

Citizens

FIRST NAME	LAST NAME	DATE
Dwayne	Aberle	11/14/2016
Zeke	Alexander	10/18/2016
Andy	Alexander	10/20/2016
Michael	Alexander	11/14/2016
Daniel	Allen	10/24/2016
Kurt	Anders	11/14/2016
Tracie	Anderson	11/14/2016
Jan	Anderson	10/21/2016
Anonymous		10/27/2016
Anonymous		11/11/2016
Jude	Armstrong	10/29/2016
Ron	Averill	11/12/2016
Brandon	B.	10/17/2016
Pat	Baird	10/20/2016
Thomas	Baker	11/10/2016
Thomas	Baker	11/10/2016
Julie	Balmelli-Powe	11/14/2016
Janet	Barr	10/16/2016
Ian	Barrett	11/9/2016
Michael	Beehler	11/14/2016
Andrew	Berger	11/14/2016
Shirley	Billings	10/27/2016
Mary Lou	Bissett	10/19/2016
Pam	Borso	11/14/2016
Leon	Bowman	10/23/2016
John	Box	11/10/2016
Thomas D.	Bradley	11/14/2016
William	Brake	11/14/2016
Sheilah	Bray	11/10/2016
Judy	Breen	11/12/2016
Andrew	Brown	11/14/2016
Ally	Bugliari	11/9/2016
Alicia	Bull	11/14/2016
Teresa	Bush	10/17/2016
Nikki	Bush	10/18/2016
Susan	Carpenter	10/16/2016
Lauri	Chown	10/17/2016
BJ	Clinger	10/20/2016
Randy	Cobb	10/18/2016
Randall	Collins	11/4/2016
Heather	Cox	10/17/2016

FIRST NAME	LAST NAME	DATE
D.	Crake	10/20/2016
John	Cramer	10/13/2016
John	Cramer	11/1/2016
Richard	Curtis	11/14/2016
Julie	Dalsaso	11/13/2016
Aaron	David	11/11/2016
Arny	Davis	10/17/2016
Michael	Deckert	11/10/2016
Kyl	Depriest	10/16/2016
Gary	Dibble	10/16/2016
James	Dooley	11/14/2016
Kevin	Drake	10/1/2016
Gloria	Dupree	10/26/2016
Lawrence	Durham	11/14/2016
Richard	Eades	10/18/2016
John	Emerson	10/28/2016
Steve	Emrich	10/24/2016
Brady	Engvall	11/5/2016
Christiena	Ervin	10/18/2016
Josh	Fay	10/19/2016
Ron	Figlar-Barnes	11/14/2016
Kim	Figlar-Barnes	11/14/2016
Caryn	Foley	10/27/2016
Mark	Foltz	11/4/2016
Steve	Fransen	11/9/2016
David	French	11/4/2016
Sylvia	Freund	10/18/2016
Isaac	Fu	10/31/2016
Carolyn	Fuleihan	10/16/2016
Gary	Fussell	10/11/2016
Gary	Fussell	10/20/2016
Kathryn	Garrett	10/30/2016
Vicky	Gee	10/20/2016
	Gildersleeve	10/18/2016
Joshua	Greene	11/11/2016
Robert	Guenther	10/29/2016
Kathryn	Gunderson	10/29/2016
Martha	Hall	11/14/2016
Steve	Hallstrom	11/14/2016
Kim	Heaton	11/11/2016
Jessica	Helsley	11/14/2016
Terry	Hetzel	10/12/2016
Robin	Hill	10/21/2016

FIRST NAME	LAST NAME	DATE
Sharlene	Hoffman	10/17/2016
Meredith	Holgerson	11/14/2016
Darlene	Holmes	10/18/2016
Michele	Hulbert	10/18/2016
Michele	Hulbert	10/18/2016
Bonnie	lone	11/1/2016
Theressa	Julius	11/14/2016
Shad	Kearse	11/1/2016
Catherine	Kilty	10/14/2016
M	Knipp	10/20/2016
Donald	Koidahl	10/17/2016
Lauren	Kuehne	11/14/2016
Debbie	Lane	10/17/2016
Dawn	Lawson	10/19/2016
Jim	Lazar	10/30/2016
Randy	Leduc	10/21/2016
Elijah	Liske	10/27/2016
Mike	Little	10/18/2016
John	Long	10/19/2016
Amy Stefan	Loudermilk Schelcht	11/4/2016
Jami	Lund	10/18/2016
Ray	Marshall	10/20/2016
Raymond	Marshall	10/20/2016
Jessica	Marshall	10/20/2016
Guillaume	Mauger	12/07/2016
Larissa	Maughan	11/14/2016
Daniel	Maughan	11/14/2016
Bonnie	Maynard	10/18/2016
Larry	McFarlane	10/28/2016
Larry	McGee	10/18/2016
Merinda	McGrath	10/19/2016
Luke	Moerke	10/27/2016
Dick	Morrison	10/31/2016
Scott	Morrison	11/14/2016
Colleen	Morse	10/16/2016
Sal	Natasi	10/21/2016
John	Newman	10/29/2016
Frederick	Norquist	11/9/2016
Michael	O'Leary	10/30/2016
Jennifer	O'Neal	10/26/2016
David	Ortman	11/13/2016
John	Panesko	10/17/2016

FIRST NAME	LAST NAME	DATE
Vince	Panesko	11/14/2016
Janean	Parker	10/24/2016
Robert	Parrish	10/7/2016
Cris	Peck	10/18/2016
Erin	Peplinski	10/18/2016
Ryan	Peplinski	10/19/2016
Amelia	Petersen	11/5/2016
Rebecca	Peterson	10/16/2016
Douglas	Peterson	10/16/2016
Rebecca	Petheram	10/19/2016
Jason	Piper	10/28/2016
Edward	Pittman	11/14/2016
Shelby	Pothier	11/14/2016
Chad	Price	10/19/2016
John and Julie	Rabey	10/27/2016
John	Rabey	11/9/2016
Linda	Raschke	10/24/2016
Joe	Reid	10/23/2016
Daniel	Rich	10/19/2016
Lynn	Richard	10/16/2016
Haley	Richards	10/18/2016
L	Riener	10/28/2016
Chris	Ringlee	10/19/2016
Cindy	Riskin	10/27/2016
Larry	Robertson	10/17/2016
Jan	Robinson	11/7/2016
Mike	Roble	10/26/2016
Mike	Roble	11/2/2016
Colton	Rogers	10/28/2016
Joe	Rosbach	10/19/2016
Susan	Rosbach	10/19/2016
Sandra	Roubal	10/29/2016
Jamie	Roundtree	10/16/2016
Erika	Rubenson	11/11/2016
Erik	Sandgren	11/13/2016
Erik	Sandgren	11/14/2016
Ron and Kathy	Sandrini	10/19/2016
Lanette	Scapillato	10/16/2016
Kathy	Schaeffer	11/14/2016

FIRST NAME	LAST NAME	DATE
Robert	Schanz	11/14/2016
Nate	Schmidt	11/14/2016
Carolyn	Schuster	10/28/2016
Brian	Scott	10/28/2016
Carol	Seaman	10/14/2016
Carol	Seaman	10/24/2016
Lizabeth	Seebacher	10/27/2016
Judy	Selleck	10/17/2016
James	Shannon	10/18/2016
Andrew	Short	10/23/2016
Mike and Glenda	Smell	11/2/2016
Blake	Smith	11/1/2016
Eileen	Smoke	11/3/2016
Randall	Snell	10/19/2016
W. Thomas	Soeldner	11/14/2016
Barbara	Soto	10/18/2016
Debra	Sparkd	10/18/2016
Patricia and Larry	Stafford	10/19/2016
Merrill	Stulken	10/21/2016
Lance	Succo	10/21/2016
Randy	Sullivan	10/20/2016
Jeremiah	Sutton	11/5/2016
Robert	Thompson	10/21/2016
Virginia	Tichacek	10/16/2016
Arielle	Tonus Ellis	10/28/2016
Brian	Tornow	10/24/2016
Dave	Tracy	10/16/2016
Russell	Trentlage	10/17/2016
Desiree	Tullos	11/14/2016
Laurel	Turner	10/28/2016
Mert	Turner	10/31/2016
Christopher	Vandenberg	11/14/2016
Roby	Ventres-Pake	10/31/2016
Richard	Walker	10/31/2016
Shari	Watt	10/19/2016
William	Watt	10/23/2016
William	Watt	10/24/2016
Jacob	Waunch	10/31/2016
Alyssa	Westall	10/18/2016
Bryce	Westman	11/14/2016
Megan	Whiteside	11/14/2016
Stacy	Wilson	10/27/2016
Les	Wright	10/24/2016

FIRST NAME	LAST NAME	DATE
Dave	Wright	10/28/2016
Les	Wright	10/31/2016
Steve	Wyckoff	11/11/2016
Willard	Young	10/20/2016
Cecil	Zellers	10/19/2016
Deanna	Zieske	11/13/2016
Deanna	Zieske	11/14/2016
Craig	Zora	10/21/2016

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 9:21 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Dwayne

Last Name: Aberle

Organization:

Address:



Phone:

Email:



Comments:

After watching flooding in the Chehalis Valley for many years it's time to resolve the issue. After review of the EIS the best alternative is Alternative number 1. This alternative would control flooding and also see a long term improvement to the fishery. This alternative is also the most cost effective alternative over the next 100 years. Doing nothing is not an alternative and implementing some of the other alternatives are not cost effective or resolve flooding in the areas that have been impacted in the past.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 10:54 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Andy
Last Name: Alexander

Organization:

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: I really applaud the efforts of th Basin Group, the Governor's Office, and Ecology for the alternatives laid out before our communities. I have witnessed many of the most recent events and am a lifetime citizen of Chehalis. As a kid I grew up with the river in my back yard. Many times we were flooded. It is devastating to families, business owners, habitat, and commuters just trying to get through. Not too many photos can make it through the devastation either when waters are rising quickly and you are trying to escape a swelling river. I would say alternative 1 offers the best hope to all parties and improves habitat at the same time. So many studies have been done in the past, with little or no results. I really think that this time we are getting somewhere- keep up the good work- and please again let's look at Alternative 1!!!!!!

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From: Mike Alexander [REDACTED]
Sent: Monday, November 14, 2016 3:52 PM
To: info@chehalisbasinstrategy.com
Subject: Comment to draft programmatic EIS

To whom it may concern:

Please let the record reflect that I am in full support of Alternative 1 (one) of the draft programmatic environmental impact statement for the Chehalis Basin Strategy. I have been a lifelong resident of Chehalis and feel that Alternative 1 is the only solution to reduce and help control continued future potential flooding of areas affected by the Chehalis River.

Respectfully,

Michael Alexander
[REDACTED]

Sent from my iPhone

From: Zeke Alexander [REDACTED]
Sent: Tuesday, October 18, 2016 6:23 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Zeke Alexander

EMAIL
[REDACTED]

MESSAGE

Alternative 1 makes the most sense. It will provide the best protection for the whole river basin and will provide more water in river during the summer for fish.

Sent from (ip address): 174.21.171.76 (174-21-171-76.tukw.qwest.net)
Date/Time: October 18, 2016 1:22 pm
Coming from (referer): <http://chehalisbasinstrategy.com/strategy/>
Using (user agent): Mozilla/5.0 (Windows NT 10.0; Win64; x64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.79
Safari/537.36 Edge/14.14393

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 25, 2016 9:23 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Daniel

Last Name: Allen

Organization:

Address:



Phone:

Email:

Comments: I am in favor for Alternative #1. It is the best solution for not only flood control but for the habitat restoration for the fish and other aquatic species.

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This email was built and sent using [Visual Form Builder](#).

From: enjoy life [REDACTED]
Sent: Monday, November 14, 2016 11:53 AM
To: chrb461@ecy.wa.gov; info@chehalisbasinstrategy.com
Subject: The more you fill, the more it floods!!!!

Good Morning,

Yes, no words were ever spoken, but for some reason the people of the Chehalis River Basin especially around my neck of the woods don't seem to get that fact.

I always say get a five gallon bucket and fill it halfway with water than mark that level before you throw a couple bricks in it. Now, if the level stays the same or goes down than you are someone who believes filling in the flood plain is a good thing and if it goes up than you are someone like myself who knows what the consequences of flooding is all about.

My family has lived at Ground Zero of the flooding situation in Centralia for close to a 100 years where two major rivers, two major creeks and three major lakes all come together to create a perfect storm of destruction.

Since, the last big flood in our area that occurred in December 2007, the misguided powers to be have allowed ten of thousands of fill to be put in that area that can ill afford it being that is where the water used to be stored, but now it supports collector distributor lanes between Mellen St. and Harrison Ave., a ridiculous new overpass and a soon to be unwanted shopping center right next to my house.

So, with projects like that I am thoroughly convinced that no one cares about the flooding situation here and for someone who has gone through five major floods with all the pain and suffering that those events caused I am none to happy that I am one of the few people who actually gets it while others could care less if I and/or my hometown drowns!!!!

Let's stopping being stupid and quit filling in the flood plain or this area will be doomed forever.

Thanks for your time,

Kurt F. Anders,
the voice of reason in a sea of insanity

P.S. - Oh, a dam at the headwaters of the Chehalis River will do nothing to stop the major flooding in my area!

From: Jan [REDACTED]
Sent: Thursday, October 20, 2016 6:22 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Jan

EMAIL
[REDACTED]

MESSAGE
I do not support #4

Sent from (ip address): 71.212.81.81 (71-212-81-81.tukw.qwest.net)
Date/Time: October 21, 2016 1:21 am
Coming from (referrer): <http://chehalisbasinstrategy.com/eis-library/>
Using (user agent): Mozilla/5.0 (Windows NT 10.0; Win64; x64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.79
Safari/537.36 Edge/14.14393

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 10:50 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Tracie

Last Name: Anderson

Organization:

Address: [Redacted]

Phone:

Email: [Redacted]

Comments: Thank you to all involved in preparing the EIS. I would like to express support for Alternative 1. It is the best approach to provide meaningful habitat restoration and significant flood relief. The other alternatives provide limited flood relief. Alternative 4 was an interesting concept; however, I do not believe that it could actually be implemented due to the related legal and financial constraints. Most importantly, Alternative 4 provides very little flood damage relief. Therefore, I strongly support Alternative 1 as the best way to accomplish the goals of flood damage reduction and habitat restoration. Thank you for your consideration of my comments.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 27, 2016 1:38 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name:

Last Name:

Organization:

Address:

Phone:

Email:

Comments: Alternative 1 is the best option

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 10, 2016 11:36 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: anonymous

Last Name:

Organization:

Address:

Phone:

Email:

Comments:

For background, I grew up in Lewis County and now live in Olympia. I'm a whitewater rafter and kayaker. While a lot of my whitewater friends don't like the idea of a dam, I do. Dams to me are always a balancing act, does the benefit outweigh the cost? In this case, my opinion, the answer is yes. The other options for flood control don't seem like they'll work, and losing a bit of whitewater to protect a huge area from flooding makes sense. Now, I do prefer the dam version that would only collect water during big floods, and otherwise let the river run free. Maybe with that option, whitewater runs on the Chehalis could be retained. A final note: it's not true that this is not a well-used whitewater run -- it would be, except that Weyerhaeuser has the gates shut, like they do on the North Fork Toutle and Green. On that issue, I think Weyerhaeuser and large-scale private landowners should be required to provide access to waterways that belong to the public. My two cents.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, October 29, 2016 11:34 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jude
Last Name: Armstrong
Organization: citizen

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

It is a frightful mistake to even consider building a dam on the Chehalis River. The river and the ecosystem it supports existed very well for untold centuries with you interference. Look at other watersheds; how many places with dams have now made the decision that that they are an impediment to the health of the ecosystem and have removed them. The Elwah is only one example of such a series of events.

It is clear that the recent floods on the Chehalis and the damage to buildings are the result of two things: Inadequate forest cover and the stupidity of people who have built in a flood plane. Building a dam will not correct either of those faults.

Adopt alternative 4. Restore the forest, protect the river. All else is folly.

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From: COL RONALD H AVERILL [REDACTED]
Sent: Saturday, November 12, 2016 8:44 PM
To: info@chehalisbasinstrategy.com
Subject: Comments on Department of Ecology DRAFT Programmatic EIS
Attachments: Letter to Department of Ecology on DRAFT PEIS 12 Nov 16.docx

Importance: High

For your consideration, at attachment, are my formal comments on the Department of Ecology DRAFT Programmatic Environmental Impact Study.

Ron Averill

RONALD H AVERILL
Colonel, US Army Retired


RONALD H AVERILL **Colonel, U.S. Army Retired**

12 November 2016

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

Dear Sir:

I have reviewed the DRAFT Programmatic Environmental Impact Statement published by the Washington Department of Ecology and, below, provide my personal comment.

As background, I have been involved with the Chehalis River Basin Flood Authority (FA) since its inception in 2008. I was the first chair of the FA while a Lewis County Commissioner and represented Lewis County on the FA until my term ended in December 2012. Since 2013, I have represented the City of Centralia on the FA. In addition, I am the Chair of the FA Small Projects Committee.

As a representative on the FA I have attended almost all the workshops and public meetings conducted by the Governor's Chehalis Basin Work Group (GWG). I am familiar with the history, legislation, policies and accomplishments of the both the FA, and its member jurisdictions, and the GWG.

Furthermore, I represent the Lewis County Farm Bureau on the Washington Farm Bureau Legislative Committee and I will address preferences and concerns of agriculture on the various alternatives as well.

Following is a summary of the comments I made on the Ecology DRAFT PEIS at the Public Hearing at the Veterans Memorial Museum, Chehalis, on 11 October, 2016:

- ALTERNATIVE 1 provides the best opportunity to mitigate against major flooding and improve fish populations by habitat restoration. I believe, that the best version of this option should be a dam with a permanent reservoir (FRFA) to provide water augmentation during the summer; and, the "high scenario" aquatic species habitat actions, to provide the highest fish restoration option.
- ALTERNATIVE 2 only protects the I-5 Freeway and leaves the remainder of the basin vulnerable to flooding. This alternative violates Governor Gregoire's promise not to just fix the freeway and leave the population in the basin at risk.
- ALTERNATIVE 3 is a Band-Aid and does nothing to address the major problem of repetitive flooding and depletion of fish species. This option only provides for local scale flood damage reduction options (usually about \$5 million in projects annually) and reduced aquatic species habitat actions (usually about \$6 million annually).

- ALTERNATIVE 4 grossly underestimates its already prohibitive cost and, while minimally reducing flooding in the I-5 corridor, increases the incidents of flooding in the upper basin. This option would move farmland from the floodplain to the hillsides in apparent disregard of the need for appropriate soil types and availability of water rights. There are many obstacles to achieve this alternative, not the least of which is finding willing farm participants and affordability on a cost/benefit basis.
- NO ACTION continues the problem and makes it worse as there will be neither flood mitigation nor fish restoration. Climate change will certainly put the basin in greater risk of flooding and, assuredly, some species of salmon will be put on the endangered species list.

I will further elaborate on each of the alternatives:

ALTERNATIVE 1

- This is the alternative recommended by the GWG and is far and away my preferred Alternative.
- Both the FA and the GWG have committed to not only meaningful flood mitigation, but equal commitment to fish habitat restoration. This is the only alternative which gives balanced attention to both objectives.
- The Dam south of Pe Ell and the Centralia-Chehalis Airport levee improvement provide the best flood mitigation for Centralia, Chehalis and the I-5 Freeway corridor; and, the Aberdeen/Hoquiam North Shore Levee will provide the two jurisdictions protection against tidal flooding.
- All the jurisdictions in the FA have made significant improvement to flood proofing frequently flooded properties; and, have implemented Land Use Management practices responsive to best environmental practices.
- The City of Centralia has adopted environmentally responsible Land Use Management practices prohibiting fill in the flood plain, converting frequently flooded areas to open space, and proactively complying with FEMA requirements to improve their CRS rating. Centralia's Phase 1, China Creek Project will achieve its goal by restorative river flood protection in the upper China Creek basin.
- Farmers in the basin, with the assistance of their county conservation districts, are active in habitat restoration projects; and, Grays Harbor, Lewis and Thurston County are actively participating in the Voluntary Stewardship Program which is aimed at protecting critical areas while maintaining the economic viability of agriculture.
- Although a Dam has the greatest adverse impact on fish habitat, modern practices can provide significant mitigation. In addition, a FRFA dam would significantly improve the water quality and temperature in the summer; and, using the "high scenario" aquatic species habitat actions on the 350 tributaries in the Chehalis Basin will not only mitigate for the dam but substantially increase most species in the basin as well.

ALTERNATIVE 2

- Without a dam, no water is retained in the upper Chehalis basin to reduce flooding in the Chehalis, Centralia, and I-5 Freeway corridor. To keep the freeway open this option uses levees, walls and raises the freeway. This levee option has proven flawed in previous studies by the U.S. Army Corps of Engineers. There will continue to be major flooding in the corridor during major flood events and the freeway (as a levee) will cause more water to move downstream faster causing increased flooding in the central and lower basin.
- Governor Gregoire promised in 2008 that Washington would not solve freeway flooding at the expense of the remainder of the population in the basin. This solution violates that promise.
- While this option still addresses tidal flooding in Aberdeen/Hoquiam, and maintains aquatic species habitat restoration, it is totally inadequate in providing flood mitigation in the upper basin.

ALTERNATIVE 3

- This alternative is almost tantamount to doing nothing. It neither provides major flood mitigation (a dam) nor major aquatic species habitat restoration.
- Local-Scale Flood Damage Reduction Actions are the small projects accomplished by the FA over the last five years. The Legislature's Capital Budget has provided about \$5 million annually for these projects; however, they are aimed primarily at local flood mitigation to protect sewer plants, protect city water wells, provide agriculture pads for farm animals and equipment, and improve local drainage. These projects in aggregate would not provide sufficient mitigation of flooding in a major flood event.
- The Aquatic Species Habitat Actions are not the major restoration projects envisioned by the GWG but, rather, the local projects conducted by County Conservation Districts, County Public Works and watershed salmon recovery plans. These projects generally receive about \$6 million in funding annually and are woefully short of stemming local species reduction. These projects and their level of funding will not restore and enhance local aquatic species.

ALTERNATIVE 4

- This alternative would restore the upper Chehalis River's main channel and floodplain, as well as major tributaries including the Chehalis South Fork, Newaukum and Skookumchuck to their natural flood water storage capacity. The problem is much of this area is occupied by farm land, and commercial, manufacturing and residential property. To accomplish this plan some 21,000 acres of land would need to be purchased and converted.
- The cost of land purchase alone is estimated at \$1.2 billion, based on assessed value of the land. Land normally sells at market value, not assessed value, and that value rises in tight property markets. The cost is grossly underestimated and I expect that a properly estimated cost will be an extremely low cost/benefit ratio.
- Much of the land slated for purchase is farm land. The proposal is to move this farmland to the hillside. The proposal appears to be in total disregard of the fact that farm products and productivity is based on soils. The reason the farms are in the floodplain is because that is where the good soils are. The reason higher elevations in Lewis County are in forestry is because that is where the trees best grow. The farms in the floodplain would not survive in the poorer soils on the hillside, and even if they marginally produced, soil erosion and water runoff would create additional problems.
- It is highly unlikely that farmers, entrepreneurs, and residents who have successful businesses or a prized residence, especially if they have been there for several generations, will willingly sell

their property. Implementing the buyout portion of this plan, even under eminent domain, would take years, if it can be accomplished at all.

- In FA studies, it is estimated that 50,000 to 80,000 acre feet of water would need to be retained in a major storm to mitigate against major flooding in the I-5 corridor. This alternative does not come anywhere near that level of retention. It will marginally reduce flooding in the corridor; however, at the expense of major and prolonged flooding in the upper basin.
- Admittedly, this alternative provides the best aquatic species restoration; however, at the expense of the local economy and reduced flood mitigation.
- The alternative claims that one of its advantages is that it would greatly reduce farm damage during major storms. It fails to point out that it will achieve that objective by buying the farms out so there is nothing to save. On the other hand, Lewis County's farm economy will be crippled.

NO ACTION ALTERNATIVE

- I think everyone agrees that taking no action is a non-starter. All climate projections agree that major storms will come more frequently, and will be more destructive. Without flood mitigation residents in the basin will be subject to repeated property damage/loss and risk of life. Damages in the basin in the 2008 flood were just short of \$1 billion.
- If there is not an extensive aquatic species restoration program, then salmon in the Chehalis basin will be put on the federal endangered species list. That prospect is not desired by anyone.

For the reasons stated above, I strongly support Alternative 1 as the course of action which will give the best balance to both mitigate flooding and provide aquatic species restoration. On the other hand, due to its potential damage to agriculture, I strongly oppose Alternative 4.

Ron Averill

RONALD H AVERILL
Colonel, US Army Retired

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 10:14 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Brandon

Last Name: B.

Organization:

Address:

Phone:

Email:

Comments: After reviewing the options put forth, I vote for Option 1. It seems to be the only option that actually addresses the issue.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 11:44 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Pat

Last Name: Baird

Organization:

Address: Chehalis 98532

Phone:

Email:

Comments: For the most effective strategy to protect a broad section of Lewis County, not just I5, at a reasonable cost, I support alternative 1.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 10, 2016 5:17 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Thomas

Last Name: Baker

Organization: Citizen

Address:



Phone:



Email:

“Selling a dam as fish enhancement is absolutely ridiculous. No salmon ever thought life got easier because a dam went in. Why not do some enhancement without the dam? I think there’s things that can be done to help the flooding. I’m not necessarily for option 4 either. I don’t want to displace families and I don’t want to buy people’s land when they’re forced to sell,” Wilson.

Comments:

Absolutely true and spot on point. We are tearing down dams to restore the damage they have done; we should not be building new ones. The damage to the fishery by dam building cannot be repaired without removing the dam. Decades of scientific work on the Columbia river dams have proven this: mitigation is ineffective.

No alternative with a dam will be reasonable or feasible, will result in ongoing litigation and will irreparably damage the environment. New dams are not acceptable.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 10, 2016 5:30 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Thomas

Last Name: Baker

Organization: Citizen

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

Option 1, Building A Dam is NOT ACCEPTABLE

“Selling a dam as fish enhancement is absolutely ridiculous. No salmon ever thought life got easier because a dam went in. Why not do some enhancement without the dam? I think there’s things that can be done to help the flooding. I’m not necessarily for option 4 either. I don’t want to displace families and I don’t want to buy people’s land when they’re forced to sell,” Wilson.

Comments:

Absolutely true and spot on point. We are tearing down dams to restore the damage they have done; we should not be building new ones. The damage to the fishery by dam building cannot be repaired without removing the dam. Decades of scientific work on the Columbia river dams have proven this: mitigation is ineffective.

No alternative with a dam will be reasonable or feasible, will result in ongoing litigation and will irreparably damage the environment. New dams are not acceptable.

This option would “potentially significantly adversely affect some populations, species or life stages of salmonids and lamprey.” NOT ACCEPTABLE

Other adverse impacts include reduced water quality in regards to temperature, dissolved oxygen and turbidity. Permanent losses to wetlands and forested areas would occur with the construction of the dam. NOT ACCEPTABLE

Adverse impacts to tribal resources and non-tribal resources would occur to treaty-reserved fish resources, the report says, along with impacts to traditional cultural practices. NOT ACCEPTABLE

Alternative 1 and any alternative with a new dam is not acceptable: too much damage.

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This email was built and sent using [Visual Form Builder](#).

From: [REDACTED]
Sent: Monday, November 14, 2016 5:37 PM
To: info@chehalisbasinstrategy.com
Subject: Public comment for the Chehalis Basin Strategy Programmatic EIS

State of Washington
Department of Ecology

Chehalis Basin Strategy Programmatic EIS

To whom it may concern:

I would like to submit comment in Support of Alternative 1 in the Chehalis Basin Strategy Programmatic EIS. After many years of searching for a solution to catastrophic flooding in the Chehalis Basin, I truly believe Alternative 1 is the answer. This alternative is a “win-win-win” solution for the upper basin, lower basin and fish. I firmly believe that the FRFA dam is the only way to go. I’ve lived in this basin all my life, and have watched the fish die during the summer heat wave. It’s happening more frequently, and if climate change goes as predicted, the fish will be gone before the restoration can take effect.

