the impacts to fish and wildlife.

- For Alternative 4: please explain any impacts to I-5 as well as the temporal and geographic extent of floodplain restoration for low-med-high scenarios. Please also explain how long these action will take to ensure both flood protection and species recovery, as well as the local governments' willingness to modify local land use plans and regulations to protect and restore floodplain functions-and/or to use conservation easements or buy-out programs for lands and structures in the floodplain.

- For all alternatives, please describe in detail the impacts of climate change on species and habitats and discuss how further declines in habitat could result in future threatened or endangered species listings.

- Please outline for all alternatives how the potential decline of far-north migrating fish runs could lead to ESA listings and negative consequences to the tribes, and how the alternatives could have an impact on the contribution to the State of Alaska of fisheries that encounter many Grays Harbor salmon. This is because fisheries harvesting salmon for both recreational and commercial purposes encounter large numbers of far-north ocean migrating salmon stocks that are native to the Chehalis Basin.

<u>What we recommend for additional studies and analysis:</u>

- For the no Action Alternative: please construct a task-timeline chart outlining future restoration projects in the Basin.

- For Alternative 1: please conduct extinction risk analyses for the FRO and FRFA structures. Please also analyze the use of a series of run-river flood/hydro structures to attenuate floods, generate green power and produce revenues for the local communities to dedicate towards future restoration and flood protection measures. Please also conduct an assessment of the impacts to tribal fishing access and resources, as well as impacts to cultural resources, from any flood attenuation (and hydro) structures.

- For Alternative 2: please model the impacts to fish and wildlife and analyze the effects to tribal fishing and cultural resources.

- For Alternative 3: same as for Alternative 2.

- For Alternative 4: please conduct a life cycle analysis of the costs and benefits for achieving sufficient floodplain storage to attenuate the 100-year flood events.

- For all alternatives, please conduct a detailed analysis of the frequency and duration of flooding events and the effects to aquatic species and their habitats. For instance, the PDEIS estimates the events would occur once every 7 years. However, if they occur every 7 years but last for 2, 3 or 4 years in a row, what would be the impact (extinction risk) to the fish and wildlife populations in the Basin?

- For all alternatives, please conduct detailed analysis and lifecycle extinction modelling for Chinook steelhead, coho and lamprey.

Conclusions

This PDEIS is a good-faith effort by the Work Group and Committees associated with the Chehalis basin Strategy. We recognize, as the DEIS states, that additional funding will be required to complete additional studies as outlined above, to facilitate stakeholder participation, and to complete the Basin strategy and the final EIS We would be supportive should the Governor decide to create the Office of the Chehalis Basin and provide sufficient funding to conduct studies and analysis, as outlined above, and to foster the involvement of tribal and local governments. We look forward to helping you to come to an agreement on the preferred alternative for the final EIS, as well as the completion of the Plan and the final EIS.

Sincerely,

Michael Grady

NOAA Fisheries

(206) 526-4645

Attachment

Comments from the NW Fisheries Science Center (Michael Pollock)

14 November 2016

From: Michael Pollock, NWFSC

Subject: Comments on the Chehalis Basin Strategy-Draft Programmatic EIS

To: Governor's Work Group and Washington State Department of Ecology

Background

The Chehalis Basin Strategy-Draft Programmatic EIS (DPEIS) seeks to reduce flood damage to human-built infrastructure on floodplains and to restore aquatic species habitat in the Chehalis Basin in southwestern Washington. The DPEIS balances the rights and desires of floodplain user groups or economic interests who want to protect homes and infrastructure and those who also want to derive cultural and economic benefit through floodplain management that sustains and enhances aquatic species and their habitats in the basin

General Comments on the Alternatives

One of the primary proposed means of addressing floodplain damage reduction is through construction of a floodwater retention dam (s) and a primary proposed means of addressing

aquatic species protection and conservation is through habitat restoration. The details of the proposed dams are relatively well developed and a specific location has been proposed, whereas the details and locations of restoration structures or actions are largely unknown.

An alternative approach to floodwater retention using process-based restoration techniques is presented (in Alternatives 2, 3 and 4), but is also lacking in detail. The PDEIS is very general rather than analytical in terms of its assessment of environmental impacts, and thus does not lend itself to detailed analysis as to the basis for which its conclusions are reached. Numerous statements of fact are presented without any accompanying data or citation of references where such data can be found. Overall, the presentation of data or other information to support factual statements and any conclusions reached is extremely limited and the DPEIS does not provide a rational basis for assessing the environmental impacts of the proposed actions. However, through the broad framework as to what the Chehalis Basin Strategy hopes to achieve, below we note several key issues that need further exploration, primarily in regards to recovery of salmonid habitat and salmonid populations. Finally, an independent review of the proposed Chehalis Basin Strategy (and its supporting documents) is strongly recommended to objectively assess the extent to which there is a rational basis for the conclusions reached as to the proposed course of action, and the extent to which the Strategy is likely to achieve its intended goals.

Spring Chinook

The Chehalis Basin contains a number of salmonids, including spring Chinook salmon, which according to the DPEIS and documents cited therein, has the potential to be listed under the federal Endangered Species Act if restoration actions as part of the no action alternative are hindered by funding and increased risks from development and climate change are not addressed. Thus the aquatic habitat restoration portion of the DPEIS appears to act in essence as a habitat recovery plan for a salmon species that could be depressed population in the future. However, a stated goal of the DPEIS is to avoid the potential for future ESA-listings.

Other related goals are to increase the abundance of salmon and steelhead and to enhance tribal and non-tribal fisheries (DPEIS pp. 11-12). The spring Chinook population in the highly degraded Chehalis basin appears to be depressed but relatively steady (Lestelle, unpublished data). This question takes on additional relevance, as there is growing evidence that spring and fall Chinook populations in the same river system are not just behaviorally distinct, but genetically distinct (see Prince et al. 2016).

This warrants additional lifecycle modelling by the Technical Advisory Committee.

Construction and Operation of Flow Attenuation Structures

As stated in the DPEIS, the primary means by which the salmon habitat will be degraded in the future is through the construction of a large concrete dam on the upper Chehalis River (see DPEIS section 4.2 beginning on p. 247) to retain floodwaters. There are two configurations of the dam: Flood Retention Only (FRO) and Flood Retention and flow Augmentation(FRFA). Both configurations would inundate a large area of prime salmonid habitat, with the FRFA configuration resulting in more or less permanent inundation (see DPEIS map on p. 249), with the retained floodwaters of the FRFA to be released for environmental flows. In terms of their design and function, both dam configurations are experimental. The negative habitat impacts from similar designs are well known, as are the flood attenuation impacts. The adverse effects of habitat inundation are intended to be partially offset by summertime releases of waters stored behind the FRFA dam with the intent of lowering downstream temperatures. However, in terms of habitat impacts, the only near certainty if a dam is built is that the upstream reservoir will inundate and degrade relatively high quality salmonid habitat. Much less certain, and unsupported by data or analysis, is the assertion that the FRFA dam will significantly improve habitat conditions (temperature) downstream through the summertime release of reservoir flows. This too requires additional study and modelling by the Technical Advisory Committee. It is possible that the cooling effect of the flows are likely to be limited to a relatively short downstream effect. Additionally, the cooling effect may be compromised because the reservoir water will heat over the course of the summer, particularly late summer when the volume is low.

In addition, there is a reasonable likelihood that increased flows will eliminate cold water refugia that are essential to the survival of heat-stressed oversummering salmonids (both juveniles and adults). This is because during low flows, pools may stratify, with cool strata near the bottom, creating limited, but tolerable temperature conditions for fishes. Increased flows can homogenize the temperature of pools, creating habitat that is on average cooler, but lacks the spatial temperature homogeneity that allows fishes to persist. Thus the overall effect of increased flows may be positive, neutral or negative, with the direction of the effect varying in both time and space along the downstream river corridor. Further analysis is needed to determine the potential effects to aquatic species in the Basin.

Has a dam like this ever been built as proposed (either design option) and shown to improve salmon habitat? The dam designs seems highly experimental. We recommend proof of concept before embarking on an expensive and irreversible course. Why not test the individual components first and make a smaller scale dam out of materials that could be removed (e.g. earth)? It seems quite risky to go all in on the first iteration, when so little is known about whether it will benefit fishes, We recommend you also study run-river structures that do not have the negative impacts on aquatic species and could generate revenue for dedicated restoration actions in the Basin.

In summary it is uncertain whether the proposed environmental flows from the FRFA dam configuration will be of benefit to salmon and steelhead, and there is the potential that such flows may be harmful. The inundation footprint of the reservoir upstream of the dam is almost certainly going to be harmful. Much more extensive modeling and data acquisition is needed to provide an informed basis for determining the temperature effects of flow releases and how those flows are likely to affect salmonid populations.

Restoration Actions

In addition to the environmental flows from the FRFA dam configuration, the DPEIS also envisions improving salmonid habitat through a series of voluntary restoration actions that are hoped to take place on floodplain properties of private landowners (see Governor's Chehalis Basin Work Group 2014 Recommendations Report). These restoration actions are generalized and need additional details for analysis of their impacts. They also need a map of the proposed actions as well as the list of commitments from local landowners to pursue such actions. As such, assessing the likely benefits to salmon of generalized actions would have a high degree of uncertainty, making it difficult to estimate such benefits.

While the Governor's Report asserts that a high level of restoration will increase spring Chinook by 110%, there is no clear basis for this conclusion provided in the Report or in the DPEIS, nor is there mention of the uncertainty around this estimate or really any specificity as to what a high level of restoration would entail. We recommend additional analysis of this assumption by the Technical Advisory Committee. The benefits from restoration in the Chehalis basin will lead to salmonid population recovery should be considered a working hypothesis for the recommended analysis.

What limited information is provided as to the nature of the restoration actions proposed in the Chehalis suggests that they should focus on the proximate cause of most habitat degradation within the upper Chehalis basin, which is channel incision. Channel incision is a well-documented phenomenon that has occurred throughout much of the United States and throughout many parts of the world. The environmental effects of incision on floodplains and aquatic habitat have been well-documented. Incision is a complex hydrogeomorphic response to changing environmental conditions. Common adverse effects of channel incision include lowered water tables, decreased alluvial aquifer recharge, loss of floodplain connectivity, loss of riparian habitat, simplification and degradation of the remaining instream habitat and exacerbated flooding downstream (Cluer and Thorne 2014). The logical corollary to these observations is that an incised stream that is restored by facilitating aggradation should see beneficial improvements in these parameters, and indeed, such improvements have been observed to benefit salmonids (e.g. see Bouwes et al. 2016). A number of techniques have

been developed for restoring incised streams, including plug and pond, restoration check dams, and beaver dam analogues (see NMFS 2013, Pollock et al. 2014, Pollock et al. 2015, Oregon Department of State Lands, 2016).

The Restorative Flood Protection Alternative (Alternative 4--DPEIS Section 4.3) pursues restoration from a much more process-based approach and seeks to achieve some of the same benefits and takes somewhat similar approaches to incised stream restoration. The RFP alternative is encouraging in its approach, but needs to be expanded to help restore the damage caused by stream incision. Its primary focus seems to be to simply attenuate floodwaters in the upper basin by increasing flow resistance both within the channel and on the floodplain. Such an approach may help to allow for aggradation and full ecosystem recovery over the long term, depending on the number, location, porosity and overall design of any restoration structures and actions. The drawback to the FRP approach relative to incised stream restoration is that opportunities for groundwater recharge are much more limited. This is important, because a fully charged alluvial aquifer in an unincised stream can provide cool groundwater inputs to a stream into the summer to a much greater extent than can an alluvial aquifer that rapidly drains through a deep incision trench. A full and recharged alluvial aquifer also benefits farmers in that crops can be water through natural sub-irrigation, reducing the need for pumping, and that where pumping is necessary, costs are reduced because the less energy is required to pump from shallower depths. If there is a reduced need to pump from surface waters, aquatic habitat benefits as well. Observations suggest that there is currently significant surface water pumping in the upper Chehalis Basin, potentially contributing to temperature and other water quality problems.

Overall, it would be very helpful to have a better understanding of how the hydrology of the basin would behave if the channels were not so deeply incised and there was greatly increased floodplain connectivity throughout the basin, particularly in the upper basin. That is, reversing the effects of incision by elevating groundwater levels and encouraging aggradation through sediment retention should be considered as a restoration option that could meet the two primary objectives of improving salmonid habitat while decreasing catastrophic flooding. Increased floodplain connectivity would necessarily increase the duration of flooding in upstream areas, but it has the potential to significantly decrease the flood elevation on downstream floodplains such as those near Centralia-Chehalis. The Chehalis Basin Strategy would be greatly enhanced by pursuing the potential for increasing floodplain connectivity and/or incised stream restoration as a solution that would both improve habitat conditions for salmon and steelhead while lowering flood peaks on downstream floodplains where there is critical infrastructure.

Other comments

There is limited discussion of how any of the proposed actions, but particularly the dam proposal, will affect sediment transport processes. For a project of this magnitude, a watershed-scale sediment budget and a better understanding of sediment transport processes

need developing. The quality and quantity of sediment moving through fluvial ecosystems has tremendous effects on the salmonid habitat forming processes. This is particularly true for incised streams. Notably, dams have the potential to retain sediment, and cause downstream incision, further exacerbating the primary cause of degradation in the basin. Similarly, the project and watershed as a whole, should develop spatially explicit groundwater and surface water models so that the environmental effects of the dam can be better assessed and compared to the effects of any current or future proposed restoration strategies, inclusive of effects of the different alternatives on groundwater recharge, hyporheic exchange, stream flow and stream temperatures throughout the basin.

We appreciate your alternatives that outline extensive restoration actions in the Basin for two main reasons: (1) if successful restoration has already occurred prior to dam construction, then the negative effects of the dams on fish populations will be offset by the improved habitat conditions. Conversely, if the restoration actions are not first, then the dam has the potential to further depress the fish populations. (2) It is unclear whether meaningful restoration will increase fish population numbers. Immediate implementation of restoration actions would enable restoration practitioners to assess which types of projects are having desired positive effects to fish habitat and fish populations, and to make adjustments, as needed. Implementation of a restoration strategy and demonstration that it has successfully achieved the desired outcomes in terms of increasing fish populations prior to construction of a concrete dam (whose effects are largely irreversible) could be an effective strategy both for ensuring adequate restoration funding and floodplain landowner cooperation with restoration actions.

p.58 "*The restoration actions identified in the final ASRP (being prepared by winter 2017) are dependent upon site conditions and landowner willingness, and would likely be within the low and high restoration scenarios*." We support using the high restoration scenario for implementation of all alternatives However, its success hinges on landowner willingness, which needs to be assessed by the Technical Advisory Committee

See table 4.3.-3 on p. 361/593. Shows almost no significant change in flood elevation (restoration option). Table 4.2-3 shows same thing for an experimental dam. This is useful in a comparative sense. Also, with anticipated climate change impacts, it doesn't appear that the dam is going to reduce I-5 flooding relative to the frequency of flooding that has occurred in the past. If so, the dam isn't really going to address the problem of I-5 flooding and additional expenditures are going to be needed to protect I-5.

Finally, we recommend an independent review of the proposed Chehalis Basin Strategy to objectively assess the extent to which there is a rational basis for the conclusions reached as to the proposed course of action, and the extent to which the Strategy is likely to achieve its intended goals.

Dear Governor's Work Group Members and the State Department of Ecology,

Thank you for the opportunity to participate in the Chehalis Basin Strategy Committees and to review and provide comments on the recently released Chehalis Basin Strategy Draft SEPA Programmatic Environmental Impact Statement (PDEIS). We at NOAA Fisheries conducted a thorough review of the PDEIS and have outlined our comments, below, to help with the future development of a comprehensive strategy to reduce flood damage and restore aquatic species habitat in the Chehalis Basin. Our review and comments have been completed in accordance with our Secretarial Order to protect tribal treaty rights and obligations, as well as are responsibility to implement the provisions of the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Marine Mammal Protection Act (MMPA) and the Fish and Wildlife Coordination Act (FWCA).

In addition, we have attached the PDEIS review comments from Michael Pollock of the NW Fisheries Science Center at Montlake.

We hope you will find our comments useful as you proceed to work with the tribes and numerous local, state, and regional public and private stakeholders. We remain committed to helping you develop a basin-wide plan that is agreed-upon by all the members of the Work Group and committees.

Currently, there are no ESA-listed species in the Chehalis Basin. However, our review of the PDEIS analyzed the impacts and effects to fish and marine mammals consistent with our statutory authorities, as outlined above. We also analyzed the effects of the PDEIS per our federal treaty- trust obligations to protect and uphold the treaty rights of the Quinault Indian Nation and the Confederated Tribes of the Chehalis Reservation. Our review focused on the following PDEIS alternatives:

- **No Action Alternative**
- **Alternative 1: The Governor's Work Group Recommendation that consists of a flood retention facility (either a Flood Retention Only (FRO) or Flood Retention and Flow Augmentation (FRFA)), and**

levees around the airport and the Aberdeen/Hoquiam north shore.

- **Alternative 2: Structural Flood protection (without a flood retention facility) that consists of I-5 flood protection and levees around the airport and Aberdeen/Hoquiam north shore.**
- **Alternative 3: Nonstructural flood protection that includes local flood protection actions like buy-outs and floodproofing structures.**
- **Alternative 4: Restorative Flood Protection that includes buy-outs, easements, or regulations to restore and enhance floodplain functions to slow and store floodwaters in the floodplain.**

All but the No Action Alternative includes local-scale flood damage reduction actions and aquatic species habitat actions at either the high or low scenarios.

The Chehalis Basin is within the reservation of the Confederated Tribes of the Chehalis and within the Quinault Indian Nation's usual and accustomed fishing areas, for which it reserved a right to take fish when its predecessors signed the Treaty of Olympia in 1856.

What Objectives and Actions We Support in the Draft Programmatic EIS:

· The Strategy Objectives to reduce flood damages while reducing the potential for future ESA listings and enhancing tribal fisheries.

· A basin-wide, ecosystem approach.

· Improved flood warning systems for local communities.

· The option to blend alternatives for the final EIS

· Structural and non-structure actions to address flooding issues.

· In-stream, near shore and floodplain habitat improvements.

- Extensive out-reach and collaboration with the tribes and local, state, and federal leaders.

- Including the Aquatic Species Restoration Plan (ASRP) -low and high scenarios, and local flood reduction actions through all alternatives.

- Improvements to wetlands and floodplain functions in most of the alternatives.

- For the No Action Alternative: restoration and flood protection projects will continue to be implemented.

- For Alternative 1: provides the greatest flood protection to structures and infrastructure and includes ASRP actions for species habitats.

- For Alternative 2: achieves the best protection for I-5 and the Centralia-Chehalis area.

- For Alternative 3: uses local floodproofing for homes, businesses and infrastructure.

- For Alternative 4: over time, enhances floodplain storage and species habitats to avoid ESA listings.