Alternatives 2, 3 and the “do nothing” option do not do enough. They would make all of the efforts over the decades be for nothing – a tremendous waste of time and money.

Alternative 4 looks good on paper, but is not a realistic option. It would cost too much time and money to implement, and the only thing it benefits is fish. It would do more damage, both physically and economically, to the communities of Lewis County than if we did nothing at all. The reason for our efforts is to alleviate catastrophic flooding in the basin without causing more harm to others in the basin, and to mitigate impacts to fish. Alternative 4 does not meet our goals.

Thank you all for your efforts, Alternative 1 is everything we could hope for!

Sincerely,
Julie Balmelli-Powe

[REDACTED]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 1:42 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Janet

Last Name: Barr

Organization:

Address:



Phone:

Email:



Comments: #1

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, November 9, 2016 11:47 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Ian
Last Name: Barrett
Organization: Citizen

Address: [Redacted]

Phone:

Email: [Redacted]

Comments: I object any dam construction of any kind on a free flowing river. I understand the economic and social affects of flooding to those downstream. However, I doubt there is any real scientific evidence that building a dam upstream of critical fish habitat would yield adequate recovery efforts. I would venture that comparable rivers with dams have worse quality fisheries. I would support all efforts to better the habitat, but to present the dam as an effective way to achieve this result seems unlikely and not science based. I would support buying out anyone in the floodplain, since that seems to reduce the concern for future impact costs. However adding small scale barriers to residences seems to be on the private citizen not the taxpayer. I do support the infrastructure reinforcement to the Interstate and airport. We need to accept the effects of climate change on such installations.

No dam. Restore the river corridor!

Thanks

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 8:50 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: michael

Last Name: beehler

Organization: none

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: As a volunteer with the Chehalis-Centralia Railroad I have for the past 10 years observed the weekly flows of the Chehalis River from Chehalis City limits to the south fork of the Chehalis. This has been during the whole year, not just summer. In my opinion the best solution to the flood events is either the FRO or the FRA option, with the FRA option as my preference. The damage to both the ecology and economy of the basin needs to be mitigated with action that minimizes the surge events that cause damage downstream. Doing nothing is tantamount to failure, but moving forward with the dam option seems to me the least intrusive option in the long term. Disturbance to the habitat of the basin because of dam construction and operation appears to be much less than the ongoing flood events that are bound to continue

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 11:45 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

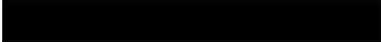
First Name: Andrew

Last Name: Berger

Organization:

Address:

Phone:

Email: 

What is the over all cost balance of purchasing land and moving land owners out (leaving only those large agricultural areas that could work in tandem) in affected areas versus building/maintaining a dam and perhaps long term costs associated with mitigation (which could be expensive)? Or any of the other combination of alternative with associated costs, need a matrix table with all the alternatives laid out.

Are there any approaches to add environmental externalities to the costs of the projects economic analysis?

What are the economic losses of fisheries? Timber? Cultural Significance? Recreation?

Comments:

The species that reside in the affected area (the dam site) are a genetically distinct population of salmon and Bull Trout, which are listed by the ESA, although some species are not listed in ESA in the Chehalis there is no doubt historical, cultural and economical value to these species? What would the costs become if the species become listed under the ESA, potential law / never ending mitigation for building a dam that wipes out historical/ancestral salmon populations that are already holding on. The upper Chehalis River is home to one of the four ancestral rivers for Pacific Salmon in the world!!! Read Waples, Pess and Beechie Evolutionary History of Pacific Salmon in dynamic environments.

Washington has just removed a dam – Elwha. Why would we risk the same mistake...we are already committed with our policy of being “fish friendly” and this is our state fish – The Steelhead. How sad would that be if you wiped out this species from its ancestral home. The upper Chehalis should be a salmon sanctuary, not a dam site.

Climate change. How does this tie into the options? With increasing floods and weather patterns we may need more floodplains in the long run, no dam will hold back the amount of water forever. It will need to be replaced and costly maintenance....Take the smart option by developing wisely. Make Chehalis great again! hire people, build infrastructure, use federal funds, be creative in your solutions dont get stuck in single minded ideas! There are many many more alternatives and iterations of those.

Cooler waters are not always a good thing...This could introduce an new environment for invasive species above and below the dam because of constant moderate temperatures. Need a potential invasive species list to be prepared for impacts to wild fish and other species.

The Oregon dam built by the concrete design mentioned here is susceptible to noxious gasees dissolving (sulfur?) into the water (see the Willow Dam in Oregon wiki page and other links), which would be harmful to river residents and create costly maintenance.

Every dam has an expiration date, conserved land does not.

Has a juvenile salmon collection facility (see Lewis River Project) being examined as part of downstream fish migration evaluation? If not it should be.

What does the Fisheries Charter Commission think of fisheries loss in case of the dam?

What do the Tribes think of the fisheries, economical and cultural loss?

Has the idea of a raised freeway been addressed through the Cheahalis / I5 corridor....An elevated freeway, or by pass, simliar to those in other states and countries Florida, Alaska and even Iceland? Lest put people to work....Lets make Chehalis great again!!!! Bring lots of jobs and spend lots of taxpayer dollars, why not, good for the environment, good for people. The proposols in the plan are too small. Think big.

If you cant think that big, mix and match all options, why cant some restorative actions be used in the restorative actions, make it dynamic and equitable...people dont want dam, get no damn but give up bank armoring and the full removal of peoplein flooplain, but the save the infrastructure people get saved infrastructure and reduced flood risk and aide in managing during flood periods.

Immediate stop developing in the floodplain, a moratorium until a solution can be addressed. This will save time and money down the road.

What does FEMA think of the proposal? Will they certify the new levees, if any?

The evaluation of impacts by Industry (logging, RR, agriculture, development) to the fishing population/economics have probably been underestimated. The loss of fisheries already taken by industry, development, etc., should be calculated into the value and recovery goals to achieve maximum recovery. Use the EDT to populate out historical runs.

The intrinsic, scientific and cultural value of this race of salmon is un-paralleled. The

Chehalis River was one of the first major rivers during salmon evolution. The genetic risk of losing this stock of salmon (Chinook, Steelhead, Bull Trout, Coho, etc) puts this species at a serious risk.

Use the high priority habitat option in the aquatic species habitat options.

In Aquatic species habitat action items, there needs to be a maintain/increase wild sustainable fisheries in respect to tribal, commercial and sport fisheries? And just in general. The fisheries action deserves an action item...Its a commercial industry!!!

Address the needs of tribal communities, this will lead to less costly measures down the road.

Is the most recent scientific data being used for fisheries population/management. I hear new studies are being conducted in the upper Chehalis in the dam reach (USGS, WDFW, DOE)... What are these conclusions? What would be lost? What could be improved with restoration. Appendix K does not go far enough to evaluate other species of salmon/steelhead/trout.

From this data evaluate the value of wild sustainable stocks of salmon in the basin and factor this in the analysis/economics of wild and hatchery salmon. How does Alaska make a sustainable fisheries work???

NO hydraulic capacity improvements, such as dredging and removing sediment and building extensive levee systems. This has been proved not work and not good for environment.

Back water flood control areas seem very plausible efficient cost effective way to increase flood storage...large back water areas similar to the Mississippi.

Appendix K although written for Chinook does not address Steelhead, the other listed species in Washington State, as well as Bull Trout (ESA listed) and how they would be affected. Both these species have much more complicated life histories and would reside in the freshwater environment 1-4 years before leaving for the salt. Having a dam would significantly alter this life history, and probably in most cases extinguish it...Survival, ability to adapt and health would decrease....Has the group looked at the Pelton Round Butte project?

Dam spills should not hold water until late spring and etc if this is proposed. Flows should be bleed off normally from the temporary stored pool during high flow events, this way the natural hydrological process are still in effect (albiet no more high flows). Many salmon during spring—steelhead/chinook depend on pronounced high flows to move upstream into the upper watershed, some moving as quickly as 30 miles a day, if this flow is gone, then so is the ability. Maintaining high spring flows would increase salmon survival, just as in the columbia river studies, juveniles need high flows for safe spring passage, otherwise they are sitting ducks.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 26, 2016 8:31 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Shirley

Last Name: Billings

Organization:

Address:



Phone:

Email:



Comments:

In order for our area to grow and prosper I believe we must do something to mitigate flooding damage. It impacts every person in our area through loss/lack of business growth, existitng employers resulting in jobs to support families. The damaging effects on human life and quality of life crosses all social and economical barriers but hardest hit is often those who can least afford it. I want my money spent on the most efficient solution to the flooding problem that will help the most people. I believe that solution is Alternative #1.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 8:47 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Mary Lou

Last Name: Bissett

Organization:

Address:

[Redacted Address]

Phone:

[Redacted Phone]

Email:

[Redacted Email]

Comments: I strongly support implementation of Alternative 1, building a dam to reduce flooding and manage water flow to the river year around.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 12:38 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Pam

Last Name: Borso

Organization: Ms.

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

I am writing to support Alternative 4; Restorative Flood Protection. Dams stop salmon and disrupt habitat. Restoring the connectivity to this huge basin would preferred to further fish and wildlife habitat.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 23, 2016 11:16 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Leon

Last Name: Bowman

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I prefer a dam on the upper Chehalis River. If it is economic feasible I would like to see it generate electricity. Our auto repair shop has had water 4 times since building it in 1974. 5 inches, 5 1/2 inches, 16 inches and 2007 36 inches. The problem is not going away. We have the most public support right now that we ever have had. Let's attempt to fix the problem.
I say attempt because Storms Happen, we can only hope to stay ahead of nature.

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This email was built and sent using [Visual Form Builder](#).

From: John Box [REDACTED]
Sent: Thursday, November 10, 2016 2:36 PM
To: info@chehalisbasinstrategy.com
Subject: Comment regarding the Chehalis Basin Strategy

My comment specifically focuses on my opposition to the possibility that Alternative 1 is selected. I currently live in the Upper Columbia basin after periods in NW OR, and various locations on the west side of the Cascades in Washington. Being an angler in the Upper Columbia I'm seeing the many issues posed by dams within the mainstem of the Columbia and the harms caused to our ESA listed populations.

There is currently a lot of habitat reconstruction being done in my area, but it is a complete fallacy to suggest that those projects can make up for what has been taken away.

I'm in complete opposition of the creation of a flood control dam on the Chehalis. I believe the Chehalis is currently the longest river in WA with out a dam on it. It would be a shame to continue with the ecological destruction of rivers through dam creation.

Please do not consider Alternative 1.

Thank you,
John Box
[REDACTED]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 5:46 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Thomas D.
Last Name: Bradley
Organization: Thomas D. Bradley, PS, Certified Public Accountants

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: I have been a CPA in the practice of public accounting in Chehalis since 1979. Over the years there have been several floods, some small and a few major, especially December 2007. The floods and threat of flooding have been devastating to our entire community and especially those who are impacted directly in their homes and businesses. We now have an opportunity to do something to reduce the impact of future flood events. I support Alternative 1 as the best option to reduce flooding in the future and enhance fish habitat in the Chehalis River and tributaries. Alternative 2 would protect I-5 but could actually make the impact worse for surrounding areas. Alternative 3 does not do nearly enough to reduce the impacts. Alternative 4 would displace hundreds of landowners with small farms at a huge cost to buy replacement property. The reduction in flooding in Chehalis and Centralia would be very small. The dam proposed in Alternative 1 should be a retention dam to allow storage during the winter and controlled release during the summer to maintain flows in the river. Thank you for the opportunity to express my opinion.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 7:16 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Brake-Chehalis-River-EIS-Comments.docx

Comment Form

First Name: William

Last Name: Brake

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: Attached are my Comments on the Chehalis Basin Strategy

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Brake-Chehalis-River-EIS-Comments.docx>

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November 13, 2016

CHEHALISBASINSTRATEGY.COM/COMMENT-FORM/

I am William Brake a Retired Chemical Engineer and Registered Professional Engineer with a 35 Year Career in the Upstream Energy Business and live in Vancouver Washington for the past 11 Years.

I am also concerned on the flooding of the Chehalis River Basin and the impacts on Interstate 5 and the Commerce that uses the I-5 Corridor.

However, the wisdom of the American Whitewater Association has been overlooked in the massive 593 page document.

1. Overall: Ecology should reject Alternative 1 (proposing a dam/reservoir as a flood retention facility) and instead focus on local actions to reduce flood damage, as well as aquatic restoration.
2. The Flood Retention Flow Augmentation (FRFA) dam/reservoir proposal has very few benefits. It may improve a small amount of habitat just downstream of the dam, but the reservoir footprint will destroy a substantial amount of spawning habitat and wipe out juvenile lamprey. The risks are too large and the benefits too speculative.
3. Dams will affect the movement of large woody debris and sediment in the river, with negative impacts all the way down the system to Grays Harbor.
4. The dams may disrupt water supply and, given the over-allocation of water rights in the Chehalis Basin, it will be extremely difficult to protect flow releases from the FRFA reservoir.
5. A recent WSU study indicates that reservoir in our latitudes release much more methane than previously thought. The Draft PEIS does not assess how much the proposed reservoirs will contribute to GHG emissions.

Thank You for allowing Public Input into this Chehalis River Project.

William Brake PE

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

New Dam Proposed for Chehalis River (WA)

*posted November 9, 2016
by Thomas O'Keefe*



The Chehalis Basin is the second largest river basin in Washington State. It is a uniquely fertile and abundant river basin, but it has suffered from devastating flooding for decades. One proposal to address the chronic flooding issue is construction of a new dam that would represent the largest new dam in Washington State in years on a currently free-flowing river.

The Washington Department of Ecology is currently accepting public comment on this proposal for a new massive dam on the Chehalis River. The dam would inundate an outstanding Class III whitewater run, one of the longer stretches of continuous whitewater in the state. Although the river is currently difficult to access due to the need to secure an expensive permit issued by the forest landowner, we believe blocking this river by a dam and inundating several miles under a reservoir will be bad for fish and the overall health of this spectacular river, and will preclude future opportunities to realize its recreational potential. Importantly, the flood control benefits are relatively small given the expense and environmental impact of this project.

As an alternative, American Whitewater supports actions evaluated in the Environmental Impact Statement (EIS) that include projects to reduce flooding and closures of I-5, airport levee improvements for the Chehalis-Centralia Airport, an Aberdeen/Hoquiam North Shore Levee, and Restorative Flood Protection that is intended to rebuild some of the lost natural flood storage capacity of the river by reconnecting the river with its floodplain and enhancing natural flood storage. We also support reducing local-scale flood damage through elevating buildings in the floodplain, buying frequently flood-damaged properties from willing landowners, and land use management policies to limit new development in the floodplain. Finally, the EIS includes actions to restore degraded aquatic species habitat that we support

We encourage American Whitewater members to comment on this proposed project indicating opposition to the dams and support for alternatives that include restorative flood protection; investment in projects that include I-5 protection, the airport levee, and Aberdeen/Hoquiam North Shore levee; and local-scale projects that include land management policies that discourage development in the floodplain.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 10, 2016 3:07 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: SHEILAH
Last Name: BRAY
Organization: CONFEDERATED TRIBES OF THE CHEHALIS RESERVATION

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: I am writing to voice my opinion about these proposed solutions to the flooding of the Chehalis Basin. The proposed dam is, in my opinion, the worst solution to a flooding issue. The flooding of the Chehalis Basin has been happening for decades, and probably centuries. Building a dam that would ultimately flood other areas while wiping out wildlife habitats, aquatic life, plant life, and archeological artifacts, all to 'save' a few buildings and other structures that should have never been built in flood plains in the first place, is asinine. Buildings and homes can be rebuilt. Wild life, archeological artifacts, and plant life, once they are destroyed from being buried under water because of a dam, can not ever be recovered. The state should not feel obligated to 'fix' the flooding that has occurred in this area for a very long time just so some buildings, structures and homes can not get flooded while in the flood plains! Also, the building of stores and other structures should not just continue in these flood areas! If I decided to build my store or house in a known flood area, I alone should be responsible for what may happen to my building when it rains enough to flood! I should also pay a fine to the state, county and city for having the audacity of building right where it frequently floods. No to the dam. No to the state of Washington bailing out the chosen few who foolishly build in the known flood zones; Yes to recovery by using plants and aquatic life that should help strengthen the area around the Chehalis River and reduce flood damage naturally. Yes to heavy fines to those who build in the flood zones.

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This email was built and sent using [Visual Form Builder](#).

From: [Judy Breen](#)
To: [Bailey, Chrissy \(ECY\)](#)
Subject: Re: Chehalis Basin Strategy SEPA Draft Programmatic EIS | comment period extension
Date: Saturday, November 12, 2016 5:49:04 PM

Have been meaning to email you and the days just slip away. Realize the deadline for comments is Monday the 14th. Thank you for the presentation and taking the time for our resident's comments. There are many of us heavily affected by the Chehalis Basin flooding. Of course I agree that the only and best option is the dam. To me the hold and release one is the best option, as the poor salmon need extreme help in the summer, when the Chehalis River becomes a low oxygen/temperature body of water. I understand the Indian's are against it, but it would be a win/win as far as I am concerned. The other comment is this has been STUDIED to death, and the funds spent on STUDIES could have probably built the dam. Also, if something had been done even 15 years ago, it probably would have cost a lot less. The other thing that I resent, is with all of your studies, you continue to let filling to be done in the flood plains and even floodways. There is no way the designation on the east side of I-5 at Exit 72 should have been allowed to be changed to "flood plain" not "floodway". I have sent years of multiple pictures of the Newaukum River roaring across my front field, even washing out my driveway and taking out fences. No one cares!! I have hired attorneys and a hydrologist to no avail. I have lived on this farm since 1962, and the river never even came across our field until 1990. That is because of all of the fill allowed on the west side of the freeway. Also the fill allowed at the Wal Mart area affects and backs up the Newaukum River, causing more flooding here in the Exit 72 area. Also, as far as the plan to buy out all of the farmers in the Adna/Curtis/Boistfort Valley and move them to the hills is the most asinine and insane idea anyone could ever dream up. Whoever dreamed up that insanity should either be demoted or fired. I wonder if any of you have spent your entire living in the Chehalis River basin on either the Chehalis or Newaukum Rivers? You might care more and try harder to come up with and implement something to help this area. It is all about the dollar and I mean allowing continued fill and only caring about protecting I-5, not residents of this area. Very truly yours, Judy Breen, 167 Kirkland Road, Chehalis, WA, 98532, 360-748-4593.

From: Bailey, Chrissy (ECY)
Sent: Friday, October 21, 2016 5:14 PM
To: Bailey, Chrissy (ECY)
Subject: Chehalis Basin Strategy SEPA Draft Programmatic EIS | comment period extension

Please note:

The Department of Ecology received and considered 5 requests for an extension of the Chehalis Basin Strategy SEPA Draft Programmatic EIS comment period.

Per the attached notice, Ecology is granting a 14-day extension to the public comment period. The new closing date for the public comment period will be **November 14, 2016**.

Thank you,

Chrissy Bailey

Chehalis Basin Strategy Programmatic EIS PM

Mobile: (360) 790-8822

Desk: (360) 407-6781

chr461@ecy.wa.gov



Before printing, please consider the environment.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 4:56 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Chehalis_comments.pdf

Comment Form

First Name: Andrew

Last Name: Brown

Organization:

Address:



Phone:



Email:

To Whom It May Concern:

Comments:

I am pleased to provide comments on the Chehalis Basin Strategy draft EIS. I provide these comments as a lifetime resident of Western Washington, a frequent user of public lands within the Chehalis basin, a regular commuter through the affected floodplain, and a research scientist with substantial knowledge of salmon ecology. While I appreciate the considerable time and resources invested in development of the draft Alternatives, I am both surprised and disappointed to see that construction of a dam in the Chehalis basin is still considered a viable option for flood control. Alternative 1 is unacceptable as it poses a grave threat to unique fisheries resources in the upper Chehalis basin, and to tribal entities and local economies that depend on them. Moreover, other proposed Alternatives would provide effective flood control improvements, and could do so at lower cost.

The draft EIS extensively addresses the significant fisheries resources existing within the Chehalis basin. In addition to supporting a substantial run of wild steelhead (a globally at-risk species that is federally Threatened in nearby waters), the upper Chehalis is particularly unique among western Washington rivers in that it supports a population of stream-maturing chinook that do not depend on early season snow and glacial melt to survive the holdover period. Other such populations existed historically (e.g., in the Clearwater River of the Olympic Peninsula), but there is no doubt that the population in the Chehalis is the largest extant – remarkably robust fish, considering the habitat impacts already absorbed. Given their unique biological value (to say nothing of their cultural and potential economic values) construction of a dam that would inundate – or flood – critical

upriver holdover and spawning habitat, is at best short-sighted. A similarly short-sighted dam construction project on the Elwah river all but guaranteed the demise of another unique stream-maturing western Washington chinook population. Those dams provided some fleeting economic benefit to the North Peninsula, but their effect on fish was catastrophic and in a matter of decades, local residents, elected officials and tribal leaders called for their removal. Several more decades and several hundred million federal dollars later (speaking of economic impacts), the dams are gone, but the spring/summer chinook population is hanging by a thin strand; a warming climate and receding glaciers may preempt their recovery altogether. In fact, in a strange twist, if projected impacts of climate change on snowpack and glacial melt are borne out, the stream-maturing chinook of the heavily impacted yet spring-fed Chehalis may be better suited to survive than populations of some more-pristine but snow-fed freestone rivers of the Cascades and the Olympics (e.g., Sauk, Suiattle, Skykomish, Queets, Quinault, Hoh, Elwah).

While Alternative 1 attempts to offer some provisions for fish, the details of fish passage or trap-and-haul facilities will be moot if a large segment of critical spawning, rearing, and holdover habitat becomes lake bed seasonally or permanently. Habitat improvements elsewhere in the basin (e.g., culvert removal in downstream tributaries) are a separate issue and cannot reasonably be offered as an ameliorative measure to support dam construction. In short, though any alteration of the natural floodplain can be considered an “impact,” there is no more consistently detrimental impact to rivers and fish than dam-building. I and the many others opposed to Alternative 1 understand that something must be done to reduce flood impacts to existing infrastructure within the Chehalis basin. Some combination of Alternatives 2-4, including levee improvements and updates to existing infrastructure (i.e. elevation above the likely inundation zone) will likely meet this need, though there is inherent risk in developing floodplains. On that point, Alternative 1 Evaluation essentially dismisses the possibility of earthquake damage leading to dam failure (“Geology” p. 19). The section-ending qualifier “could have an adverse impact on downstream communities” certainly seems to understate potential impacts of activity along the overdue Cascadia fault. This is a slight but serious risk, which can be added to the economic / fundraising burden of dam construction, the direct assault on one more of Washington’s salmon populations (the same species appearing on the Washington State quarter, by the way), and the further denigration of Chehalis and Quinault Tribal values, as reasons to put Alternative 1 to rest once and for all in favor of more sensible Alternatives.

Improve existing levees, build some more, elevate or relocate at-risk developments, but DO NOT build a dam on the Chehalis River.

Thank you for taking the time to consider my comments.

Sincerely,

Dr. Andrew Brown
Kent, WA

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http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Chehalis_comments.pdf

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This email was built and sent using [Visual Form Builder](#).

To Whom It May Concern:

I am pleased to provide comments on the Chehalis Basin Strategy draft EIS. I provide these comments as a lifetime resident of Western Washington, a frequent user of public lands within the Chehalis basin, a regular commuter through the affected floodplain, and a research scientist with substantial knowledge of salmon ecology. While I appreciate the considerable time and resources invested in development of the draft Alternatives, I am both surprised and disappointed to see that construction of a dam in the Chehalis basin is still considered a viable option for flood control. **Alternative 1 is unacceptable** as it poses a grave threat to unique fisheries resources in the upper Chehalis basin, and to tribal entities and local economies that depend on them. Moreover, other proposed Alternatives would provide effective flood control improvements, and could do so at lower cost.

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While Alternative 1 attempts to offer some provisions for fish, the details of fish passage or trap-and-haul facilities will be moot if a large segment of critical spawning, rearing, and holdover habitat becomes lake bed seasonally or permanently. Habitat improvements elsewhere in the basin (e.g., culvert removal in downstream tributaries) are a separate issue and cannot reasonably be offered as an ameliorative measure to support dam construction. In short, though any alteration of the natural floodplain can be considered an “impact,” there is no more consistently detrimental impact to rivers and fish than dam-building. I and the many others opposed to Alternative 1 understand that something must be done to reduce flood impacts to existing infrastructure within the Chehalis basin. Some

combination of Alternatives 2-4, including levee improvements and updates to existing infrastructure (i.e. elevation above the likely inundation zone) will likely meet this need, though there is inherent risk in developing floodplains. On that point, Alternative 1 Evaluation essentially dismisses the possibility of earthquake damage leading to dam failure ("Geology" p. 19). The section-ending qualifier "could have an adverse impact on downstream communities" certainly seems to understate potential impacts of activity along the overdue Cascadia fault. This is a slight but serious risk, which can be added to the economic / fundraising burden of dam construction, the direct assault on one more of Washington's salmon populations (the same species appearing on the Washington State quarter, by the way), and the further denigration of Chehalis and Quinault Tribal values, as reasons to put Alternative 1 to rest once and for all in favor of more sensible Alternatives.

Improve existing levees, build some more, elevate or relocate at-risk developments, but ***do not build a dam on the Chehalis River.***

Thank you for taking the time to consider my comments.

Sincerely,

Dr. Andrew Brown
Kent, WA

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, November 9, 2016 12:07 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Ally

Last Name: Bugliari

Organization:

Address:

[Redacted Address]

Phone:

[Redacted Phone]

Email:

[Redacted Email]

Comments:

Please do not build another dam that would remove whitewater recreational opportunities and harm fish and other wildlife!

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 3:16 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Alicia

Last Name: Bull

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

I am writing this comment in support of alternative #1. I believe water retention is our best option to address flooding in the Chehalis Basin.

kind regards,
Alicia Bull

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 1:48 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Nikki

Last Name: Bush

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: As a Lewis county resident and a family that was severely impacted by the flood of 2007 in the greater Chehalis river area I am in favor of Option 1- Flood retention dam. This option seems to be the most logical as to benefit the most widespread area. That being said, I am most definitely NOT in favor of Option 4 as this would greatly impact my family personally as well financially along with the education of my children as where they attend school, Pe Ell School District. A buy out and relocation is not a feasible option. I also do not see how this would prevent I-5 interruption in a major event.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 17, 2016 3:55 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Teresa

Last Name: Bush

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments: I chose option 1

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 2:34 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Susan

Last Name: Carpenter

Organization:

Address:



Phone:

Email:

Comments: It is very important to protect our livelihood in Lewis county. Option 1 is the most effective choice .12

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 7:40 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Lauri

Last Name: Chown

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

I think the only solution is to put the dam on the Chehalis river, not only would it protect town and I 5 but it would protect us in the PeEll, Doty, Meskil, Boistfort and Adna area. Anything else leave the rest of us unprotected

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 9:50 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Bj

Last Name: Clinger

Organization: private citizen

Address:



Phone:

Email:

Comments:

Alternative 1 which includes a flood retention dam appears to provide the most good for the most people of Chehalis and Lewis County. I support the plan's application as soon as is reasonably practicable.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 11:15 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Randy

Last Name: Cobb

Organization:

Address: [Redacted]

Phone:

Email: [Redacted]

Comments: Just a reminder that government, therefore the decisions they make, are supposed to be "for the people"! People that feel safe and secure in their homes so that they can live and work and spend their money here, are the foundation of a healthy, thriving economy! Based on these beliefs, I support Alternative 1 of the 5 proposals being considered! The others do not seem to do enough to alleviate the flooding issue or is detrimental the the people of this area, especially #4! So, please proceed with the 1st alternative! Thank you

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, November 4, 2016 10:50 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Randall

Last Name: Collins

Organization:

Address: [Redacted]

Phone:

Email: [Redacted]

Comments: I support "Alternative 4". Washington's Chehalis River is the only river where salmon aren't endangered. The river, which empties into Grays Harbor Estuary in the Pacific Ocean is the only one left with large wild salmon runs. "Alternative 1" of the Chehalis Basin Strategy would inundate or block access to 40 miles of salmon habitat. "Alternative 4" would provide restorative flood protection, relocation, and aquatic species habitat restoration. We have learned much about the destructive, hidden costs of dams over the years. Please do not build a dam on the Chehalis and remove our last hope for wild salmon and the wildlife.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 17, 2016 12:07 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Heather

Last Name: Cox

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

Our family supports alternative #1. Building a dam provides the best outcome for the Pe Ell, Boistfort, & Chehalis communities. All other options would just cause more destruction to all Western Lewis County.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 7:34 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: D.

Last Name: Crake

Organization:

Address: Chehalis

Phone:

Email:

Comments:

<http://inhabitat.com/thirsty-concrete-absorbs-880-gallons-of-water-a-minute-to-minimize-urban-floods/>

‘Thirsty’ concrete absorbs 880 gallons of water a minute to minimize urban floods

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This email was built and sent using [Visual Form Builder](#).

To: J Vander Stoep, Über Esq, member Gov's Chehalis River Basin Flood Work Group
To: Lewis County Commissioners Edna J Fund, Bill Schulte, Gary Stamper,
Commissioner Candidates Bob Bozarth, Bobby Jackson and Dan Keahey
To: Lonnie Willey, Pe Ell Mayor; Dennis Dawes, Chehalis Mayor

October 13, 2016

From: John F Cramer; MSEE UW, 34 yrs Boeing Mil-Space, 22 yrs Ener Management and Systems Engineering; [REDACTED]

Message: A 100 year life Dam above Pe Ell, with a permanent reservoir, potentially can reduce Property Losses for Storms/Floods by \$75 Billion at a Benefit-to-Cost-Ratio of 60:1. This is the basic must-have item from Work Group Alternative One.

Discussion: Of the last 16 record storms and floods which occurred in the Willipa Hills and Chehalis River Basin, 14 occurred at times of minima in the ~11 year Sunspot Cycle. When the number of Sunspots is zero to ~10 per day, there is a decrease in Total Solar Irradiance [Sun heat, all EM frequencies] and an increase in the imbalance of Earth Enthalpy, i.e., there is more [Solar energy being reflected from the Earth plus long wavelength (IR, $700\text{nm} < \lambda < 1\text{ mm}$) Earth radiation to outer space] than [Sun energy being absorbed by the earth and it's oceans]. This correlates and coincides with extra Earth atmospheric instabilities, i.e. there are more storms/floods and stronger storms/floods during Sunspot minima like that in 2007 to 2009.

Sunspots zeroed mid-2007 followed by the 145+MPH hurricane that dumped well over a foot of rain in under 24 hours on 3 Dec, 2007 in the Willipa Hills. Whereas the Sun-spots have usually bounced right back up after hitting zero, that did not happen in Sunspot Cycle 23 which "ended" mid-year 2007. Sunspots went to zero and stayed low for two years and finally started back up the fall of 2009. That is an important reason for the 2nd record flood in Jan 2009, just over a year after the record flood of 2007.

Conclusion: When Sunspots go to zero and stay low, nature has already proven that another record storm/flood can happen the very next winter after a record storm/flood.

Importance: The 3 Dec 2007 record storm/flood cost over \$850 Million. The next record storm/flood, which is expected fall/winter 2018/2019 some eleven years later, will likely cost WA State \$1Billion to \$1.25 Billion because we have no Dam.

Astro-Physicist PhD Habibullo Abdussamatov shows curves of Sunspots that continue to decrease in count from Cycle 23 to Cycle 24, which is now winding down. He shows Cycles 25,26, etc will have fewer Sunspots yet and the Sun Total Solar Irradiance [TSI] will continue to go to a minimum of about 1360 watts per square meter of projected Earth area. Reference: GRAND MINIMUM OF THE TOTAL SOLAR IRRADIANCE LEADS TO THE LITTLE ICE AGE by Habibullo Abdussamatov | November 25, 2013 Source: Published by Nestor-Istoriya in

St. Petersburg, Russia, October 2013, ISBN 978-5-44690-122-7, -246 p., in Russian.
abduss@gao.spb.ru

From 2043 on, there likely will be a few (or zero) Sunspots for over 60 years. History says the atmosphere will be more unstable and the climate will be colder as in the Wolf (1280 to 1350), Sporer (1460 to 1550), Maunder Sunspot Minimum from 1645AD to 1715AD, and Dalton Minimum from 1790 to 1830AD, each of which Dr HA terms a "Little Ice Age"[LIA]. We had previously labeled 1280AD to 1830AD as the LIA.

With no or few Sunspots, expect "record" storms/floods every year from 2043AD to 2130AD. So, the upper Chehalis River Dam could well prevent a \$1+ Billion loss every year for 75 years. Result: a 100 year Dam life yields a \$75 Billion+ total benefit of property damage avoided, not counting inflation or additional growth in the Basin (not the study benefit of \$3.5 Billion). If the Dam cost \$1.25 Billion, this is a 60:1 benefit-to-cost ratio. As they say in New York, "What's not to love about that?" If we delay building the dam, by 2043 there may be little or nothing left to protect. This is your choice.

The Army Corp of Engineers has built many earthquake-proof dams. Those preaching doom for Pe Ell do so without benefit of backup data or rationale.

I favor conservation electrical generation. With the price of electricity going up regularly, it appears to me to border on criminal to not convert all rainfall water potential energy into usable electrical energy and help hold down the cost of energy in our area. Let us conserve energy.

I am given to understand that new technology turbines driving the electrical generators have well over 90% success saving our important juvenile fish. We would lose fewer fish to the turbines than we would to Lamprey blood-sucking-vampire fish below the Dam. I would not spend one dollar to help the "blood sucker" get into the lake above the dam.

Fish runs below our Alder Dam on the Nisqually River have prospered as have those at many Dams. Water from Alder/LeGrand Dam lowers river temperature in the summer which is a help to our fish. With the Dam in place, additional habitat can be enhanced without the fear that it will be washed away in the next big storm and flood.

My Opinion: An upper Chehalis River Dam above Pe Ell, with $\geq 140,000$ Acre-feet permanent lake and active water level management is logically most secure/ reliable/ available, and provides the highest probability of accomplishing flood retention and mitigation tasks.

One concern about a flow-through Dam is that there is a probability greater than zero [maybe 25%] that the gates would fail to close [Murphy's Law has not been repealed; If something can go wrong, it will go wrong and at the worst possible time.] Perhaps logs or slash from logging jams the gates. Perhaps the sensor mechanism that says this is a big rain gets stuck and doesn't generate the signal to close the gates. Perhaps the battery that energizes the closure mechanism goes dead. Maybe the backup man to close the gates cannot get to the dam in the torrential downpour. Maybe he [or she] is on vacation and didn't tell the replacement backup person, etc, etc, etc.

Until we have a full failure- modes-and-effects analysis of the dam operations, I surely would not trust an unattended facility to be safe and available and to reliably do operations like a robot.

Bear in mind that a robotic unattended flow through Dam facility implies a computer with software that will implement the required logical steps in the operational process. We will address this below.

If given that there is always a closed Dam to hold back the water, you do not have to worry about the failure chain that would lead to a \$Billion dollar property loss. You should have person(s) on duty at all times to take care of whatever problems arise. Those person(s) can make sure that everything is operational and in working order.

You do not want to wait for someone from town [Pe Ell or Chehalis] to get out of bed [these things always happen in the middle of the night, with icy roads in the winter]. You want any problem to be noticed and handled in minutes, not hours or days.

This responsible person needs to be able to coordinate with other entities to make sure that the water drawdown after a storm does not cause more flooding.

There is no such thing as error free software. Software is released to customers for use when the number of errors found per week of testing gets down to "an acceptable number". [Note: When the software project runs out of time or money, sometimes that is when the software is declared to be "ready to use".] Then, they let the customer use the software [Beta testing], and when the customers find a problem, the software folks try to fix it. Hopefully, the person who built the software is still available and hasn't gone on to another project or company. Otherwise, some of the assumptions used in building the software will be lost and you will start putting in more errors than you find and fix. Ultimately, enough spurious errors are incorporated that the error rate builds up to an "unacceptable level". The software is then declared to be "non-supportable" and the software is termed "worn out" and must be rebuilt from scratch.

When you invent a new procedure, you can train a person to do it in a few minutes to a few hours and the person will tell you when he or she does not comprehend. Computer software will at most just tell you it doesn't work; you must figure out why.

Note to concerned parties: A WA Licensed Professional Civil Engineer friend says a complete flooding solution requires [in addition to the Dam above Pe Ell] that you:

- 1) remove the weirs in the Chehalis channel, which means flatten the channel bottom,
- 2) dredge and blast to lower some channel bottom sections that are significantly higher than others, (every foot you lower the channel helps lower the flood level you will have in Centralia, on the freeway or in Chehalis),
- 3) remove obvious bottlenecks and sudden changes in flow direction like at the Mellen Street Bridge and where other streams merge with the Chehalis River,
- 4) increase the capacity of the Skookumchuck Dam.

I wish you lots of luck getting those done.

We are not beholden to anyone. We live at 1100 feet altitude and have no skin in the game; we provide objective analysis. Our total interest is the welfare of ALL the people in the Chehalis River Basin. Sincerely, John F (and wife Nancy R) Cramer

PS: Floodplain dwellers, you will want to tether your escape boat to the back porch. You may need it sooner than I expect. The sunspot number hit 12 this June but popped back up and is now at 25 for Sept 2016. It could go to zero anytime from now to 2019. Be safe, not sorry. Make advance arrangements to get your livestock to high ground.

Reference 2: Chronicle article 29 Sept 29, 2016 “A Generational Crossroads”, subtitle, “State Report Proposes Options for Future of Chehalis River Basin”.

From: [REDACTED]
Sent: Tuesday, November 1, 2016 9:25 AM
To: info@chehalisbasinstrategy.com; JFC451934@aol.com; rachel.hunt@lewiscountywa.gov
Subject: CRAMER MEMO RE FLOOD PREVENTION 4 ALTERNATIVES

TO: info@chehalisbasinstrategy.com revised 11AM PDT, 31 Oct 2016
To: J Vander Stoep; Über Esq, Member Extraordinaire of Gov's Chehalis River Basin Flood Work Group
To: Lewis County Commissioners Edna J Fund, Bill Schulte, Gary Stamper, Commissioner Candidates Bob Bozarth, Bobby Jackson and Dan Keahey
To: Ron Averill, Rep, Centralia Flood Authority; Bonnie Canaday, Centralia Mayor
To: Lon Willey, Pe Ell Mayor; Dennis Dawes, Chehalis Mayor
From: John F Cramer; MSEE UW, 34 yr Boeing Mil-Space, 22 yr Engineering Mgmt and Systems Engr; [REDACTED]
Subject: Comments Re Draft EIS, Analysis/Conclusions Re Gov's Work Group Alternatives Solving The Number 1 Requirement for Flood Damage Prevention in The TOTAL Chehalis River Basin, from Pe Ell to Pacific Ocean

Message # ONE: A 100 year life Dam near Pe Ell, with permanent reservoir, can potentially avoid Chehalis Basin Property Losses of ~ \$75 Billion for Storms & Floods at a Benefit-to-Cost-Ratio of 60:1 [explanation below].

This Dam & Reservoir is a must-have item from Work Group Alternative One to meet the requirement to prevent flood damage in the TOTAL Chehalis River Basin. It helps protect I-5; it minimizes business losses by reducing disruption of I-5 transportation from ~5 days to a few hours.

This result includes consideration of *CLIMATE CHANGE* factors defined by Habibullo Abdussamatov, PhD Astro-Physicist [who is in charge of Solar Experiments on the International Space Station, Russian Section, and in charge of Solar Research at the Pulkovo Observatory in St Petersburg, Russia.] Dr HA has been studying the Sun for over 50 years and is a world renowned expert. Also Valentina Zharkova's [North Umbria Univ, UK] new model shows next mini-Ice-Age begins in 15 years, from Sun heat reduction.

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Alternatives [2, 3, 4] do not help dwellers in the total Basin, and are not effective in protecting TOTAL Basin property, businesses and folks from floods. They are not recommended as is the so-called "No Action" Alt.

Weather, CLIMATE CHANGE, Storms and Floods, History vs Future:

The Climate always is changing because Earth Enthalpy is never zero [balanced heat]. The Sun heat output is not quite a constant, it varies in cycles of about 200 years, i.e. it increases to a maximum, levels out, goes down to a minimum and then back up. It just went to a maximum in the 1990's and went down enough [about 0.015 Watts per square meter of projected Earth area] to cause global warming to stop, to the great dismay of the Anthropogenic (people caused) GLOBAL WARMING cabal. Whereas the AGW folks tell us that GW brings more atmospheric instability, recorded experience in 1280AD through 1350AD in the Wolf Sunspot Minimum clearly shows that Global Cooling brings on more atmospheric instabilities and the resulting storms, torrential rains,

cold, crop losses, etc. This brought famines, disease (including the dreaded Bubonic Plague), etc. Both Europe and China suffered population losses of more than 50% by 1350AD. Habibullo Abdussamatov, PhD Astro-Physicist measured the Sun Total Solar Irradiation [TSI] and verified we are on the same Sun TSI curve as that for the Maunder Sunspot Minimum of 1645AD to 1715AD, the coldest part of the Little Ice Age from 1280AD to 1830AD. Global warming is over and cold is on the way. This would be a good time to build a hot-house/green-house for your garden. All forms of energy will soon be needed.

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We conclude: When Sunspots go to zero and stay low, nature has already proven that another record storm/flood can happen the very next winter after a record storm/flood.

Importance: The 3 Dec 2007 record storm/flood cost over \$850 Million. The next record storm/flood, which is expected fall/winter 2018/2019 some eleven years later, will likely cost WA State \$1 Billion to \$1.25 Billion. Reasons: we have no Dam, inflation, less Total Solar Irradiance, higher Bond albedo, more atmospheric instability than '07.

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From 2043 on, there likely will be a few (or zero) Sunspots for over 60 years. History says the atmosphere will be more unstable and the climate will be colder as in the Wolf (1280 to 1350), Spörer (1460 to 1550), Maunder Sunspot Minimum from 1645AD to 1715AD, and Dalton Minimum from 1790 to 1830AD, each of which Dr HA terms a "Little Ice Age"[LIA]. Note: We had previously known 1280AD to 1830AD as the LIA.

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My Considered Opinion: An upper Chehalis River Dam near Pe Ell, with 140,000 + Acre-feet permanent lake and people directed water-level management is logically the most secure, reliable, and available. This surely provides the highest probability of accomplishing the flood retention/mitigation task for the Total Chehalis River Basin.

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You should have person(s) on duty at all times to take care of whatever problems arise. Those person(s) can make sure that everything is operational and in working order.

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Note to concerned parties: A WA Licensed Professional Civil Engineer friend says a complete flooding solution requires [in addition to the Dam/lake near Pe Ell] that you:

- 1) remove the weirs in the Chehalis channel, which means flatten the channel bottom,
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We wish you lots of luck in ever getting those above 4 things done.

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above Pe Ell for the 3 Dec 2007 flood, the actions taken for Alt 4 will hardly slow the flood down and will make ~zero difference in the destruction in the Total Chehalis River Basin. Alt 4 does not meet the Total Basin Protection Requirement.

Alt 4 appears to address how to return the Chehalis River Basin to the era of the 1600's or 1700's at the expense of people and farming. Alt4 puts original Gaia (Mommy Earth) at the highest priority, not people. Whereas we should all be good stewards of the earth and not destroy or waste it, the earth is not a more important creation than people, au contraire. Alt 4 will deleteriously affect WA State Farming GDP without question and will surely disrupt many people's lives. This certainly is not clever. It additionally is not necessary when a Dam will do the job without disruption of people. Use of the people's tax money to buy farms and tear citizens' lives apart is not moral or ethical, period.

The reason farms are in the valley is that is where the good soil for farming is located. We certainly don't want to turn the Chehalis River Basin into a mosquito infested swamp. Nor do we want to cause further gross erosion of the hill tops. Should several Environmentalists want to buy some farms with their own personal money and let them go wild, it is their money and their prerogative. Do not ask us citizens to pay for this.

Sincerely, John F and Nancy R Cramer 11AM, Monday, 24 October, 2016

ATTACHMENT: Article in the UK "Express" Re A Mini Ice Age coming soon.

www.Express.co.uk/news/science/723481/Earth-ICE-AGE-big-freeze-solar-activity Earth faces another [mini] ICE AGE within 15 YEARS as Russian **scientists discover Sun 'cooling'**. The Earth is heading towards another [mini] ice age as solar [electro]-magnetic activity is set to drop by up to 60 per cent in the next 15 years.

By SEAN MARTIN UPDATED: 12:22 GMT, Sat, Oct 22, 2016 [with JFC notes]

Experts say that solar activity as low as it currently is has not been seen since the mini-ice age that took place between 1645AD and 1715AD – a period known as the Maunder [Sunspot] Minimum where the entire Thames [River at London, England, pronounced "Tims"] froze over [with ice thick enough that they had winter fairs on the river ice].

A new model has allowed experts to predict solar activity with more accuracy than ever before and it suggests that magnetic activity will fall by 60 per cent between 2030 and 2040. The model looks at the Sun's 11-year magnetic activity cycle.

However, a mathematician has established a more up-to-date model that can forecast what the solar cycles will look like based upon dynamo effects in two layers of the Sun.

Dynamo effects are an Earth geophysical theory that dictates how the movement of the Earth's outer core conducts materials like liquid iron across the magnetic field to create an electric current – this also influences fluid motion beneath Earth's surface to create two magnetic fields along the axis of the Earth's rotation.

Valentina Zharkova from Northumbria University, UK, applied this theory to the Sun, and was able to predict the effects of solar cycles with 97 per cent accuracy. Ms Zharkova said at the National Astronomy Meeting [in the UK]: "We found magnetic wave components appearing in pairs, originating in two different layers in the Sun's interior". "They both have a frequency of approximately 11 years, although slightly different, and they are offset in time". "Combining both waves together and comparing to real data for the current solar cycle, we found that our predictions showed an accuracy of 97 per cent."

Ms Zharkova says the next [Sunspot] Cycle [#25 starting in 2019] is set to peak in 2022, and the cycle after, known as Cycle 26, will herald a new [mini] ice age. [Note: She speaks of a mini-Ice Age, not a Grand Ice Age that Earth sees on about 100,000 year cycles.] She continued: "In Cycle 26, the two

waves [almost] exactly mirror each other - peaking at the same time but in opposite [upper, lower] hemispheres of the Sun”.

“Their interaction will be disruptive, or [i.e.] they will nearly cancel each other. We predict that this will lead to the properties of a 'Maunder Minimum'." [Dr HA agrees.]

During the Maunder Sunspot Minimum, [1645-1715] temperatures dropped globally by 1.3 degrees celsius. [Note: $1.3 \times (9/5) = 2.34$ degrees F, and this is the *annual global average temperature reduction*.] Although it seems insignificant, it led to shorter [crop growing] seasons and ultimately to food shortages. [Note: This will surely lead to higher number of degree-days of heating for your house and higher fuel bills. With a CO2 tax to beat on the dead global-warming horse, fuel will cost much more.]

The Maunder Minimum is also known as the "prolonged sunspot minimum" and is the name used for the period starting in about 1645AD and continuing to about 1715AD.

During this 70 year period sunspots became exceedingly rare. [Note: People even began to doubt their existence. This is the coldest period in the 1280-1830AD Little Ice Age.]

The phenomenon was only properly researched in 1976 when John Eddy published a scientific paper. Astronomers before Eddy had also named the period after the husband and wife solar astronomers, Annie Maunder and E. Walter Maunder, who [as a team] studied how sunspot latitudes [on the Sun surface] changed with time.

Climate models have shown that low solar activity [Sunspots and TSI] interferes with the [Earth's] Jet Stream – the current of air and warm water which keeps Britain's temperatures higher than they would otherwise be. FINI

Updated email from original letter supportive of Alternative 1

TO: info@chehalisbasinstrategy.com revised 11AM PDT, 31 Oct 2016

To: J Vander Stoep; Über Esq, Member Extraordinaire of

Gov's Chehalis River Basin Flood Work Group

To: Lewis County Commissioners Edna J Fund, Bill Schulte, Gary Stamper,

Commissioner Candidates Bob Bozarth, Bobby Jackson and Dan Keahey

To: Ron Averill, Rep, Centralia Flood Authority; Bonnie Canaday, Centralia Mayor

To: Lon Willey, Pe Ell Mayor; Dennis Dawes, Chehalis Mayor

From: John F Cramer; MSEE UW, 34 yr Boeing Mil-Space, 22 yr Engineering Mgmt and Systems Engr;

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Alternative 3 supporters wish and hope and tinker around the edges of the problem. They would build habitat that floods will wash away every big flood. These are feel good actions, but don't solve the problem. We cannot recommend them as primary actions.

Alternative 4 is really not a solution because it will not stop the flooding down through the Chehalis River Basin. When you have over 70,000 acre feet of flood water as we did just in the watershed above Pe Ell for the 3 Dec 2007 flood, the actions taken for Alt 4 will hardly slow the flood down and will make ~zero difference in the destruction in the Total Chehalis River Basin. Alt 4 does not meet the Total Basin Protection Requirement.

Alt 4 appears to address how to return the Chehalis River Basin to the era of the 1600's Or 1700's at the expense of people and farming. Alt4 puts original Gaia (Mommy Earth) at the highest priority, not people. Whereas we should all be good stewards of the earth and not destroy or waste it, the earth is not a more important creation than people, au contraire. Alt 4 will deleteriously affect WA State Farming GDP without question and will surely disrupt many people's lives. This certainly is not clever. It additionally is not necessary when a Dam will do the job without disruption of people. Use of the people's tax money to buy farms and tear citizens' lives apart is not moral or ethical, period.

The reason farms are in the valley is that is where the good soil for farming is located. We certainly don't want to turn the Chehalis River Basin into a mosquito infested swamp. Nor do we want to cause further gross erosion of the hill tops. Should several Environmentalists want to buy some farms with their own personal money and let them go wild, it is their money and their prerogative. Do not ask us citizens to pay for this.

Sincerely, John F and Nancy R Cramer 11AM, Monday, 24 October, 2016

ATTACHMENT: Article in the UK "Express" Re A Mini Ice Age coming soon.
www.Express.co.uk/news/science/723481/Earth-ICE-AGE-big-freeze-solar-activity Earth faces another [mini] ICE AGE within 15 YEARS as Russian scientists discover Sun 'cooling'. The Earth is heading towards another [mini] ice age as solar [electro]-magnetic activity is set to drop by up to 60 per cent in the next 15 years.

By SEAN MARTIN UPDATED: 12:22 GMT, Sat, Oct 22, 2016 [with JFC notes]

Experts say that solar activity as low as it currently is has not been seen since the mini-ice age that took place between 1645AD and 1715AD – a period known as the Maunder [Sunspot] Minimum where the entire Thames [River at London, England, pronounced “Tims”] froze over [with ice thick enough that they had winter fairs on the river ice].

A new model has allowed experts to predict solar activity with more accuracy than ever before and it suggests that magnetic activity will fall by 60 per cent between 2030 and 2040. The model looks at the Sun’s 11-year magnetic activity cycle.

However, a mathematician has established a more up-to-date model that can forecast what the solar cycles will look like based upon dynamo effects in two layers of the Sun.

Dynamo effects are an Earth geophysical theory that dictates how the movement of the Earth’s outer core conducts materials like liquid iron across the magnetic field to create an electric current – this also influences fluid motion beneath Earth’s surface to create two magnetic fields along the axis of the Earth’s rotation.

Valentina Zharkova from Northumbria University, UK, applied this theory to the Sun, and was able to predict the effects of solar cycles with 97 per cent accuracy. Ms Zharkova said at the National Astronomy Meeting [in the UK]: “We found magnetic wave components appearing in pairs, originating in two different layers in the Sun’s interior”. “They both have a frequency of approximately 11 years, although slightly different, and they are offset in time”. “Combining both waves together and comparing to real data for the current solar cycle, we found that our predictions showed an accuracy of 97 per cent.”

Ms Zharkova says the next [Sunspot] Cycle [#25 starting in 2019] is set to peak in 2022, and the cycle after, known as Cycle 26, will herald a new [mini] ice age. [Note: She speaks of a mini-Ice Age, not a Grand Ice Age that Earth sees on about 100,000 year cycles.] She continued: "In Cycle 26, the two waves [almost] exactly mirror each other - peaking at the same time but in opposite [upper, lower] hemispheres of the Sun”.

“Their interaction will be disruptive, or [i.e.] they will nearly cancel each other. We predict that this will lead to the properties of a 'Maunder Minimum’.” [Dr HA agrees.]

During the Maunder Sunspot Minimum, [1645-1715] temperatures dropped globally by 1.3 degrees celsius. [Note: $1.3 \times (9/5) = 11.7/5 = 2.34$ degrees F, and this is the annual global average temperature reduction.] Although it seems insignificant, it led to shorter [crop growing] seasons and ultimately to food shortages. [Note: This will surely lead to higher number of degree-days of heating for your house and higher fuel bills. With a CO2 tax to beat on the dead global-warming horse, fuel will cost much more.]

The Maunder Minimum is also known as the "prolonged sunspot minimum" and is the name used for the period starting in about 1645AD and continuing to about 1715AD.

During this 70 year period sunspots became exceedingly rare. [Note: People even began to doubt their existence. This is the coldest period in the 1280-1830AD Little Ice Age.]

The phenomenon was only properly researched in 1976 when John Eddy published a scientific paper. Astronomers before Eddy had also named the period after the husband and wife solar astronomers, Annie Maunder and E. Walter Maunder, who [as a team] studied how sunspot latitudes [on the Sun surface] changed with time.

Climate models have shown that low solar activity [Sunspots and TSI] interferes with the [Earth's] Jet Stream – the current of air and warm water which keeps Britain's temperatures higher than they would otherwise be. FINI

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 1:22 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Richard

Last Name: Curtis

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Chehalis Basin. In reading through the DEIS and the alternatives, I feel there should be another alternative that has an emphasis on limiting or prohibiting development in the flood plain. Such an alternative would be simple, inexpensive and an effective solution to limiting damage from future flooding events. While a dam and levees will reduce the impact of a major flood event, the only real long term approach to preventing flood damage is restricting permanent development in the flood plain. This alternative has the benefit that it saves taxpayers the costs of building and maintaining extensive and expensive infrastructure. Why doesn't the DEIS include this as an alternative?

Comments:

The DEIS seems to accept that development will occur in the flood plain and therefore infrastructure must be developed to protect that development, ie, either we build a dam or property damage will occur. This is a false dichotomy. It is much easier to prevent damage by banning or at least limiting the continued development in the flood plain. Why doesn't the DEIS present and discuss an approach that would limit or ban permanent development in the flood plain?

The Chehalis River is simply doing what a healthy river system does naturally including carrying away winter rain and snow melt to the ocean while providing essential elements for a healthy ecosystem for humans and wildlife. In particular the river carries soil from the hills and deposits it in the floodplain creating rich farmlands that grow abundant farm crops in the summer. In addition the river provides both a recreational and commercial

fishery. Building infrastructure to modify the river restricts its ability to perform these and other beneficial functions. Why doesn't the DEIS discuss the adverse impact that building a dam and/or other infrastructure to prevent some of the flooding will have on the environment and the essential benefits of a naturally flowing river?

The DEIS makes it clear that the construction of a dam will not prevent all flooding in the Chehalis area and other communities downstream. In fact the proposed dam will only have a limited effect in reducing a flood event due to other tributaries entering the river above the city of Chehalis including the South Fork of the Chehalis River. Why doesn't the DEIS clearly present the potential for flood waters from all sources and discuss the limited capability of preventing flooding by a dam above PeEll? What effect will a dam above PeEll have on flooding in Chehalis if a storm event occurs over the South Fork of the Chehalis River or the Newaukum River basin? The limited ability of the dam above PeEll to prevent flooding must be fully discussed so that residents and decision makers are fully aware of the limits to flood prevention.

The DEIS states that modeling indicates one of the main benefits of the dam is to reduce the number of closure days on I-5 for a 100 year flood from 4 days to one day. However, there is no justifying documentation shown for that statement. Clearly that statement must be supported by appropriate documentation. As there are other parts of the proposed infrastructure that come into play including the levees that affect the water level over I-5. Why doesn't the DEIS provide documentation clearly showing what benefit the dam alone provides? Where is the reference pointing to the actual studies and modeling in the Chehalis Basin Strategy website or other documentation that would explain why that unsupported comment was made?