We are supportive of the efforts to implement the Restorative Flood Protection Alternative 4, which seeks to rebuild the natural flood storage capacity of the Chehalis Basin through easements, buy-outs or regulatory oversight of the floodplain. It would restore habitat and increase the flood storage capacity of the Chehalis Basin by adding bio-engineered structures, that include floodplain fencing, in-stream logjams, and vegetation planting. This alternative would create "roughness" (or resistance to flow) to river and stream channels that serve to slow or obstruct the high flow of rivers and streams in the Chehalis Basin during large flood events. This decrease in floodwater velocity will "backs-up" high flows which in-turn will activate the adjacent floodplains with floodwaters that overtop river or stream banks. The vegetation planting and bioengineered structures within the floodplain will then serve to temporarily store floodwaters and further decrease floodwater velocity. These natural means to attenuate flooding will have beneficial effects to fish populations and to floodplain habitats that are limited in the floodplain now, due to intense land-uses permitted by local governments.

Some Concerns We Have with the PDEIS

What we recommend for additional clarification:

· For the no Action Alternative: please explain the extent and future funding for floodplain restoration projects in the Basin.

· For Alternative 1: please describe what level of restoration will be implemented--low or high scenario. Please also provide detailed species and habitat impacts from the Flood Retention Only (FRO) and the Flood Retention and Flow Augmentation (FRFA) structures on coho, Chinook, steelhead and lamprey. Please clarify the description of the operation of the FRO (flood retention only) structure during flood-operations. It is not clear that the temporary fish passage structure (trap and haul) used during retention events would provide upstream passage only, despite the statement reading: With the FRFA dam, and when the tunnels in the FRO dam are closed for flood retention, engineered structures and mechanisms for the passage of juvenile and adult fish through or around the dam would be provided. (see page 285 in section 4.2.4.2.1).

· For Alternative 2: please identify any key infrastructure that will not be protected and the scenario for habitat restoration projects.

· For Alternative 3: please explain the frequency and extent of future flooding and the impacts to fish and wildlife.

· For Alternative 4: please explain any impacts to I-5 as well as the temporal and geographic extent of floodplain restoration for low-med-high scenarios. Please also explain how long these action will take to ensure both flood protection and species recovery, as well as the local governments' willingness to modify local land use plans and regulations to protect and restore floodplain functions-and/or to use conservation easements or buy-out programs for lands and structures in the floodplain.

· For all alternatives, please describe in detail the impacts of climate change on species and habitats and discuss how further

declines in habitat could result in future threatened or endangered species listings.

· Please outline for all alternatives how the potential decline of far-north migrating fish runs could lead to ESA listings and negative consequences to the tribes, and how the alternatives could have an impact on the contribution to the State of Alaska of fisheries that encounter many Grays Harbor salmon. This is because fisheries harvesting salmon for both recreational and commercial purposes encounter large numbers of far-north ocean migrating salmon stocks that are native to the Chehalis Basin.

What we recommend for additional studies and analysis:

· For the no Action Alternative: please construct a task-timeline chart outlining future restoration projects in the Basin.

· For Alternative 1: please conduct extinction risk analyses for the FRO and FRFA structures. Please also analyze the use of a series of run-river flood/hydro structures to attenuate floods, generate green power and produce revenues for the local communities to dedicate towards future restoration and flood protection measures. Please also conduct an assessment of the impacts to tribal fishing access and resources, as well as impacts to cultural resources, from any flood attenuation (and hydro) structures.

· For Alternative 2: please model the impacts to fish and wildlife and analyze the effects to tribal fishing and cultural resources.

· For Alternative 3: same as for Alternative 2.

· For Alternative 4: please conduct a life cycle analysis of the costs and benefits for achieving sufficient floodplain storage to attenuate the 100-year flood events.

· For all alternatives, please conduct a detailed analysis of the frequency and duration of flooding events and the effects to aquatic species and their habitats. For instance, the PDEIS estimates the events would occur once every 7 years. However, if they occur every 7 years but last for 2, 3 or 4 years in a row, what would be the

impact (extinction risk) to the fish and wildlife populations in the Basin?

· For all alternatives, please conduct detailed analysis and lifecycle extinction modelling for Chinook steelhead, coho and lamprey.

Conclusions

This PDEIS is a good-faith effort by the Work Group and Committees associated with the Chehalis basin Strategy. We recognize, as the DEIS states, that additional funding will be required to complete additional studies as outlined above, to facilitate stakeholder participation, and to complete the Basin strategy and the final EIS We would be supportive should the Governor decide to create the Office of the Chehalis Basin and provide sufficient funding to conduct studies and analysis, as outlined above, and to foster the involvement of tribal and local governments. We look forward to helping you to come to an agreement on the preferred alternative for the final EIS, as well as the completion of the Plan and the final EIS.

Sincerely,

Michael Grady

NOAA Fisheries

(206) 526-4645

Attachment

Comments from the NW Fisheries Science Center (Michael Pollock)

14 November 2016

From: Michael Pollock, NWFSC

Subject: Comments on the Chehalis Basin Strategy-Draft Programmatic EIS

To: Governor's Work Group and Washington State Department of Ecology

Background

The Chehalis Basin Strategy-Draft Programmatic EIS (DPEIS) seeks to reduce flood damage to human-built infrastructure on floodplains and to restore aquatic species habitat in the Chehalis Basin in southwestern Washington. The DPEIS balances the rights and desires of floodplain user groups or economic interests who want to protect homes and infrastructure and those who also want to derive cultural and economic benefit through floodplain management that sustains and enhances aquatic species and their habitats in the basin

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One of the primary proposed means of addressing floodplain damage reduction is through construction of a floodwater retention dam (s) and a primary proposed means of addressing aquatic species protection and conservation is through habitat restoration. The details of the proposed dams are relatively well developed and a specific location has been proposed, whereas the details and locations of restoration structures or actions are largely unknown.

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improvements have been observed to benefit salmonids (e.g. see Bouwes et al. 2016). A number of techniques have been developed for restoring incised streams, including plug and pond, restoration check dams, and beaver dam analogues (see NMFS 2013, Pollock et al. 2014, Pollock et al. 2015, Oregon Department of State Lands, 2016).

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Overall, it would be very helpful to have a better understanding of how the hydrology of the basin would behave if the channels were not so deeply incised and there was greatly increased floodplain connectivity throughout the basin, particularly in the upper basin. That is, reversing the effects of incision by elevating groundwater levels and encouraging aggradation through sediment retention should be considered as a restoration option that could meet the two primary objectives of improving salmonid habitat while decreasing catastrophic flooding. Increased floodplain connectivity would necessarily increase the duration of flooding in upstream areas, but it has the potential to significantly decrease the flood elevation on downstream floodplains such as those near Centralia-Chehalis. The Chehalis Basin Strategy would be greatly enhanced by pursuing the potential for increasing floodplain connectivity and/or incised stream restoration as a solution that would both improve habitat conditions for salmon and steelhead while lowering flood peaks on downstream floodplains where there is critical infrastructure.

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We appreciate your alternatives that outline extensive restoration actions in the Basin for two main reasons: (1) if successful restoration has already occurred prior to dam construction, then the negative effects of the dams on fish populations will be offset by the improved habitat conditions. Conversely, if the restoration actions are not first, then the

dam has the potential to further depress the fish populations. (2) It is unclear whether meaningful restoration will increase fish population numbers. Immediate implementation of restoration actions would enable restoration practitioners to assess which types of projects are having desired positive effects to fish habitat and fish populations, and to make adjustments, as needed. Implementation of a restoration strategy and demonstration that it has successfully achieved the desired outcomes in terms of increasing fish populations prior to construction of a concrete dam (whose effects are largely irreversible) could be an effective strategy both for ensuring adequate restoration funding and floodplain landowner cooperation with restoration actions.

p.58 "*The restoration actions identified in the final ASRP (being prepared by winter 2017) are dependent upon site conditions and landowner willingness, and would likely be within the low and high restoration scenarios*." We support using the high restoration scenario for implementation of all alternatives However, its success hinges on landowner willingness, which needs to be assessed by the Technical Advisory Committee

See table 4.3.-3 on p. 361/593. Shows almost no significant change in flood elevation (restoration option). Table 4.2-3 shows same thing for an experimental dam. This is useful in a comparative sense. Also, with anticipated climate change impacts, it doesn't appear that the dam is going to reduce I-5 flooding relative to the frequency of flooding that has occurred in the past. If so, the dam isn't really going to address the problem of I-5 flooding and additional expenditures are going to be needed to protect I-5.

Finally, we recommend an independent review of the proposed Chehalis Basin Strategy to objectively assess the extent to which there is a rational basis for the conclusions reached as to the proposed course of action, and the extent to which the Strategy is likely to achieve its intended goals.

From:	Liston, Steve
To:	info@chehalisbasinstrategy.com
Cc:	gordon.white@ecy.wa.gov; Miranda Plumb; Denise Hawkins; Curtis Tanner; Judith Gordon; Roy Elicker; Rollie White; Eric Hein; Eric Rickerson
Subject:	U.S. Fish and Wildlife Service Comments on the Chehalis Basin Strategy DPEIS
Date:	Thursday, November 10, 2016 8:31:13 AM
Attachments:	USFWS Comments on the Chehalis Basin Strategy 11-9-2016.PDF

Attached is a pdf copy of the U.S. Fish and Wildlife Services' comments on the Draft Programmatic Environmental Impact Statement for the Chehalis Basin Strategy.

Original letter has been sent to:

Director Maia Bellon
Washington Department of Ecology
Chehalis Basin Strategy EIS
c/o Anchor QEA
720 Olive Way, Suite 1900
Seattle, WA 98101

and a cc copy mailed to:

Gordon White, SEPA Responsible Official
Program Manager, Shorelands and Environmental Assistance Program
Washington State Department of Ecology
300 Desmond Drive SE
Lacey, Washington 98503

If you have any questions please contact Denise Hawkins, Project Leader for the Western Washington Fish and Wildlife Conservation Office or Curtis Tanner, Washington Fish and Wildlife Office, at 360-753-9440. Their email addresses are also in the cc field of this email.

Thanks,

Steve Hayes-Liston
Executive Administrative Assistant
Assistant Regional Director
Fish and Aquatic Conservation
U.S. Fish and Wildlife Service
Region 1, Regional Office
Office (503) 231-6155

United States Department of the Interior

FISH AND WILDLIFE SERVICE
911 NE 11th Avenue
Portland, Oregon 97232-4181

In Reply Refer To:
FWS/R1/AFAC

NOV 0 9 2016

Director Maia Bellon
Washington Department of Ecology
Chehalis Basin Strategy EIS
c/o Anchor QEA
720 Olive Way, Suite 1900
Seattle, WA 98101

Dear Director Bellon:

The U.S. Fish and Wildlife Service (Service) has reviewed the Washington State Department of Ecology's (Ecology) September 29, 2016, Draft Programmatic Environmental Impact Statement (DPEIS) for the Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat, and are providing the following comments for your consideration. We offer these comments on the assumption that early identification of concerns will minimize the cost of later project revisions at the time any Federal funding, permitting or other authorization is realized. The Service acknowledges the human and economic costs resulting from floods and believes that healthy, functioning and connected floodplains can play a key role in reducing flood damage, while restoring and conserving aquatic species populations.

General Comments

The Service's mission is to work with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people. Over the last 23 years, the Service has invested over $7 million in aquatic species and habitat restoration in the Chehalis River Basin with the intent of sustaining healthy and vibrant salmon and steelhead populations, restore floodplains and enhance other aquatic species in an effort to reduce threats and prevent future species listings in the watershed. The Service has a long history of assessing impacts of dams, reservoirs, and other structural flood control projects to aquatic resources. More recently, the Service has worked nationwide with partners to assess the outcome of dam removal projects to restore riverine habitat and hydrologic processes for the conservation of aquatic species and their habitats. Construction of flood retention structures (i.e. dams) considered in the DPEIS run counter to aquatic species conservation objectives of the Service and our partners in the Chehalis Basin.

The federal government maintains a special trust relationship with federally recognized tribes to protect, conserve, and use Tribal reserved, treaty guaranteed, or statutorily identified resources such as salmonid species and Pacific lamprey in the Chehalis Basin. The Service has a unique set of responsibilities and opportunities to work with federally recognized tribes. For decades, the Service's Fish and Aquatic Conservation Program has supported supplementation of fishery resources on Tribal lands. We also work with Tribes to provide technical assistance to promote sustainable management of culturally, economically and recreationally important Tribal fisheries and wildlife and management of aquatic species for Tribal subsistence harvest. The Service

pursues these collaborative efforts to both fulfill Tribal trust responsibilities and to realize opportunities for resource conservation to benefit all Americans.

In providing these comments, the Service has focused on areas in which additional information would greatly help inform future decisions regarding the impact of the selected alternative on aquatic species and the ecosystems on which they depend. The Service also provides additional technical information, where appropriate.

Specific Comments

Alternative 1, including both flood retention flow augmentation (FRFA) or flood retention only (FRO)

The installation of a dam on the Chehalis River is likely to have adverse impacts on fish and wildlife habitat. Studies to date indicate that a dam would adversely affect Chehalis Basin steelhead and other salmonids, non-game native fish, Pacific lamprey (a Species of Concern for the Service and state sensitive species), amphibians, and the endemic state sensitive Olympic mudminnow. The Service also anticipates adverse impacts from installation of a dam on the Chehalis River would include altered river flow, degraded habitat and ecosystem function and negative impacts to fish and wildlife.

DPEIS evaluation of Alternative 1 does not adequately examine the loss of natural flood regimes and habitat connectivity in downstream areas of the Chehalis River due to a flood retention facility, despite the promotion of habitat restoration in the Basin. The Service requests these impacts to Chehalis basin riverine processes, including impacts to stream channel geomorphology upstream of the proposed dam structures, be more completely described and considered in the alternatives analysis process.

Many of the fish species in the basin are dependent upon natural flood regimes and connections to the floodplain to complete their life history. Disruptions of natural flood regimes and resulting loss of habitat connectivity and complexity can have adverse effects on several species. A flood retention facility would reduce floodplain inundation by 10%, according to the DPEIS.

Headwater streams, like the upper Chehalis, are the main source of sediment for downstream reaches. Erosion of floodplain stream banks in reaches downstream from these source areas does not represent new sediment supply, but only mobilization of sediment in temporary storage, from a geomorphic perspective, and moreover, floodplain erosion usually results in input of finer-textured sediment rather than gravels which are of paramount importance to most salmonids. Thus, even if modeling shows that sediment loads will "recover" at a sufficiently far distance downstream from the dam, removal of this headwater sediment source area from the Chehalis system is not well compensated for, and is not equivalent to, recruitment of the type of sediment which occurs downstream.

Coarsening of the streambed and loss of alluvial gravel can be expected downstream of the dam. The streambed will become less mobile and more embedded due to inability of the new hydraulic regime to move the larger sediment sizes. In extreme cases, the channel will erode to bedrock, resulting in loss of spawning substrate and hyporheic function.

Alluvial fans at tributary junctions are destabilized both by the dropping elevation of the mainstem streambed, and by the widening of the mainstem channel as the banks become destabilized, all of which causes the water surface elevation to drop, causing head cut migration into the tributaries. This propagation of headcuts can create fish barriers as well as streambed instability within alluvial fan channels.

The reservoir in both the FRO or FRFA would create a flattening of the channel slope upstream, which reduces the hydraulic energy and allows all of the course sediment, and some of the fine sediment, to deposit. This in-channel deposition, or aggradation, triggers a sequence of adjustments in the upstream channel morphology. These adjustments include: streambed destabilization (e.g. more frequent or more intensive scour, bar migration, and rapid changes in substrate texture, as from sand to gravel to silt); increased bank erosion and increased rates of channel migration as the channel moves around the valley floor in response to sediment deposition, and more frequent flooding due to increased streambed elevation, filling in of the channel cross-section and reduced slope. These effects will extend upstream well beyond the upper end of the reservoir, as the delta continues to grow. The distance affected by these processes depends on sediment load and channel type, being more severe in alluvial channels and in channels that have a higher sediment load.

Impacts due to alteration of flow regime, including loss of large peak flows and increases in the duration of moderate peak flows (decreased flow variability, and altered magnitude, timing and duration of channel forming events) should be considered. This may include increased floodplain bank erosion due to longer duration of moderate peak flows. This is also a result of channel incision allowing increased erosion below the rooting depth of the riparian forest. Channel incision reduces the level of the dry season water table, and eliminates periodic overbank flows that affect soil moisture, plant reproduction, and overbank deposition of fine sediment.

Periodic fluctuations in the water level associated with FRFA reservoir operations would cause severe seasonal channel and streambed destabilization that propagates upstream. This includes episodes of alternating aggradation, scour, down cutting, and bank erosion.

As the reservoir fills in through deposition of upstream sediments, its effectiveness for water storage diminishes, and thus any benefits derived from potential augmentation of flows during periods of extreme low flow or extreme water temperature diminishes accordingly. The literature shows that average rates of storage capacity loss range from 0.5% to 5% per year. Thus, in sediment-rich watersheds, such as the Chehalis, the loss of storage can render the dam ineffective in as little as twenty years.

According to the DPEIS when water is not being impounded, an "FRO dam may only present a minor adverse impact on passage for adult and juvenile fish migrating upstream and downstream." There is a high degree of uncertainty regarding how long and how frequently the FRO tunnels will be closed. When the FRO tunnels are closed, it is questionable whether juvenile salmonids and resident non-salmonids would have adequate passage for survival to sustain populations. Although the DPEIS predicts an average of once every 7 years, this may become more frequent given the increasing frequency and severity of storms predicted by climate change models for the basin. As a result, there is a high degree of uncertainty regarding the effects of the FRO on fish populations. According to recent WDFW studies, with an FRO facility, a single, temporary inundation event is expected to result in a complete loss of any

incubating salmon embryos that are in the inundation area at the time of the flood, eliminating this proportion of the annual cohort of salmon originating from the upper Chehalis Basin.

Additionally, the Service believes the establishment of a permanent reservoir will likely lead to the introduction and establishment of non-native fishes which could be detrimental to native salmonids and native non-game fish species. The DPEIS should address this likely scenario more fully.

The Service supports modification of land use management practices such as higher standards that would minimize development in flood-prone locations and protect natural floodplain functions. We support standards that limit new, and work to convert existing, impervious surfaces to surfaces that allow storm water to soak into the ground. Where impervious surfaces are unavoidable, we recommend installation of storm water control structures that allow runoff to soak into the ground at an upland site, instead of being channeled down a storm drain to a stream where it creates or exacerbates flooding. This comment applies to each alternative that includes Local Scale Actions.

Additional information sought to address these specific concerns includes the following:

1. The DPEIS does not adequately explore the effects of either dam alternative, FRFA or FRO on non-game native species.

Recent Washington Department of Fish and Wildlife (WDFW) surveys documented 12 different non-game native species in the dam footprint, and there are additional non-game native fish species downstream. These species, although not commercially or recreationally important, make up an important component of both the aquatic and terrestrial ecosystem and the impacts to these species should be explored. For example, Pacific lamprey are likely to be affected above the dam site due to habitat degradation and loss in the reservoir area associated with the FRO dam. The scale of impacts to Pacific lamprey in the FRO reservoir area is unknown and should be investigated. This type of evaluation will assist the Service in analyzing the impacts of this alternative on trust resources and future populations. Without such information, the Service is unable to assess the long-term benefits or impacts of the alternative on trust resources.