Western Washington, including Lewis County, is located in an active earthquake zone known as the Cascadia subduction zone. In addition there is a known fault running between Chehalis, Centralia and Doty known as the Doty Fault. According to geologists this fault has the potential to generate a magnitude 7.0 earthquake. If a dam is built nearby on the Chehalis River, what is the potential for an earthquake to cause damage to the dam structure or to cause landslides into the reservoir and result in a catastrophic failure. What impact would such an event have on the residents living downstream such as in PeEll or Chehalis? What impact will the reservoir have on the ground water resources in the area? What is the probability that a large body of water, such as the reservoir behind the dam, will trigger slippage of the fault and create an earthquake? What studies will be required to ensure the safety of residents living below a dam and reservoir placed near a fault line? If such a dam failure event occurs who will pay for the resulting damage? Will the taxpayers be held accountable as we are in the case of the OSO slide? Will the value of private properties situated below the dam be adversely impacted and if so by how much? If the dam fails what are the plans to safely evacuate residents living below the dam?

As mentioned above, the river naturally carries sediment from the watershed into the reservoir where it settles to the bottom. What is the estimated annual sediment load carried by the river? What will the impact be on the storage capacity of the reservoir? What is the expected lifespan of the dam and reservoir?

As there will be numerous activities over a long period of time during construction, what are the impacts to property owners and residents living in the area? What are the

environmental impacts that will occur during the construction of the dam? As hundreds of truckloads of rock and soil will be required to be removed from the site during construction, how will that impact traffic in the area? What will the impact be to the safety of residents living in the area? Will new roads be required as part of the construction effort?

What is the geologic profile of the site where the dam would be constructed? Why was the current site for the dam chosen? What impact will the dam and reservoir have on plants and animals currently living in the area where the dam will be constructed and the upstream area flooded by the reservoir? In particular what will the impact be on amphibians that are already struggling to survive due to other environmental threats?

Finally, there are far more uncertainties than those listed in the DEIS. Why has the discussion of uncertainties been limited to climate change and landowner cooperation. In reality there are numerous areas of uncertainty that must be addressed. For example, what are the uncertainties related to the geology of the area and the Doty Fault? What is the potential for a large body of water perched above a fault to cause slippage of the fault and damage or failure of the dam structure? As the geology of the area includes basalt intermixed with marine sediments, what will ensure the long term stability of a dam especially located in an active earthquake zone? There is a large uncertainty regarding the actual effectiveness of a dam in preventing future flooding due to the other rivers and streams in the watershed above the city of Chehalis. How will the dam ensure future floods are prevented when there are a multitude of sources of flood water outside the control of the dam? There is significant uncertainty regarding the landslide potential in the Chehalis Basin watershed. Why isn't the landslide potential included in the list of uncertainties? Why aren't the uncertainties regarding the archaeological resources in the area listed? Why aren't the uncertainties regarding the amount of overburden that must be removed and trucked to another location listed? Why aren't the uncertainties of the adverse impact to fish and wildlife listed? There are also uncertainties in the anticipated beneficial effects on the fishery from the dam through summer water releases including significant amounts of water being pumped from the river at that time for irrigation of farm crops? What is the actual impact and why aren't the uncertainties of the beneficial impact being presented in the DEIS? As the list above is but a small subset of the actual uncertainties, why aren't more of the known uncertainties being identified and listed?

Rational decisions depend on a thorough and comprehensive analysis of all facets of a problem to be solved especially when the costs both environmentally and economically are major with long lasting impacts as they are in this case. Therefore you must ensure that the final EIS is not only comprehensive and accurately reveals the environmental impacts but is unbiased and focused on providing essential information on which to base decisions and inform citizens who will ultimately pay for the projects that are approved as well as those who will directly benefit.

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Chehalis Basin Strategy EIS, c/o Anchor QEA

Nov. 13, 2016

720 Olive Way, ste 1900

Seattle, WA. 98101

To: Wa. Department of Ecology

Please accept my comments at the Washington Dept. of Ecology on keeping the Chehalis River free flowing! Solutions can be localized to improve aquatic conditions that will likely protect flow releases without the degradation to spawning habitat further downstream. Impacts to a functioning ecosystem need to be considered in detail all the way to Grays Harbor!

We know more now about warming trends to existing reservoirs. By rejecting Alternative 1, we actually plan for the inevitable methane releases recently discovered with decomposition of organic matter trapped by the Dams, (refer to WSU studies on the "hot" subject). The unintended consequences of multiple Dams in the Northwest and Idaho, have come to light after 50 years of measuring significant impacts over time. Negative impacts must be avoided, not mitigated.

We live with the mistakes of history. The over allocation of water rights won't go away by holding back more water for the takings. We are wiping out salmon, rich cultures, and enabling abuses by some irrigators to continue. The more FRFA feeds the balance sheet for available water, the more water will be taken to avoid the inevitable alternatives in dealing with shortages of water supply. It's past time to establish measures to mitigate flood hazards due to greedy logging practices by Weyerhaeuser Corporation. Impacts to the watersheds from massive overcutting can't be so easily solved to reduce flood damage by creation of another Dam. So, why is the second largest river Basin within Washington paying the price with further choking off the Chehalis River with unnatural damming?? Bad idea.

Moving forward, please keep the River moving too.

Thanks,

Julie Dalsaso



From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 10, 2016 10:59 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Aaron

Last Name: David

Organization:

Address:



Phone:

Email:



Washington State Department of Ecology:

Comments:

I am writing to comment on the draft Programmatic Environmental Impact Statement for the Chehalis Basin Strategy. Foremost, I urge the Department of Ecology to adopt Alternative 4 of the draft EIS, and to reject from further consideration the core proposal of Alternative 1, the construction of a dam and reservoir storage facility within the Chehalis watershed. Alternative 4 is the only alternative of those considered within the EIS that substantially proposes to address the root causes of catastrophic flooding in the Chehalis basin: human development of the floodplain, diking and confinement of the river, and removal of a functional riparian corridor along the river channels. In contrast, while Alternative 1 would offer at least near term reductions in flooding, it would not address the root causes of major flooding. Alternative 1 would also result in negative impacts to several native aquatic species, including salmonids, and could ultimately exacerbate flooding in parts of the basin by disrupting natural hydrologic processes.

To carefully evaluate the potential alternatives for reducing the risk of major floods while also improving conditions for native aquatic species, it is important to take a big-picture approach. The Chehalis basin has a large floodplain along its mainstem river and many of its tributaries. From what I understand, this large floodplain may be the result of there being a much larger volume of water flowing through the watershed in the past (i.e., tens of thousands of years ago) than there is today. Regardless of the reason, the extensive floodplain area in the Chehalis basin, coupled with the wet climate of western Washington, creates a naturally flood-prone watershed. The Chehalis basin's extensive floodplains have been amenable to agricultural, residential, and commercial

development. Many of these developments have resulted in the destruction of wetlands and the disconnection of river channels from their floodplains, which reduce the natural ability of the watershed to buffer floodwaters. Additionally, much of the basin's uplands have been intensively and repeatedly logged, resulting in increased peak flows during storms and increased sedimentation downstream, further reducing the ability of the river network to store water during hydrologic events. Taken together, the agricultural and urban development of floodplains, along with extensive clear-cut logging in a vast majority of the basin's uplands, have created conditions perfect for increasing flood risk in a naturally flood-prone basin.

Because much of the flooding problem in the Chehalis basin is the result of human modification of the basin coupled with development of naturally flood-prone areas, efforts to reduce flood risk should directly address the human causes of the flooding problem. Alternative 4 best addresses the root causes of catastrophic flooding because it specifically aims to reduce development of the floodplain in certain areas and to restore the natural functions and structures of floodplains (connectivity between river channels and wetlands, intact riparian areas, large wood and other roughness elements, floodplain storage of water). To be sustainable in the long term and to minimize negative impacts to native aquatic species, any proposed action needs to address the root causes of the flooding. For this reason, I urge the Department of Ecology to adopt alternative 4 in its Chehalis Basin Strategy EIS. Furthermore, of all the alternatives considered, Alternative 4 would produce the greatest benefits to native aquatic species.

In contrast, Alternative 1 does not address the root causes of catastrophic flooding. Instead, it proposes a "band aid" approach which would likely have substantial negative effects on salmon and other native aquatic species. I find it perplexing that when we as a society are exerting tremendous effort and are providing substantial funding to remove dams and to restore salmon populations, one of the alternatives being considered would result in the construction of a new dam. The evidence is clear and compelling that dams negatively impact salmonids and many other aquatic species adapted to river environments of the Pacific Northwest. Additionally, not far to the north of the Chehalis basin is another flood-prone basin, the Skokomish River. Flooding in the Skokomish River is partly the result of a large dam on the river, which diverts flow and reduces the ability of the river to transport sediment downstream that has been deposited in the river channel from intensive logging. While the dam being proposed on the Chehalis River appears to be functionally different than the dam on Skokomish River, I wonder if in the long term it could actually backfire by reducing the river's ability to transport sediment downstream, thus reducing the river's ability to store floodwater.

To summarize, I urge the Department of Ecology to adopt Alternative 4 because its restorative approach address the root causes of major flooding in the Chehalis basin and because it entails actions that would have significant positive benefits for native aquatic species. In contrast, Alternative 1 doesn't address the root causes of major flooding while its main proposal of construction of a dam and storage reservoir would likely have significant negative effects on native aquatic species, potentially nullifying gains from concurrent habitat restoration efforts within the basin.

Sincerely,

Aaron David

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 5:25 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Arny

Last Name: Davis

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I am in support of option 1 as it will have the greatest impact on the potential reduction in flooding for the Chehalis Valley.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, November 9, 2016 4:24 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Michael

Last Name: Deckert

Organization:

Address:



Phone:

Email:



Comments:

The Chehalis River was a "goto" play run in the late 1980's to mid 1990's. I paddled it every year during that timeframe (only missing 1990) at flows ranging from 800-6400cfs. I'd would love to go back and paddle it again. It was an important recreation resource for the community.
Michael

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 2:35 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Kyl

Last Name: DePriest

Organization:

Address:



Phone:

Email:

Comments: I believe option 1 is the most reasonable option.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 4:08 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Gary

Last Name: Dibble

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Among the four proposals that have been put forward, Alternative 1 appears to be the most reasonable and effective. I would favor that approach.

Comments:

Conversely, I can hardly believe that Alternative 4 has been put forth as a serious proposal. The ramifications for businesses and other properties which would be affected, are horrific. I would under no circumstances support that proposal.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 9:02 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: James

Last Name: Dooley

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Thank you for the opportunity to comment on the Draft Programmatic Environmental Impact Statement for the Chehalis Basin Strategy. As a resident of Washington State, I would like to express my thoughts and concerns regarding the information presented in the PEIS.

I would first like to commend the parties involved in the studies for looking at a variety of alternatives to reduce impacts of flooding throughout the Chehalis Basin. This is highlighted through the many alternatives not evaluated in detail in this report (Section 2.3.5), as well as the four alternatives studied for the PEIS.

Comments: I only view Alternative 4 (Restorative Flood Protection/RFP) as a viable option after reviewing the information presented in the PEIS. While alternatives 1 and 2 succeed in the reducing flood impacts to the towns of Chehalis and Centralia, they result in negative impacts to the environment, fisheries, recreation, and tribal resources as well as a lack of economic uplift. Alternative 3 does not adequately address the impacts of flooding and is not an adequate option. I understand to the need to address the flooding issues discussed in the PEIS for both public safety/health reasons as well as economic reasons and feel that the RFP alternative is the only proposed approach that addresses these concerns while having a net positive impact to the watershed and community.

Washington encompasses some of the most beautiful and pristine ecosystems in North America and I feel a responsibility as a resident of Washington State to protect those

ecosystems. As the second largest basin in the state, it is imperative to preserve the fisheries, recreation and other benefits associated with Chehalis basin. Two dams already exist within the basin (Wynoochee and Skookumchuck rivers) and a third does not need to be added to the list if there is an alternative way to reduce flooding, as suggested by the RFP. Both the Flood Retention Only (FRO) and Flood Retention Flow Augmentation (FRFA) dam alternatives will severely impact the natural processes of a free-flowing river ecosystem. The FRO alternative will have tremendous impacts on the 5.3 miles upstream of the proposed dam location. The transition of vegetation within the inundation extent from riparian forest to shrubs will reduce shading and increase water temperatures in the summer when cool water from the upper reaches of the basin is most needed. It does not seem likely that significant vegetation will ever become established along the banks of the channel within the inundation extent with the predicted frequency of flood storage. This will also reduce the frequency of habitat throughout the inundated reach because wood will not be retained, channel complexity will be minimal, and floodplain connectivity will not exist. Degrading the area of highest juvenile salmonid concentration as noted in Section 3.4.1.1 is completely unacceptable. While the FRFA will have a positive impact to downstream water temperatures in the summer months compared to the FRO or no action alternative, I do not see that lone benefit as an acceptable compromise for turning a minimum of 6.3 miles of productive river into a reservoir with absolutely no recreation benefit to the public due to the facility being located within privately held lands. Furthermore, the FRFA alternative would disrupt the natural geomorphic processes and have major impacts downstream of the proposed dam location through reduced sediment transport. While the FRO facility allows passage of small wood, the 15 ft maximum length is not large enough to be stable in the lower Chehalis. With reduced wood loading and impacted sediment transport below both the FRO and FRFA dams, habitat is likely to further degrade within the remaining free-flowing reach of the Chehalis. Additionally, the conceptual nature of the fish passage designs for the FRFA alternative is extremely concerning. There is great variability in effectiveness of fish passage designs, some of which have devastating effects to fish populations. The 0.3-0.6% downstream passage rate of juvenile pacific lamprey and 64% downstream passage rate for juvenile salmonids (Section 4.2.4.2.1) would be incredibly detrimental to fish populations already experiencing degraded habitat under the FRFA alternative.

Simply put, I see the FRO and FRFA alternatives as “band-aid” solutions, temporarily reducing flood impacts but not addressing the root cause of flooding in the lower Chehalis. Dams have a finite life and as the reservoir fills with sediment and climate change impacts flow regimes, the proposed dam alternatives will have diminished benefits over time. Modifications could be made to the FRO or FRFA dams in the future, but considering modifications to the Skookumchuck Dam were determined to be economically unjustified and would cause significant environmental impacts (Section 2.3.5.2), it would be unreasonable to consider modifications to the FRO or FRFA dams as an adaptive solution for the future. Washington State has been a pioneer and advocate for dam removal, but dam removals can be costly and river systems take time to rebuild (often require engineered restoration/revegetation). It does not seem logical to construct another costly dam in Washington when there are other options.

The RFP is not a “band-aid” solution and addresses the cause of the problem; the upper Chehalis has been altered by human impacts (logging and development) causing channel incision, loss of connectivity to floodplains, and reduction of habitat. All of these changes have resulted in modified hydrographs and flooding throughout the lower Chehalis

region. Restoring the entire basin to pre-colonization conditions would be extremely beneficial, but that is not reasonable or cost effective and would displace thousands of people. The RFP alternative is a step in the right direction and a starting point for compromise between the natural environment and human development. Moving people away from areas of danger is a permanent solution and restoring floodplains along the river corridor is immensely beneficial to the aquatic and terrestrial ecosystem. Moving farmland to higher elevations would reduce crop loss and decrease pollutant loading into the river. The Chehalis basin is impacted and fragmented through forest practices with 54% of the basin being classified as managed forest (Section 3.10.2). Restoring forest connectivity along the riparian corridor would be beneficial to many terrestrial species. Enhancing in-water habitat for salmonid and lamprey species through floodplain connectivity (nutrient exchange), habitat uplift due to natural and constructed logjams (cover, pool formation, refuge), reforestation of the riparian corridor (shading, bank stability) and allowing unobstructed fish passage and sediment transport while achieving reduced flooding is an excellent solution. Floodplain restoration would also create vital wetland habitat and recharge aquifers for additional cool water input in the summer months.

As a whitewater kayaker and river enthusiast, having access to free-flowing rivers is incredibly important. The proposed location of the FRO and FRFA facilities would impound the current whitewater run and further limit access to outdoor recreation. The RFP alternative would allow this stretch of river to remain free-flowing and give whitewater paddlers the ability to continue enjoying the upper Chehalis.

Economically, I do not believe the full cost of dam implementation is encapsulated within the cost estimate. As previously stated, dams have a finite life expectancy and both dam alternatives would eventually need to be removed at the end of their life-cycle resulting in a degraded fishery and a need to address the same flooding concerns being discussed today. The costs associated with the RFP alternative are lifetime costs, as a restored river system is self-mitigating and will continue to become more effective with time. If the life-cycle costs of all alternatives were evaluated, the RFP would likely have a greater benefit to cost ratio than the ratio assigned to the FRO and FRFA alternatives which do not include removal and replacement after 100 years. Additionally, while there is a monetary benefit to fisheries through the RFP, there is no monetary benefit associated with maintaining a culturally significant fishery, but the cultural value of retaining/enhancing a fishery used by both the Quinault Indian Nation and Chehalis Tribe must not be understated. The RFP would likely provide local economic benefit during construction as compared to construction of the FRO and FRFA facilities. Restoration designs could be constructed by numerous local construction companies and would take place over many years, resulting in economic uplift to the local communities.

While the RFP alternative is the best proposed alternative, additional questions still need to be addressed in order to evaluate how effective the RFP alternative will be. Further studies need to be conducted to evaluate landowner cooperation for property buyouts and proposed relocation of 462 structures. Will there be cooperation from private landowners (most notably Weyerhaeuser) to allow for purchase of proposed floodplain restoration areas and/or the ability to put these areas under conservation easement? Are there opportunities to reduce flood impacts to roads and infrastructure (SR6, SR506, SR508) under RFP? Is the proposed timeline for full flood reduction benefit (10 years) acceptable to the community and is there any way to expedite the restoration process? Are there

restoration areas that can be prioritized to have the greatest flood reduction in the shortest time period?

In combination with the I-5 projects, Airport Levee Improvements, Aberdeen/Hoquiam North Shore levee, and local-scale flood damage reduction actions, RFP is a solution that will address the devastating flooding experienced in the lower Chehalis basin near Chehalis and Centralia. I strongly support further investigation of the Restorative Floodplain Protection alternative and consider it a viable solution for symbiosis between people, infrastructure, and the environment within the Chehalis basin.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, October 1, 2016 11:06 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: kevin

Last Name: drake

Organization:

Address:



Phone:

Email:



Comments:

Everything about the Chehalis Basin Strategy has been a waste of time and money, quit filling in the wet lands for development, raise I-5 (really the only thing the State wants), there's plenty of room in Napavine and Winlock for development, in fact encourage that.

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From: Gloria Dupree [REDACTED]
Sent: Wednesday, October 26, 2016 4:42 AM
To: info@chehalisbasinstrategy.com
Subject: flooding

I do not wish to see a dam built in this day in age of removing them. I see that environmental groups and tribes will fight a dam on fish habitat issues. Costs will rise and dates will get pushed back. Didn't Lewis County just build Cowlitz Falls Dam a few years ago? The Cowlitz River has been dredged many times of Mt St Helens ash with great success. Fish runs have been great there. What will a dam do for flooding similar to 2015? China and Salzer Creek swelled. Damming the upper Chehalis River seems limited. The river should have been dredged after the 1990 or 1996 floods. We would be miles ahead by now. Yet building in the flood plain continues. Thank you. DD

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 6:17 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Lawrence

Last Name: Durham

Organization: Private citizen

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

In my opinion, a dam on the Chehalis River should not be constructed. I have been a biologist for most of my life, approximately 28 years, and I have never witnessed a dam built in the Northwest that improved natural fish populations, especially salmon and steelhead.

The Proposed dam will inundate approximately 95 % of the naturally spawning areas for wild steelhead in the Chehalis Basin, and will most certainly lead to the federal listing of this stock under the Endangered Species Act. Once a fish species is listed on a river, then it makes it much more difficult to do any road construction, building construction, farm land alteration, or other land management in the river basin.

Comments:

The construction of a fish hatchery may not be able to preserve the genetic integrity of the steelhead population, and even if biologists are able to maintain the wild steelhead genetics, it is well documented that once a species is reared in a hatchery, the behavior of the stock changes from wild to “domesticated”. (I don’t have time to provide a list of scientific publications on this subject). So, building a new Sonic Restaurant, etc. in Chehalis near the Walmart will become a very cumbersome process and may not be allowed at all once steelhead are listed as endangered.

Furthermore, the dams on the Cowlitz River were supposed to have eliminated flooding for towns downstream, but in 1996, the town of Toledo was flooded, so flood control is not guaranteed with this new dam.

I feel that the new Doppler radar located on Washington’s coast was a major step in

improving the flood warning system for the Chehalis River system. In 2007, the remains of the tropical storm came right into the cone of “no radar detection”, and that led to the high number of roof top evacuations and loss of domestic animals. Had the radar been in place in 2007, then the loss of livestock would have been minimized.

Another sound alternative to the dam is the improvement of forest practices in the Upper Chehalis River. As I recall, a very large hillside gave way which initiated the wall of debris that came down from the Upper Chehalis. I have spoken with local residents along the south fork of the Chehalis River, and they all felt that the flooding was much worse there than it was from Pe Ell to Rainbow Falls. The dam as it is proposed will not control any flooding along the south fork of the Chehalis River.

I have examined early data from a consulting group hired by the Lewis County commissioners, and it indicated that there may be a slight increase in the spring Chinook salmon if a dam is built, but it also said that all other stocks would be negatively affected. The spring run Chinook were only slightly improved, and they also stated that biologists would have to have a major role in the dam operation for this to occur. Again, I have never seen a dam in which biologists played a major role in its operation. Also, predicting fish returns is a very inaccurate art at this time, and they are very unreliable most of the time. How they could predict an improvement in spring run Chinook seemed very far-fetched, as the error bars on their data points were very large, and they had to do some unusual statistical analysis to get this perceived benefit.

Do what is right for the fish and wildlife, do not build the dam. For once, do what is right for the native Americans downstream, and protect their heritage by maintaining their fishing stocks. We don't need the extra electricity from a dam, and with the new radar, we will minimize the risk to farm animals and humans from future floods. We need to stop building in the flood plain, especially in the area west of the interstate near Chehalis.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 3:58 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Richard

Last Name: Eades

Organization:

Address:



Phone:

Email:

Comments:

My family was affected by the December 2007 storm and flood. We had just moved 4 months prior to the area due to new employment with in the timber industry. Our chosen location is in Curtis, approximately 150 yard from the South Fork Chehalis River. We received some damage due to flooding but to a lesser degree than some of our neighbors who lost everything. This 500 year event was devastating for SW Washington. I support a combination of #2 since it does not include a dam.

I have reviewed the alternatives and pondered their effects of each. The sticking point on number one for me is the dam. In this day and age, whereby a free-flowing salmon river would be dammed for water retention seems a non-starter. There are too many issues with the dam completion actually happening in any of our lifetimes seems slim. Condemning private land, spending millions on dam related studies, proposed dam without hydroelectric generating capabilities, and numerous fault lines in the proposed dam site are negatives for me.

I do however support: stream restoration projects, habitat improvement, dredging areas of accumulated material, and similar projects. Building levees in particular areas seems logical. I believe that new large footprint projects should not be built in the flood plains as it block flood flow. This indicates alternative #2

I am vehemently against number 4: which is essence is erasing all human existence in the flood plains and managing that land in a natural state. This would be astronomically expensive to move so many people and purchase their land. I doubt it would be a fair

price either. Our local school and many others, would become nonexistent. And #5 is currently what we are doing. Time for some action.

As a family that has been affected by the flood, I support alternative #2. I feel it is the best course of action.

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This email was built and sent using [Visual Form Builder](#).

From: Jon Emerson [REDACTED]
Sent: Friday, October 28, 2016 2:28 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Jon Emerson

EMAIL
[REDACTED]

MESSAGE

I do not support this dam and think it's going backwards in terms of helping the fish and environment. Please do not waste tax payers money on this abomination.

Sent from (ip address): 70.199.128.166 (166.sub-70-199-128.myvzw.com)

Date/Time: October 28, 2016 9:27 am

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 10_0_2 like Mac OS X) AppleWebKit/602.1.50 (KHTML, like Gecko) Version/10.0 Mobile/14A456 Safari/602.1

①

Chehalis Basin Strategy

Reducing Flood Damage and Restoring Aquatic Species Habitat



Draft EIS Comment Form

COMMENTS:

We are land owners - 30 Acres on the Chehalis River in the City Limit. we have lived on this property nearly all my life + our married life. I'm 60 yrs old + have been through every flood for those past years here. In the mid 70's my father had a solution to the flood problems - it was simply - "put the Shober Road ditch back functioning under Hwy 6 that got covered up when Hwy 6 got "re-done" mid 70's - as this allows rising river water to get downstream faster below the Centralia "Hump" + lessens flood height later in the chehalis area - then put a retention dam on 1 fork of chehalis upper watershed" -

The army Corp of Engineer head told my dad - "mike - you are just a "dumb farmer" - we are engineers + we will solve the problem" well - you can see how good that turned out to be - I was there when they told my dad that + later my dad said they'll never solve it in my time + will as usual - "study" the problem to death" - Dad died in 95 - I'm now 60 - wonder if it will get solved in "my" time too -

NAME

Steve Emrich

EMAIL

ldswebman@comcast.net

PHONE

360-880-8905

2

Chehalis Basin Strategy

Reducing Flood Damage and Restoring Aquatic Species Habitat



Draft EIS Comment Form

COMMENTS: (overpage)

Recently I was told by Neil (Shelbourn?) of Army Corp. to keep paying my taxes to build the levees at airport higher to put more flood water in my buildings + house - "I'm on the wrong side of the dike", S.W. corner of Airport and Golf course - (Again - what a comforting statement from Govt entities)

I attended the 10/18 mtg in Chehalis - Approve the proposition to put a retention dam on "1" Chehalis Tributary + get more trees growing back forests up there - Shamber Road Ditch will never happen - bummer - and I'm appalled that Hwy 6 got 4' new height pavement on it years ago which engineers never figured out would backup severe flood waters even more from going downstream.

Proposition 4 on farmers being re-located up in the hills is at best ludicrous! - there were plenty of reasons why - given in testimony at mtg. So no sense re-hashing that.

Scrap #4 completely! (I have no idea who would even lay claim to Sacha plan)

oh - and 2007 flood = fluke rain fall - we had 6 1/2" at River St. (near place) 36 hrs. 6 1/4" at Skookumchuck + 6 1/2" upper Newaukum - all typical of 95/96 flood - but the kicker was 20" at Bawfaw - if 6 1/2" like the rest - would have been just a 95/96 flood.

NAME	EMAIL	PHONE
Steve + Kendra Emrich	idswebman@comcast.net kendraemrich@comcast.net	360-880-8905 360-880-8906

Thanks for reading - Listening - *Steve Emrich*

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, November 5, 2016 4:46 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Brady

Last Name: Engvall

Organization: Self

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Dear Sirs,
Thank you for the opportunity to comment on the PEIS. Aquatic species are my principle concern. Historically fish and Tribal Treaties predate rapid development of the Chehalis Basin. As time passed pioneers moved and developed closer to the Chehalis River and its tributaries creating flood problems that were just a river doing it's natural process for eons Destructive logging practices also added to the destruction of the natural flood cycles of the river.

Comments: The PEIS at Section 2.3.3.3- as removing barrier culverts, reconnecting side channels, and restoring riparian areas would go a long way in improving aquatic species habitat which has been compromised over the years by development in the flood plain.

A dam on the Chehalis river is not the answer to habitat improvement as governments all over the west are rightly taking out dams to support and improve aquatic habitat.

I support options three and four or a combination of the two to help restore the Chehalis river system.

Brady Engvall [Redacted]

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 10:43 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Christiena

Last Name: Ervin

Organization:

Address:

Phone:

Email:

Comments: I feel we need a solution that includes a retention dam, as it seem to be the only plan that actually protects the communities that have bordered these creeks and rivers for a hundred years or more.
If we have successfully lived and farmed here for so long, obviously there are other issues causing the flooding. There is no way to reverse the "progress" that may well have led to these issues, but we must protect the communities that have existed and flourished, because of these rivers, for generations.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 8:59 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Josh
Last Name: Fay
Organization: Lewis County Resident

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

As a life long resident along the Chehalis River, the only reasonable option for mitigating flood damage along this river is retention.

Reaped flooding on the scale we have seen will continue to create heavy siltation in the river channel. This siltation has a big impact on fisheries. Controlling the volume of water racing down the basin would undoubtedly limit the amount of silt entering the river.

Comments:

In addition to a retention facilities impact on siltation, it would also control summer water levels. I have seen water at record lows in recent years. Even crossing the river when there is less than 12 inches of water. Undeniably these water levels and the water stagnation impact water temperatures which directly impact fish. With a retention facility the flow of the river could be better managed, thus dropping water temperatures.

A retention unit could also help irrigation during drier months and would help reduce flood damage and the types of costs that have occurred as a result of this flooding.

I firmly believe that alternative #1 is the only idea that helps residents along the river, residents of the twin cities and the fish and wildlife that inhabit the river.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 10:06 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: DEIS-Chehalis-Basin-Strategy.docx; 2007-Slides.jpg

Comment Form

First Name: Kim

Last Name: Figlar-Barnes

Organization: Self

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: Comments submitted by Kim Figlar-Barnes

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/DEIS-Chehalis-Basin-Strategy.docx>

File Upload (2): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/2007-Slides.jpg>

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This email was built and sent using [Visual Form Builder](#).

Comments submitted by: Kim Figlar-Barnes

Chapter 3 Affected Environment

3.1.1.2.4.2 Temperature

This section of the report states:

Water temperatures routinely exceed the water quality standards criteria for applicable aquatic life-designated uses (see Appendix D, Table D-1).

and:

By 1978, the upper watershed had been logged and the lands adjacent to portions of the mainstem Chehalis River had been cleared for agricultural and rural residential uses, which likely contributed to the elevated temperatures. The Chehalis River most likely had cooler water temperatures prior to land clearing and timber harvesting because a mature, vegetated, riparian corridor and adjacent valley forestlands would have limited direct solar heating of the water surface. Water temperature data was collected by Ecology from May 19 to September 15, 2015. The mainstem Chehalis River exceeded the temperature criterion of 16°C throughout the study period, with the peak water temperature of 26.5°C recorded on July 5, 2015 (Ecology 2016b).

Lack of riparian zones, land clearing and timber harvesting - All human caused activities that directly cause water temperatures to exceed 17.5 C . So why are these issues not being addressed? Please explain in detail and how this will be addressed in Alternative 1 through 4?

This section of the report states:

Similar to Dryad, Ecology records continuous water temperatures at Porter (RM 33). Based on these data, water temperatures are consistently warm and exceed applicable aquatic habitat temperature criterion in the late spring and fall (see Figure 3.1-5). Based on data collected by Ecology at Porter since 2001, the peak water temperature was recorded on July 29, 2009 (27.9°C)—the same date as the recorded maximum temperature at Dryad.

According to Figure 3.1-5 then there should be no salmon or other aquatic species because the temperatures exceed 17.5 C (and at many occasions are higher). Why are salmon species still surviving in the Chehalis from 2001 to present? Please explain how salmon species can survive when the figure states they should not? Do not attempt to state that they are hatchery fish when all the major hatchery programs are below the mouth of the Newaukum River and spawning ground survey carcass recoveries of hatchery fish support this fact.

This section of the report states:

Because of these high temperatures and the previous Water Quality Assessment Category 5 listing for water temperature in the upper Chehalis Basin, a TMDL for water temperature was developed and approved in 2001 (Ecology 2001). The temperature TMDL for the upper Chehalis River was partially based on the development of a functional riparian corridor to limit heating and help improve conditions for aquatic species, including salmonids (Ecology 2001). However, a Basin-wide functional riparian corridor would take decades to develop as trees are planted and reach the necessary heights to provide a shading function.

Since human activities are directly related to lack of riparian function, why has this not been addressed since 2001? This needs to be stated in the report.

Also, the last sentence: *However, a Basin-wide functional riparian corridor would take decades to develop as trees are planted and reach the necessary heights to provide a shading function.*

If the above statement is true, then in Chapter 5.3.2 why would *Modeled the results of salmon habitat potential for Alternative 1 include the **maturation of riparian areas** in managed forest lands....?*

Explain the contradictions between the Chapter 3 and 5. Explain in detail how was the “maturation of riparian areas” used in the model in Chapter 5.3.2?

3.1.2.4.5 Turbidity and Total Suspended Solids

This section of the report states:

Turbidity in the upper Chehalis River generally peaks in January and has been documented during winter storm events (Collyard and Von Prause 2010). Landslides also contribute to elevated turbidity in the river (Green et al. 2009). The upper Chehalis River is on the Ecology 303(d) list (Category 5) for turbidity (Ecology 2016a).

Turbidity and total suspended solids are directly related to poor forest practices and lack of riparian zones throughout the Chehalis River Basin. How will these issues be addressed in Alternatives 1 through 4? All dams also contribute to an increase in turbidity and total suspended solids (the Wynoochee and Skookumchuck dams have had this problem for over the past 20 plus years) How will this be addressed under Alternative 1?

3.1.2.4.7 Fecal Coliform Bacteria

This section of the report states:

Data collected at Ecology’s long-term station at Dryad indicated that the highest fecal coliform loads to the upper Chehalis River occur during the first rain events in September and October, whereas data from

Ecology's station at Porter showed that the lower reaches receive their highest bacterial loads in November (Ahmed and Rountry 2004). The upper Chehalis River is also a contributor of bacterial loads to Grays Harbor (Pelletier and Seiders 2000).

This is directly related to livestock not being restricted from the rivers. Livestock freely roam the banks of rivers and streams and defecate in them daily. How is this going to be addressed to reduce fecal coliform bacteria? Septic tank failure also contributes to fecal coliform bacteria. How are failing septic tanks going to be addressed to reduce fecal coliform bacteria?

3.1.2.5.3 Skookumchuck River

This section of the report states:

*The river is identified in Ecology's 2014 Water Quality Assessment as a water of concern (Category 2) for fecal coliform bacteria, pH, temperature, and DO along additional segments not covered by an applicable TMDLs (Ecology 2016a). **Sampling results from multiple studies documented that peak summer water temperatures exceeded applicable criterion on occasion.***

and also, states:

*Ecology's water temperature data collected during the summer of 2015 (at RM 0.6) indicated that from May 19 to September 15, 2015, **river waters exceeded the temperature criterion of 16°C a total of 110 days (97% of the days), and the peak water temperature was 24.7°C on July 13 (Ecology 2016b).***

But wait, according to the FRFA dam proposal in Chapter 4, dams are supposed to supply cooler water in the summer and fall. The Skookumchuck has a dam (oh with Spring Chinook on it no less) so then why are high water temperatures an issue? How can the report repeatedly boast that an FRFA dam will provide cooler water temperatures in the summer/fall when **in fact this does not occur with the Skookumchuck dam?** This is a historic problem with the Skookumchuck dam and has been documented as far back as 1994 (see INITIAL WATERSHED ASSESSMENT WATER RESOURCE INVENTORY AREA 23 UPPER CHEHALIS RIVER 1995 this document needs to be included in the report). The Skookumchuck dam is not the only dam in Washington State where water temperatures are high below the dam, this is an ongoing problem for many dams in the state, especially on the Columbia River (summer 2015 had record salmon kills due to high water temperatures). **To boast that the FRFA dam will be a benefit to salmonids by providing cooler water temperatures below the dam is an all-out misrepresentation of the data to solely influence the pro-construction of the dam.** This blatant misrepresentation of data needs to be removed from all sections of the report.

All the models in Chapter 4 that claim such "cool water temperatures" benefit fish and other aquatic species must be removed from the report as the models are using misleading and deceptive information. Why are water temperature studies associated

with dams in Washington State that directly dispute the cooler water temperature benefits to aquatic species being deliberately excluded from the report? All such data must be included in the report and utilized in all the temperature models represented in Chapter 4.

3.2.3 Landslides and Mass Wasting

This section of the report states:

Existing landslides in the upper Chehalis Basin were mapped for geology reports completed for the proposed Flood Retention Facility (Shannon & Wilson 2015). These landslides were examined to determine whether they could become active as a result of reservoir water level operations. The location of those landslides is shown in Figure 3.2-3.

Where is ArcGIS or satellite imagery depicting the 1000 + slides that occurred from the 2007 event above the dam site? See Attachment 4: 2007 Slides. Slides above the proposed dam sites are highlighted in red in this photo. This image is also available as an uploaded file. This information is pertinent and the public has a right view the images depicting the instability of the slopes in the upper watershed above the dam site. The ramifications of locating a dam in a watershed with extremely unstable slopes prone to mass wasting during “*extremely high precipitation*” (this term is repeated numerous times in “Appendix E Evaluation of Forest Practice Effects on Landslides and Erosion in the Chehalis Basin”) must be made available to the public. After all the whole reason to have the dams according to Alternative 1 in the report is to intercept waters from “*extremely high precipitation*” events. So, please state the exact facts as to how long it will take for the FRFA dam to fill up with sediments from repeated mass wasting events similar to “*the 2007 storms extremely high precipitation*”? This information must be presented in the report. What will the costs be to mitigate the sedimentation effects caused by such storms occurring above the FRFA dam?

Over time the FRFA dam would become less economically viable and costlier to maintain. As sediment accumulates behind the dam rather quickly as the reservoir footprint is shallow, the reservoir will not hold as much water; thus, hampering the dam’s ability to capture and control floodwaters efficiently.

The FRO dam options would trap sediments when it is closed and then sediments would be released for 32 days or longer from behind the dam when the water is released. How will sedimentation be eliminated with FRO options? The Skookumchuck dam releases sediments year around, it never settles out of the reservoir. This will be same case for the FRO dam options.

3.4.1.1 Salmonids 3.4.1.1.1 Distribution

This section of the report states:

Among the rivers surveyed, juvenile salmon densities were highest in the upper Chehalis River (Zimmerman and Winkowski 2016).

In the summer of 2014, juvenile salmon distributions were surveyed intensively within a 9-river-mile stretch of the mainstem Chehalis River (Winkowski and Zimmerman, in prep.). Densities of steelhead and Chinook salmon were greater at sites within approximately 1 river mile of the proposed dam site than other sites farther away. In the summer of 2015, juvenile salmon distributions were surveyed more extensively around and within the inundation area of the proposed reservoir, in the upper mainstem Chehalis River near the dam site at RM 116, and extending approximately 10 river miles upstream. Juvenile coho salmon and trout (cutthroat and rainbow/steelhead) were found throughout the proposed reservoir inundation area, which includes stretches of the upper mainstem Chehalis River and lower reaches of several small tributary creeks (WDFW 2015b). Juvenile coho salmon and trout were also observed in reaches above the proposed reservoir inundation area (WDFW 2015b). Juvenile Chinook salmon were observed only within approximately 1 river mile of the proposed dam site.

The above stated facts alone show that juvenile salmon have a high propensity to rear in the site adjacent to and above the proposed dam sites. These results show that the areas adjacent and above the dam site are prime rearing habitat for salmonids. How will the dams prevent the decimation of the salmonid populations in these areas? Why does the report not state the high likelihood of salmonid populations becoming ESA listed species within 5 or more years of the dams becoming operational? The likelihood of this event occurring must be included in the report.

3.4.1.1.3 Status and Species Abundance

This section of the report shows:

Table 3.4-4 Salmon and Steelhead Species Run Sizes

Where is the exact source for this table? It is not listed or presented in Appendix G. This must be included in the report.

3.4.1.2 Other Fish Species

This section of the report shows:

Table 3.4-5 Occupancy and Density of Fish Species in the Upper Chehalis River

Why are the 3 Lamprey species not included in this table? This data must be included in this table.

3.4.1.3 Shellfish

This section of the report shows no studies were conducted above the proposed dam sites for densities of the three species of freshwater mussels: western floaters, western pearlshell and western ridged mussel. According to Nedeau et al. (2009) Nedeau, E.J., A.K. Smith, J. Stone, and S. Jepsen, 2009. *Freshwater Mussels of the Pacific Northwest*. Second Edition. Portland: The Xerces Society for Invertebrate Conservation.

“The greatest threats to western pearlshells come from loss of host fish species and water diversion projects for irrigation, power generation, and water supply particularly in Washington, Oregon, Idaho and California. Dams destroy many miles of free-flowing rivers, disrupt native fish communities, and may have contributed to the demise of many populations of western pearlshells.”

Due to the above statement when will population information be collected for western pearlshell mussels at and above the proposed dam site? When will studies be conducted at the same location for western floaters and western ridged mussels?

3.4.2.1 Amphibians and Reptiles

This section of the report states:

Terrestrial amphibian species included western red-backed salamander, Dunn’s salamander, Van Dyke’s salamander, and ensatina. Semi-aquatic amphibian species included five stillwater-breeding amphibians (Pacific treefrog, northern red-legged frog, northwestern salamander, rough-skinned newt, and western toad) and the three stream-breeding amphibians (coastal giant salamander, coastal tailed frog, and Columbia torrent salamander).

Instream amphibian surveys document the occupancy of amphibians breeding in the mainstem Chehalis River and adjacent areas, including the vicinity of the proposed dam and its reservoir. Five amphibian species were observed during instream amphibian surveys: Columbia torrent salamander, northern red-legged frog, Pacific treefrog, rough-skinned newt, and western toad (Hayes et al. 2015d, 2016b). Western toad breeding was observed to be limited to the upper portions of the Chehalis Basin watershed and was more widespread in the footprint of the proposed dam and its reservoir than either up- or downstream of these areas (Hayes et al. 2016b).

What measures will be taken at and above the dam site to ensure the survival of the Dunn’s salamander, Van Dyke’s salamander, ensatina, Pacific treefrog, northern red-legged frog, western toad, northwestern salamander, rough-skinned newt, coastal giant salamander, coastal tailed frog, and Columbia torrent salamander?

3.13.2.3 Grays Harbor County

This section of the report states:

In the 1997 flood, the Wynoochee valley, Satsop River valley, Brady Loop Road area, Johns River area, and Humptulips River Basin received major damage (CH2M HILL 2001) and area roads were flooded.

The Wynoochee dam was specifically designed for flood control and was supposed to prevent this type of flooding in 1997 and **it did not work**. Many roads were flooded along the Wynoochee valley along with Hwy 12. How can the public be assured that this situation will not be repeated with the dams proposed in Alternative 1?

4.2 Flood Retention Facility (FRO and FRFA)

There are more than 1,000 dams obstructing the flow of water in Washington and dams are one of the biggest contributors to salmon declines in the state. By slowing and changing natural water flows, dams can lead to an inadequate water supply downstream, raising water temperatures and allowing too much silt to collect. Dams block fish from moving upstream to spawn, and can reduce the number of juvenile salmon that successfully migrate to the ocean. Even dams with fish ladders can create problems for salmon. Adults may have difficulty negotiating ladders and become disoriented or injured in the process. And juveniles can easily become stranded in the reservoir if they don't use the fish ladders while moving downstream.

According to the U.S. Fish & Wildlife Service:

“Dams can block or impede migration and have created deep pools of water that in some cases have inundated important spawning habitat or blocked access to it. Dams also change the character of rivers, creating slow-moving, warm water pools that are ideal for predators of salmon. Low water velocities in large reservoirs also can delay salmon migration and expose fish to high water temperatures and disease”.

<https://www.fws.gov/salmonofthewest/dams.htm>

The report continually boasts the dams (especially the FRFA) will benefit salmonid species, specifically Spring Chinook that will supposedly benefit from cooler water temperature being released from the dam.

It is true water released from the bottom of dam reservoirs is much colder, but it also contains less oxygen than river water, this can affect the reproductive processes of some fish species; and when water with decreased oxygen is released, it can be lethal to fish downstream.

Contributing to decreased oxygen levels in the reservoir are the buildup of organic materials behind the dam. Organic materials from within and outside the river would normally wash downstream, but instead they built up behind dams and start to consume large amounts of oxygen as they decompose. When the shallow reservoir behind the dam (modeled to be about 200 ft. deep) heats up this will trigger algae blooms which in turn, create oxygen-starved “dead zones” incapable of supporting river life of any kind. This problem will be exasperated as Weyerhaeuser fertilizes its slopes with aerial pellet

nitrogen fertilizers (above the dam site) 1-3 times over a trees life cycle. The increased input of nitrogen fertilizers washing downstream behind the dam will increase the frequency and size of algae blooms, thus creating even larger oxygen starved “dead zones” in the reservoir. This will kill all aquatic organisms with in the “dead zones” of the reservoir and increase fish kills below the reservoir when the waters containing zero oxygen are released downstream.

The alteration of a river's flow and sediment transport downstream of a dam often causes the greatest sustained environmental impacts. Life in and around a river evolves and is conditioned on the timing and quantities of river flow. Disrupted and altered water flows can be as severe as completely de-watering river reaches and the life they contain. Even subtle changes in the quantity and timing of water flows impact aquatic and riparian life, which can unravel the ecological web of a river system.

Dams also hold back sediments that would naturally replenish downstream ecosystems. When a river is deprived of its sediment load, it seeks to recapture it by eroding the downstream river bed and banks (which can undermine bridges and other riverbank structures, as well as riparian areas). Riverbeds downstream of dams are typically eroded by several meters within the decade of first closing a dam; the damage can extend for tens or even hundreds of miles below a dam. Another consequence of riverbed incising will be lower groundwater tables along the river. Lower water tables will limit the accessibility of water to plant roots (and to human communities drawing water from wells). Altering the riverbed also reduces habitat for fish that spawn in river bottoms and for aquatic invertebrates.

The report neglects to state who will pay for the construction, operation and maintenance of the FRO & FRFA dams? This information must be present in the report.

4.2.1.2 Long-term Impacts

This section of the report shows: *Figure 4.2-1 Reservoir Inundation Areas* and the report states:

The FRFA reservoir would permanently inundate existing spawning areas, and eliminate habitat features necessary for spawning and emergence of salmonids, as is required for this designated and existing use.

The reservoir inundation areas images must include all current and past GPS locations of Spring/Fall chinook redds, Coho redds, Steelhead redds and Pacific and Western Brook Lamprey redds. The public has a right to view these images and must be included in this section of the report (NOT IN THE APPENDIX). These locations have been available through WDFW since 2014.

The permanent inundation of existing spawning and rearing habitat for salmonids and other aquatic species is unacceptable. The loss of spawning and rearing areas for

Chinook (spring and fall), Coho, Steelhead and lamprey species will dramatically increase the likelihood of these species being extirpated from the upper watershed of the Chehalis basin.

4.2.1.2.1 Surface Water Quality

This section of the report states:

Therefore, a moderate adverse impact on water quality (temperature and DO) in the reservoir during late summer and early fall is anticipated because surface water quality criteria are not predicted to be met during water storage in the reservoir.

High water temperatures released from the reservoir will negatively affect fish species downstream of the dam especially during the summer and early fall when juvenile salmonids migrate to the ocean and adults migrate upstream to spawn.

Downstream Flow Augmentation

This section of the report states:

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).

Improve water quality? As stated earlier the Skookumchuck River has a dam and water quality below the dam does not improve.

In fact as shown by "Ecology's water temperature data collected during the summer of 2015 (at RM 0.6) indicated that from May 19 to September 15, 2015, river waters exceeded the temperature criterion of 16°C a total of 110 days (97% of the days), and the peak water temperature was 24.7°C on July 13 (Ecology 2016b)."

High water temperatures below the dam in the Skookumchuck has been an ongoing documented problem since 1994. The reservoir above the proposed dam site is shallower compared to the Skookumchuck reservoir. So how can the report continue to "model" for "improved water quality in the Chehalis River downstream of the dam to approximately the confluence of the Skookumchuck River (RM 65)"? This is false! How will the water remain "cool" when the river is shallow and spread out (which increases water temperature) and the riparian zone is severely degraded due to land clearing and agricultural practices? The entire "Downstream Flow Augmentation" section is severely flawed with false data and needs to be removed from the report.

Regardless of the supposed "improved water quality" Figure 4.2-4 shows that water temperatures are still above the threshold temperature for salmonids. How exactly

does this benefit salmonids? The figure depicts one day in July when this does not benefit any salmonids during because they are not migrating or spawning in the river in July. The figure is totally misleading and should be removed the report.

The report states:

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.

In the fall this will not benefit the adult salmonids migrating upstream for spawning and the juveniles migrating to the ocean. This will increase the likelihood of fish kills to occur below the dam. The reservoir above the dam is shallow and all the riparian vegetation will be removed; this will cause the reservoir the heat quickly and retain the heat longer. In the long run, there will be no beneficial release of cooler water, only lethally warm water that will impact all fish species downstream of the dam.

The report states:

In those tributaries, such as the South Fork Chehalis River, Newaukum and Skookumchuck rivers, flood levels would be reduced indirectly as a result of a Flood Retention Facility reducing flood flows in the Chehalis River.

The 2009 flood which flooded I-5 was due to record floods on the Newaukum River system. The 1996 flood caused record flooding on the Wynoochee River system. This river had a dam constructed solely for flood protection in 1972, however it did nothing to stop the flooding from the 1996 storm. The FRO or FRFA dams will do little to stop flooding on the SF Chehalis, Newaukum and Skookumchuck rivers if weather systems stall over these drainages and cause record flooding. Making such predictions based on models with no facts (its pure speculation) is false and misleading and should be removed from the report. Again, this is more misleading information being presented in the report to promote the construction of dams.

4.2.2.2.1 Geology and 4.2.2.2 Geomorphology

The report states:

In the reservoir area, fluctuating water levels and removal of trees could trigger shallow landslides and deep-seated landslides around the reservoir footprint (RM 108 to RM 114; see Figure 4.2-5). Because shallow landslides have the potential to occur around the reservoir perimeter with impacts isolated to the reservoir area, the adverse impact on geology would be moderate. For deep-seated landslides, there would be a minor to moderate adverse impact for the FRO facility due to the limited presence of a fluctuating reservoir (once every 7 years) and slightly smaller reservoir footprint, and a moderate adverse impact for the FRFA facility because the risk for slope instability could be higher and more widespread due to the larger reservoir footprint and increased saturation of the landslide masses.

Over the long term, small-scale sloughing or slumping would periodically occur along the temporary FRO or permanent FRFA reservoir perimeter, especially in areas of dynamic water-level fluctuations, releasing fine-grained sediment and woody material into the reservoir. There would be a moderate adverse impact due to its limited geographic extent and periodic nature.

Based on preliminary modeling results, sediment entrainment of up to 1 foot could occur upstream of the FRO dam throughout the reservoir footprint (based on modeling results for large floods; Dubé 2016). The FRFA facility would retain most sediment in the reservoir upstream of the FRFA dam (Watershed GeoDynamics and Anchor QEA 2014). For the FRFA facility, all bedload and 86% to 93% of the suspended load would be retained, which is equivalent to approximately 85,000 tons per year on average.

The 2007 flood event created over 1,600 landslides in the Upper Chehalis watershed. Why are these slides above the reservoirs not mentioned in the report? Where are the graphics depicting these landslides? There were 1,000 slides on Chehalis and tributaries above the dam sites! See the attached Google Earth KZM file. The slides are also documented in Sarikhan, I., K. Stanton, T. Contreras, M. Polenz, J. Powell, T. Walsh, and R. Logan, 2008. *Landslide Reconnaissance Following the Storm Event of December 1-3, 2007, in Western Washington*. Washington Division of Geology and Earth Resources Open File Report 2008-5. November 2008. Figure 6 on page 12 of this document must be included in the report – NOT IN THE APPENDIX.

Such slides will continue to occur and the FRO and FRFA reservoirs will fill with sediments and woody debris causing the dams to become less economically viable and costlier to maintain. As sediment accumulates behind the dam rather quickly, as the reservoir footprint is shallow, the reservoir will not hold as much water; thus, hampering the dam's ability to capture and control floodwaters efficiently. Forest practice regulations have done nothing to reduce the risk of slides from occurring above the dam site. It is business as usual for Weyerhaeuser constructing roads and clearing cutting timber stands on excessively steep slopes (but wait this is not supposed to happen according to Forest Practice Rules). See Attachment 3: 2016 Image Upper Chehalis Watershed. A picture speaks a thousand words. This image needs to be included in the report showing that the threat of landslides still exists and it is even worse than it was in 2007. See Attachment 2: 2009 Image Upper Chehalis Watershed. In fact, a nice comparison of the two images side by side would be very effective at showing the differences in the amount of clear cutting from 2007 to 2016 and it reveals how deficient forest practice regulations are in this area.

Are the models for sediment entrainment being modeled for storm events equivalent to or worse than the 2007 event? This must be taken into consideration. There is no mention of what types of storm events these models are based on or if the models are even based on storm events at all. This must be made clear to the public in the report.

4.2.2.3 Mitigation 4.2.2.3.1 Geology

The report states:

Long-term landslide avoidance and minimization measures could consist of one or more stabilizing strategies at each landslide site, such as constructing surface and subsurface drainage to lower groundwater levels in the landslide hazard area(s), excavating landslide debris above the landslide plane, installing earth or rock buttresses, and controlling the drawdown rate of the reservoir (anticipated to be 10 to 20 feet per day). For potential low-level induced seismicity of the FRFA facility, the proposed reservoir depth would be designed to be shallower than reservoirs elsewhere that have incurred seismicity.

To minimize the risk of earthquake-generated landslides to the dam, the following avoidance and minimization measures would be implemented:

- *The dam and appurtenant structures would be designed to withstand the effects of shaking on the CSZ and other nearby faults (including the Doty Fault) considered to have the most effect*
 - *The dam would be designed accordingly, and instrumentation would be installed to measure motions in the structure in the event of a seismic event*
- *The design of the dam would include incorporation of local seismic criteria*
 - *The seismic design criteria would result in a dam designed to withstand a seismic event about four orders of magnitude greater than a seismic event that could be generated by reservoir conditions*

What about the 1,000 plus landslides above the dam site? Will “Long-term landslide avoidance and minimization measures” be used to mitigate for the all slides above the dam? Exactly how much will such measures cost and exactly how effective will such measures be?

Exactly how will the dam be designed to withstand an earthquake of magnitude 6-7? What exactly is “four orders of magnitude”? This needs to be spelled out in layman terms. Will the dam be designed to withstand a Cascadia fault predicted earthquake with a magnitude of 9 or higher? If I lived in Pe Ell I sure as heck would want the dam to withstand an earthquake of any magnitude. What if any evacuation plans will be created for the town of Pe Ell in case of full dam failure? Will an early warning system be put in place for Pe Ell? How long will the residence of Pe Ell have to evacuate if the dam were to fail? How high will the wall of water be from a full dam failure? This needs to be documented in the form of figures including satellite imagery showing the inundation zone. How many people would be impacted in the entire inundation zone of a dam failure from Pe Ell to the Aberdeen? Who will be held accountable for dam failure? Who would be responsible for the following costs associated with dam failure: damage and loss to public and private property, loss of life, loss of livestock, damage and loss of public and private infrastructure?

4.2.3.2.2 Vegetation

The report states:

The potential adverse impacts of the FRO reservoir area on vegetation include the following changes in vegetation communities:

- *Selective harvesting of up to 405 acres of mixed coniferous/deciduous forested riparian areas, which would convert the area to forests dominated by deciduous riparian shrubland*
- *Periodic inundation of up to 306 acres of coniferous forest dominated by Douglas fir, which would transition to a mixed deciduous/coniferous forest dominated by such species as red alder, western red cedar, and big-leaf maple*

The potential adverse impacts of the FRFA reservoir on vegetation include the following changes in vegetation communities:

- *Permanent loss of 711 acres from forested upland, riparian, and wetland plant communities*
- *Selective harvesting of up to 178 acres of mixed coniferous/deciduous forested riparian areas, which would convert the area to forests dominated by deciduous riparian shrubland*
- *Periodic inundation of up to 262 acres of coniferous forest dominated by Douglas fir, which would transition over time to a mixed deciduous/coniferous forest dominated by such species as red alder, western red cedar, and big-leaf maple*

This is preposterous. Essentially there will be no riparian vegetation available for decades to provide any sort of habitat for wildlife and aquatic organisms. This will cause extreme temperatures for salmonids and other aquatic life, increase sedimentation, there will be a loss of nutrients & LWD to the system. Again, how can claims be made that the FRFA dam will provide cooler water releases – there will be zero riparian vegetation around the reservoir. It will be even worse with the FRO designs as the river will be allowed to flow freely except there will be zero riparian vegetation along the river to provide shade and habitat. This is absolute insanity! Exactly how this will benefit salmonids and increase their populations?