2. Impacts to future populations of anadromous juvenile salmon and steelhead and adult lamprey are not adequately addressed in the DPEIS.

According to the DPEIS, the trap and transport facility at either a FRO or FRFA will have 54% survival for anadromous juvenile salmon and steelhead and adult lamprey. Without more information about the facility design and additional analysis on the long-term population impacts, it is difficult to assess what the consequences of a 46% mortality rate on these species would be. Without such information, the Service is unable to assess the long-term benefits or impacts of the alternative on trust resources.

In addition, short-term impacts during the 2- to 3-year flood retention facility construction period could become a long-term impact as reduced egg and juvenile survival in a given year would lead to reduced abundance in subsequent generations. Short-term construction impacts, coupled with natural variations in flow, could lead to long-term depression of population numbers. The Service did not find adequate modeling in the DPEIS to provide

information on reduced abundance in future populations of game and non-game fish species. Modeling and analysis of these compounding effects will assist the Service in evaluating the impacts of this alternative on future populations. Without such information, the Service is unable to assess the long-term benefits or impacts of the alternative on trust resources.

Historical data suggest that high flow events are cyclical in nature, with multiple years of record storm events occurring sequentially. The current analysis does not evaluate the impact of multiple sequential years of dam closure on fish populations, but rather assumes that high flow events will be distributed evenly over time. Please evaluate scenarios of this type consistent with recent historical records of basin high flow events. This type of evaluation will assist the Service in analyzing the impacts of this alternative on future populations. Without such information, the Service is unable to assess the long-term benefits or impacts of the alternative on trust resources.

3. The Service requests that the final DPEIS provide adequate information on passage facilities for adult and juvenile fish species present in the proposed dam footprint. We also request additional information on population scale effects from increased mortality associated with fish passage facilities.

The passage design at both FRFA and FRO options lack specific information on upstream and downstream passage for resident species, including Pacific lamprey and other non-game native species. Without such information, the Service is unable to assess the long-term benefits or impacts of the alternative. Additionally, information on the design of upstream passage for juvenile salmonids is inadequate for us to fully evaluate. The Service requests additional detail on the function and design of the low-flow entrance at the trap and haul facility for upstream passage of juvenile salmonids be incorporated into the final DPEIS. This type of evaluation will assist the Service in analyzing the impacts of this alternative on trust resources and future populations.

4. The DPEIS to provide information on reduced abundance in future populations of game and non-game fish species. For example, the DPEIS affected environment chapter acknowledges freshwater mussel species in the Chehalis Basin and relative abundance in the upper basin. However, the document fails to address potential impacts to freshwater mussels in the modeling for either flood retention facility option.

In addition, the Service is concerned with the passage design for the FRFA. There is high uncertainty of the magnitude of the impact that the loss of lamprey upstream of the FRFA dam presents to the whole Chehalis Basin population. FRFA downstream passage of juvenile Pacific lamprey is estimated to be less than one percent. This low passage of juveniles through the FRFA dam could significantly diminish or eliminate Pacific lamprey from the upper mainstem of the Chehalis River. We suggest assessing the potential effects of the alternative to other aquatic species.

5. The DPEIS does not address flow requirements or preference for varying life stages of species known to move upstream and downstream (e.g. daily movement) such as juvenile salmonids or resident non-game species. The DPEIS should include documentation of available science relating to flow requirements for each species of fish known to reside in the proposed dam footprint or regularly utilize the habitat, the expected survival of

upstream and downstream passage through the 230 foot tunnels, and substrate anticipated to remain inside the tunnels to aid upstream passage.

6. The DPEIS is unclear on how changes in water temperature will affect salmonid populations. The document states that flow augmentation via the FRFA will increase spring-run Chinook salmon and native non-salmonid species habitat below the dam; yet the document later cites recent studies that show spring-run Chinook salmon have behaviorally adapted to warmer water in this watershed implying that this species has evolved to the conditions in the Chehalis Basin.

The Service is unaware of empirical data that demonstrate increases in salmonid populations following dam construction, and requests more information on this issue. The Service also requests quantification of changes to hyporheic flow downstream of the proposed dam site.

Alternative 2

This alternative would have significant adverse impacts on wetlands, primarily due to the permanent loss of wetlands that would be required to construct the Large-scale Flood Damage Reduction Actions. The Service advocates for protection of existing wetlands and the restoration of degraded wetlands since they store floodwater and decrease floodwater velocity, and provide rearing habitat for aquatic species.

Alternative 3

This alternative would result in greater benefits to Service trust resources and have fewer impacts on aquatic species habitat function due to the lack of large-scale structural flood damage components. This alternative will have components via the high restoration scenario habitat action that could decrease flood waters and create water storage areas from restored floodplain projects.

Alternative 4

This alternative does the most to reestablish a natural flood regime within the Chehalis Basin which will benefit all aquatic species.

This alternative relies heavily on the use of large wood and natural structures to reduce flooding in the Chehalis Basin. Numerous studies have demonstrated the benefits of these types of projects for fish populations, including the benefits to Pacific salmon and steelhead populations.

This alternative will help to reestablish historic connections between the mainstem Chehalis River and the floodplain that many fish species in the basin (both salmonids and non-game native species) depend upon to complete their life cycle. When rivers are connected to their floodplains during high flow events, water is distributed over floodplain habitat which dissipates hydraulic energy and slows flood water. Connected floodplains also create side channels and off-channel habitat which are essential refugia for salmon and other aquatic species.

This alternative addresses flooding issues in other subbasins (e.g. Newaukum River and others) and may address flooding issues across a broader geographic scale depending on the nature of individual storms and floods. Consequently, it may be helpful to explore scaled-down versions

of this alternative in the DPEIS. For example, what would be the effects of implementing this alternative only in the upper Chehalis, or implementing this alternative at 50% of the river miles?

Thank you for the opportunity to provide comments on this draft DPEIS. If you need any further information or clarification of our comments, please contact Denise Hawkins, Project Leader for the Western Washington Fish and Wildlife Conservation Office at Denise_Hawkins@fws.gov or Curtis Tanner, Washington Fish and Wildlife Office at Curtis_Tanner@fws.gov or both can be reached at 360-753-9440.

Sincerely,

Acting Regional Director

cc:
Gordon White, Ecology SEPA Responsible Official

State of Washington
DEPARTMENT OF FISH AND WILDLIFE

Mailing Address: 600 Capitol Way N • Olympia, WA 98501-1091 • (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building • 1111 Washington Street SE • Olympia, WA

November 14, 2016

Gordon White
Chehalis Basin Strategy, SEPA Responsible Official
info@chehalisbasinstretegy.com.

Dear Mr. White

This letter provides the Washington Department of Fish and Wildlife's (WDFW) comments on the Chehalis Basin Strategy Draft Programmatic Environmental Impact Statement (EIS). Comments related to specific elements of the EIS, its assumptions and potential impacts to the fish, wildlife and ecosystems our agency is charged with protecting follow this letter.

The Chehalis River Basin is a unique and special watershed. As the second largest watershed entirely in Washington, it continues to support some of the most extensive floodplains in the state and has the highest diversity of native amphibians in the state and is the historic home of the federally listed Oregon spotted frog. Without an ESA listed species of salmonids, the Chehalis Basin supports an economically important commercial, Tribal and sport fishery.

Historic flood damage to the communities in the Chehalis Basin has been catastrophic, and there is a great need to address those real impacts which will likely only magnify in the future. At the same time, the Basin's habitat have been significantly degraded from its historic condition, and a valuable ecosystem as well as several important fisheries face significant challenges under predicted climate change scenarios.

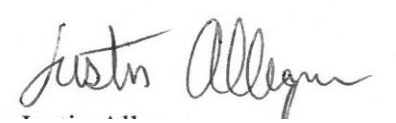
WDFW looks forward to continuing to be a partner in protecting and restoring the watershed and addressing catastrophic flood damage.

Governor Jay Inslee, the Department of Ecology, the Chehalis Basin Work Group, the Ruckelshaus Center, and many other stakeholders deserve credit for creating an transparent process that has lead to the draft EIS, and for attempting to identify integrated solutions to significant regional concerns. The process has supported and encouraged cooperation between state, Tribal and local entities, and has resulted in a clear description of the possible paths forward for the Basin's residents and aquatic species. The draft EIS addresses some of the uncertainties identified in the last biennium and serves as an outline for the work that will need to be done for a project-specific EIS.

WDFW supports the highest level of restoration for the Chehalis Basin to build resilience in the face of climate change and be implemented on a rapid timeline. The highest level of restoration is needed for an integrated program as that envisioned in the EIS, in order to address

uncertainties around landowner engagement and project effectiveness. Restoration must be coupled with a commitment to monitoring outcomes and adaptive management.

Sincerely,



Justin Allegro
Habitat Program
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(360) 707-8927

cc:
Rob Duff (Governor's Office)
Erik Neatherlin (WDFW)
Jeff Davis (WDFW)
Ron Warren (WDFW)
Chrissy Bailey (Ecology)
Tom Clingman (Ecology)
Junior Goodell, Jr. (Quinault Indian Nation)
Don Secena (Confederated Tribes of the Chehalis Reservation)

Cultural Resource Comments: Our review of Chapters 3 and 4 indicate that full consideration was not given to the impacts to Historical, Archaeological, Architectural, and Cultural Resources as required and intended by the EIS process. Specific deficits are as follows:

- *Historic Properties* - The document acknowledges that not much is known about what effects to historic properties, but goes on to state that the Section 106 review will be differed until later; that the project proponents will take care of any identified impacts; and concludes that the impacts will not be a problem.

  Considering environmental impacts after a decision has been made is a serious flaw and defeats the purpose of considering impacts in preparing to make decisions. It also guarantees last-minute conflicts between project implementation and historic preservation, resulting in unforeseen costs.

- *Cultural Resources* - By focusing on historic properties, the document overlooks the broader definition of cultural resources (archeological sites, social impacts). The analysis should broaden the scope of the resources examined and go beyond easily quantifiable socioeconomic variables like population, employment, and use of public services. Omission of this analysis may result in impacts to other classes of cultural resources simply not being identified or their significance considered.

- *Surveys and Evaluation Tools* – While the references used are appropriate, they are also very basic and do not reflect recent information. This is in marked contrast to the more detailed analysis for biologic, hydrologic, and geologic factors presented throughout the document. Approaching cultural resources with a similar degree of time and effort would result in a much better EIS and less uncertainty about the potential effects to cultural resources.

- *Social Justice and Socioeconomics* – The document fails to address the impacts of any of the alternatives on social justice or socioeconomic factors.

- *Federal, State and Local Regulations* – The document fails to fully address the full suite of regulations and jurisdiction associated with cultural resource management, or their interaction with each other. For example, while both the National Historic Preservation Act (NHPA) and Governor's Executive Order 0505 are identified, there is no indication that the NHPA takes precedence or that NHPA compliance leads to an automatic exemption from Order 0505.

  The Fact Sheet list of cultural resource related laws is missing a number of appliucable acts (e.g., Native American Graves Protection and Repatriation Act, Archaeological Resources Protection Act, American Indian Religious Freedom Act). Please ensure that a complete list is provided in the final EIS.

Section	Page	Paragraph	Review Comment
1.1	2	Aquatic Species Conditions inset box	It would be helpful if the inset box indicated that the Chehalis basin is unique in western Washington in reaching into three ecoregions, the Olympics, the Willapa Hills, and the South Cascades, which is an underpinning for its diversity.
1.2	6	3	The terms "flood" and "extreme flood" need to be defined to avoid conflating human property loss with flood magnitude. Using magnitude in stage height or cfs, or recurrence interval would be more useful.
1.2	7	2	The statement that, "residential, commercial, and industrial land use collectively comprise only a small portion (7%) of the overall land cover in the Chehalis Basin" may be accurate, but does not capture that flooding is associated with the **floodplain,** the magnitude of the uses within the **floodplain** or the likelihood of flood damage to those uses in the **floodplain**. . 3rd sentence: Consider changing the word "People" to "Some" to avoid implying that everyone assumes development has contributed to the increase in flooding. Typo: "Ground Mound" should be "Grand Mound"
1.3	8	2	As the Chehalis Basin is being discussed as a whole, please add that two federally listed aquatic are known from the larger Basin. First, the Oregon spotted frog (*Rana pretiosa*), which is now restricted to a handful of sites in the upper Black River system, and second Eulachon or Candlefish (*Thaleichthys pacificus*), which historically supported a tribal fishery in the estuarine portion of the Chehalis mainstem.
1.3	8	Text box	Protection; nutrient dynamics; increased abundance of non-salmon native fishes, birds and amphibians; improvements in ecosystem goods and services should also be included here.
1.3	8	Last paragraph, last sentence	Erosion is part of the natural dynamic of riverine system. Please modify to "continually eroding at levels greater than the historical background."
1.3	9	1	Recruitment of LWD and gravel are <u>both</u> beneficial to spawning - wood moderates stream power, creates roughness and pools in the mainstem; with gravel providing substrate. The use of "excellent" to describe spawning areas assigns a value that that may be inappropriate. Please substitute "suitable"

Section	Page	Paragraph	Review Comment
1.5	12	Last paragraph, last sentence	The last clause in the last sentence that states " mitigation measures are also typically more general and focus on actions that could be implemented or might be required." begs for a contrast to complete the thought, which is presumably "actions that will be implemented or required" in a project-level EIS. The explicit statement would be useful.
2.2	19	1	The Chehalis Basin is incorrectly referred to here, and in several other places in the EIS, as "…the second largest river basin within the state." The Chehalis Basin is the largest river basin contained entirely within the State of Washington, which is important as we in the State have total control of what happens in the basin. The largest is the Columbia, by both area and flow, but most of it is located in many other states and another country (Canada). The second largest by flow but the third largest by area is the Skagit. However, part of this river basin is also within Canadian boundaries and thus removed from state or even federal influence. So we should embrace the Chehalis as being truly the largest basin, either by area or flow, that is located entirely within the State, and refer to it in the EIS as such.
2.3	26	1	Please indicate what the major flood stage would be for operation of a flood retention facility
2.3	27	1	The 3rd sentence incorrectly states that the major flood stage at which the FRO would begin holding water was previously described.
2.3	31	2	Please indicate the likely width of the tunnels. Clarify if FRO facility entrances are the same as the tunnels. Define/describe the "plunge pool" shown in figure 2.3.3
2.3	31	4	Please indicate how many acres would be flooded during operation; define "freeboard"
2.3	33	3	Define "bollards"
2.3	34	1	Provide an acreage for the amount of land that the FRFA will flood
2.3	39	5	Describing and depicting in Figure 2.3-7 "…new farming….uses in upland areas…" is a bit problematic for evaluation of this alternative in the EIS. It would seem at this stage of development a variety of approaches to compensate for land and the associated economic use of that land would be under consideration, some which may not include new farming uses in upland areas. Such approaches may not be implementable in the end, but would not limit the Alternative at this stage in the process.
2.3	55	1, Bullet 3	Compensatory floodplain storage areas should be designed to mimic natural floodplain, including water retention capability, and planted with native vegetation.

Section	Page	Paragraph	Review Comment
2.3	55	Last bullet, last paragraph, also first paragraph on page 56	Add a bullet requiring that hazardous materials, or items containing hazardous materials such as motor vehicles, not be stored or warehoused below BFE. This would be an agreement required to be recorded on the property deed or title in the same manner as the non-conversion agreement in this paragraph.
2.3	57	1	Please rework this to indicate that the actions would be part of the ASRP; why the ASRP itself is not evaluated here; and what the components of the plan are 2nd bullet: To be accurate the last part of the sentence in this bullet should be re-written as follows "…this does not include the required State of Washington owned culvert corrections." WSDOT is not the only agency identified in the culvert case, WDFW and WDNR also have barrier culverts on their lands that are required to be removed or corrected by the court decision. Add a bullet, "Reduce channel incision and restore already incised channels."
2.3	57	3	This paragraph incorrectly omits the protection of existing functional habitat.
2.3	59	Figures 2.3-13 and 2.3-14	Both of these would be significantly improved by identifying public lands, such as State Parks, WDNR and WDFW, and also depicting Forest Service lands, where restoration actions conceivably could be conducted, separately from national parks and wilderness areas, where they couldn't. For example, most of the lands in the upper watersheds of the Humptulips, Satsop, and Wynoochee Rivers are National Forest and not all "National Parks and Wilderness Areas".
2.3	61	3	WDFW and WDNR are implementing state-wide fish passage restoration programs, not just WSDOT.
2.3	61	5	Also mention the Washington Coast Restoration Initiative (WCRI) in this list, which has been a significant source of restoration funding for the entire Washington coast, including the Chehalis Basin.
2.3	62-63	Last paragraph	Unclear why the statewide Forests and Fish HCP that add addresses major private timberlands is not mentioned here; this not the same as the DNR HCP that addresses state forest lands.
2.3	63	3	Again, WDFW and WDNR are implementing state-wide fish passage restoration programs, not just WSDOT.
2.3	64		Please restructure similarly to section 2.3.4.2 such that the elements of each alternative are indicated with bullets
2.4	70	Last Paragraph	The Quinault Nation is a co-manager with WDFW for all fish and shellfish within their U and A area, not just those mentioned.

Section	Page	Paragraph	Review Comment
2.4	73		This section overlooks legal requirements specified for the management of state-owned aquatic lands. Please correct.
3.1	77	3.1.1 Precipitation	The Humptulips shares headwater conditions with the Wynoochee and Satsop and is also somewhat influenced by snow-dominated areas in the Olympics.
3.1	83	2	Define "CIG"
3.1	85	1	The head of tide in the Chehalis River is actually just below the mouth of the Satsop near RM 20. When the Chehalis is at flood stage, tidal influence has been reported as far upstream as Porter. The second paragraph is incorrect in the description of floodplains. They generally do not exist in headwaters (steep gradient); inserting an image of an elevational river continuum would be helpful
3.1	87	1	WWTP has not been previously defined.
3.1	104	1	Grays Harbor is the second largest estuary on the coast behind Willapa Bay, but not in the state. Puget Sound is considered an estuary also, is at least close to being the largest in the United States, and certainly is the largest in Washington.
3.2	118	1, line 3	The highest elevation point in the Willapa Hills, at the indicated 3,114 ft, is Boisfort Peak (also called Baw Faw Peak); might be good to use the actual name here.
3.2	119	Figure 3.2-4	In the Reach 7 box, "Lower 13 miles are tidally influenced" needs to be corrected, it is actually the lower 20 miles as tidal influence is present nearly up to the mouth of the Satsop and RM 20 (the river miles I am referring to are those in the Stream Catalog).
3.2	120	1, last sentence	The analysis concluding that channel migration takes place during small floods is true for tallying overall migration events, most of which are small magnitude migrations; but major migration events of the magnitude to create an avulsion and potentially the level of energy (work) to create new off-channel habitat require larger magnitude floods; ignoring this distinction will be misleading.
3.2	121	2, tail of last sentence	Please add "selected agricultural practices"
3.2	122	Figure 3.2.7	Figure 3.2.7 should be redone to show splash dams throughout the basin
3.2	124	3	Under the paragraph that begins "Tributaries to Grays Harbor…" be sure to include the Hoquiam River.
3.2	126	Last sentence in paragraph	Human removal of wood during high flows was far more the important factor in wood depletion than high flows; this should be clearly distinguished.