4.2.3.3 Mitigation

The report states:

- *Creating wetlands around the perimeter of the FRO flood pool or FRFA conservation pool*

Exactly how will wetlands be created around the perimeter of the FRO flood reservoir (not a pool!) or FRFA reservoir (not a conservation pool!) when slopes are consistently 30% or greater? Exactly how much will it cost to create such wetlands?

4.2.4.2.1 Fish

The report states:

Anticipated adverse impacts of the Flood Retention Facility on fish would be significant for fish

populations in the Chehalis Basin. Adverse impacts would primarily affect fish in the mainstem Chehalis River above and immediately below the dam; however, 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. Adverse impacts would occur due to changes in habitat functions and reduced access to habitat from the following:

- Loss of habitat function within the reach of the Chehalis River inundated upstream of the dam for cool, swift-water associated fish species, including loss of spawning habitat and food supplied to the river from the riparian corridor and vegetation*
- Partial reduction in fish survival and potential interruptions to migration due to passage impediments, including salmon and lamprey spawning migrations*
- For the FRFA, exposure of juvenile salmonids that use the permanent reservoir for rearing to predators that may thrive in the reservoir*
- Changes to fish habitat-forming processes and water quality downstream of the dam*

The effects of dams on aquatic systems in the Pacific Northwest have been widely studied, with the literature generally showing far-reaching negative impacts for aquatic systems. These impacts are particularly notable for salmonids, affecting habitat quality, upstream and downstream survival, and migration. In addition, headwater areas like the upper Chehalis River are important holding and rearing areas for salmon across the Pacific Northwest, and the construction of dams in Puget Sound rivers has led to multiple extirpations of spring-run Chinook salmon populations (Beechie et al. 2006).

Short-term impacts during the 2- to 3-year 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. For instance, reduced salmon and steelhead egg survival in a given year could result in fewer adult salmon and steelhead returning to the upper Chehalis Basin 2 to 4 years later.

Overall, both the FRO and FRFA facility types would create a significant adverse impact on fish survival, migration, and the area of habitat available for spawning and rearing, specifically for species that use the stream reaches just above and below the dam. The impact on fish resources would result from loss of habitat functions and reduced survival or access to spawning grounds in the vicinity of the Flood Retention Facility.

There is no mention of the three lamprey species. What will happen to these fish?

It is inconceivable to read this report and be dismayed at the boastful benefits Alternative 1 and the dams will bring to aquatic species, especially salmonids and then read the above passages. This is absolutely unacceptable and ludicrous. Where are the models predicting the ESA listing or total extinction of all salmonid runs in the Upper Chehalis above the dam? Such models must be included in the report and if they are not then the FRFA and FRO dams should not be considered as a viable Alternative.

The report states:

The dams proposed for the upper Chehalis River are uniquely designed for the purpose of flood retention and fish passage, with added measures intended to reduce the adverse impacts on fish.

Look at the billions of dollars that have been spent on the Columbia River dams to reduce the adverse impacts on fish passage and those measures have not worked. What are the measures that will be used on the FRO and FRFA dams that will be different from measures being currently used on the Columbia River dams? What “magical” fish passage system is going to be used that is not currently being used on any other dam throughout Washington State? Please present a thorough and complete list including all associated costs of installation, maintenance and operation over the life of the proposed FRO and FRFA dams. Who will be paying for such costs?

The report states:

Loss of habitat function would occur due to removal of trees with either the FRO or FRFA facility, as described in Section 4.2.3, which would permanently eliminate the riparian buffer zone and reduce food and nutrient inputs that directly and indirectly feed fish (Allan et al. 2003). With the FRO reservoir, shading by riparian trees would be reduced or eliminated around stream reaches that flow through the reservoir footprint, resulting in an increase of water temperatures in the summer of up to 5°C for some areas compared to current conditions (e.g., Crim Creek, an area with a narrow stream channel that is currently well shaded) that would persist to areas downstream of the FRO dam. Water temperatures in the reach immediately below the FRO dam—where summer water temperatures already exceed optimal limits for salmon and other cool-water fish species—are predicted to increase in summer by approximately 2 to 3°C (Beschta 1997). Impacts of the FRO facility on water temperature would be negligible below the confluence with the South Fork Chehalis River.

Again, how can models in the report suggest that cooler water temperatures will be released from the dam to the mouth of the Skookumchuck River? The above passage totally contradicts the supposed modeling of cooler water temperatures presented previous sections of this chapter.

The report states:

Changes in water quality in the reservoir, as discussed in Section 4.2.1.2.1 (turbidity, temperature, and DO), would create a significant adverse impact on fish.

Warmer waters in the FRFA reservoir would also hold lower DO; however, reductions in DO are not expected to reach levels considered lethal for juvenile salmon near the surface.

The second passage is totally contradicted by the first passage. How was the information in the second passage determined? Where are the facts to support this statement? Anything speculated using models to support the second passage should be removed from the report if it cannot be supported by facts.

The report states:

In addition, decaying vegetation and lack of mixing could contribute to low DO levels deep in the reservoir, causing fish to avoid seeking refuge at depth.

This is the water that will be released downstream for cooler temperatures? This lack of oxygenated water will be released because it is “cooler” thus increasing the likelihood of fish kills occurring downstream of the dam. How can this be justified? Will fish kill monitoring be conducted 24/7 when the “cooler” water is released from the dam? Why are low DO levels not addressed in the temperature section of the chapter?

The report states:

Reduced water quality in shallower layers of the reservoir could force juvenile salmon to seek thermal refugia in deeper water, limiting their foraging opportunities and reducing the effectiveness of juvenile fish collection facilities, or could cause them to emigrate from the reservoir early in the summer, eliminating any benefit of the reservoir for rearing.

How does this benefit salmonids? This will contribute to their demise and extinction in the Upper Chehalis. Similar situations have already occurred with Spring Chinook at other dam locations in WA state. This is not acceptable. Exactly how will the juvenile salmon emigrate from the reservoir early in the summer? There is a massive dam blocking their downstream migration.

The report states:

Mobilization of fine sediment would occur in hydrologically dynamic areas of both the FRO and FRFA reservoir, causing increased turbidity in the reservoir and areas downstream of the dam. Turbidity could affect fish directly by causing gill abrasion and impairing vision. Frequent disturbance of the substrate would alter food webs that support fish by resetting the standing crop of algae and aquatic invertebrates that feed fish (Power 2006). Sediment deposition would create the greatest impact on benthic species and immobile life stages. Fine sediments could reduce incubation survival for fish that use the riverbed for spawning, and change habitat use for species that rely on larger bed materials. In particular, incubating salmon embryos in redds require a constant flow of oxygenated water through the gravel and would suffocate if inundated under still, deep water or if they become covered in newly deposited sediment.

Another death sentence for salmonids and other aquatic species. Where are the studies to determine the exact impacts this will cause? Why does this report consistently “model” for the benefits dam will provide and yet there are no “models” for the negative impacts dam will cause to salmonids and other aquatic species? These models and numbers must be presented in the report.

The report states:

Passage through tunnels with the FRO dam presents the least impact on migratory species because these would be designed to mimic the natural gradient of the river channel.

Where are the studies to support the claims of the above passage?

The report states:

With the FRFA dam, and when 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 either dam would be provided.

What exactly are those structures for fish passage? Details must be presented and the success and failure of those structures must be presented.

The report states:

Overall, adult and juvenile lamprey passage through the FRO dam is expected to be high (from 95% to 96%), and higher than passage through the FRFA dam (adult passage estimates range from 40% to 60%; juvenile downstream passage estimates range from 0.3% to 0.6%).

Will there be a fish ladder to allow adult passage of lamprey? Exactly how was 40% to 60% adult passage determined? Please state studies, reports and facts that support this claim.

What will be done to prevent the extinction of lamprey with a juvenile passage at 0.3% to 0.6%?

The report states on more than one occasion:

The fish passage facilities associated with the FRFA dam could nearly eliminate downstream passage for lamprey.

Passage of juvenile lamprey migrating downstream is expected to be extremely poor and could result in Pacific lamprey being eliminated from the upper Chehalis River.

This is not an option and the FRFA dam must allow for the passage of all adult and juvenile life stages of lamprey species. How will this be accomplished? All lamprey species are essential for the ecological health and balance of river systems. The preconceived notion that it is totally acceptable to allow the lamprey species to go extinct above the dams is totally unacceptable! If passage for both adults and juvenile lamprey cannot be mitigated, then the FRFA and FRO dams should not be considered as a viable Alternative.

The report states:

However, the Basin-wide population is not expected to be eliminated with either dam type, based on the conclusion by Jolley et al. (2016) that a robust population of Pacific lamprey is currently present in the Chehalis Basin.

Jolley et. al (2016) go on to mention "The Construction of a new dam to provide flood control for the cities of Chehalis and Centralia is being proposed. This could have a negative effect on lamprey populations in the Chehalis Riverbasin, as dams on the mainstem Columbia and Snake rivers have been implicated as a major contributor to the decline of Pacific Lamprey (Moser et al. 2002; Mesa et al. 2010; Jackson and Moser 2012; Keefer et al. 2012). In some cases dam construction and operation has led to the extirpation of Pacific Lamprey in upstream areas (Beamish and Northcote 1989)." This passage needs to be included in this section of the report. Again, all lamprey species are essential for the ecological health and balance of river systems. The preconceived notion that it is totally acceptable to allow the lamprey species to go extinct above the dams is totally unacceptable and the FRFA and FRO dams should not be considered as a viable Alternative.

The report shows:

Table 4.2-5 Anticipated Fish Passage Survival Through the Dam and Fish Passage Structures

Trap and transport is already being used on the Columbia River dam systems with little success and there are still ESA listed salmonids on the river. What exactly are the juvenile passage facilities for transporting juvenile salmon and steelhead downstream?

The report states:

Though inundation or blockages to fish passage could be temporary, a loss of productivity for several weeks in a single year due to temporary inundation or blockage of fish passage would lead to reduced productivity in the subsequent generation. 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.

This would cause a complete loss of salmon runs - not reduced productivity in subsequent generations and eventually their extinction from the Upper Chehalis basin. The preconceived notion that it is totally acceptable to allow the salmonid species to gradually go extinct above the dams is totally unacceptable and the FRFA and FRO dams should not be considered as a viable Alternative.

The report states:

(further details on salmon run size can be found in Table 3.4-4 in Section 3.4.1.1.4).

Where is Section 3.4.1.1.4 in the report? How can further information on run size be reviewed if it is withheld from the report? Withholding information is totally fraudulent and yet not surprising or unexpected.

The report shows:

Table 4.2-6 Baseline Potential Salmonid Abundance in the Chehalis Basin
Source: ICF 2016

Where is this report? Why is not available for public review?
The report states:

All of the three dam scenarios modeled would reduce the overall abundance of all salmon and steelhead populations in the Chehalis Basin from less than 1% to 4% depending on the species.

Exactly how were these reductions determined? Where is the documentation for public review so an individual can review the facts? Columbia river salmon populations have decreased by 85% since dams were installed. The same results can be expected for the Chehalis. Please provide information showing rivers with dams in Washington containing an ESA listed salmon species that are flourishing and can be delisted from the ESA.

The report states:

The behavioral response of adult spring-run Chinook salmon in the Chehalis River to modulating temperature and flow from the FRFA facility is unknown and represents a key uncertainty described in more detail below and in Appendix K.

If this is unknown, then how can the report repeatedly state that the dams will help Spring Chinook? There are no rivers with dams in the state of Washington that have an ESA listed Spring Chinook population that have been delisted. See http://www.rcow.wa.gov/salmon_recovery/is_recovery_working.shtml

How can individuals be referred to Appendix K when that report has no tagging or tracking data of Spring Chinook above the dam site? This is totally misleading and all data used in models and presented in the report should be removed.

The report states:

Permanent inundation of up to 1,264 acres for the FRFA reservoir would convert stream and riparian habitats to a pool (lacustrine) habitat for which many stream-dwelling wildlife species, especially native amphibians, are not well adapted, presenting a loss of functional habitat for these species and a substantial adverse impact on aquatic wildlife. Most wildlife species would not adapt to the changes from stream, riparian, and terrestrial habitats to a lacustrine habitat, forcing these species to attempt to relocate to other suitable habitat (Knutson and Naef 1997). Some species would successfully relocate to other suitable habitat and some species would be unsuccessful in relocating to other habitats and would perish (Knutson and Naef 1997).

As discussed in Section 4.2.4.2.1, conversion of stream and riparian habitats to a pool habitat under the FRFA would also result in the loss of salmon spawning habitat within the reach of the Chehalis River upstream of the dam. Salmon provide nutrients to a wide range of wildlife species

that directly prey on live spawners, scavenge the carcasses of dead fish, or prey upon salmon eggs and juveniles after spawning. The range of mammal species that feed on salmon includes bears, weasels, shrews, and potentially deer, squirrels, and mice. Avian predators and scavengers include eagles, hawks, gulls, crows, and some songbirds (Willson and Halupka 1995). The nutrients from spawners also benefit wildlife by fertilizing riparian and aquatic plant species which, in turn, provide food or cover for aquatic and terrestrial animal species (Schindler et al. 2003). Decreases in salmon abundance resulting from lost freshwater habitat will, therefore, have an adverse impact on wildlife species that either feed on or otherwise benefit from salmon-derived nutrients. The significance of the adverse impact on wildlife is proportional to the decrease in abundance and is also expected to be most intense in areas where salmon spawning is substantially reduced or prevented, such as the reservoir footprint.

The consequences of above passages are totally unacceptable and the FRFA and FRO dams should not be considered as a viable Alternative.

The report states:

The Flood Retention Facility could worsen the adverse effects of climate change on some salmonid species, including winter/fall-run chum salmon and spring-run Chinook salmon. The FRO facility would have greater detrimental adverse impacts on the spring-run Chinook salmon population than the FRFA facility. Modeling results indicate that little or no change in populations of other salmonid populations are predicted with climate change and construction of a Flood Retention Facility.

What were the inputs used in the modeling to make these determinations? The ICF 2016 report must be made available to the public for review.

5.3 Alternative 1: 2014 Governor's Work Group Recommendation

Who is going to pay for all the costs associated with Alternatives 1-4? This must be part of the EIS before any alternative can be considered. Until all funding sources are determined none of the alternatives should be considered

5.3.2 Aquatic Species Habitat Actions Evaluation

The report states:

Modeled results of salmon habitat potential for Alternative 1 include the maturation of riparian areas in managed forestlands...

Exactly how will this be accomplished and whose managed forestlands will this occur on? Do you have agreements for these forestlands to mature from landowners? How large will these riparian areas be? Who will compensate the managed forestlands owners for the loss of timber revenue?

The report states:

Most of the benefit of riparian and fish passage improvements in managed forestlands would accrue to coho and steelhead because a larger portion of their habitat is located in the Satsop, Humptulips, and Wynoochee basins that are largely managed forestland³.

The entire area above the dam sites is Weyerhaeuser managed forestlands! Why are these managed forestlands not included in the report? Does that mean none of the riparian and fish passage improvements will occur?

The report states:

Although the FRFA facility would be designed to provide cool water downstream to benefit salmon,

This is a bunch of misleading information that is continually being flaunted throughout the report. What about the low DO levels that will be going downstream with the cool water? This fact must be presented every time the benefits of provided cool water downstream of the dam is mentioned in the report. Cool water does not benefit any aquatic organism downstream of the dam if that water will cause suffocation.

The report shows:

*Table 5.3-4 Potential Response in Salmonid Abundance for the Chehalis Basin with Alternative 1
Figure 5.3-4a Potential Response in Salmonid Abundance to Habitat Change in the Chehalis Basin with Alternative 1*

All three dams would benefit salmon - what a bunch of false and misleading information presented in this table. How about using facts instead of speculative models? Please list all dams in Washington State that contain ESA listed salmonid species that have fully recovered and increased in similar numbers shown in this table? You have a choice of 1165 dams in WA state to choose from. Where have salmon numbers increased to such levels with dams (many dam locations have had habitat improvement similarly mentioned in Alt. 1)? Dams decimate fish runs and do not improve fish runs. Fig 5.3a, b & c: Spring Chinook numbers are impossible - please list the exact facts as to how this will occur? These entire sections and any subsequent data or models used in the ICF 2016 report must be removed from the report – it is totally false and misleading and not based on facts. How can an individual review any information in this report when it is not available for public review? Again, data from the ICF 2016 report promotes the construction of dams that is the main purpose of the report.

Appendix E Evaluation of Forest Practice Effects on Landslides and Erosion in the Chehalis Basin

The report states:

Current Forest Practices Rules are designed to avoid harvesting and road building on unstable slopes. The 1999 5-year review of the three watershed analyses showed that there were fewer landslides during the 1996 (approximately 100-year) storm than during previous periods with less intense storms, suggesting that the prescriptions that limited harvesting/road construction and improved existing roads on unstable landforms may be effective at reducing mass wasting during large storm events.

Are you serious? This statement is totally misleading. Aerial photos show that a higher percentage, about 95% of the water shed was forested with timber in 1999 vs. 2007. Therefore, it was more protected from slides compared to the 2007 event. See Attachment 1: 1996 Image Upper Chehalis Watershed and Attachment 2: 2009 Image Upper Chehalis Watershed.

Current Forest Practice Rules are designed to avoid harvesting and road building on unstable slopes.

Oh, really? It is business as usual for Weyerhaeuser, the company is currently constructing roads and clearing cutting timber stands on excessively steep and unstable slopes (but what about those Forest Practice Rules?). See Attachment 3:2016 Image Upper Chehalis Watershed. As one can see from this image harvesting and road building are continuing on steep and unstable slopes. This image needs to be included in the report showing that the current threat of landslides still exists and it is even worse than it was in 2007.

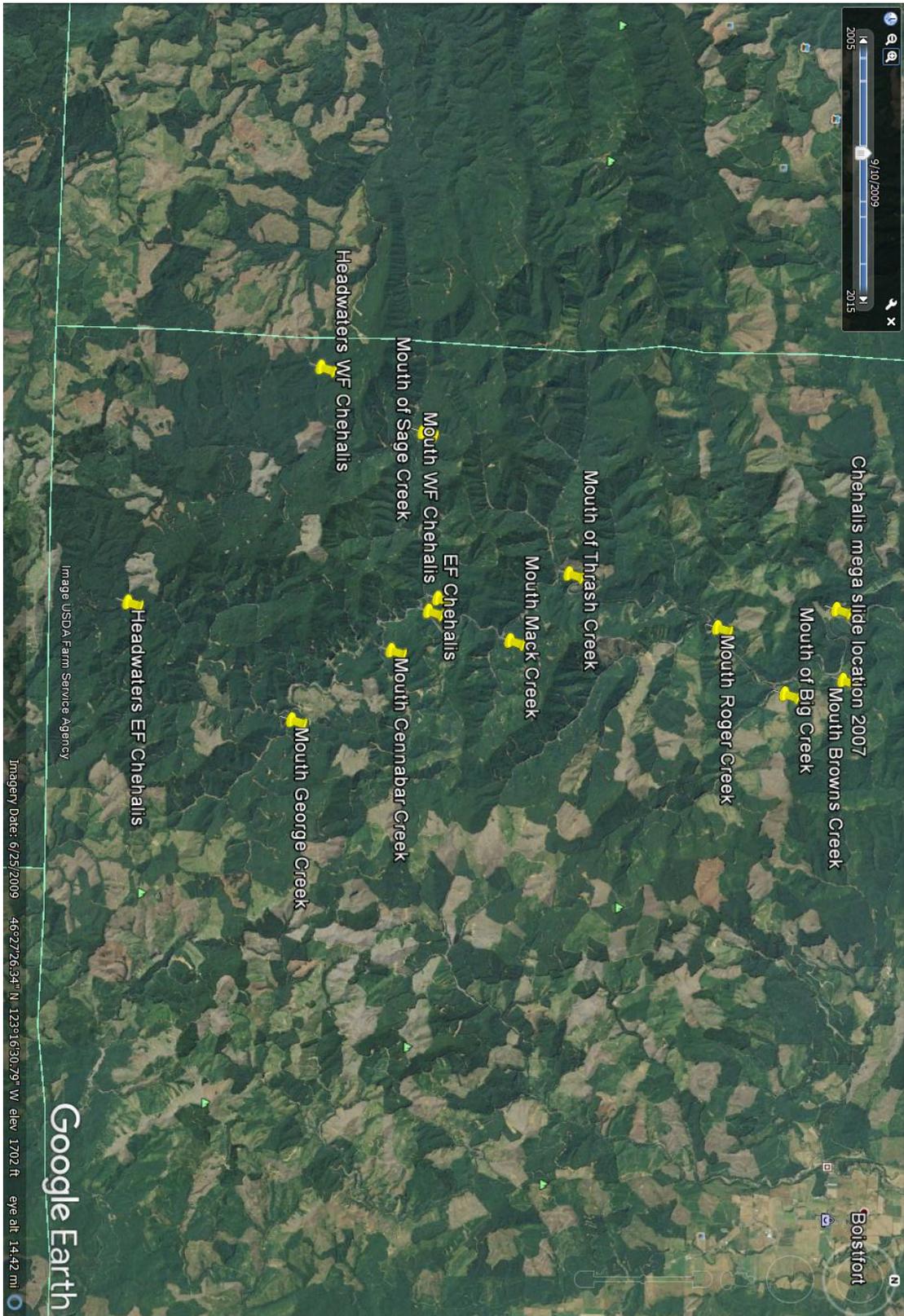
The presentation of the EIS Alternatives 1 – 4 is very confusing. Are the options available under each Alternative only applicable to that particular Alternative? Why is a mix of Alternatives not available as an option? For example: Why can't sections of Alternative 2, 3 or 4 be used as another Alternative, say Alternative 5? Making the Alternatives so limited defeats the purpose of coming up with strategies to reduce flooding impacts to the Chehalis basin.

I am totally against Alternative 1 due to the FRO & FRFA dam proposals. It is insane to even propose such an option. The reasons are clear, there are over 1165 dams in the State of Washington, all the rivers with dams in the Puget Sound and the Columbia River have ESA listed salmonid species. The Chehalis Basin will join the "club" within 5 to 10 years of a dam being constructed. This is not acceptable and should never be considered as a viable Alternative.

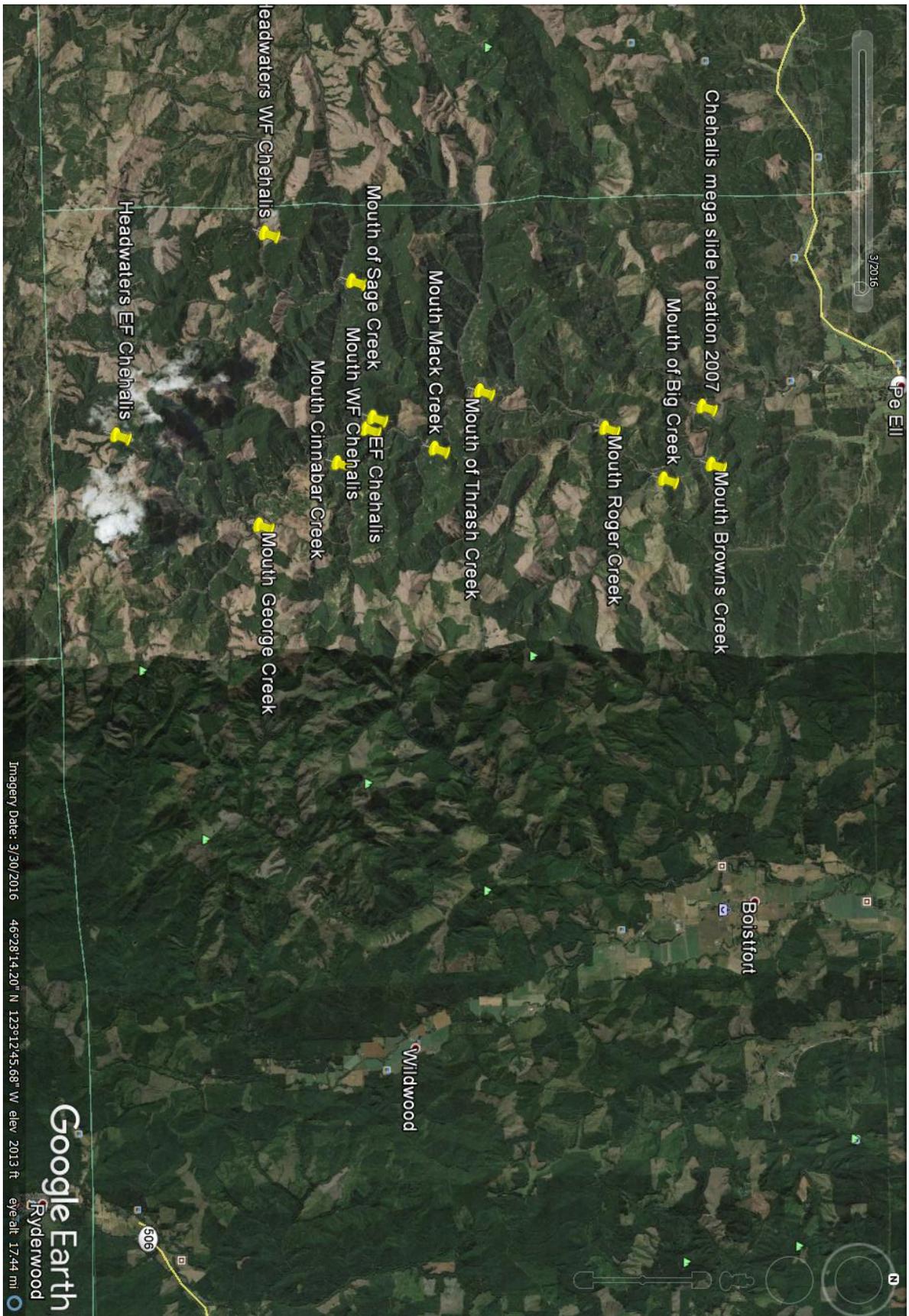
Attachment 1: 1996 Image of Upper Chehalis Watershed



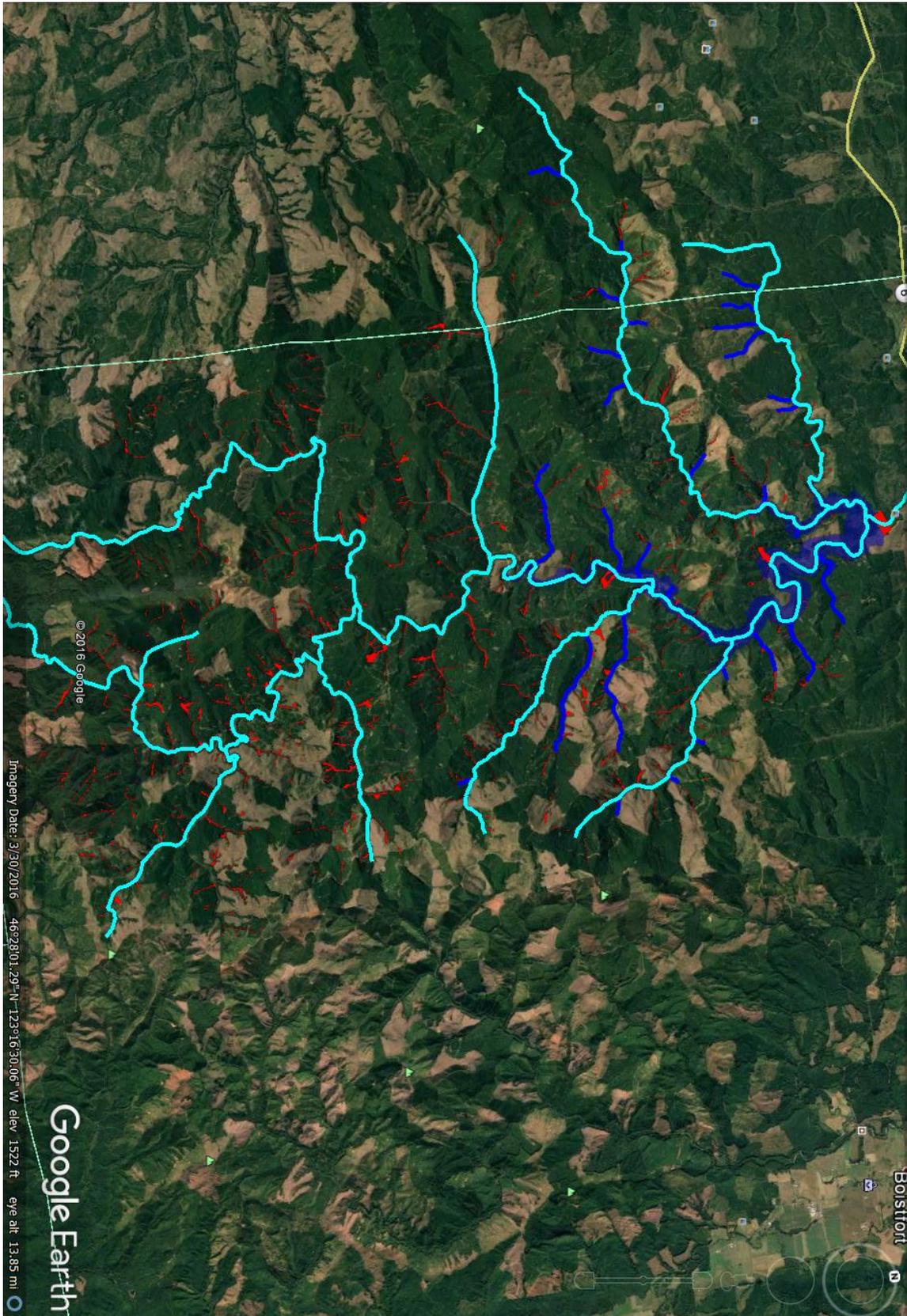
Attachment 2: 2009 Image of Upper Chehalis Watershed



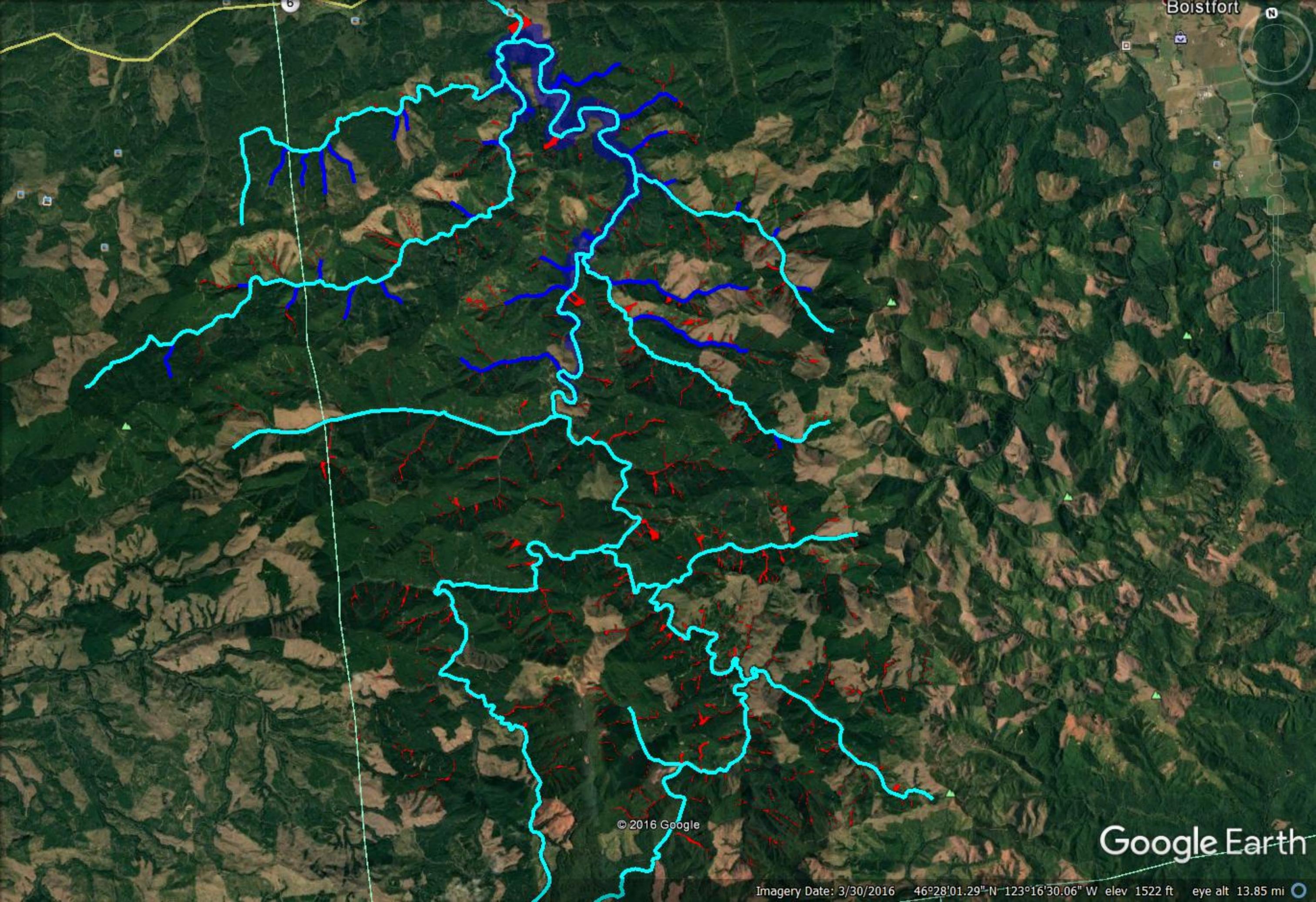
Attachment 3: 2016 Image of Upper Chehalis Watershed



Attachment 4: 2007 Slides - All red highlighted areas represent slides from the 2007 Storm.



Boistfort



© 2016 Google

Google Earth

Imagery Date: 3/30/2016 46°28'01.29" N -123°16'30.06" W elev 1522 ft eye alt 13.85 mi

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 9:33 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Draft-Chehalis-Basin-Strategy-Programmatic-EIS.docx

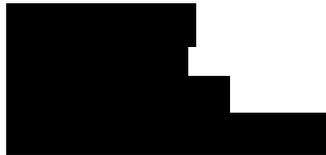
Comment Form

First Name: Ron

Last Name: Figlar-Barnes

Organization: Self

Address:



Phone:



Email:



Comments: See Attached

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Draft-Chehalis-Basin-Strategy-Programmatic-EIS.docx>

File Upload (2):

File Upload (3):

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November 13, 2016

Draft Chehalis Basin Strategy Programmatic EIS

Ron Figlar-Barnes



Over all Comments

The DEIS does not state who will pay for the construction, operation and maintenance of proposed dams in Alternative 1 or 2? Why is this not included in the report? The Chehalis River Basin Food Authority suggested forming Flood Districts to pay for the maintenance and operation of the dam(s). Any citizen living within the Chehalis River Drainage would be part of the flood control taxing district. Ocean Shores residents will see no flood relief from a dam that will benefit Lewis County residents. Does that mean Lewis County residence should pay for coastal erosion control in Ocean Shores? Why should residents of Grays Harbor be taxed to pay for the operation and maintenance of a dam that will provide no flood relief in Grays Harbor County?

The 2009 Flood Event had record floods in the Newaukum drainage where I-5 was flooded. How will flooding be addressed in other drainages such as the Newaukum, SF Chehalis and Skookumchuck which has a dam and still floods? What if a similar rain on snow event happens in a neighboring drainage of the Chehalis? Do we build another dam there? The South Fork Chehalis or the North and South Fork Newuakum could flood Lewis County at any time with a similar rain event and close down Interstate 5.

Why does the DEIS not address the poor forest management practices that directly contributed to the 2007 flooding in the upper headwaters of the Chehalis River? This is an on-going problem statewide. The lack of adequate riparian zones, short harvest rotations and poor forest road construction and maintenance continues to contribute to flooding/landslide issues state wide.

What current dammed river in WA State has recovered ESA listed salmon? None! We are in an era of removing dams not building them. The chances are great if a dam is built in the Upper Chehalis there will be ESA listed salmon.

Flood Damage Reduction

Large-scale

- **Flood Retention Facility (Dam and Associated Reservoir)**
 - *Specific elements include a Flood Retention Facility (dam and associated reservoir), Restorative Flood Protection, and three new or improved levee systems. In the levee category, the I-5 Projects action element includes a series of new levees, floodwalls, and bridge replacements to help reduce flooding and closures of I-5 in the Chehalis and Centralia areas. Improvements to an existing levee are also being evaluated in the Airport Levee Improvements action element, which would provide additional flood protection to the Chehalis-Centralia Airport, local businesses, and a portion of I-5. An Aberdeen/Hoquiam North Shore Levee is also evaluated, which would be a new levee to provide coastal flood protection for residents and business in low-lying areas within those two cities, both currently and when considering potential future sea level rise.*
 - These alternatives provided give a large array of potential flood reduction methods. Unfortunately, the dam on the Chehalis River is a nonstarter. There is not one dam or dam project in the United States that truly reduced major flooding. Dams have to release water when precipitation outstrips their capacity to retain water. Even in the Mississippi River over and over again flooding occurs with one of the most comprehensive flood control projects ever created. The watersheds of the upper Chehalis basin are many and to think that a dam placed near Pe Ell will somehow protect the mid-and lower Chehalis from rain on snow events in other drainages is very optimistic. The planners and committee of the Chehalis Basin Strategy need to rethink this alternative. In addition, dams in no way shape or form can save fish runs. To say that a retention flow argumentation facility or a flood retention facility would help save salmon is a ridiculous premise.
 - New levees, unless these setback are to the furthest extent of the floodplain they will not work. Floods need to be absorbed into valley soils and spread out in order to reduce their impact. Channeling floodwaters only increase the velocity and the destructiveness of stream flow. Erosion and channelization is a natural occurring outcome of restricting a river.
 - Bridge replacement is a good alternative if it's a large enough structure to allow floodwaters to flow through natural occurring flood channels.
 - The Aberdeen/Hoquiam North Shore levee evaluation is an exercise in fertility. The low lying areas of Aberdeen and Hoquiam would need a major project to surround the cities to reduce the impacts of sea level rise. The levees as depicted would only put a finger in a dike with sea level rise finding the next lowest area to trickle in. This is not a solution for the communities of Grays Harbor. The natural solution to sea level

rise in these areas is to start moving off the floodplain. This is something that no one wants to consider but if climate change is real is the only solution for coastal communities. One nice thing about the Chehalis surge plane is that it mitigates the major flooding impacts to these communities without spending a dime.

- **Airport Levee Improvements**
 - As stated, levees cause problems mostly to the downstream areas associated with a floodplain. It is understandable that the local airport would want be protected from flooding. It is unfortunate however, that the airport was placed in the middle of the Chehalis floodplain to begin with.
- **I-5 Projects**
 - Interstate 5 should have been an elevated roadway for at least 10 miles. Projects that allow the floodplain to function normally would be preferred. Building or enhancing bridges across the 10 mile section of the flood corridor is a good idea.
- **Aberdeen/Hoquiam North Shore Levee**
 - As I stated earlier is good that this is just a study to determine the feasibility of such an undertaking.
- **Restorative Flood Protection**
 - Trying to rebuild some of the lost natural flood capacity in the Chehalis basin is a good idea. Put in a log jams where you know sediment might be trapped is good idea, but again without the removal of dikes associated with farm fields throughout the watershed this alternative will have limited success. Reconnecting floodplain channels to restore floodplain storage is also a good idea after all water allowed to spread out is absorbed into the soil and the volume of flooding is lowered.

Local-scale

- **Floodproofing**
 - Elevating homes or businesses in a floodplain is difficult at best. Building structures around homes and businesses does not help the main issue of restrictions in the floodplain. Any time, boulders are placed in streams the water increases its velocity as it finds a new a new path around the obstacle. This increase in velocity causes erosion and flooding as water finds the best alternative to its original course. The real solution is buyout properties and frequently flooded areas and planning that includes removal of livestock and equipment from the floodplain during flood periods.
- **Local Projects (Small Flood Reduction)**
 - Local projects to protect roads wastewater treatment plants and other floodplain areas is the prudent path. However, in order to protect those

roads in treatment plants the course of rivers and streams need to be included. Again, bridges in elevation of roadways would be preferred for the long-term protection of both citizens and habitat.

- **Land Use Management**
 - Improvements in land-use management are a much needed process for all the counties associated with the Chehalis floodplain. I certainly like the idea that local construction standards and local land-use plans need to protect remaining floodplain functions that still exist. To gain those functions back local land-use decisions need to include the opening up of areas that have been lost in the floodplain. Certainly, new development in the floodplains needs to be stopped.
- **Flood Warning System Improvements**
 - Improving a flood warning system is a good idea and should be part of any actions associated with the Chehalis basin strategy.

Aquatic Species Habitat Actions

- **Restore Riparian Habitat**
 - As pointed out in the EIS much of the drainage is associated with timber management activities. These activities do fall under the Washington Forest Practices Act and the Habitat Conservation Plans associated with each management unit. The riparian zones associated with those active timber areas have been meager while clearcutting on steep slopes contributed to the rain on snow floods in 2007. A report published by the Dept. of Natural Resources in 2008 found there were 1,614 landslides which created numerous and devastating debris flows in the headwaters of the Chehalis River basin. Of those 1,614 landslides, 1,054 occurred in clear cuts or timbered stands of trees less than 50 years old. There were ZERO landslides associated with stands of trees that were 50 years and older. The remaining 560 landslides were associated with forest roads in steep terrain. The elephant in the room no one is willing to discuss are the poor forest practices that occur in this state. Managing forests for a profit with short rotations, large clear cuts and lack of adequate riparian zones contributed directly to the flooding event in the Chehalis River Basin of 2007. **DO NOT DISCOUNT THIS REPORT!** With soil saturated, no vegetation on the slopes, slope failure and landslides, the water had nowhere to go except downhill and into the various streams. There have been copious studies showing the relationship between steep slopr logging and raod building and slope failure and loandslide activity. According to a study (Megahan 1983 and 2010) *many of the environmental impacts of logging and wildfire are caused by changes in the hydrologic response of slopes after disturbances. This study was conducted to evaluate changes in inflow, storage, and outflow for 3-year*

periods before and after clearcut logging and wildfire on two steep, granitic microwatersheds in Idaho. Clearcutting alone and clearcutting plus wildfire increased annual peak snow water equivalent and snowmelt rates an average of 41% and 30%, respectively. The greater volume and rate of snowmelt caused respective increases in the peak piezometric rise and in total piezometric storage, amounting to 47% and 27%. Accordingly, the total volume of subsurface flow intercepted by the roadcut was increased 96% and was accompanied by 27% greater peak flow rates. None of the above responses were detectable on an adjacent watershed that was burned by wildfire alone. Evapotranspiration was reduced on both watersheds after clearcutting or wildfire, as indicated by increases in the unsaturated soil water content at the end of the growing season amounting to 44 and 72%, respectively. Accelerated mass erosion on clear-cut slopes, and accelerated surface and mass erosion on roads and in channels below roads, can result from such changes. Regulation of forest practices in the upper watershed has to be stringent for timber companies seem unable to control their desire to cut down forests. For the Chehalis Basin strategy to be successful it is imperative to repair and restore upper forested land areas. Native plants and vegetation as well as salmon can thrive with regulatory oversight of an industry that fights tooth and nail not to do the right thing.

- **Remove Fish Passage Barriers**
 - The removal of fish passage barriers is a requirement. The Washington State culvert case decision needs to be implemented.
- **Restore Off-channel Habitat**
 - The off channel habitat in the Chehalis system certainly needs to be restored. In order to accomplish this one has to take into consideration the removal of dikes along farm fields and the restoration of meanders in the floodplain.
- **Add Wood to Streams for Habitat**
 - Adding wood to streams can help form and function of floodplains and riparian zones. However, this alternative should be the last in the effort to restore of the floodplain of the Chehalis basin.
- **Restore Bank Erosion to Naturally Occurring Rates**
 - Restoring bank erosion to naturally occurring rates is a confusing thought process. Are we talking about rip rapping areas that are eroding farmers' fields or are we talking about allowing erosion to meander into farmers' fields? Please clarify! Again, allowing the Chehalis River to flow means to allow the floodplain to meander.
- **Reconnect the Floodplain**
 - In order to reconnect the floodplain landowners have to be willing to relocate. Reconnecting the floodplain in areas that are readily available should certainly be a high priority.

- **Create, Restore, and Enhance Wetlands**
 - It is a given that bring healthy salmon populations back to the Chehalis system that restoring and enhancing wetlands is a critical component.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 27, 2016 9:28 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Caryn

Last Name: Foley

Organization:

Address: 

Phone:

Email: 

Comments:

I have lived in Lewis County my entire life, growing up in Pe Ell. Flooding has to be mitigated. I have seen family and friends lose everything because of inaction to mitigate flooding. We cannot let our family and friends be impacted again by another flood like that of 2007, and that is why I support Alternative 1. This alternative seems to be the best comprehensive approach that can make a major difference. Local community members have dedicated years of their time to develop a solution based upon facts and relevant science.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 3, 2016 10:56 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Mark

Last Name: Foltz

Organization:

Address:

[REDACTED]

Phone:

Email:

[REDACTED]

I am writing in opposition to the construction of a dam on the lower Chehalis river. Ostensibly this dam would control flooding and subsidize agricultural land use to the tune of \$600 million to \$1.2 billion dollars. However, all it will do is move the flooding elsewhere. Also, no one has clearly explained why the private landowners who will benefit from the dam deserve this public subsidy.

A dam on the lower Chehalis will also disrupt salmon runs, already at historically low levels from climate change, and threaten endangered steelhead salmon. This would continue to deprive First Nations of their treaty rights.

Comments:

I would also like to point out that \$350 million in public money was just spent to remove a dam on the lower Elwha, and there are several other candidate dams in the region whose removal would benefit watersheds and ecosystems. If we are spending public money, put it to use to restore natural watersheds, and mitigate flooding of urban areas in Lewis County and I-5 through floodplain restoration, not to subsidize private agricultural land use.

Yours,
Mark A. Foltz

[REDACTED]

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, November 9, 2016 2:49 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Chehalis-flood-comment-ltr-1109.docx

Comment Form

First Name: Steve

Last Name: Fransen

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: Please see attached WORD file.

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Chehalis-flood-comment-ltr-1109.docx>

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November 9, 2016

Chrissy Bailey
EIS Project Manager
Chehalis Basin Strategy
Department of Ecology

Dear Ms. Bailey,

I'm providing comments on the Chehalis Basin Strategy draft Environmental Impact Statement (EIS). I have several concerns, chief among them are the adverse environmental impacts and the prospective benefits relative to the costs to attain them. The U.S. Army Corps of Engineers has done repeated studies to identify flood control and flood damage reduction alternatives in the Chehalis River basin. It's true that a flood control dam would significantly reduce flood damage. However, those studies have also found that such a dam is not economically beneficial, that is, the Benefit:Cost threshold of 1.0 is not met.

The benefit:cost (B:C) ratio is invariably negative except in certain alternatives for fish restoration. Project costs range from \$548 million to \$1,139 million. The benefits without fish restoration are all well below 1.0. Even with fish restoration measures, the B:C ratio is only 1.1 for the high restoration alternative with Flood Retention Only (FRO) and 1.6 for the low restoration alternative with FRO. This makes it pretty clear that alternatives that include additional storage and flow augmentation (the FRFA alternative) will be off the table.

Uncertainty abounds in the analysis. First and foremost is, where will the money come from? This would be a huge capital investment project, unlikely to be paid for by the prospective beneficiaries. The economic analysis does a good job of describing this project as a boondoggle without actually using the term. It's obvious that the project doesn't stand on its own merit when major fisheries resource enhancement or restoration is incorporated to lift the project benefits over the threshold of 1.0. Further, there is no certainty that the suggested fish restoration elements will come to pass, let alone that the estimated level of benefit will materialize therefrom.

Aside from local interests, the EIS analyzes the impact of the occasional closure of Interstate 5 due to Chehalis River flooding. The closures average about five days once every 10 years. I find the inconvenience acceptable, just as when snowstorms render highways over mountain passes impassible occasionally during the winter. I prefer the more positive outlook that I-5 is almost always passible and seldom closed. The notion that occasional closures is unacceptable is foolhardy, arrogant, and enormously costly if you're spending your own money to mitigate the effect. Personally I'd much rather pay a bit more for my lettuce and other produce from California's Central Valley having to take a detour once a decade than to pay for a costly and environmentally destructive flood control dam on the upper Chehalis River.

I see a potential project outcome where natural ecological processes lose. Fish and wildlife lose. Whoever pays for the project certainly loses. All this so that those who have chosen to locate in or develop in the floodplain, and who wish to further develop the floodplain, can enjoy being subsidized by others. An axiom of reality is that there are natural and logical consequences. If you locate in a floodplain you will occasionally get wet. A corollary to that is that stupidity should hurt. Flood-proofing your floodplain location is your responsibility, not mine. So please don't stupidly ask me to help pay for this boondoggle.

Eliminate Alternative 1 from any further consideration, and please stop spending more public funds studying this wasteful boondoggle. And eliminate alternatives that clearly don't meet the B:C ratio of 1.0 at the outset from further consideration.

Sincerely,

Steve Fransen

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, November 4, 2016 12:37 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: David

Last Name: French

Organization: University of Washington School of Aquatic and Fishery Sciences

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

For over a century our state has allowed development to encroach floodplains, waterways, forests, and critical habitat for salmon and other wildlife. Traditional engineering approaches to flood control have only exacerbated impacts of development on the natural processes that shape and maintain aquatic habitat. Putting a dam in the Chehalis River basin would perpetuate these issues, encouraging ongoing development of areas naturally prone to flooding. What the system needs is restoration, relocation of industry, agriculture, and residential uses out of the floodway, and re-engagement of natural floodplains. The historic removal of old growth forests and instream large wood has led to channel incision, a loss of habitat, and reduced availability of spawning gravels. A dam would increase these impacts by altering flow and sediment regimes, further reducing habitat availability while reducing flooding by a small margin. Watershed scale restoration of upland forests, floodplain wetlands, side channel habitat, and instream large wood is needed to fix this problem in the long-term. A dam will cost our state millions initially, with millions spent in the future on maintenance, habitat mitigation, and insurance payouts when flooding inevitably occurs. I urge the state to consider making a long-term investment in the restoration of the Chehalis watershed. The dam alternatives are short-sighted, they will ultimately not ameliorate flooding, and we have spent millions removing dams around the Pacific Northwest in efforts to regain the salmon populations we've already lost. The Chehalis basin is one of the few river systems in Washington without endangered or listed Pacific salmonids. The location of the dam would negatively impact steelhead habitat, among myriad other negative impacts. Thank you for your consideration of the restorative flood protection alternative.

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From: Sylvia Freund [REDACTED]
Sent: Tuesday, October 18, 2016 2:22 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Sylvia Freund

EMAIL
[REDACTED]

MESSAGE

I, personally, support the water retention project that is activated only during potential flooding. It would seem to have less impact on fish and would be protective from damage at the same time?

Sent from (ip address): 97.126.21.39 (97-126-21-39.tukw.qwest.net)
Date/Time: October 18, 2016 9:21 pm
Coming from (referer): <http://chehalisbasinstrategy.com/eis-library/>
Using (user agent): Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/53.0.2785.116
Safari/537.36

From: Isaac Fu [REDACTED]
Sent: Monday, October 31, 2016 9:41 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Dam

Please to not dam this beautiful river. Rivers were not meant to be dammed and the fish will suffer - specifically the salmon and steelhead. This is one of the last rivers in Washington state that has a healthy run of native fish that will be severely impacted with the installation of a new dam.

I have seen first hand the number of beautiful native fish that would be affected by this dam if it is built and there has not been one dam ever built in human history that has been good for native fish. Please let the fish swim and spawn in their natural habitat on the upper Chehalis river.

Thank you,
Isaac Fu

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 11:20 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Carolyn

Last Name: Fuleihan

Organization:

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: While I do not live in a flood zone, I can see the devastation floods cause in Lewis County. Loss of income is one, but the absolute major cause is loss of potential business development, which would increase the tax base.

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This email was built and sent using [Visual Form Builder](#).

From: Gary Fussell [REDACTED]
Sent: Saturday, October 1, 2016 11:44 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Gary Fussell

EMAIL
[REDACTED]

MESSAGE

Stop the Indians from putting so many nets out and you will improve the fish runs tremendously

Sent from (ip address): 75.165.41.200 (75-165-41-200.tukw.qwest.net)

Date/Time: October 1, 2016 6:43 pm

Coming from (referrer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (Linux; Android 5.0.1; SCH-I545 Build/LRX22C) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/53.0.2785.124 Mobile Safari/537.36

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 7:49 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Gary

Last Name: Fussell

Organization: retired

Address:

[Redacted Address]

Phone:

[Redacted Phone]

Email:

[Redacted Email]

Comments:

I support alternative 1, Dams have many effects to them, and in my opinion they are good, and would be a good solution for our flooding problems.

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This email was built and sent using [Visual Form Builder](#).

From: Kathryn [REDACTED]
Sent: Sunday, October 30, 2016 5:17 PM
To: info@chehalisbasinstrategy.com
Subject: My Comments on Chehalis Basin Draft

Gentlemen,

We were new to the area in 2007. After being impacted by the last major flood I have been following the issue of preventing a repeat. I now realize the issue of studying flooding in this area has been ongoing for 100 years. I think it is time to stop 'studying' the problem and move forward with a solution. I believe the most appropriate solution to the flooding is to build the dam and prevent future floods. I appreciate your efforts to study the problem again and to draft a proposed resolution. Why it has taken 100 years to get to a resolution is beyond comprehension but it is now time to build the dam!

Sincerely,
Kathryn Garrett
Chehalis, WA
Sent from [Mail](#) for Windows 10

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 11:51 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Vicky

Last Name: Gee

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I am a resident of Lewis County, and live on 40 acres that is partially in agriculture. This results in a lower assessed value for us, since we engage in agricultural activities.

I am in favor of Option 1, building a dam in the Pe Ell area. This would result in an effective solution that will reduce or almost eliminate flooding down valley, while creating recreational opportunities as well. This option is the best use of tax payer funds. It is a permanent solution and could be used to create electricity if desired.

To consider replacing good bottom land that has yielded family income and agricultural resources for generations with logged off hillside land is absolutely ridiculous! The proposed land would not yield any significant agricultural output, due to the quality of the soil, and hillside aspect of the land itself.

Not only that, but the assessed value is artificially low in comparison to what it would cost to purchase new land. Plus that land is likely in Timber, not agriculture Therefore the new land owners would probably have to pay the penalty in taking it out of timber production. Quite a hefty fine.

In addition, with the over-flooding what would happen to the water systems that depend on that area, such as Adna and others. This is not only ridiculous, but disastrous, disrespectful to the farming way of live, as well as totally not based on any kind of logic at all.

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This email was built and sent using [Visual Form Builder](#).

From: Gildersleeve [REDACTED]
Sent: Tuesday, October 18, 2016 1:14 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Gildersleeve

EMAIL
[REDACTED]

MESSAGE

Implementation of number 4 would be devastating to our area! Number 1 would be the most acceptable. Our area is a close knit community, rich in agriculture and history which needs to be considered.