Section	Page	Paragraph	Review Comment
3.3	127-133		Please include discussion of the historic loss of marshes in the basin. Based on the work of Beechie et al using PLO maps. the loss is estimated at 80% of pre-1900 levels.
3.4	140	1	Shellfish are incorrectly classified as fish - they are invertebrates, with different ecological needs compared to fish. Suggest creating a subsection for them under wildlife and including a brief discussion of the needs of freshwater species.
3.4	140	2	At the end of the paragraph there is a general statement that off channel habitats "serve as refugia from main channel and high-quality rearing habitat for other species like juvenile coho salmon." Please specify that off channel flood plain areas serve as important over winter rearing habitat for species such as juvenile coho salmon. It is likely that such habitat is unsuitable for summer rearing. Also, throughout remainder of the fish section, "headwater" areas are referred to as high quality juvenile salmon summer rearing habitat and it would be good to include that here especially since a statement is being made about the downstream off channel area's serving as high quality habitat for juvenile coho.
3.4	140	3	This paragraph does not adequately capture the role of temperature in structuring native fish distribution. Suggest rewording: "High summer water temperature is a major factor influencing fish distributions during the summer months. Summer habitat available for cold-water species like salmon and trout is primarily limited to the higher elevations of the mainstem Chehalis River and the upper extent of major tributaries (e.g., Newaukum and Satsop). Summer temperatures are lower elevations are conducive to native cool-water species as well as non-native warm-water species. Summer temperatures vary among sub-basins. For example, the upper mainstem of the Chehalis River is warmer compared to the headwaters of the Satsop and North Fork Newaukum rivers at the same altitudes, with maximum temperatures upstream of river mile 108 exceeding 20°C from mid-July through August (Zimmerman and Winkowski 2016). "
3.4	140	4	Remove the sentence "Conversely, these conditions are conducive to warm-water species (and many non-native warm-water species)." It implies there are non-native warm-water species in the Upper Chehalis, when there are not. In fact, indicate the upper Chehalis is used only by native fish and predominantly by salmon, trout, and sculpin species. In addition, WDFW Riverscape surveys found no nonnative warm water fish species upstream of Rainbow Falls.
3.4	141	Text Box	Text box incorrectly classifies Grays Harbor as marine. It is an estuary

Section	Page	Paragraph	Review Comment
3.4	141	1	The relationship between temperature and fish movements needs to be clarified. The "blocking of migration" refers to adult Chinook salmon. Text should be rewritten with this clarification. With respect to juvenile salmon/trout, increasing temperature was associated with the downstream migration of juvenile Chinook salmon and was not related to the daily movements of steelhead trout (Winkowski & Zimmerman Submitted). A reference needs to be provided to support the statement that fish kills have occurred in isolated pockets of low DO
3.4	141	2	Remove the word "very" from, "…varies considerably across seasons with ~~very~~ high fall and winter flows" It is subjective. Delete "For some fish" from the beginning of the last sentence.

Section	Page	Paragraph	Review Comment
3.4	142	1	Need to include multiple species in the opening statement of this paragraph. Suggest rewording to: "Findings from snorkel surveys conducted over the summers of 2013 through 2015 show that juvenile Chinook, coho, and steelhead are abundant in the headwaters of..." Add juvenile coho salmon to first sentence, as they are also abundant in the headwaters of each sub basin Suggest rewording the second sentence to better represent the results of the work "In these three areas, the proportion of the fish community made up of salmonids declined from upstream to downstream, with a transition to more native warm-water species in association with differences in habitat characteristics and warmer temperatures." Suggest rewording the third sentence to better represent results. The sentence provided speculates on a mechanism describing fish distribution. While this is a hypothesis I think speculation is not appropriate. "Salmonids were more widely distributed throughout the entirety of the East Fork Satsop River compared to the other areas surveyed. The East Fork Satsop River was identified as unique relative to other sub basins surveyed in terms of habitat characteristics, temperature, and gradient. The headwaters of the East Fork Satsop are low gradient and spring fed."

Section	Page	Paragraph	Review Comment
3.4	142	2	Incorrect statement regarding the length of the survey... Reword to: "In the summer of 2014, juvenile salmon distributions were surveyed intensively within a 14.8-river-mile stretch of the mainstem Chehalis River upstream of the confluence with Elk Creek (Winkowski and Zimmerman Submitted.) Last sentence of the paragraph. If we are being consistent with the theme of communicating the upper Chehalis as the warmest of the surveyed sub basins it would seem appropriate to add that to the last sentence of this paragraph, i.e., "While the upper Chehalis was warmer compared to other sub basins, juvenile salmon densities were also highest." Ensure the reference WDFW 2015b is correct. Currently the author is referencing PHS mapping, but I suspect you mean to reference the Upper Chehalis Instream Fish Study 2015 (Winkowski, M., Kendall, N., and Zimmerman, M., 2016). Remove or correct the sentence, "Juvenile Chinook salmon were observed only within approximately 1 river mile of the proposed dam site." Without context this statement is incorrect. Assuming the author is referencing the Upper Chehalis Instream Fish Study 2015, juvenile Chinook salmon were not expected to be observed because of the timing of the study. Another study (Winkowski and Zimmerman, in prep.) found that juvenile chinook salmon used more of the inundation footprint and were collected 5 river kilometers (over 3 river miles) upstream of the proposed dam site. In the 2014 study described at the beginning of this paragraph, juvenile Chinook were observed in all 10 reaches surveyed within the 9 miles surveyed in late June and early July. Which means juvenile Chinook were observed at least 4 miles above and below the potential dam site.

Section	Page	Paragraph	Review Comment
3.4	143	Table 3.4-1	This table needs to be reviewed closely with WDFW data stewards and fishery experts before a final version of this PEIS is published. Based on the WDFW data published in Salmonscape, this table is not entirely correct. Per Salmonscape spring chinook have never been documented spawning in the Black River, Scatter Creek, or in any of the middle Chehalis tributaries. By indicating that they spawn in these areas in the EIS we are both inconsistent with WDFW data and minimizing the importance of the areas where they have been documented spawning. Either that or we have erroneous data out there on our website that is going to be used to fact-check this EIS. Second, and I know this is innacurate in Salmonscape, apparently fall chinook have been not been documented spawning in the Humptulips, Elk River, Johns River, Hoquiam River, Delezene Creek, Scatter Creek, nor any of the middle Chehalis tributaries. Salmonscape only indicates that presence has been documented, not spawning. I could go on with other species, like steelhead, which definitely spawn and are abundant in the Black River system in spite of the EIS indicating that they are not, but hopefully I have made the point that it is essential to be as accurate in the EIS as possible concerning every known fact about the life histories and habitats of salmonids in the Chehalis, just as it is essential that these facts match our data available in Salmonscape, as there are those who are reading this with litigious intent that do not like some of these alternatives and will take something as simple as misinformation about salmonid life histories to court. Remove dots in the Spring Run Chinook Salmon column from Scatter Creek and Middle Chehalis River tributaries as spring Chinook do not spawn in these waters. Add a dot in the Steelhead column to Black River. Steelhead are documented as spawning within this basin.
3.4	143	1	Incorrect statement. Recommend rewording: "Juvenile salmon and steelhead can be highly mobile during the summer low-flow period as demonstrate by a study conducted in 2014 in the mainstem Chehalis River conducted upstream of the confluence with Elk Creek. Up to 52% of the juvenile steelhead, Chinook, and coho salmon tagged within 7 km of the proposed dam site were observed actively moving upstream and downstream during the summer months through areas in the upper Chehalis River that would be disconnected or inundated by the proposed Flood Retention Facility (Winkowski and Zimmerman, Submitted). During the summer months, juvenile steelhead and coho were observed moving up to 7 km in both the upstream and downstream directions whereas juvenile Chinook salmon were observed moving in a downstream direction only.

Section	Page	Paragraph	Review Comment
3.4	143	1	After the second sentence add: "In 2014, tagged juvenile steelhead were detected at the dam location on 96.7% of the days between June 27 and September 29. Of the juvenile steelhead detected, 83.2% of the individuals were detected on more than one day. These data suggest movements over the entirety of the summer months." After the last sentence add: "In addition to main stem movements, juvenile coho and steelhead were observed moving between main stem and tributary habitat over the summer months. Tributaries included Crim Creek, Rock Creek, Stowe Creek, and Jones Creek."
3.4	144	Last on 144, first on 145	This information on spawning locations of spring chinook is consistent with what we know from surveys. However, it is not consistent with Salmonscape. Considering what is at stake, Salmonscape really needs to either be updated for the Chehalis or equipped with a disclaimer indicating that this information may not be accurate and to contact your district biologist for accurate information.
3.4	144	Table	Table 3.4-2 would be much more effective if the number of redds and spawner abundance below the proposed dam were included to allow comparison. Recommend doing that to extent possible, using data from Chehalis basin areas upstream of Porter and/or from another appropriate comparison area per species. The table headers should also be redone to indicate that the values are a range
3.4	144	2	Population designations are based on distinct spawning distribution and are identified by river names, not based on river names.
3.4	144	3	Spring Chinook are not found "throughout" the Chehalis River and its tributaries, they are found in specific areas. Check this reference (WDFW 2015a). Currently the author is citing SCoRE and I assume SCoRE is not doing the genetic work to determine Chinook salmon population designations. SCoRE references Marshall et al. (1995) for genetic work on spring Chinook, but the author states the work is currently being conducted.
3.4	145	Paragraph 5 on 145, 1st on 146	The last sentence in the "Coho Salmon" paragraph states that Coho are "trapped and transported above a natural barrier". This is no longer true and hasn't been for a number of years. There is an open fish way that allows passage upstream of the barrier. The trap is still there, but is currently not in operation. Please correct

Section	Page	Paragraph	Review Comment
3.4	145	3	The wording for the distribution for fall Chinook spawning habitats needs to be changed to represent that spawning occurs upstream of the project site. Remove Pe Ell [RM 108] and add West Fork [RM 119]…..”at the confluence with the South Fork Chehalis River [RM 88] to upstream of the West Fork [RM 119]. Listing Pe Ell [RM 108] is misleading, Pe Ell is actually at RM 106 and the proposed dam site is at RM 108. Fall Chinook are documented spawning far upstream of the project site. This needs to be clear.
3.4	145	4	Again, this information is accurate in the EIS, but it isn’t even close to what is in Salmonscape. Add sentence...” Within the Chehalis River, there is some uncertainty about the chum salmon population structure; additional genetic work is planned in the upcoming year to determine if the current population designation is accurate.”
3.4	145	Last paragraph	Coho spawn basically everywhere in the watershed, and are small water specialists that will ascend and spawn in any stream with suitable habitat and made accessible by favorable flow conditions. The statement in the EIS that “In the mainstem Chehalis River, coho salmon only spawn in the most upper reaches of the sub-basin (upstream of Pe Ell) and the East Fork Chehalis River sub-basins (in Stillman Creek and upstream of Boistfort Prairie)” seems to me to minimize the extent of their upper watershed spawning, when in reality coho spawn in more than a half-dozen streams, both the mainstem and West Fork Chehalis above the dam site, including within the proposed reservoirs, along with almost every type F tributary downstream of the proposed dam location. Correct the following, “In the mainstem Chehalis River, coho salmon only spawn in the most upper reaches of the sub-basin (upstream of Pe Ell) and the ~~East~~ South Fork Chehalis River sub-basins (in Stillman Creek and upstream of Boistfort…” Either change East Fork Chehalis to South Fork Chehalis or remove “… (in Stillman Creek and upstream of Boistfort…” as it is not a tributary to the East Fork Chehalis River. Add sentence... “Within the Chehalis River, there is some uncertainty about the coho salmon population structure; additional genetic work is planned in the upcoming year to determine if the current population designations are accurate.” In the third sentence, the word “only” is used as a limiter to Coho distribution, which makes the statement not true. Using the term “typically” would make the statement correct.

Section	Page	Paragraph	Review Comment
3.4	146	2 (Cutthroat)	Provide reference for statements about cutthroat life history diversity. Satsop River contains the largest population of Coho is the Grays Harbor basin, and it is not mentioned in the distribution of Coho. The Wynoochee River is also not included. The two largest sub basins in the WRIA 22 need to be discussed.
3.4	146	3 (Steelhead)	Add sentence... "Within the Chehalis River, there is some uncertainty about the steelhead population structure; additional genetic work is being conducted to determine if the current population designations are accurate."
3.4	147	2	The following statement refers to summer movements only but is incorrectly presented as ALL movements. "While residing in freshwater, juvenile salmonids may actively migrate upstream and downstream relatively short distances, usually less than 1 mile, but in some cases several miles—as observed in the upper Chehalis River by Winkowski and Zimmerman (in prep.)." Other studies have shown substantial movements (10s of miles) by juvenile salmon and steelhead during the fall and winter months. Suggest qualifying this statement in that it specifically refers to summer movements and adding information about more extensive fall/winter movements of juvenile salmonids.
3.4	147	3	The list of habitat alterations is missing the reduction in wetlands/marsh as identified by Beechie's Watershed Assessment Analysis. Their analysis from historical conditions showed that there has been a substantial reduction in wetlands/march habitat – far more than any other habitat type in the basin.
3.4	147	3rd - Side bar box	LWM acronym- write what it means prior; e.g., large woody material (LWM)
3.4	148	2	Wynoochee Dam provides upstream trap and haul passage for adults only, no juveniles are able to pass upstream.
3.4	148	3	This paragraph should be updated to include export of grains, vehicles, methanol, and other products that can be found on the Port of Grays Harbor website, log exports are now a very minor product. The new ships that transport these commodities draw more water, so the navigation channel is also being deepened this year. In addition, there is only one pulp mill left, so historical pollution issues have improved, but pollution from an overloaded secondary wastewater treatment plant and untreated stormwater continue to decertify a large part of the estuary for shellfish production.
3.4	148	4	Lack of riparian vegetation should also be mentioned as an impairment, as this contributes directly to high temperature and low wood recruitment problems.

Section	Page	Paragraph	Review Comment
3.4	149	Table 3.4.3	Do these numbers represent the Grays Harbor Basin or Chehalis Basin? If these numbers include Humptulips or South Bay populations, this is Grays Harbor Basin, not Chehalis Basin. It appears that this may be a universal issue throughout the document. Humptulips populations and number are not included in the Chehalis Basin in any escapement or runsize estimates except for Chum. Please correct
3.4	149	1	Channel incision should also be mentioned in this paragraph, as it is the primary driver in disconnecting the river from its floodplain as well as driving erosion and channel instability.
3.4	149	2	Delete last two sentences of paragraph because they are not accurate. Replace with: "When controlling for river location, a relatively small proportion of variation in fish species distribution can be explained by habitat (12.3%) and temperature (7.3%) metrics alone. However, the majority (52.4%) of variation in fish species distribution is explained by a combination of river location, habitat, and temperature metrics. These results suggest the interaction of these factors, not any single factor, results in suitable habitat for specific fish species in the upper Chehalis River."
3.4	151	Table 3.4-4	Define run size in the caption to this table. Clarify if the values are spawner escapement plus freshwater harvest and if they include ocean harvest. These numbers are Grays Harbor Basin numbers, not Chehalis Basin. Humptulips is independent of the Chehalis.
3.4	151	1	Using the reference of "Chehalis Basin" to represent the Grays Harbor Basin is a misrepresentation. Chehalis and Humptulips Basins are managed individually and have fundamentally different Geomorphology.

Section	Page	Paragraph	Review Comment
3.4	151	2	WDFWs riverscape surveys are "snapshots" of what is in the river at specific locations at specific times and are valuable tools for documenting distributions of species with relatively small home ranges during parts of their life cycles, like juvenile salmonids during summer rearing. While the surveys also capture migratory species like large scale suckers and mountain whitefish, they do not capture the full extant of migratory species habitat use. The text should clearly caveat all statements made regarding these migratory species with the fact that they are migratory throughout their life cycle and avoid using riverscape surveys as the basis for statements regarding these species. Remove "trout" and include peamouth in the list of species. "Native non-salmonid ~~and trout~~ species that dominate freshwater habitat in the Chehalis watershed include northern pikeminnow, peamouth, largescale sucker, redside shiner, mountain whitefish (a member of the salmonid family), six species of sculpin, three species of lamprey, speckled dace, and longnose dace (see Appendix G, Table G-8; Wydoski and Whitney 2003)."
3.4	151	3	Please rework the text to indicate that the description of spatial distribution is for the summer months.
3.4	152	Table 3.4-5	Please rework this table to indicate that the densities reported are INDEXES as they were obtained through snorkel surveys. They describe relative differences among species and were not intended to represent absolute densities. Define what section (river miles) comprise the Upper Chehalis River.
3.4	152	1	Please clarify what "... were less widely distributed in the Chehalis Basin" means, where the information comes from and if surveys were conducted elsewhere to allow the comparison (less widely). Rework the text to clarify that while lamprey were not detected in the surveyed tributary reaches, only the lower portions of the tributary reaches were surveyed because they were within the dam footprint. The spatial limits on the surveys does not support making blanket statements about lamprey distribution in tributaries

Section	Page	Paragraph	Review Comment
3.4	152	2	Based on genetic analyses, the following sentence should be corrected. In addition, it should be clear that the results are for the proposed dam inundation footprint, not the entire Chehalis Basin because as it is written, it is incorrect. "Reticulate sculpin and redside shiner ~~riffle sculpin, and prickly sculpin~~ were also observed and were less widely distributed in the proposed inundation footprint~~Chehalis Basin~~." Correct the following sentences: "Largescale sucker, redside shiner~~, western brook lamprey ammocoetes~~, and mountain whitefish were only detected in mainstem reaches within 2.5 river miles upstream of the proposed dam site. Northern pikeminnow and western brook lamprey ammocoetes were only observed in supplemental reaches surveyed downstream of the proposed dam site." It should be clear that the results are for the proposed dam inundation footprint, not the entire Chehalis Basin because these species definitely reside in the Chehalis basin throughout the year.~~.~~ "Though the river was surveyed in summer, it is likely that these species reside in the upper Chehalis River and proposed dam inundation footprint ~~Basin~~ throughout the year." For the sentence "In the summer of 2015, 12 of the non-salmonid fish species previously located in the area by Wydoski and Whitney (2003) were identified in the reservoir inundation footprint; the most widely distributed non-salmonid species were torrent sculpin, speckled and longnose dace, Pacific lamprey ammocoetes (larvae), and other unidentifiable lamprey ammocoetes (Winkowski 2015)." Please clarify if the area being referred to for "widely distributed" is the dam inundation footprint or the entire Chehalis basin. For the sentence: "Reticulate sculpin, redside shiner, riffle sculpin, and prickly sculpin were also observed and were less widely distributed in the Chehalis Basin", clarify if the species were less widely distributed in a particular area or the entire basin

Section	Page	Paragraph	Review Comment
3.4	153	2	"Among the ~~headwater~~ reaches surveyed ~~that include~~ in the upper Chehalis River, North Fork Newaukum River, West Fork Satsop River, and East Fork Satsop River, ~~the only non-native predators observed were smallmouth bass. S~~smallmouth bass were only found in the lowest reach of the North Fork Newaukum River—a relatively low-gradient reach of river." The statement "Though the river was surveyed in the summer, it is likely that these species reside in the Chehalis Basin throughout the year." Implies that the species leave the Chehalis Basin. Since that is obviously not true, the sentence should be clarified to indicate if the statement is implying that th species reside in the Upper basin rear round and provide references. In 2013 riverscape surveys, smallmouth bass were also found in the Chehalis mainstem downstream of the South Fork Chehalis River confluence. Since this is not "headwater" habitat, the statement that "Among headwater reaches that include……the only non-native predators observed were smallmouth bass" it is incorrect and lead the reader to believe there are smallmouth bass in "headwater" reaches. It should be emphasized that the Hughes & Herlihy (2012) data, though they did record around half a dozen exotic species in an extensive electrofishing effort of the mainstem between the Satsop and the Newaukum Rivers, the numbers of exotics recorded were extremely few, and the native to exotic ratio abundancewise was extremely high. It should also be emphasized that exotic fishes were much more abundant in off-channel habitats than they were in the mainstem. Off-channel habitats, especially between the Newaukum and the Satsop Rivers harbored a total of 10 predatory exotic fishes, an assemblage that was dominated by centrarchid fishes, but particularly largemouth bass, bluegill, pumpkinseed, rock bass and white crappie.
3.4	155	1	Dethier 2006 is cited in last sentence, but the citation does not appear to be in the References section.
3.4	155	2	"Freshwater mussel species have a parasitic larval stage that ~~may~~ requires ~~a~~ specific fish species as a host; their distribution reflects movement and colonization of their host species (Jepsen 2009; Nedeau et al. 2009). Adult mussels live within the substrate~~,~~ or on the bottom of ~~,~~ river or stream habitats and tend to concentrate in areas with consistent flows and substrate conditions (Nedeau et al. 2009)…"
3.4	155	3	In the sentence "These species are uncommon, and little is known about their distribution..." please clarify if the species are not commonly present in the basin or difficult to find/survey and provide references.

Section	Page	Paragraph	Review Comment
3.4	156	4	Please add a dollar sign to "more than 90 million; rephrase the 3rd sentence to state "Grays Harbor represents 7.7% of the total acreage of shellfish culture in Washington, and provides 210 jobs and $5.9 million in labor income to the region."
3.4	158	1	Western red-backed salamanders and Ensatina are indeed terrestrial amphibians, but they are not particularly stream-associated. Reword as, "…and terrestrial amphibians found in riparian areas (such as the stream-associated Van Dyke's salamander) or more widespread across the landscape (such as western red-backed salamanders and Ensatina)" Please correct
3.4	160	1	Please add "native" before "painted turtle"
3.4	160	2, 2nd sentence	This sentence needs rewording because exotic red-eared sliders (turtles) have been found in off-channel habitats during 2015-2016 off-channel surveys, whereas painted turtles and western pond turtles may be present, but have not yet been found.
3.4	161	2	The 2nd sentence appears to be missing a word or two..."...forage on plants that grow."
3.4	162	3	The marine portion of Grays Harbor is a nesting area of the ESA listed Snowy Plover (at Damon Point) and a major staging area for numerous shorebirds, including the listed Red Knot. It is also a major wintering area for a variety of puddle ducks, including pintails, widgeon, green winged teal, and mallards that support significant recreational hunting.
3.4	162	1	Typo: "Non-waterflow waterbirds..."
3.4	162	2	Grays Harbor is an estuary, not marine habitat
3.4	162	3	The marine portion of Grays Harbor is a nesting area of the ESA listed Snowy Plover (at Damon Point) and a major staging area for numerous shorebirds, including the listed Red Knot. It is also a major wintering area for a variety of puddle ducks, including pintails, widgeon, green winged teal, and mallards that support significant recreational hunting.
3.4	163	3	EFH acronym- write what it means prior to use. It is not defined anywhere in section 3.4.
3.4	164	1	Table 3.4-6 The species listed in this table do not potentially occur in the basin, they are known to occur. Please correct

Section	Page	Paragraph	Review Comment
3.4	165	1	Include information from Kuehne & Olden (2016), especially the importance of groundwater springs as an environmental driver of Olympic mudminnow distribution within the Chehalis River. Kuehne, L.M. & Olden, J.D. 2016. Environmental drivers of occupancy and detection of Olympic Mudminnow. Transactions of the American Fisheries Society 145: 17-26. Need to add that Olympic mudminnow were recorded in about two-thirds of the off-channel habitats surveyed in the Chehalis floodplain and generally increased in occupancy and abundance with downstream position in the floodplain.
3.4	165	2	Adult bull trout were observed in the West Fork Humptulips river during snorkel surveys conducted in summer of 2016 (M. Zimmerman, WDFW, personal communication) "Bull trout have been documented in Grays Harbor and in the lower portions of the Chehalis River (Jeanes et al. 2003), but they do not appear to spawn in the Chehalis Basin (75 Federal Rule 63898)." Suggest this revision: "Bull trout have been documented in Grays Harbor and in the lower portions of the Chehalis River (Jeanes et al. 2003), and at the time of critical habitat designation they did not appear to spawn in Chehalis Basin areas (75 Federal Rule 63898). Recent observations of bull trout in upper areas of the Humptulips basin in summer months (John Winkowski, 2016, personal communication) possibly could indicate spawning use there. " Please verify statement with John directly
3.4	165	3	The author incorrectly attributes eulachon spawning data to Cloen 2016 Pacific Eulachon: NOAA documents do not appear to use the name 'Pacific Eulachon', instead just Eulachon. E.g., see http://www.westcoast.fisheries.noaa.gov/publications/status_reviews/other_species/eulachon/eulachon_2016_5-year_review.pdf Suggest changing 'Pacific eulachon' throughout this paragraph, and elsewhere in EIS, to eulachon.

Section	Page	Paragraph	Review Comment
3.4	168	2	"The historical range of the spotted frog includes portions of Western Washington; although, over the past 50 years, this species' range has been dramatically reduced. (add underlined word) To the sentence beginning, "The most significant factor contributing….." Should be added the clause, "though the introduction of exotic aquatic predators (bullfrogs and warmwater fishes) may be equally important (Hayes 1994). Reference: Hayes, M.P. 1994. The status of the spotted frog (Rana pretiosa) in western Oregon. ODFW Technical Report 94-2:1-11. + appendices The sentences, "According to WDFW, the species persists in only six Washington locations. Five of these locations are located within Klickitat County and Whatcom County." are very dated. These should be modified to, "According to WDFW, the species in only three general areas of the state: the upper Black River in Thurston County; the northern Puget Trough in Skagit and Whatcom Counties; and in Klickitat County. The species occurs in 30-odd localities, collectively, across those three areas." This is based on the draft recovery plan by Lisa Hallock, which is not yet in circulation. Also should add, "Though present in the upper Black River, Oregon spotted frogs have not yet been detected in the extensive off-channel surveys in the Chehalis floodplain, the habitat type in which they would be most likely to be found."
3.4	168	3	Please add information related to western pond turtle historical or current distribution within Chehalis basin, as well as whether any reintroductions are planned in basin Add, "Western pond turtles have not yet been found during the extensive off-channel surveys in the Chehalis floodplain, the habitat type in which they would be most likely to be found."
3.4	168	4	Please list the five gopher species with state-threatened status.

Section	Page	Paragraph	Review Comment
3.7	178		The climate change impact that has the potential to cause the greatest harm to salmonid populations in the Basin has been entirely left out of this section. That would be the anticipated warming of the ocean to the point that nearshore coastal waters will no longer support oil rich northern copepods, instead producing only southern species that salmonids cannot live on. Events like "The Blob" are expected to increase in duration and severity, exacerbating this situation. In addition, increasing ocean acidity has also been left out of the discussion, even though this has already contributed to the loss of pteropods, a critical salmonid food source, and prevented spawning of oysters, and potentially even of crab in the not-too-distant future, and crab spawn is also a major component of salmonid diets. Promoting freshwater restoration techniques theorized to recover salmon and protect them from impacts of climate change, while ignoring changes in the suitability of the ocean environment to support salmonids, leads to the real risk that enhancement, and even future mitigation measures necessary to compensate for the wholesale loss of salmonid subpopulations that would be caused by some of the alternatives, is not going to be enough to save salmonids in the Chehalis. Please correct
3.7	179	4	Awkward phrasing – "Climate change has been modeled for several categories (e.g., temperature, precipitation, and sea level) over 100 years (for the periods of 1970 to 1999 and 2070 to 2099)." Clarification would be helpful, perhaps something on the order of "Climate change has been modeled for 2040s, 2080s, and 2100, with projected changes in temperature, precipitation, and sea level compared to baseline conditions from 1970-1999."
3.7	179	3	Define "abnormally" for both wet and dry, and clarify what baseline period was used.
3.7	180	3	Using an average sea level rise (2 feet) is misleading. Please redo the text using the projected range of increase (i.e, from 2 to 50 inches)
3.7	180	4	"As noted previously, the Chehalis Basin is mostly rain-dominated, thus impacts from climate change are not expected to be as dramatic as in <u>some</u> other basins in the state." (<u>add underlined word</u>)

Section	Page	Paragraph	Review Comment
3.8	184	Table 3.8-1	Second bullet in the first line, box 4, there are no "splash dams" anymore. However, there are permanent dams on both the Skookumchuck and the Wynoochee. 4th line, 5th box, second bullet, there is no "Clearing, including logging, up to river's edge" allowed anymore, under the Forest/Fish agreement and FPA rules, and under the SMP and GMA, with the exception of lands already cleared and in agriculture. Line 4, 4th bullet in box 2, all small streams, and some large ones, have log jams, but none have "booms". These date to the era of splash damming over a century ago and are long gone. Line 8 (Newaukum), box 2, bullet 3, there is no dam on the North Fork Newaukum River, the "dam" is the one built on Gheer Creek, which is a small tributary at Onalaska. Also in the 5th box on this line it should be noted that the upper Newaukum is mostly in commercial forestry. 9th line in the table (Satsop). This river is not characterized by "…low water levels and relatively slow flows" at all, especially the West and Middle Forks, but even the mainstem is flowing at 2,760 cfs today, whereas the mainstem of the Chehalis at Porter is only putting out 2,032 cfs. Last line (Wynoochee), in the second box, "many crossings present" is a bit off base. This river, which is the second largest tributary of the Chehalis behind the Satsop, is crossed by one railroad, one state highway, 3 county roads, and one logging mainline below the fish barrier dam. Hardly "…many…".
3.10	195	3	Current forest practice rules require all existing fish passage barriers on commercial forest roads to be upgraded to pass juvenile and adult fish by 2017, and all new water crossings to meet WDFW fish passage guidelines. They also require mandatory buffers on type F waters and stream initiation points. It is important to point this out in the EIS as the majority of the basin, including most areas in which fish spawn and find cold water refugia as juveniles in the summer, is in commercial forestry.
3.10	196	Table 3.10.1	Table 3.10.1 overlooks the acreage of aquatic lands in the basin. Please correct
3.11	202	Map	There are locations and features that seem to be missing from the map. Lake Sylvia State Park in Montesano, Twin Harbors State Park near Grayland, WDFW Chehalis Wildlife Area, WDFW Olympic Wildlife Area, WDFW Wynoochee Mitigation areas....
3.11	204	Below table	Please clarify whether any of the alternatives' will reduce boat access

Section	Page	Paragraph	Review Comment
3.11	209		Please include discussion of waterfowl as a recreational hunting opportunity. This is particularly true for the lower Chehalis.
3.14	223	Table 3.14-1	The table incorrectly identifies Montesano's Fire Protection District #1 is within the floodplain. It is on Pioneer Avenue, well above the floodplain. It is also incorrect to include the City of Ocean Shores Fire Department – damage to this facility would be associated with coastal ocean flooding (tsunamis, sea level rise) not riverine
3.14	224	1	It is incorrect to include the City of Westport Police Department in this document. Flood impacts on the facility are coastal (tsunamis, sea level rise) not riverine
3.14	226	1	Consider adding Summit Pacific Medical Center to this paragraph. It is a full service hospital with emergency and urgent care facilities as well as a wellness center, is located in Elma, and may be in the 100 year floodplain.
4.1	237	1	Recognizing that nor all readers will read every chapter, we suggest adding a **brief** (parenthetical) definition of "actions" As it is unlikely that **all** potential impacts are analyzed here, a qualifier such as "many" or "most" should be added to the first sentence.
4.1	238	1	2nd sentence ("The discussion of impact and mitigation…" is unclear. Please rewrite 5th sentence should be changed to read: ~~Ecology expects that a~~A more detailed evaluation of project impacts would be required during project-level environmental review.

Section	Page	Paragraph	Review Comment
4.1	239	Table 4.1-1	Include adaptive management under Avoidance and Minimization column. For example, "Design and adaptively manage bypass channel with hydraulic conditions…" Increased dust and particulates could also have short-term impacts on fish and wildlife. 3rd column: When it comes to diversions, it should be clear that any diversion located within fish bearing waters shall be equipped with proper screening to avoid damage to fish. Page 240: Explain the phrase "Implement seasonal restrictions for protection of wildlife using upland habitats." Page 242 - 2nd line, last box: Advanced planting and monitoring would be necessary to mitigate this kind of impact, as vegetation takes a relatively long time to grow and become established, and temporal impacts occur in the mean-time that would require pre-project planting at alternate sites. - 3rd column: When pile driving, or impact hammers are to be used for any project, a noise attenuation plan should be in place for the protection of fish life. Along with blasting the use of impact hammers should also be staged so as not to impact sensitive wildlife. - The notes explaining abbreviations should be moved to the first page and repeated on each subsequent page.
4.1	243	1	Please simplify the sentence structure for the 1st sentence. For example: "Long-term impacts are defined as impacts that are projected to occur within a 100-year timeframe."
4.1	243	3 (inset box)	The sentence "Average percent change in modeled flow …" is not detailed enough to understand exactly what was averaged since you have 12 GCMs and three different scenarios - refer reader to place they can find data. When you use the word average, the reader has to know how that statistic is derived

Section	Page	Paragraph	Review Comment
4.1	244	2	The list of significant impacts incorrectly excludes lack of downstream passage for lamprey and localized extirpation; extirpation of localized western toad populations; changes in temperature and flow related life cycle cues for amphibians; miles of salmonid spawning habitat lost, and known spawners; potential loss of an entire year class of spring chinook (FRO) 2nd bullet: Include the estimated distances inundated for each dam alternative. For example: Conversion of XX Rm of the upper Chehalis River from a free-flowing river to a permanent reservoir impoundment (FRFA facility), and XX Rm of the upper Chehalis River from a free-flowing river to a non-permanent reservoir 6th bullet: Change to "Geomorphic impacts on the Chehalis River and its floodplain downstream of the dam due to changes in sediment and wood transport processes, as well as truncation of the river's natural flow regime " 7th bullet: Indicate where the wetlands are located (e.g., upstream or downstream) of the proposed dam. 8th bullet If the FRFA alternative not only reduces, but blocks juvenile Pacific lamprey passage state it. Add: "Permanent loss of warmer water habitat during the low-flow oviposition and rearing for state candidate western toad (FRFA facility only)."

Section	Page	Paragraph	Review Comment
4.1	244	3	The use of the subjective term "substantial" in the 1st sentence allows the reader to infer the actual quantity. Delete the word and provide actual values. The authors incorrectly speculate that "…temperature reduction…downstream of the dam…would result in beneficial effects to…fish…" . This benefit has consistently been contested by WDFW staff and every spring chinook run downstream of a high-head dam in the Pacific Northwest is either ESA listed or has been extirpated. Since the benefit is entirely speculative, the sentence should be rewritten to indicate that the benefit **is** speculative and that existing dams have not benefited migratory salmonids. For the Restorative Flood Protection alternative, the author gives a range of flood reduction. To avoid bias, provide a range here for both dam alternatives. "Along the Chehalis River in the Chehalis-Centralia area, the flood level could be reduced by XX feet ~~up~~ to 1.8 feet during a 100-year flood (WSE 2014d)." The phrase "...reduced flood elevations have corresponding beneficial effects..." overstates our certainty about what will happen.
4.1	244	Last	In stark contrast to the previous paragraph , the paragraphs on restorative flood protection emphasize the impacts while minimizing the benefits. The disparity includes "visual quality" impacts which are not mentioned for a da. In addition, although the benefit of self-sustainability is mentioned for RFP, the relatively high to extremely high annual operating costs for the FRO/FRFA options are not mentioned at all. These need to be called out up front, probably in the bulleted table on page 244, so that people can really get an idea what they are evaluating.
4.1	245	1	1st sentence - rephrase as : "Based on screening-level analysis, these impacts could cause new or increased flooding to an area, up to 21,000 acres, which includes approximately 12,100 acres of active farmland." The sentence "significant adverse impacts on the visual…" is a value judgement and is not addressed in the dam alternatives in a similar manner. Also there is not a time element to this - this structures in the floodplain are temporary until trees are established. Please address.

Section	Page	Paragraph	Review Comment
4.1	245	3	Include a more precise number of potential acres lost or state as "up to" so the reader has a better understanding of area lost. For example: "Adverse impacts are primarily minor in nature, except for the potential loss of up to 5 acres of wetlands as a result…" 4th sentence - rephrase as, specifying what damages would be reduced: " "These action elements would reduce damages to the airport and (what specifically) during a 100-year flood, resulting in beneficial effects with regard to water resources, transportation, public services and utilities, and environmental health and safety."
4.1	246	2	Are Aquatic Species Habitat Actions those taken under the ASRP? Please be explicit about who or what will be taking those actions. Climate change impacts on ocean condition may have a significant impact on the numbers of returning salmon. To ensure that restoration and mitigation benefits are not overestimated, a project specific EIS should include and analysis of ocean conditions on populations Clearly state where the abundance changes came from. For example: The Ecosystem Diagnosis and Treatment (EDT) model predicts.... Define habitat potential Please address the uncertainty associated with both the high and low scenarios.
4.2	247	1	Reorder the 1st two paragraphs such that paragraph 2 is first.
4.2	247	2	It appears "this section" actually includes a summary of both short-term and long-term adverse impacts as well as long-term benefits. If so, adjust accordingly. "This section provides a summary of the primary short-term and long-term adverse impacts and long-term benefits resulting from…" OR, if the author means to focus on the long-term impacts, more clearly state that. "This section focuses primarily ~~provides a summary of the~~on the primary long-term adverse impacts and benefits resulting from…"

Section	Page	Paragraph	Review Comment
4.2	248	2	This emptying time assumes that you not have events with a 15% probability of occurring in a given year not occurring sequentially close to one another in time within the same year. Though the probability of that is fairly low, a modest climate change scenario could uptick it significantly. Same assumption applies to the FRFA alternative, i.e., two major floods within close temporal proximity to each other within the same year.
4.2	248	5	The paragraph implies a benefit to fish from releases of cool water. We will not address this in every location it occurs in the draft PEIS, but implore Ecology to closely review the Final PEIS ***text*** to ensure this potential fish response is described as a plausible response and that the lack of a response is equally plausible. This is how the Appendix covers the issue and is also included as a footnote in a table in this section. But there are locations where the text of the PEIS portrays the benefit without uncertainty. We are not concerned if the text describes habitat benefits from cold water and flows, but we are concerned when that an assumption is made that the habitat benefit will translate to a fish benefit in this particular situation, without acknowledging the possibility of a fish benefit not occuring. As noted, this is consistent with the Appendix in the PEIS and we only seek to ensure that consistency in the document. Additionally, not all native aquatic species would benefit. For example, western toads, which breed instream during the tail of the declining or basal hydrograph would lose breeding and rearing habitat below the dam, of which there is already a limited amount for this species. Moreover, even if they did manage to breed, the elevated flow has a greater chance of sweeping their unattached eggs downstream into unfavorable habitat or the depressed water temperature protract developmental times, increasing the amount of time larvae are exposed to predators.

Section	Page	Paragraph	Review Comment
4.2	251	1	2nd bullet: Bank erosion is not reduced by "…reducing peak flows.", it is exacerbated, because rivers are at their most erosive when they are at bankfull width. Prolonging the period the river is at bankfull for controlled release of floodwaters will worsen bank erosion and channel incision. A perfect example of this is occurring on the Wynoochee River, where bank erosion has increased dramatically over the years since the dam was built. The other contributor is increased channel incision from sediment starvation below dams. This creates "hungry water" (see Kondolf 1997, its available on the net) which is dramatically more effective at eroding river banks as a result. 3rd bullet: Remove "potential". There would be a reduction in inundation (shown by inundation modeling) and a reduction in peak flows so that less of the floodplain is inundated. • ~~Potential~~ ~~r~~Reduction in the downstream floodplain area that could settle sediment out
4.2	251	2	For the FRO, the effect of tree removal on temperature would be present year-round, despite inundation. The fact that the reservoir would be operational from October to March seems irrelevant with respect to river temperature. If there is another point to this sentence, the author should make it more clear. If not, it should be removed. "Flood retention is anticipated to only occur in the FRO reservoir during October to March~~ when air and water temperatures are cooler~~."
4.2	252	Inset box	Be specific with the WAC being referenced (i.e., WAC 173-201A-200). Remove quotations or use direct quote. "For lakes, human actions considered cumulatively may not increase the 7-DADMax temperature more than 0.3°C (0.54°F) above natural conditions."

Section	Page	Paragraph	Review Comment
4.2	252	2	Temperatures are predicted to reach up to 25 degrees C in the reservoir. However the statement "…which is comparable to current conditions that exist in the summer in the Chehalis River without the reservoir…" is highly misleading. Temperatures at the reservoir site do not even approach this level, which can be fatal to salmonids. In fact, "The upper Chehalis River had the highest fish counts per mile surveyed" (Wynkowski 2015 and in the EIS), which would indicate that harmful temperatures never occur where the dam and reservoir are proposed to be built. What is being referred to is the temperature of the river in the Twin Cities reach just above the Skookumchuck, where salmonids are absent except during the cold months. The way this is depicted in this paragraph misleadingly minimizes the impact of the FRFA on water temperature above the dam site, and this statement needs to be qualified with the real locations of the "current conditions". Include the actual range of temperatures that are present and be specific about the location. Make sure the author is referencing the Upper Chehalis' temperature. "Surface layer temperatures could reach approximately 20 to 25˚C depending on meteorological conditions (see Figure 4.2-2), which is comparable to current conditions that exist in the summer in the Upper Chehalis River without the reservoir which ranges from XX to XX ˚C ~~(see Figure 4.2-2)~~."
4.2	255	1	While the paragraph provides modeled conditions, it gives no indication of the potential effects on salmonids. Please modify to include the following: high temperature near the surface and low DO near the bottom of the reservoir will prevent its use for rearing juvenile salmonids; the conditions portrayed are only suitable non-native warm water species which prey upon juvenile salmon; no salmonid native to the Chehalis basin rears at depth near the thermocline where conditions would be favorable; Coho live in shallow water, where it would be too hot; and Steelhead and trout require fast moving water high in DO, which would be severely reduced in extent by the FRFA. 1st sentence - Change to: Model results show that upper portions of the conservation pool do not meet the core summer salmonid habitat criterion of 16°C (Figure 4.2-2), and that portions of the lower waters do not meet the DO criterion of 9.5 mg/L (Figure 4.2-3) in late summer.

Section	Page	Paragraph	Review Comment
4.2	255	1	2nd sentence – Define the term "period" (e.g., portions of the summer period) and rework the sentence as follows: "Model simulations showed that over certain depths in the reservoir (from an elevation of approximately 560 to 580 feet), both the temperature and DO criteria are met simultaneously over portions of the summer period. However, during XX to XX one or both of temperature or DO criterions are not met throughout the water column."
4.2	255	2	Last Sentence – Rewrite as follows: "The FRFA reservoir would permanently inundate existing spawning areas, and eliminate habitat features necessary for spawning and emergence of salmonids and is therefore in conflict with its designated and existing use."
4.2	256	2	This paragraph reads as if the author is trying to use model results from the FRFA alternative to make inferences about the FRO alternative. If so, be clearer. Alternatively, the author could remove the reference to the FRFA reservoir modeling results here. Suggest rewriting as follows: "The potential also exists for reduced DO concentrations in floodwater discharged from the FRO reservoir as a result of any water temperature warming, decay of organic material, and periodic sediment inputs at and upstream of the dam. For reference, the FRFA reservoir would store nearly twice the volume proposed for the FRO reservoir and based on water quality modeling for the FRFA reservoir), adverse impacts on DO were predicted near the bottom of the reservoir over the wet season (October through March) (Figure 4.2-3). However, the impacts predicted for the FRFA facility are the result of warmer conditions over the summer when productivity in the reservoir resulted in a higher oxygen demand at the bottom of the reservoir in the fall. Whereas, for the FRO facility, the impact is likely to be minor because flood retention operations would occur in cool months and the retention time is short…"
4.2	256	3	1st sentence – Rewrite as follows: "For the FRFA facility, temperature modeling of the controlled releases of waters from different parts of the FRFA reservoir (flow augmentation) showed that downstream water temperatures in the Chehalis River can be ~~improved~~ reduced during late spring through early fall." 3rd sentence – Rewrite as follows: "In particular, in the upper sections of the reaches designated as core summer salmonid habitat immediately downstream of the FRFA, ~~improvements~~ decreases of up to 10°C were predicted, which would bring these reaches into compliance with the 16°C criterion for salmonids during the summer ~~immediately downstream of the dam~~."

Section	Page	Paragraph	Review Comment
4.2	256	4	1st sentence - Assuming the author is saying DO would be lower than the criteria for salmonids, it should be included here. Suggest rewriting the end of the sentence as follows: "…that are lower in DO than current criteria mandates for salmonids …"
4.2	257	2	Juvenile salmonids are not going to be able to live in a reservoir with up to 25° C temperatures. 4th sentence - Mountain whitefish and rainbow trout are in fact salmonids and salmonids or non-salmonids could spend longer than 1 year in the reservoir. "Juvenile and adult native freshwater fish (salmonids and non-salmonids) ~~Non-salmonid species (e.g., mountain whitefish, rainbow trout, Northern pikeminnow)~~ have the potential to spend extended periods of time in the reservoir~~, reservoir, and salmonids have the potential to spend up to 1 year in the reservoir~~…" Last sentence - Explain "short reservoir residence times". Is it the amount of time the Hg would be in the reservoir or the amount of time the water is in the reservoir? As the author is stating this as the reason Hg would be only a minor impact, it should be very clear.
4.2	259	1	The statement regarding the extent of linear benefit seems to be an overreach when compared to the graph.

Section	Page	Paragraph	Review Comment
4.2	259	1	Avoid using the terms high and low in this paragraph. Instead, compare the modeled temperatures to baseline conditions and let the data speak for itself. For consistency, use "could potentially" when describing both model predicted increases and decreases in temperature. If the author chooses to use "would" when describing temperature decreases, but "could potentially" when addressing temperature increases, there is bias presented to the reader. For example: "Currently, the mainstem Chehalis River experiences ~~high~~ summer and early fall water temperatures that routinely exceed applicable criteria (WAC 173-201A; Ecology 2012). In terms of temperature, the FRFA facility operations would improve water quality in the Chehalis River downstream of the dam to approximately the confluence of the Skookumchuck River (RM 65) during the late summer and early fall due to cool-water flow augmentation from the reservoir pool (see Figure 4.2-4). From the late spring to early fall (mid-May to October), ~~natural flows in the upper~~ Chehalis River are low; median flows are currently from 20 to 160 cfs in the upper Chehalis River. The minimum discharge at the dam would range from 80 to 160 cfs during this timeframe. This flow augmentation would increase flows and reduce temperatures at and downstream of the proposed dam. The model predicted temperature ~~improvements~~ decreases ~~w~~could potentially be in the range of 10°C immediately downstream of the dam, with the proposed flow range (80 to 160 cfs) during the summer and attenuate to baseline conditions by RM 65." Why are the fall temperature changes not shown in a figure? If they are somewhere, please direct the reader. Is there a figure showing the annual changes in temperature from the FRFA alternative? 6th sentence - These sentences seem to contradict each other. First the author states the temperatures discharged from the reservoir could be warmer, and then the author states they could be cooler than existing temperatures. Assuming the same baseline temperature is used for comparison, how can this be the case? Clarification or a correction is needed. Suggest: "In the fall, ~~warmer~~ water in the range of 1 to 2°C higher than baseline condition could potentially be discharged as a result of warming in the upstream reservoir. This flow c~~w~~ould be cooler in temperature than existing flows in the mainstem Chehalis River during the late summer through early fall (see water quality benefits described for temperature and DO (REFERENCE SECTION)). "

Section	Page	Paragraph	Review Comment
4.2	259	1	Although cooler water would hold more DO, we know from previous sections that DO would not be improved without additional aeration at the dam because of algal growth in the reservoir. Qualify the DO statement with reference to the required aeration or only speak about temperature. "This increase in cool-water flow from what month to what month could improve habitat conditions in the mainstem Chehalis River (downstream of the dam) for cool-water dependent aquatic species that use this area by lowering water temperatures ~~and improving DO conditions~~ (see Section 4.2.4 for effects to fish and wildlife)." Add, "but disfavor habitat conditions for at least one warmer water dependent species, the western toad.
4.2	259	2	Surface water quality is also going to be adversely affected by extended releases of silty water for "…up to 32 days". Moreover, all this silt will be confined within the bankfull width of the river instead of the normal situation where silt flows overbank and settles out in the floodplain, cleaning the river. This increase silt could contaminate mainstem spawning beds further downstream, and ultimately will wind up in the estuary, which will increase already expensive dredging of harbor berthing areas and the Grays Harbor Navigation Improvement Project. These impacts need to be estimated and the costs considered in this alternative.
4.2	260	2	If proposed operations of the FRFA facility limit reservoir drawdown sufficiently, it may create breeding and rearing habitat for western toad in the margin of the reservoir pool. Some uncertainty exists in this possibility because if fluctuations in stage exceed about 6 inches, either western toad breeding would be prevented or if breeding occurred, stranding of eggs deposited in shallow water would be likely.
4.2	261	2	2nd sentence – suggest rewriting to: "In those tributaries, such as the South Fork Chehalis River, Newaukum and Skookumchuck rivers, flood levels would be reduced in the downstream-most areas indirectly as a result of a Flood Retention Facility reducing flood flows in the Chehalis River."
4.2	262	2	5th sentence – Please improve the clarity of this sentence. Suggest: "The potential reduction in recharge could be partially offset by emptying the reservoir causing higher stages in the river potentially lasting for a longer duration than currently exist~~ing as the reservoir empties~~, but this has not been quantified to support this programmatic-level analysis."

Section	Page	Paragraph	Review Comment
4.2	263	3	The listed avoidance and minimization measures do not address the extended release of silt suspended in the reservoir during flood retention or the exceedances to water quality standards. This should be addressed in the project EIS 2nd bullet – The down-ramping rate in this bullet is 2 to 5 times WDFWs established rate of 2"/hour. As a result, it is likely that juvenile salmonids will be stranded or if newly emerged, will be unable to keep up with waters that fall that rapidly. The presence of dense thicket type vegetation that would not normally grow in the range of a natural river and floodplain will exacerbate the situation, leaving pockets that will trap fish. This must be addressed in a project specific EIS.
4.2	264	6	For consistency, state similar findings as were listed in the long-term impacts section (4.2.1.2.3). "The long-term impacts have not been quantified to support this programmatic-level analysis~~No long-term adverse impacts on groundwater quantity or quality are anticipated~~, so no mitigation is proposed."
4.2	265	2	Typo – geomorphologist not geomormorphologists
4.2	269	2	Sediment starvation causes channel incision, not "…an increase in bed elevation…". The most significant impact will be caused by Kondolf's "hungry water", which basically tries to maintain channel equilibrium by taking sediment from banklines, increasing erosion.
4.2	270	Figure 4.2-6	The text in this figure needs updating based on the geomorphology impacts in section 4.2.2.2.2. It is clear there would certainly (not possibly) be less deposition of substrate and LWM in the reach from RM 107.5 to RM 93.5. "For the FRFA facility, all bedload and 86% to 93% of the suspended load would be retained…" Also, "Large wood would also be trapped in either reservoir during flood operations. During non-flood operations, the FRFA facility would trap all large wood while the FRO facility would allow wood up to 15 feet in length and 3 feet in diameter to be transported through the dam with the flow." Reach 2 (RM 107.5 to RM 93.5) FRFA: ~~Possible~~ Ssubstrate erosion/coarsening and narrowing of channel with ~~potentially~~ less LWM FRO: In confined sections, minor changes to substrate and channel with potentially less LWM In unconfined sections, continued aggradation and substrate fining, and minor changes to the channel with potentially less LWM

Section	Page	Paragraph	Review Comment
4.2	272	Third bullet	To, "…determine whether gravel augmentation is necessary to preserve existing gravel bars used for spawning" add "or whether substrate armoring that reduces habitat quality is occurring." And modify the subbullets as appropriate.
4.2	273	2	2nd sentence – delete the word scattered. In addition, speaking to the relative size or locations of these wetlands would be helpful, as would a figure showing their location.
4.2	274	2	Suggest redoing as follows: "Downstream of the Flood Retention Facility, some wetlands in the Chehalis River floodplain ~~could~~ would be affected by reduced water inputs from overbank flooding events. Since the FRO and FRFA facilities are designed to reduce flooding from a major flood, ~~many~~ XX percentage of floodplain wetlands would continue to receive floodwater inputs from smaller floods. Wetlands in the outer edges of the Chehalis River floodplain could experience a reduction in the frequency of floodwater inputs; however, as flooding there is already infrequent, these potential changes are unlikely to result in any major changes to the hydrology of these wetlands. Modeled results for the decreased area of floodplain inundation and its potential effect on wetlands have been developed for the combined Flood Retention Facility and Airport Levee Improvements (Alternative 1) and are described in more detail in Chapter 5."
4.2	276		"The reduction in flood extents downstream of the dam would also reduce the episodic ~~disturbance~~ recharging of downstream riparian areas and wetlands by major or larger floods."
4.2	276	5	Actually, "…major channel avulsions and large-scale channel migrations…" will become more likely, as high flows are confined within bankfull width rather than be able to flow overbank and lose energy. Sediment starvation and resulting "hungry water" will also inevitably increase erosion. These impacts are seen on the Wynoochee River today.
4.2	276	3	Quantify what the "the outer edges of the Chehalis River floodplain" represents.

Section	Page	Paragraph	Review Comment
4.2	276	4	Floodplain reconnection is a restorative action and a proposed mitigation. Furthermore, "natural seasonal variation in flow conditions can prevent the successful establishment of non-native species with flow-dependent spawning and egg incubation requirements…" (Poff et al 1997). Essentially, reductions in natural seasonal variation have been shown to correlate with the establishment of non-native fish species (the opposite of what the author is stating here). Edit or remove this sentence. Furthermore, the author stated previously that periodic disturbances were going to continue under dam alternatives and only "major floods" were going to be reduced. Suggest reworking paragraph to read: "The reduction in flood extents downstream of the dam would also reduce the episodic disturbance of downstream riparian areas and wetlands by major or larger floods. This could result in a reduction in the natural processes of the river and occurrence of major channel avulsions and large-scale channel migrations~~, allowing the adjacent riparian forest to become more mature as the occurrence of periodic disturbance decreases~~. In addition to these changes, a reduction in the downstream flooding extents could also negatively impact native fish species and Meador & Carlisle (2012) found altered streamflow has been shown to reduce native fish assemblages throughout the eastern USA on average by 35%, while native species with habitat preferences for riffles decreased over 50%. ~~limit the establishment of invasive species that are spread by flood flows, as certain areas of the floodplain would receive floodwaters less frequently."~~ Meador, M. R. and D. M. Carlisle (2012). "Relations between altered streamflow variability and fish assemblages in eastern USA streams." River Research and Applications 28(9): 1359-1368.
4.2	277	3	Last sentence – suggest rephrasing as: "Corrective measures such as replanting with native, flood-tolerant species could be implemented in ~~problem~~ areas that would allow."
4.2	278	1	The paragraph incorrectly omits "delays or blockages" to juvenile salmonids moving up and down the project site

Section	Page	Paragraph	Review Comment
4.2	278	3	It is highly unlikely that even adult salmon would be able to navigate a construction diversion of the river and it will be impossible for juveniles. A 3 year hiatus in spawning will extirpate species on a 3 year cycle like coho. Juvenile steelhead have also been shown to require access to headwater rearing areas in the summer after having been blown out of them in the winter. Denying access to these fish for 3 years, most of which have been found to be in poor condition due to hot water and lack of suitable habitat downstream of the dam site, could also cause their extirpation. These are impacts that will require additional focus during a project EIS. First bullet talks about fine sediment causing temporary disruption to spawning and rearing but omits the potential of suffocation on developing eggs and embryos. This is both a short-term and long-term impact and should be addressed in this document.
4.2	278	4	1st bullet: Typo - "Coarse", not "Course".
4.2	279	2	2nd sentence – Delete the phrase "...are reported to...".
4.2	279	3	The likely in-water work window for this project is likely to be 1.5 months in length (July 16 through August 31) due to the timing of spring chinook spawning (begins in September) and late steelhead fry not emerging from the gravel until July 15. This needs to be taken into account when estimating timelines for construction and estimating construction costs.
4.2	279	4	Add, "western toad" the species breeding in instream areas. Do not remove western toad from species breeding in Stillwater areas as western toads do both.
4.2	280	1st bullet	Update reference here and in Chapter 7 to Winkowski et al. 2016
4.2	281	2	2nd set of bullets – The list incorrectly omits discussion of impacts downstream of the dam . Please add discussion of those, including loss of spawning substrate (FRFA) and increases in turbidity and fine sediment associated with exposed reservoir shorelines.
4.2	281	3	Bulleted list – The list omits loss , loss of redds in the FRO reservoir, stranding during rapid downramping, and inability of juvenile lamprey to out-migrate (FRFA).

Section	Page	Paragraph	Review Comment
4.2	282	2	The benefits to fish from the design of the dams described here are assumed, not proven, and should be portrayed as such It is not immediately apparent to the reader why the design and flood control operations are unique to the FRO and FRFA dams. The author should, at least, include examples of what makes these dams unique. We cannot pretend to be ignorant of what science has shown about dams impacts to fish in the Pacific Northwest, but rather, compare and contrast what is modeled for these FRO and FRFA dams and what has been shown in the past. 5th sentence – suggest rewriting as: "It is important to evaluate the impacts of the proposed dams in context with historical impacts of existing dams throughout the Pacific Northwest; however, because of the unique design of the FRO and FRFA dams (e.g., …) and flood control operations (e.g., …) being proposed, ~~it is equally important to~~we will continue to evaluate the impacts of each dam type on fish ~~independent from the known effects of other dams~~."
4.2	283	2	Rewrite the 1st sentence to include the frequency of expected inundation. For example: "…either temporarily in the case of the FRO facility (up to 32 days approximately once every 7 years on average)…" The statement that major floods can negatively affect redd survival and affect populations for several generations needs to be backed up by data or else the assertion is speculation and should be noted as such. This could easily be done using returns after the 1996 and 2009 floods.
4.2	284	2	Please clarify what reduction in water quality will force juveniles to "…seek thermal refuge in deeper water…"
4.2	285		The PEIS characterizes the potential impacts in a satisfactory way at this level of analysis. When compared to the fish passage impacts of the FRO facility, the significant adverse impacts from fish passage at the FRFA facility are a concern to WDFW. Please add additional text on the estimated performance of juvenile up- and downstream passage, data from existing collectors that highlight the likelihood of making those targets, and why lamprey will be unable to move downstream
4.2	285	1	Please include discussion of WDFWs fish passage requirements (WAC 220-660-190) and how those could be met.

Section	Page	Paragraph	Review Comment
4.2	286	Table 4.2-5	Please modify the title of this table to indicate that the values are modeled and provide confidence intervals for the modeled estimates. Given technical analysis exists for this project that develops passage estimates based in part on existing facilities, please for the Final EIS discuss estimates within the lens of passage rates and adaptive challenges at similar facilities in WA, as well as noting where a passage option is unique or has limited evidence for certain life stages or species
4.2	286	General	The text at the top of the page incorrectly states that the poor passage rate for juvenile lamprey "could" result in lamprey being elimination from the upper watershed. The correct choice of words is "will result in local extirpation". While a qualitative description of potential cumulative impact related to periodic inundation is appropriate for a programmatic level EIS, a project specific EIS will require a rigorous quantitative analysis and inclusion of protracted impacts associated with sequential year flood events.
4.2	296	2	7th sentence – Suggest reworking as: "Pacific lamprey are distributed throughout the Chehalis Basin (Jolley et al 2016) and genetic analysis of sculpin in the Chehalis Basin confirms that~~,~~ riffle sculpin~~,~~ and reticulate sculpin are present ~~likely widespread across~~ in the Chehalis Basin, though their distribution requires further investigation ~~has not been extensively studied~~." 8th sentence – Suggest reworking as: "Olympic mudminnow occur in slow-moving, off-channel habitat in floodplain areas in the middle and lower Chehalis River floodplain ~~many~~ XX river miles downstream of the potential dam and downstream of the area affected by flow and temperature modulation by the FRFA facility (Hayes et al. 2016a)." Comments on sculpin need to be updated, see Marie Winkowski about details.
4.2	298	1	Add, "American bullfrog in particular are rapid colonizers of disturbed stillwater habitat, so the FRFA reservoir area provides a particularly good colonization opportunity."

Section	Page	Paragraph	Review Comment
4.2	302	3	Amphibians use lowering water levels and warming temperatures as a cue for metamorphosis. Please provide examples of amphibian species that might benefit from more consistent water levels The change in area with flow is not the importance thing affected western toad breeding habitat, it is flow velocity and water temperature that if the former is elevated (and it does not have to be elevated much) and the latter is too low, either breeding will be prevented or if breeding is not prevented, the likelihood of washing unattached eggs downstream into unfavorable habitat is higher or suboptimal temperatures can protract develop, reducing the likelihood of survival. Modeling of the area to evaluate this issue is not useful.
4.2	303	1	A year-round instream work window, as proposed, has the potential to extirpate the entire run of upper Mainstem coho, and potentially even steelhead, before the dam is even built. A 3 year delay or prevention of either upstream or downstream migration will eliminate both species because they have a 3 year life history. The PEIS must assume the potential of not having a year-round work window, which would of course not be addressed until project permitting.
4.2	306	2	Lamprey have been incorrectly omitted from the list of tribal resources that will be impacted.
4.2	309	1	Recent work from the University of Washington indicates that CO_2 released from dam reservoirs could be a significant source of GHG. As a result, emissions from the flood retention facilities proposed here will need to be analyzed and possibly mitigated for. This should occur during the project EIS, but at least mentioned in the Final PEIS. http://conservationmagazine.org/2016/10/dam-greenhouse-gas-emissions-really-add/
4.2	311		In Section 4.2.4.2.1, the PEIS states, "For salmon, the operation of the FRO facility could impair a single group of spawners, and reduce the productivity of their offspring 2 to 4 years later. In this way, the impact of a single flood could become protracted and cause fewer adult salmon and steelhead to return to the upper Chehalis Basin in future years." As flood events are expected to become more frequent with climate change, the final PEIS should be updated to indicate that analysis of future climate scenarios would result in the achievement of flood stage trigger for water retention more frequently, and that this change in future inundation scenarios could further impair the cumulative impact of the FRO facility on salmon.
4.2	311	2	This seems in contrast to Table 4.2-13. List the salmonid populations that show little or no change in populations with climate change. "Modeling results indicate that little or no change in populations of other salmonid populations (e.g., …) are predicted with climate change and construction of a Flood Retention Facility."

Section	Page	Paragraph	Review Comment
4.2	316	Figures 4.2-13, 14, and 15	These artist renderings of the FRO and FRA facilities are misleading in representing visual impacts. An additional image should be done showing the lack of vegetation when the FRO is not in operation and a more accurate portrayal of the "shrub zone" above the permanent reservoir should be added.
4.2	326	3	Long term there is a considerable electrical demand proposed for one of the downstream migrant fish passage facilities that is proposed in another section of the EIS. This should be noted here.
4.2	327	3	Rearrange these sentences. "These potential impacts are considered beneficial because they would improve public health and safety. The Flood Retention Facility would not substantially reduce contamination of drinking water wells because most areas would continue to be inundated during a 100-year flood. Reducing the level of inundation would not prevent groundwater contamination. ~~These potential impacts are considered beneficial because they would improve public health and safety.~~ Overall, the Flood Retention facility would reduce threats to public health and safety."
4.3	334	2	The construction window in locations that contain both early spawning spring chinook and late spawning steelhead would be limited to July 15 through August 31. However, it is unlikely that there are any areas where these two species overlap that would be suitable for RFP treatment, so a 3 to 4 month work window, depending upon flow and onset of migration, may be feasible. As a result, construction impacts would be dramatically minimized compared to the year-round window proposed for constriction of the dams.
4.3	338	3 and 4	There are two additional benefits that should be mentioned in this paragraph. First, sequestering of sediment in the RFP area may result in less sediment delivered to Grays Harbor, which would reduce the amount of sediment that needs to be dredged annually for navigation at a very high expense. Second, wood and debris trapped in the system by jams will not end up on farmed floodplains downstream, even if they still flood occasionally.

Section	Page	Paragraph	Review Comment
4.3	340	2	Here it is assumed that land sufficient to encompass all uses displaced from the floodplain would need to be replaced in the same location and in the same drainage. While this may be the case for many SFRs or hobby farms that need to be relocated, and even for some agriculture where high value crops (such as berries, grapes, fruit, or even marijuana) could be more successfully grown on uplands that did not flood, by far the most productive farmlands are subirrigated bottomlands, which is why the farms were put there in the first place. Expecting that this high-value farmland will be replaced by conversion of forest land may not prove to be a valid proposal – forest soils are not farm soils, nor are forest slopes farmable slopes. There may be an additional approach to mitigating this impact on agriculture worthy of some consideration. Numerous acres of high value bottomland in the general proximity of the impact area but not necessarily on-site are not in danger of flooding, but are instead in danger of conversion to a different use. Purchase of a agricultural conservation easement that keeps these valuable agricultural lands in production forever could be used to mitigate the conversion of floodplain farmlands in the Chehalis Basin to RFP facilities, potentially even at a much lower cost. Purchase of agricultural easements should be considered as a prominent mitigation measure in the EIS.
4.3	342	2	Once again, mitigation should also include agricultural easements on land at risk of conversion as proposed above. This mitigation approach may not fully address the societal impacts of the proposal, admittedly, but warrants consideration at this Programmatic level.
4.3	344	2	To the sentence "The conditions created through the Restorative Flood Protection treatments are less favorable to non-native fish species." should be added "and correspondingly more favorable for native fish species".
4.3	346	1	Again, another place to include mitigation of "…conversion of up to 16,000 acres of upland managed forestland to agriculture…" by purchase of at-risk agricultural land conservation easements instead of trying to create these lands on forest soils and slopes in which agriculture may not be suitable. This mitigation approach may not fully address the societal impacts of the proposal, admittedly, but warrants consideration at this Programmatic level.

Section	Page	Paragraph	Review Comment
4.3	346	Last	This "adverse impact" paragraph is really a stretch, given that, among other things, nearly all of the 21,000 acres being considered for RFP are already heavily infested with canary grass and likely a dozen other common pastureland invasives, which will be eliminated by the establishment of a native riparian forest that will shade them out, like loosestrife, which dies out in forested wetlands from lack of full sun. And bullfrogs in anabranching river channels and forested wetland habitats? Again, this is a full sunlight, still water adapted animal that is very susceptible to native predators like otters, raccoons, and mink that are expected to flourish in this environment. With the continual disturbance agriculture and domestic animals bring to the land, invasive species spread is already rife in the area proposed for treatment, so establishing an environment that facilitates the growth of native species will virtually curtail invasive spread, not facilitate it. Leave this paragraph out.
4.3	348	5	This was copied and pasted from section 4.2.5.2 and most of what it is not applicable here. "Some potential long-term impacts on tribal fish resources could be addressed through avoidance and minimization measures developed in consultation with tribes. ~~These may include the provision of fish passage around the dam during construction and operation, noise attenuation measures during construction, minimum instream flow release from the dam during operation, and release of cool water late spring to early fall during operation of the FRFA facility."~~
4.3	348	5 and 1	These paragraphs must be copy-and-paste mistakes as they are about mitigation for the FRFA facility. Take 'em out please.
4.3	348	1st bullet	Modify the sub-bullet to read: "– Coordination could result in adjustments to the timing of construction activities to avoid periods when use is the highest or provisions to provide an access point around the construction site ~~and proposed Flood Retention Facility~~"
4.3	349	1	Change to: ~~"Compensatory mitigation could be required for loss of fish habitat and fish habitat function, and reduced fish population performance above and below the Flood Retention Facility. Compensatory mitigation would be developed in consultation with tribes and may include fish habitat restoration and protection, or acquisition of land that presents an opportunity for in-kind compensation for fish habitat lost.~~ Mitigation of impacts on treaty rights is subject to consideration and agreement by the Quinault Indian Nation."
4.3	352	4.3.8.2 Long – term Impacts	No similar list was utilized for visual impacts from the dam. Please correct

Section	Page	Paragraph	Review Comment
4.3	354	3	3rd bullet - this is supposition based upon the assumption that all of this infrastructure could somehow only be placed in "…upland commercial forestland…". An approach to offset lost agricultural production could include permanent agricultural easements placed on existing productive lands in danger of conversion to warehouses, shopping malls, and residential developments.
4.3	358	3	The statement regarding fishing is confusing. This alternative will provide additional habitat for fish, thereby increasing recreational opportunities. Is the statement addressing access sites? Or water area covered by engineered woody debris?. Please clarify
4.4	367	3	Mitigation plantings within the existing wetlands impacted by additional fill would be limited due to open water (these are old channel sites within the levee on the North end and outside on the South) and existing vegetation. The mitigation for this option should focus off site.
4.6	394	General comment	Given the scope of potential impacts of the Aberdeen/Hoquiam North Shore Levee, a project level EIS to examine the impacts to the harbor and lower river should be completed if the project moves forward. Both the Grays Harbor County Lead Entity Habitat Work Group (2011) and the Chehalis Basin Salmon Habitat Restoration and Preservation Strategy for WRIA 22 and 23 focus on restoring, enhancing, and protecting the Grays Harbor Estuary is one of its seven approaches for salmon recovery.
4.6	394	2	In this paragraph, adverse impacts are considered "minor," but this section also recognizes the potential for increases of flood extents and elevations upstream and adjacent to the levee along the Wishkah, Hoquiam, and Chehalis Rivers. As stated in paragraph 5, with the information available at this time, it is unknown as to how much this action element really could change flooding extent and elevation. Given the design uncertainty, what is the basis for characterizing impacts as "minor"?
4.6	394	4	What operational constraints/regulations are currently applied at locations that are storing hazardous/toxic materials which are susceptible to flooding? Is there a baseline level of risk minimization in place for locations like these already?
4.6	396	3	The potential adverse impacts keep getting qualified as "moderate" based on the geographic scale of where the impact will take place instead of the impact itself. While this may be true for a programmatic EIS, those localized impacts may be deemed significant and adverse during a project-specific analysis.
4.6	396	4	Suggest that rather than simply restore "Temporarily disturbed areas…to pre-project status or function" the areas should be restored at a higher level to create a restoration lift over the already disturbed/degraded conditions.

Section	Page	Paragraph	Review Comment
4.6	396	5	Suggest restoring the areas at a higher level to create a restoration lift over the already disturbed/degraded conditions.
4.6	399	3	Please include the Olympic Mudminnow in this section. The Mudminnow is Washington's only known endemic freshwater fish species, and is listed as a state sensitive species. It occupies the western lowlands of the Olympic Peninsula, and a few places scattered throughout western WA, and nowhere else in the world.
4.6	399	4	Additional discussion at a level appropriate for a programmatic level of analysis should be included on potential impacts to nesting locations for bald eagles, herons, and other wildlife. Details would be addressed at the project-level review, but a preliminary PHS review is in order for this levee at this stage of design.
4.6	400	3	It may be worth mentioning impacts to commercial fishing resources. There are numerous commercial fisheries within this project area.
4.7	416	1	If woody vegetation is cleared from seasonally inundated areas, habitat conditions could favor stillwater-breeding amphibians which favor open, well insulated habitats for oviposition when herbaceous vegetation is present.
4.8	427	1	Suggest adding a phrase indicating that the actions would be taken under the ASRP
4.8	428	1-3	This aligns nicely with one of the goals and strategies within The Chehalis Basin Salmon Habitat Restoration and Preservation Strategy for WRIA 22 and 23, which is to "Restore Floodplain and Stream Channel Function."
4.8	431	Bulleted points	Again, this aligns well with The Chehalis Basin Salmon Habitat Restoration and Preservation Strategy for WRIA 22 and 23. All of these effects address Tier 1 concerns throughout the basin.
4.8	431	2	While there may be benefits to aquatic species during the creation of or restoration of riparian habitat, care will need to be taken to not displace habitat used by nesting birds, or upland animals during any kind of riparian alteration.
4.8	432	6	Reconstruction of off channel habitat should first determine the invasive species present and actions taken to eliminate or reduce existing populations of these species prior to reconnection activities. The Chehalis reach through the Chehalis and Centralia valley currently has vast populations of invasive species that appear to flourish in spite of flooding, water temperature and off channel rearing. Increasing connection may be a benefit to salmon but could increase predation and should be evaluated carefully on a specific project basis.

Section	Page	Paragraph	Review Comment
4.8	437	5	Care should be taken not to displace quality functioning upland habitat and the associated wildlife, along with addressing water quality issues that may arise from the Restorative Flood Protection Treatment.
4.8	438	4	Based on the data of Hughes and Herlihy (2012), who demonstrated that the abundance of exotics in the mainstem was low, restoring connections between off-channel habitats and the mainstem is probably a low-risk proposition, but nonetheless, should be approached on an experimental basis because the Hughes and Herlihy data represent pre-2007 flood information, and whether current mainstem conditions are the same is unclear.
4.8	448	7	Include section number when referencing Airport Levee Improvements in the following sentence: "Potential mitigation measures for short-term impacts on public services and utilities could include measures to maintain access and public services similar to those described for the Airport Levee Improvements."
5.1	451	2	Please clarify the 2nd sentence. Exactly which strategy is the author referring to?
5.1	451	Objectives box	In the first bullet of "Protect and restore aquatic species habitat function", the ecosystems should be resilient **to** the effects, not from.
5.2	457	1	The paragraph incorrectly uses the phrase "...feedback from the Quinault..." in discussing impacts on tribal resources. The impacts to aquatic species and habitats from rip-rap, sheetpile are well document and should be stated as facts, supplemented by feedback.
5.2	458	3	The document incorrectly omits the Grays Harbor tributaries from impacts associated with sea level rise and saltwater intrusion.
5.2	459	Table 5.2-1	Clarify if these are responses to climate change only and no other actions
5.2	459	3	2nd sentence. Van Dyke's salamander, which increases marked in occupancy and abundance with elevation, would likely be eliminated from the few low-elevation sites where it is currently found & become more restricted to higher elevations. In contrast, Dunn's salamander, the reverse is true.
5.3	466		Figures 5.3.1 to 3 do not appear to show any areas with a -15 to -10 foot change in flooding, nor is it discussed in the associated text. Showing the data range where it doesn't exist may be misleading and the legend for each figure should eliminate that category

Section	Page	Paragraph	Review Comment
5.3	470		Other impacts from either dam that need to be addressed include: • decreased stream depth due to channel widening in less confined reaches within the footprint of the seasonal reservoir, which would have significant impacts on the stream ecosystem from invertebrates on up • Warmer temperatures favor the spread of exotic invasive predators such as walleye, smallmouth bass, and pikeminnows. • During inundation events, juveniles cannot move upstream and downstream, as they do now, seeking out food and thermally-appropriate areas for digestion and metabolism • Mortality of eggs or alevin in inundated redds (lack of oxygen due to siltation, lower water flows, and changes in upwelling; predation on eggs) during inundation events
5.3	470	5	Instead of "FRO reservoir", do you mean "FRO footprint"? The temperature increase for the FRO is relevant during non-retention periods as it is due to reduced riparian associated with vegetation management. It is not specifically relevant to the temporary reservoir under an FRO scenario.
5.3	471	1	Add "with a Flood Retention Facility" to the end of the last sentence
5.3	472	1	Please include downstream sediment and wood issues In the "(delivery of coarse sediment used for…" Include discussion of non-salmonids impacts. Typo: "would result" is repeated in the second line
5.3	474	4	Typo: Second line, "was" should be "were"
5.3	475	Table 5.3-4	Recommend a similar table for the Upper Chehalis only, as used in Chapter 4. The presumption of a cold water release benefit is a key uncertainty and should be identified as such throughout the document. Please include the same footnote found in table 4.2-7 wherever potential change in abundance is discussed, such as this table in Chapter 5.
5.3	475	Figure 5.3.4a	The title of is misleading. It should indicate that the values shown are the result of restoration.
5.3	479		Additional analysis for the Final PEIS should generally summarize green house gas releases associated with the permanent pool. Some work in this field was recently released by the University of Washington – appropriate for a project-level EIS but could be summarized in a PEIS to tee up the project level analysis.
5.3	480	1	Please include the rise in FRO footprint temperatures in the paragraph

Section	Page	Paragraph	Review Comment
5.3	480	4	Again, the uncertainty regarding a cold water benefit associated with the FRFA is overlooked. Please add discussion and ensure that it is also presented in any and all tables showing a potential benefit. It is identified in the tables and therefore should be complimented at every turn in the text to prevent misunderstanding.
5.3	483		It would be useful to combine Figures 5.3.5b and c into a single graph. Doing so would allow easy visualization of the differences between the FRO50 and 100 scenarios.
5.4	488	Figures 5.4.1 to 3	Figures 5.4.1 to 3 do not appear to show any areas with a -15 to -10 foot change in flooding, nor is it discussed in the associated text. Showing the data range where it doesn't exist, if that is the case, may be misleading and the legend for each figure should eliminate that category
5.4	493	Table 5.4-2	Please include the area of permanent open water behind the reservoir in the "Open water" line of this table
5.4	495	last	Why is Alternative 1 proposed to be designed to be resistant to the impacts of increased flood elevations due to climate change, and Alternative 2 not? It seems that "…additional freeboard in levee designs." could and should be built into this alternative for comparative analysis purposes with Alternative 1.
5.4	495	1	I suggest moving "(before factoring in climate change)" before "as compared to the No Action Alternative…" I don't see any tables or figures on change in salmonid abundance. Seems like this is not covered by Alt. 1 as that situation is with a dam, not just with ASRP. Maybe just state that the reader should see the ASRP Section 4.8.4.2.1?
5.5	497	3	Unclear last sentence here. What is this single action? Should it be "Alt 2 would NOT reduce ..."?
5.5	502	1	As in two comments above, I don't see any tables or figures on change in salmonid abundance. Seems like this is not covered by Alt. 1 as that situation is with a dam, not just with ASRP (which would be similar between Alternatives 1, 2, and 3, I think?). Maybe just state that the reader should see the ASRP Section 4.8.4.2.1?
5.6	503	2	The leading phrase in this paragraph "Over the long term" emphasizes some timeline in the full realization of the benefits of the Restorative Flood Protection alternative. Understanding the timeline for realization of the combination of impacts from this and all other alternatives in this PEIS combined with the Aquatic Species Restorations efforts is vague, and better general bounds on the timelines for each would improve the utility of effectively comparing alternatives.

Section	Page	Paragraph	Review Comment
5.6	506	1	Please rewrite the following sentence to be a bit clearer: "Potential long-term impacts on tribal resources consider impacts following construction on fishing, hunting, gathering, and other traditional cultural activities and treaty-reserved resources."
5.6	511	Table 5.6-2	Shouldn't the top line heading ("Change in abundance in number of fish (%)" cover all three columns on the right? And is the 2nd column without alternative 4 or any ASRP? Please clarify.
5.6	512	Figure 5.6-3	RFPA acronym not defined anywhere. Change to Alternative 4?
5.7	514	1	After "No Action Alternative" on the 7th line of this paragraph, delete the comma. "Based on available data, Alternative 1 would reduce the areal extent and depth of 100-year floods to a greater extent than the No Action Alternative as well as the other action alternatives."
5.7	516	2	This sentence, "The increase in salmon abundance for Alternatives 2 and 3 would be very similar to the Aquatic Species Habitat Actions (see Section 4.8.4.2.1)." should be added to the Alternatives 2 and 3 sections also.
5.7	517	1	I would suggest the following changes to the text. This is because it should be "salmonids" as steelhead aren't salmon. There are other changes also.
5.7	517	2	Change "salmon" to "salmonids"
5.8	518	1	No comma: "…and the installation of dams and diversions have exacerbated flooding…"
5.8	518	3	"In THE preparation of one of the actions…"
5.8	520	3	It would be much more germane to this analysis to identify the number of the 818 WSDOT culverts in Western Washington that are in the area of analysis for this PEIS? This would be more pertinent for the EIS.
5.8	521	4	When describing the basin as "…extensively dammed…", consider defining or comparing to other basins. The Chehalis has 2 water supply dams in the 11 major river tributaries of the Basin. During public meetings on this Strategy, many individuals in the region and state have viewed that proportion of larger-scale structures in the basin as resulting in a basin with relatively few large scale infrastructure impacts when compared to other basins in the state.
6.5	531	2	Rephrase to eliminate mention of "terrestrial fish"
7	543		Henning, J.A., R.E. Gresswell, and I.A. Fleming, 2007. Use of seasonal freshwater wetlands by fishes in a temperature temperate river floodplain. Journal of Fish Biology 71(2):476-492.

Section	Page	Paragraph	Review Comment
Appendix C	ES-8	Next to last	Recommend a revision to the last sentence, as the inclusion of Alternative 4 in this PEIS undermines the assertion here that that "Aquatic Species Habitat Actions…do not result in flood damage reduction impacts." They certainly can, depending on the extent and location of habitat actions, as revealed in the flood damage reduction analysis of Alternative 4. Given the uncertainty around location of habitat restoration associated with the strategy, and that habitat actions would necessarily be targeted in areas where they could also have the most downstream flood attenuation benefits, it would fair for this Appendix to state that potential flood damage reduction impacts of habitat actions are likely to not be significant enough to warrant specific analysis at this stage. That would be an improvement over the language used here.
Appendix C	ES-10, Figure ES-4	Last	It appears as if the data is switched in this table for Atl 1 FRO and Alt 1 FRFA. The analysis in the EIS and later in this appendix projects a larger negative impact on fish from the FRFA, and theirfore with the same level of restoration, it is not logical that Alt 1 with FRFA would result in a larger net present fishery value than Alt 1 FRO. Please remedy.
Appendix C	ES-13	1	The idea of replacing agricultural land that is converted to floodplain forest under Alternative 4 with conservation easements on equally productive agricultural land that is at risk of conversion to non-agricultural uses, therefore it is possible to assume that "Alternative 4 has the greatest impact to agriculture due to the relocation of acreage…" . However, costs of conservation easements are dramatically lower than the costs of somehow creating more productive agricultural land, if that is even possible. This is a practical, low cost alternative that will preserve agricultural productivity while at the same time protecting that productivity from flood damage, so costs of agriculture lost to A-4 calculated using conservation easement values instead of replacement values should be used in the EIS.
Appendix C	27	Last line in 4.5	Concern over analysis of re-seeding costs, given the crops grown in the Chehalis Basin. Many commodity crops, such as corn, oats, wheat, barley, peas, and high-value row crops are re-seeded or re-planted annually anyway, flood or no flood. In addition, perennial crops, like hay or pasture, that are expected to remain productive need to be re-seeded on a regular basis, again, flood or no flood. An overly simple analysis such as this one that simply takes all the farmed acreage and assumes any re-seeding expense is totally caused by a flood likely overestimates this particular impact.
Appendix G	10	Black River	Low summer flows

Section	Page	Paragraph	Review Comment
Appendix G	10	Mainstem Chehalis River	Change "fall-run chum salmon" to "chum salmon" (no specific run types identified for chum in this river); remove summer-run steelhead from this list (the only summer-run steelhead in the Chehalis are hatchery production, there is no wild population identified);
Appendix G	10	Cloquallum Creek	Low summer flows
Appendix G	10	Grays Harbor Estuary	Change "fall-run chum salmon" to "chum salmon" (no specific run types identified for chum in this river); remove summer-run steelhead from this list (the only summer-run steelhead in the Chehalis are hatchery production, there is no wild population identified);
Appendix G	11	Humptulips River	Remove summer-run steelhead from this list (the only summer-run steelhead in the Chehalis are hatchery production, there is no wild population identified);
Appendix G	11	Newaukum River	Use consistent terminology for low flows – here referred to as "low base flows"
Appendix G	11	Coal Creek	Use consistent terminology for low flows – recommend low summer flows
Appendix G	12	China Creek	Use consistent terminology for low flows – recommend low summer flows
Appendix G	12	Satsop River	Use consistent terminology for low flows – recommend low summer flows
Appendix G	12	Scatter Creek	Use consistent terminology for low flows – recommend low summer flows
Appendix G	12	Wishkah River	Wishkah River is not a South Bay tributary – this river flows south into the Chehalis River, its confluence is upriver of the confluence with the Hoquaim and downriver of the confluence with the Wynoochee.
Appendix G	12	1	Clarify "heavily harvested" or remove this statement. Unclear why this statement about fall Chinook harvest focuses on ocean fisheries only. A more accurate statement is that fall-run Chinook salmon support fisheries in the ocean, Grays Harbor, and freshwater environments.
Appendix G	12	4	Stock name is "Grays Harbor chum salmon" not "Chehalis River chum salmon" because the population includes both Chehalis River and Humptulips river chum. Include information on fisheries supported by chum populations.

Section	Page	Paragraph	Review Comment
Appendix G	12	5	Commercial and sport fisheries are mentioned – but not the location of these fisheries. Include a statement about coho salmon supporting tribal, commercial, and recreational fisheries in the ocean, Grays Harbor, and freshwater environments.
Appendix G	16	2	As adults, most winter steelhead return at 4 to 5 years of total age. Most winter steelhead return after 2-3 summers in the ocean which makes their total age upon return 4 to 5 years (if they smolted after 2 years in freshwater).
Appendix G	16	2	Sport fisheries are mentioned – but not the location of these fisheries. Include a statement about steelhead supporting tribal and recreational fisheries in Grays Harbor and freshwater environments.
Appendix G	17	Table G-8	Redside shiners and Peamouth are indicated as occupying estuarine habitat. I do not think this is correct. I believe they are strictly freshwater species.
Appendix G	17	Table G-8	This table is missing Brook Lamprey; change common name for *Prosopium williamsoni* to Mountain Whitefish
Appendix G	33		With pink sockeye kokanee there is some information present about juveniles No juvenile information is included for coho, bull trout (also page G-48), chum, steelhead, or Chinook. Please correct I'd recommend referencing Wydoski and Whitney 2003 for species information
Appendix G	33	Table G-9	For anadromous fishes, the description of habitat is inconsistent. Description for each species should include habitat required for freshwater life stages AND marine life stages.
Appendix G	34		Inconsistent temperature reporting. Some species requirements are described with °F and others with °C
Appendix G	36		General statement that cutthroat fry move to sea within their first year after hatching. May be true for coastal cutthroat but not true for resident cutthroat.
Appendix G	48	2nd part of table	Mason County's northeastern areas with drainages to south Puget Sound and Hood Canal have ESA-listed steelhead & Chinook salmon, so these should be added to table, unless table is meant to only show what is in Mason County areas within Chehalis basin. Table title should be edited to say 'Chehalis basin only' if that is the case. Same comment for Thurston Co., which has ESA-listed steelhead & Chinook salmon.
Appendix K	5	2	Provide a location for this statement – "For example, daily maximum temperatures reached 27°C in July 2015 based on data collected by Washington Department of Fish and Wildlife (WDFW; Anchor QEA 2016)."

Section	Page	Paragraph	Review Comment
Appendix K	7	1	As written, it is not clear how uncertainties about behavioral adaptations are connected to the uncertainties about the EDT results. After "...below the dam raised earlier in this memorandum", insert a sentence that explains the uncertainty of how behavior impacts the assumptions of the EDT model results – "Because EDT does not accommodate for behavioral adaptations, the modeled responses of pre-spawn mortality in adult spring Chinook salmon are only valid if the adults use the reaches of the upper Chehalis for over summer rearing prior to spawning. Four years of snorkel surveys in this area of the river, conducted by WDFW in August (2013 to 2015, Zimmerman and Winkowski 2016), have observed very few adult spring Chinook salmon currently using this area of the river for over-summer rearing."
Appendix K	7	1	The paragraph brings up the previous EDT result that modeled a positive response of spring Chinook salmon to flow augmentation. Yet the results provided in this memo (Table 1, p. 9) both show that EDT modeled a negative response of spring Chinook salmon to flow augmentation. Need to provide an explanation for this difference.
Appendix K	11	1	I don't see any information in this memo to support that statement that "In one case, increased modeled habitat potential results in an increase in population size." The memo lays out two potential responses to the FRFA dam : -3% with flow/temperature benefits assumed and -6% with no flow/temperature benefits assumed.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy <info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 4:55 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Chehalis-Basin-Draft-PEIS-WSDOT-comment-letter-1.pdf; Chehalis-Basin-Draft-PEIS-WSDOT-attach_comments-final.pdf

Comment Form

First Name:	Erin
Last Name:	Gardner
Organization:	WSDOT
Address:	11018 NE 51st Circle Vancouver, WA 98668-1709 United States of America
Phone:	1-360-905-2032
Email:	gardnee@wsdot.wa.gov
Comments:	Please replace the comments submitted earlier today with the attached letter and comments. We added one comment regarding page 34 of the executive summary. Thank you
File Upload (1):	http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Chehalis-Basin-Draft-PEIS-WSDOT-comment-letter-1.pdf
File Upload (2):	http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Chehalis-Basin-Draft-PEIS-WSDOT-attach_comments-final.pdf
File Upload (3):	

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November 14, 2016

Chehalis Basin Strategy EIS
c/o Anchor QEA
720 Olive Way, Suite 1900
Seattle, WA 98101

Dear Ms. Bailey:

Thank you for providing the Washington State Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) with this opportunity to comment on the Chehalis Basin Strategy Draft Programmatic Environmental Impact Statement (EIS). WSDOT's responsibility to the citizens of Washington State is to provide a safe and efficient transportation system that supports our economy, communities and the environment. It is therefore essential for WSDOT to ensure that proposed actions that can adversely impact this mission are carefully assessed to identify conflicts and necessary mitigation strategies.

With respect to the Chehalis Basin Strategy Draft Programmatic EIS, FHWA's and WSDOT's comments focus on potential impacts to state highway and rail operations.

Overall, we commend and support this effort to reduce future flood damage and restore aquatic species habitat in the Chehalis Basin. We understand that this is a Programmatic level EIS. This means there is not enough detail at this time for WSDOT to understand the impacts to the transportation system and/or the potential mitigation needed. That said, we are comfortable with the level of detail in this document with the understanding that we expect the detail would be provided later in a project level environmental document if any of the alternatives presented were to move forward.

Please see our specific comments attached. We look forward to working with the Washington Department of Ecology, the SEPA lead, and many others involved in this effort to complete the Final Programmatic EIS. Please contact me at (360) 905-2012 if you have any questions or would like to discuss any of these comments.

Sincerely,

Bart Gernhart
Assistant Regional Administrator Engineering

BG:eg
Enclosure: Comments

cc: Sharon Love, FHWA WA Division
Liana Liu, FHWA WA Division
John Wynands, WSDOT OR ARA Project Development
Carol Lee Roalkvam, WSDOT ESO

Chehalis Basin Strategy Draft Programmatic EIS
WSDOT and FHWA Comments

#	Chapter & Section, Page	Comment
1	Comparison of Flood retention facility types, pg 23	For the FRO, the document says only 6 acres vegetation would be lost, but if flooded for up to 32 days, this would result in the loss of a lot more than 6 acres. Please clarify.
2	Executive Summary, pg 34	The table at the top of the page states Alternative 2 would avoid closure of I-5 for up to 3 days. Since the I-5 project (walls and levees) would provide full protection for a 100 year event this should read "full protection" or "reduced by 4 days".
3	Ch 2 I-5 Projects, pg 48	Editorial suggestion: Please consider adding a brief description to define what a floodwall is. A conceptual drawing would be helpful.
4	3.1.2.2 Flooding and Floodplains, pg 83	A discussion on the affect of existing floodplain development is missing.
5	3.2.4.1.3 Channel Incision, pg 121	A discussion to describe channelization of tributaries for agriculture, and also what effect the mainstem incision has had on floodplains is missing. Prior to European arrival, the river most likely overflowed its banks frequently (especially the Chehalis area).
6	Ch 4 General	Regarding Alternative 2, it is our understanding that this alternative will not reduce flood impacts to the existing rail system affecting freight and passenger rail service. This should be considered.
7	Ch 4 General	Regarding the Airport Levee Improvements that would take place under Alternative 1, WSDOT needs additional information to understand how the Airport Levee Improvements would provide protection to the airport on the east side adjacent to Interstate 5 (I-5).
8	5.7.1 Reduction in Flood Damage, pg 515	This states that 14 acres west of I-5 will see increased flooding, but the map in Figure 5.4-1 shows many hundredes of acres will see increased flooding (=0.1 to +0.9 feet)
9	5.8 Cumulative	The discussion doesn't adequately examine the potential contributions of the Programmatic EIS alternatives to significant adverse impacts by resource. Key resources are illuded to, but not systematically considered for each alternative (Land use, Transportation, Water Quality, Salmon, Treaty Resources, ...). As a result, this section does not clearly explain the potential for cumulative affects on all elements that have direct effects.

10	Sea-Level Rise	"By 2025, sea level rise is predicted to result in transitions from forested tidal swamp to irregularly flooded marsh in lower river surge plain areas, where rising water levels and increased saltwater intrusion would cause trees to die. In the inner estuary and greater Grays Harbor areas, there would be a loss of low elevation tidal mud and sand flats (ASEPTC 2014a)." The analysis of the Aberdeen Levee (Alternative 4) is very generalized, it is not clear that levee placement and transportation infrastructure was considered - can not tell if there is increased impact on highways. Does levee design consider stormwater / outflow needs?