Sent from (ip address): 169.204.238.170 (169.204.238.170)

Date/Time: October 18, 2016 8:14 pm

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (Linux; Android 6.0.1; SM-G920V Build/MMB29K; wv) AppleWebKit/537.36 (KHTML, like Gecko) Version/4.0 Chrome/54.0.2840.61 Mobile Safari/537.36 [FB_IAB/FB4A;FBAV/98.0.0.18.70;]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, November 11, 2016 1:24 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Joshua

Last Name: Greene

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: aqueducts , i lived in Arizona where they have flash floods, monsoon season the cities have large concrete aqueducts that channel the water to an area that can handle it, sure this would require buying out properties and where to channel water to ? otherwise build the hydro electric dams that had previously suggested and please stop worrying about protecting I-5 peoples homes are more important than the freeway

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File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: Robert Guenther [REDACTED]
Sent: Saturday, October 29, 2016 10:55 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Robert Guenther

EMAIL
[REDACTED]

MESSAGE

I'm having some difficulty navigating what I'm reading here, but the gist of what I'm seeing is that option 1 would create a retention reservoir west? of Pe Ell? Would this area be utilized similarly to the reservoirs on HWY 12E (Riffe and Mayfield lakes) and would there be public access? Because a lot of that is Weyerhaeuser land and they currently require permit for public access. Also, Option 4 seems to have the most nominal impact on flood water inundation in exchange for a tremendous impact on rural residential areas. I understand from friends who were able to attend the public input meeting at the veterans memorial that this option is being favored. Is this true, and can you possibly address why?

Sent from (ip address): 75.172.110.27 (75-172-110-27.tukw.qwest.net)
Date/Time: October 29, 2016 5:55 pm
Coming from (referer): <http://chehalisbasinstrategy.com/overview/>
Using (user agent): Mozilla/5.0 (Linux; Android 5.1.1; SAMSUNG SM-G530R4 USCC Build/LMY47X) AppleWebKit/537.36 (KHTML, like Gecko) SamsungBrowser/3.3 Chrome/38.0.2125.102 Mobile Safari/537.36

October 29, 2016

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

To: The Council and Director

Thanks to the Council for their decision to build a dam. Though I do not know who lives in the area where the dam is to be built, please keep in mind that those living there have worked hard to build a life for themselves and that they should benefit more than the market price. Emotions rise on all sides when there is loss/need for fairness.

Also, thanks to Gordon White^x who took time to hear me prior to the Tuesday Chehalis hearing as I could not stay for the meeting. Below are points regarding the Chehalis River Basin.

Fish species problem:

Lewis County is known for their fisheries east of Interstate 5 as well as a fish business in Rochester. As the Chehalis Indians are on the Council, I assume that they have an interest.

Then, California has tried to save a species (prior to the drought) with little to show for their endeavors. Also, the farmers have greatly suffered from the result.

When homes near the Lewis County Courthouse flood, the benchmark for not flooding the Chehalis Airport to me is strange (as well as homes in Centralia on either side of I-5 in Centralia). Digging somewhere in the dry season may create a place where people could fish. Presently the cost (license & tackle) for a one time experience are too high.

I grew up here. I have met people from all over the area. Friends have lost personal items and property from north of Centralia to PeEll; Chehalis (including the Veterans Museum area) and south. I would hope decisions made by the Council would keep in mind all people who are struggling to make a living for themselves.

Thank you for your attention to this letter.

Sincerely,



Kathryn Gunderson



*cc

From: Martha Hall [REDACTED]
Sent: Monday, November 14, 2016 4:20 PM
To: info@chehalisbasinstrategy.com
Subject: Comment on State Plan

Thank you for the opportunity to comment on the state's planning process for the Chehalis Basin. It's second in size to the Skagit River where I live. Washington's rivers are our life-line in so many ways. We need to protect them from dams first and foremost. We all now know where that leads us.

The Chehalis River, along with its many tributaries, are a vital link between the mountains and the lowland. We need this link, which means they need protection. These are important to our salmon runs which are needed by humans and numerous other species. This is also important for numerous other wild species that live in the basin.

Yes, like the Skagit River, upstream logging and lowland development in flood plains has resulted in flooding. The answer to flooding is not dams. Instead, I encourage you to use restoration of the flood plain, changes in how the flood plain is used, and wiser logging upstream. The flood plain, if restored, can provide the most valuable wildlife habitat in our state and well as corridors. These are the richest habitats to protect and enhance.

I hope you choose an alternative that will enhance the flood plain rather than dry it up with dams. I hope you choose keeping the best, most valuable ecosystems, floodplains and rivers, protected from development and uses not compatible with flooding. We have upland areas for development, for used car lots, for shopping centers. Keep those from flooding by keeping them out of the flood plain.

We sure do need more Chinook in our Puget Sound for the orcas.

Thanks for the chance to respond,
Martha Hall

[REDACTED]

[REDACTED]

From: Steve Hallstrom [REDACTED]
Sent: Monday, November 14, 2016 3:20 PM
To: info@chehalisbasinstrategy.com
Subject: PEIS comment

November 14, 2016

Comments on the Chehalis Basin Strategy PEIS

The strategy is incomplete. It only addresses the properties and aspects of the floodplain, not the basin as a whole. Nor does it look to the future and the impacts of a changing climate. Why would one build a levee to protect homes near Aberdeen in the historic floodplain knowing that the possibility of rising sea levels will soon, in only decades, threaten those homes again? One sees the efforts now occurring in the Miami area of large pump stations, canals and streets being raised. Are we so naive as to believe this will not occur here in the PNW as well? The better solution to protect the homes of those currently threatened by flooding and inundation from rising waters is to relocate the homes. This alternative is not considered except for the farmers who live on the land they cultivate. For these farmers there should be provision made to relocate their dwellings while protecting their infrastructure and allowing local agriculture on the fertile soils away from the riparian zones.. Alternative 4, the restoring of the floodplain to the river, while good for the fish is both impractical and insufficient in result. While providing buffers for channel migration and habitat restoration is important, it can be provided with less impact on the agricultural community.

The major omission of the PEIS is the failure to address the land use in the entire basin. In particular the 80% forested lands which have the potential to greatly reduce the quantity and improve the quality of the water during flood events. At public meeting this fall the land owners on both the Satsop and Wynoochee rivers noted the increased erosion and damage after logging occurred in the lands immediately upland from their properties. Mature forests greatly limit the water runoff during storm events, while rain on snow exacerbates the scouring of streams and the rush of waters to the floodplain. The 2007 event was rain on snow. Timber harvest practices such as clear cutting and removal of trees on steep slopes are a significant contributor to low water quality and flooding. The PEIS is deficient in not analyzing the alternative forest practices, such as selective harvest, sub-basin forest age, and harvest alternatives in reducing floods and their impacts, both economical and environmental.

Thank you for the opportunity to comment.

Steve Hallstrom
[REDACTED]
[REDACTED]

Steve Hallstrom [REDACTED]
[REDACTED]

"Seeking to conquer a larger liberty, man but extends the empire of necessity."

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, November 10, 2016 8:52 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

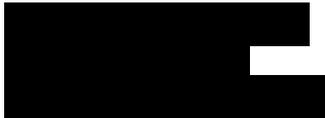
Comment Form

First Name: Kim

Last Name: Heaton

Organization:

Address:



Phone:

Email:

Comments: I believe plan 1 is the most comprehensive project. This offers a much larger area of protection to the residents.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 1:24 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: PEIS-Comments-Cover-Letter-Final.pdf; Chehalis-Basin-Strategy-Comments-Final.pdf

Comment Form

First Name: Jessica

Last Name: Helsley

Organization:

Address:



Phone:

Email:



Comments: Please see cover letter and comments in attached documents.

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/PEIS-Comments-Cover-Letter-Final.pdf>

File Upload (2): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Chehalis-Basin-Strategy-Comments-Final.pdf>

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

[REDACTED]

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

November 14, 2016

To Whom It May Concern,

As a citizen of the Chehalis Basin and professional fish biologist working to protect and restore salmon populations in the Washington Coast Salmon Recovery Region, I believe the science is clear: only healthy rivers can support healthy salmon populations. I understand the interests of those who support increased flood protection measures in the Chehalis River Basin (Basin); however, I believe that there is a unique combination of proposed actions that can better achieve these goals as well as improve salmon habitat than the alternatives presented in the Chehalis Basin Strategy Programmatic Environmental Impact Statement (PEIS).

As a professional fish biologist, I strongly oppose the construction of a new dam on the Chehalis River (Alternative 1) as it is counter to the Purpose and Need of the Chehalis Strategy as stated in the PEIS and will decimate salmon populations. I consider both the proposed Flood Retention Only (FRO) and Flood Retention Flow Augmentation (FRFA) dam actions to be unacceptable, costly and antiquated plans for the future of the currently free-flowing Chehalis River. The adverse impacts of pursuing Alternative 1 greatly outweigh the benefits.

I **support** the following:

- Further investigation and development of **Alternative 4**. The Restorative Flood Protection alternative, if implemented, will provide tangible habitat benefits and enhance the natural flood storage capacity of the Basin through restoration of riparian function.
- Investment in structural flood protection projects that do not include a flood retention facility. These include actions to improve the existing **airport and Aberdeen/Hoquiam North Shore Levees** and **local-scale flood reduction actions**.
- Implementation of the high level of **Aquatic Species Habitat Actions (ASHA) actions**.

When combined, Alternative 4, levee improvements, local-scale flood reduction actions, and the high-level Aquatic Species Habitat Actions will have significant positive impacts on salmon and other aquatic species by restoring the natural processes of this dynamic river system. Restoring these natural processes will reduce the risk of flood damage by buffering high flow events and work in concert with the local-scale damage reduction actions for the mutual benefit of Basin residents and salmon. Additional comments and questions based upon the PEIS are in the attached document. I request that the comments and questions are addressed in the final PEIS prior to the selection of an alternative.

I believe it is possible to address flood risks in a cost-effective and ecologically sustainable manner without degrading salmon habitat in the Basin. Such an approach would provide lasting and measurable benefits for fish and people who reside in the Basin and call it home.

Respectfully Submitted,



Jessica Helsley
Chehalis Basin Citizen

1) General Comments on the PEIS content based on Information Provided at the Technical Workshops (September 21 and 22, 2016)

- While I recognize that this is intended as a programmatic review, the level of detail and specificity for each of the described actions is varied and inconsistent. This prevents adequate understanding of each action and does not allow scientifically reputable analysis between actions. The PEIS is elementally flawed due to this. Additional work is needed to analyze each action and the interaction of these watersheds to facilitate a more robust programmatic evaluation. Until additional analysis of each action is completed so that they are equally robust, the PEIS fails to serve its purpose as a transparent tool for guiding decision makers.
- A critical omission from the PEIS is the failure to identify the entities responsible for performing the actions- both technically and financially. The future performance of the proposed actions cannot be adequately evaluated without insight to the capabilities of those responsible for action implementation.
- Implementation of the Alternatives, as packaged in the PEIS, is also inadequate as there is no proposed schedule for implementation. Implementing an Alternative would likely require sequencing as the individual actions are dependent upon funding availability, scheduling of needed additional studies, and public review under NEPA and/or SEPA for each individual project. The final PEIS should identify proposed sequencing for elements within actions as well as actions within Alternatives.

Fishery Impacts

- When analyzing potential impacts from construction of a dam and its associated water releases, there was no consideration for the timing of ramping rates in respect to biological processes. Significant risk of fish trauma (juvenile stranding, injuries from speed of water, gill injuries and likely death from turbidity. It was stated that the raise and hold release rate will be based upon the capacity of the reservoir, which fails to take into consideration life history needs and capacities of fish at each of those life stages.
- When analyzing potential impacts from construction of a dam, poor timed water releases could scour away redds of all downstream spawners (displaced from the reservoir footprint) which could eliminate entire year classes.
- When analyzing potential impacts from construction of a dam, there was no mitigation recommended for potentially high turbidity levels of released water.
- Analysis of all alternatives and their potential impacts to fish were based upon modeling of current habitat capacity based upon current fish abundances. These current population levels are heavily depressed and not the population levels representative of what restoration managers are currently striving for.
- The assumption that cool water from the dam releases would benefit fish is erroneous. Any assumed benefits would be negated by the anoxic conditions of the water which will not be able to be sufficiently mixed with suitable levels of both dissolved oxygen (DO) and cooler temperatures. Saturation provided at the outlet tunnels will not provide any sort of DO mitigation for the fish populations within the reservoir.

- Juvenile fish are expected to be collected for transport at the surface of the reservoir where temperatures (and new predators) will make the habitat very inhospitable.
- Any timing hindrance in juvenile outmigration can result in death if they do not reach the ocean environment within the optimal physiological window for the smoltification process. This has implications for climate change which is predicted to increase temperatures in headwater streams and in watersheds with large impoundments which increase surface water temps and slow juvenile migrations.

Flooding Impacts

- A comprehensive basin wide hydrologic and hydraulic model needs to be completed for accurate analysis of all alternatives. The failure to model the potential impacts and flooding contributions, beyond the recognition that these events are the primary source of flooding in the basin, fails to adequately address the basin's flooding problems and negates the ability to quantify benefits for a majority of the actions identified. Not all of the flood events originate from the mainstem Chehalis. A lot of site specific rain events result in flooding from tributaries that would not be minimized by the dam alternatives.
- The PEIS fails to recognize how the Army Core of Engineers and the Federal Emergency Management Agency have been working to implement a new approach to repetitive flood damage loss payments that involves buying out landowners wherever possible to allow rivers to function naturally within their floodplain. Recognition of this strategy by federal agencies should require additional exploration of the Restorative Flood Protection alternative.
- The analysis of the Restorative Flood Protection does not adequately address how healthy floodplains are nature's flood protection and that giving rivers room to move is our best protection against floods and requires additional analysis.

Dam Structure

- Analysis of the dam alternatives do not address potential mitigation for prespawn mortality as a result of the physical potential for fish to be fatally attracted to the dam structure.
- There was a dramatic failure to include the best available science in analysis between the alternatives. Despite what is indicated in the PEIS, there is no scientific evidence that indicates that dams are beneficial for salmonids in a long history of research.
- The purpose of developing the Chehalis Basin Strategy was to determine a basin wide reduction in flood damage risk and to improve aquatic species habitat. Alternative 1 will not reduce the flood risk on a basin wide scale as the benefits are site specific and its construction cannot prevent flood damage from atmospheric river events that occur in other areas of the Basin.
- The PEIS failed to recognize existing science that demonstrates how transport of juvenile salmon around dams impairs their return migration as adults. See the following scientific article for example: Keefer ML, Caudill CC, Peery CA, Lee SR. 2008. Transporting juvenile salmonids around dams impairs adult migration. *Ecological Applications*, 18(8): 1888-1900, which indicates that: The proportion of adults successfully homing was significantly lower, and unaccounted loss and permanent straying into non-natal rivers was higher for transported fish. On average, transported fish homed to the study site at rates about 10% lower than for in-river migrants. Transported fish were also 1.7-3.4 times more likely than in-river fish to fall back downstream past dams as adults, a behavior strongly associated with lower survival. These results suggest that juvenile transport impaired adult orientation or homing abilities, perhaps by disrupting

sequential imprinting processes during juvenile out-migration. While juvenile transportation has clear short-term juvenile-survival benefits, the delayed effects that manifest in adult stages illustrate the need to assess mitigation success throughout the life cycle of target organisms. An increased rate of straying and potential associated genetic and demographic effects significantly risks the sustainability of salmonid populations in the Basin.

- Based upon a recent paper published by Megan Lawson from Headwater Economics (<http://headwaterseconomics.org/economic-development/local-studies/dam-removal-case-studies/>) dams can be significant impediments to the recovery of vulnerable fish species. Fish passage facilities are insufficient at sustaining and restoring fish populations. Advances in economic methods also have improved our understanding of the economic benefits to nearby communities, river users, and the broader public from free-flowing rivers. Together, the higher ongoing costs of operating dams and an improved awareness of the economic and social benefits of removing them has shifted the balance sheet for some dams. Lawson M. 2016. Dam removal: Case studies in the fiscal, economic, social, and environmental benefits of dam removal. Published online: <http://headwaterseconomics.org/economic-development/local-studies/dam-removal-case-studies> Accessed: October 15, 2016.
- Recent research not included in the PEIS concerns climate change impacts from dam impounded reservoirs. See: Deemer BR, Harrison JA, Li S, Beaulieu JJ, Delsontro T, Barros N, Bezerra-Neto JF, Powers SM, Dos Santos MA, Vonk JA. 2016. Greenhouse gas emissions from reservoir water surfaces: A new global synthesis. *BioScience* 66(10). Accessed online 11/9/2016. This research highlights how reservoirs are now shown to be sources of greenhouse gases. The flooding of large stocks of terrestrial organic matter may fuel microbial decomposition, converting the organic matter stored in above and below ground biomass to carbon dioxide, methane, and nitrous oxide. Additionally, reservoirs that experience significant fluctuations in water level enhance methane bubbling rates. Specifically, this research identifies that the contribution of CH₄ emissions from reservoirs is significant and should be mitigated for. The PEIS fails to identify any watershed nutrient reduction strategies aimed at preventing reservoir eutrophication and mitigating both CH₄ and N₂O emissions associated with the creation of a reservoir in either of the dam alternatives.

Economic Analysis

- The economic analysis fails to consider the ecosystem value of healthy salmon populations in the Chehalis Basin and only addresses the cost of project implementation or loss to human infrastructure. What is the ecosystem value of salmon populations in the basin?
- The economic analysis fails to address the costs of dam decommissioning and removal

RFP Alternative

- Alternative 4 requires additional analysis to determine what percentage of conversion and associated willing landowner buyout would be necessary to see marked reduction in the risk of flood damage.

Forest Practice Impacts

- More analysis is warranted on how changes in our forest practices could result in a decreased risk of flood damage and enhanced habitat conditions for aquatic species given the high proportion of forestlands within the Basin being actively managed.

Climate Modeling

- Analysis and modeling of atmospheric river events must be incorporated into the decision-making process. Failure to incorporate atmospheric river events in modeling/analysis will not address the “primary contribution” to flooding in the basin.

Floodplain Development

- The adoption of local floodplain development guidelines and regulations based upon the best available science should be incorporated as an action in the selected alternative package.

2) General Comments on the Programmatic EIS and Recommendations

Chehalis Basin Strategy EIS Executive Summary

- pg. 7 - Consider additional regulations that local communities could implement to prevent the compounding impacts of flooding (i.e. not allowing new impervious surface construction). There needs to be a system wide shift with all communities working towards a common solution of flood risk reduction
- pg. 8 -The only alternatives that are complimentary in efforts to address the habitat needs of the aquatic species of the basin are the Restorative Flood Protection Alternative and the Aquatic Species Restoration actions.
- pg. 10 - The statements that “Failure to take action to restore physical and ecological Basin processes and habitat, coupled with potential impacts of climate change, are predicted to result in the complete loss (extirpation) of Spring-run Chinook from the Basin late this century, and a 70% loss of coho...” should be supported with scientific evidence via citation. If this is a model prediction (EDT) it needs to be stated as a prediction. The clause also requires a time frame. Current climate modelling indicates that the only waters within the state of Washington that will have temperatures within the salmonid temperature threshold are rivers on the Olympic Peninsula- and that is only through the 2070s (see: Mantua, N.J., Tohver, I., Hamlet, A.F. 2010. Climate change impacts on streamflow extremes and summertime stream temperature and their possible consequences for freshwater salmon habitat in Washington State. *Climatic Change* 102(1-2): 187-223, doi: 10.1007/s10584-010-9845-2).
- pg. 11 - landowner willingness will be a very large component of all alternatives, not just the Restorative Flood Protection Alternative.
- pg. 11 - States that “An integrated Basin-wide strategy that is financially viable, sustainable, and supported by the community will have the highest likelihood of being implemented.” And that “The strategy is intended to maximize the benefits of flood damage reduction and aquatic species habitat restoration actions over both the short and long term, while avoiding and minimizing adverse environmental, social, cultural, agricultural, and economic impacts.” Alternative 1 does not meet these intentions.
- Alternative 1 does not achieve and negatively impacts the intentions stated on pg. 12 - to improve resiliency of natural floodplain processes and ecosystems from the effect of climate change; increased abundance of native aquatic species, including increased populations of healthy and harvestable salmon and steelhead; reduce the potential for future ESA listings; and to enhance tribal and non-tribal fisheries.

Chapter 2 – Alternatives

- pg. 27 – it should be clearly indicated that despite the fish passage facilities proposed as part of Alternative 1, fish passage would be eliminated for certain species and certain life stages while having significant implications on all fish that are transported through the facility

- pg. 33 - It should be stated that fish passage for all current residents during all life phases is not possible and that there would be significant adverse impacts to fisheries.
- pg. 33 - A floating surface collection system for juvenile transport will force juveniles to spend time at the solar heated reservoir surface, result in increased predation risk from avian predators, and cause increased levels of plasma cortisol before compounding that stress by truck transport. This drastic increase in juvenile mortality risk will have a significant adverse impact on population levels (which will only occur if populations locate alternative and non-historic spawning locations above the proposed facility because their genetically selected spawning habitat was inundated).
- It would be productive if there was a background/introduction to the Restorative Flood Protection alternative (p. 36 Chapter 2- Alternatives) that describes what the undisturbed Chehalis basin floodplain looked like historically and how that natural flood storage capacity buffered the impacts of flooding.
- Alternative 4 is the only alternative to account for climate change through buffering the future impacts of flooding occurrence/rates of flood waters; to incorporate all sub-watersheds (not just the mainstem); that directly and positively complements the ASRP actions; and the only alternative that directly recognizes flood water contributions from non-mainstem sources.
- Alternative 4 should include some discussion and recognition that this strategy is what FEMA is moving towards with their flood insurance program.
- Discussion of Alternative 4 (pg. 39 Chapter 2- Alternatives) should recognize that certain seasonal agricultural uses could continue in the floodplain (intermixed with the floodplain roughness structures)
- Given the development timeframe that Alternative 4 has had, it would be beneficial to have a phrase for this alternative description that is similar to the one provided on pg. 50 Chapter 2- Alternatives: “The Aberdeen/Hoquiam North Shore Levee project is in the initial project planning and design phase; therefore, few details about this action element are available.”
- If the number of protected structures is going to be used as a metric for one alternative as it was on pg. 50 Chapter 2- Alternatives, it should be incorporated into all of the action elements.
- pg. 62 The Salmon Recovery Funding Board funding amount provided is incorrect. A correct number can be calculated based upon project information entered into the state Prism database (<https://secure.rco.wa.gov/prism/search/projectsearch.aspx>)

Chapter 3 – Effected Environment

- pg. 142 – The PEIS fails to adequately address the negative impacts that alternative 1 would have on fish stocks during their juvenile life history phase: “juvenile Chinook salmon and steelhead are abundant in the headwaters of the upper Chehalis River, North Fork Newaukum River, and West Fork Satsop River (Zimmerman and Winkowski 2016). “Densities of steelhead and Chinook salmon were greater at sites within approximately 1 river mile of the proposed dam site than other sites farther away.”
- pg. 143 – the PEIS fails to address the compounding stress impacts of multiple transportations during the juvenile life history phase which would be required to replicate their observed movement patterns: “Juvenile salmon and steelhead can be highly mobile during the summer low-low period in the upper mainstem Chehalis River. Up to 39% of the juvenile steelhead and coho salmon of a tagged population were observed actively moving upstream and downstream through areas in the upper Chehalis River that would be disconnected or inundated by the proposed Flood Retention Facility (Winkowski and Zimmerman, in prep.). Juvenile steelhead were observed moving over 4 miles in both the upstream and downstream directions.”

Chapter 4 – Action Elements: Impacts and Mitigation

- How would the “temperature reduction in the Chehalis River downstream of the dam to approximately the confluence of the Skookumchuck River result in beneficial effects to water quality and fish (pg. 244)” as the section above specifically states that there will be long-term significant adverse impacts of the Flood Retention Facility such as: “increase in turbidity and temperature and decrease in DO(adverse impacts for fish); permanent loss of approximately 68-98 acres of wetlands (natural flood storage systems)(adverse impacts for fish); reduced fish passage for adult and juvenile salmonids and Pacific lamprey (adverse impacts to fish); and reduced habitat for fish and wildlife species, including instream and off-channel habitat in the reservoir area (adverse impacts for fish)”
- We highly support the stated assumption that: “the anticipated adverse impacts of the flood retention facilities on fish would be significant for fish populations in the CB. Adverse impacts would primarily affect fish in the mainstem Chehalis River above and immediately below the dam; however, 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. Adverse impacts would occur due to changes in habitat functions and reduced access to habitat from the following:
 - Loss of habitat function within the reach of the Chehalis River inundated upstream of the dam for cool, swift-water associated fish species, including loss of spawning habitat and food supplied to the river from the riparian corridor and vegetation
 - Partial reduction in fish survival and potential interruptions to migration due to passage impediments, including salmon and lamprey spawning migrations
 - For the FRFA, exposure of juvenile salmonids that use the permanent reservoir for rearing to predators that may thrive in the reservoir
 - Changes to fish habitat-forming processes and water quality downstream of the dam”
- We highly support the statement that: “The effects of dams on aquatic systems has far-reaching negative impacts for aquatic systems. These impacts are particularly notable for salmonids, affecting habitat quality, upstream and downstream survival, and migration. Headwater areas like the upper Chehalis River are important holding and rearing areas for salmon across the Pacific Northwest, and the construction of dams has led to multiple extirpations of spring-run Chinook salmon populations (Beechie et al. 2006)”.
- We highly support the statement that: “Overall, both the FRO and FRFA facility types would create a significant adverse impact on fish survival, migration, and the area of habitat available for spawning and rearing, specifically for species that use the stream reaches just above and below the dam.”
- pg. 284 – The failure to consider mitigation for the impacts of invasive predatory species on survival of juvenile salmonids while in the proposed reservoir is a critical error given the documented presence of these species in the lower basin.
- Scientific evidence does not indicate that spring Chinook would find suitable sized material for spawning in the section purported to have water temperature benefits via the dam (i.e. the dam would be able to release cold water during the warm summer months, but it will only be cold for a short section immediately below the dam where the river bed will be sediment starved and consist of cobble too large to permit spawning.
- Analysis in the PEIS should better reflect that EDT models the potential for habitat to support salmon and steelhead production. It does not model how fish behave or may change their behaviors, in this case associated with the proposed installation of a dam and its ability to release cool water.

- There were no fish kills observed during the summers of 2015 and 2016 during a drought and some of the hottest summers on record. The Liedtke et al. 2016 survey results suggest that the Chehalis River spring-run Chinook populations have already begun behavioral adaptations to survive summers in the river. The only alternative that could provide added benefit is the Restorative Floodplain Alternative which will help to provide additional areas of cold water refugia for fish. This alternative will build upon existing behaviors of resiliency: “Fish were observed holding in areas with cooler water temperatures (including the South Fork Newaukum, the mainstem Chehalis River near the confluences with Cedar Creek or the Skookumchuck River, and in “Scheuber hole,” a deep pool with stratified water). They moved to cooler tributaries early in the season before mainstem river temperatures rose to lethal levels.” Rather than force the development of new behaviors.
- pg. 246 – We fully support the statement that “the high restoration scenarios with climate change would result in a significantly greater percentage increase in abundance (more than 75%) of coho salmon and spring-run Chinook salmon compared to the low run restoration scenario when applied to either 20% or 60% of the reaches, as well as for winter-run steelhead when applied to 60% of the reaches.” “...the abundance of fish under the high restoration scenario would exceed the habitat potential for these two species.” However, the benefits should be rephrased to emphasize that the actions cannot be directly linked to actual percentage changes in population abundance- the habitat will have an increased potential to hold more fish, but more fish are not guaranteed as a result of action implementation.

Chapter 5 – Combined Alternatives: Impacts and Mitigation

- pg. 465 – There should be added emphasis upon the fact that implementation of Alternative 1 would not eliminate flood damage for a majority of residential, commercial, and industrial structures in the Basin.
- pg. 470 – We fully support the statement that “unavoidable significant adverse impacts on water resources, geology, geomorphology, wetlands and vegetation, fish and wildlife, tribal resources, and cultural resources would occur – primarily as a result of implementing the Flood Retention Facility as described in more detail in Chapter 4.”
- pg. 472 – We fully support the assessment that: “Alternative 1 would result in the most adverse impacts on fish as compared to the No Action Alternative and other action alternatives because of permanent and large-scale changes to the Chehalis River and its floodplain caused by the Flood Retention Facility. Permanent changes to water quality (turbidity, temperature, and DO), temporary or permanent inundation of what is currently stream habitat above the dam, and reductions in forces that shape habitat downstream (delivery of coarse sediment used for refuge and spawning or large wood that creates habitat structure) would occur.”...” there would be significant adverse impacts resulting in the potential decline of salmonids. These declines would be greater when factoring in climate change predictions during the next 100 years.”

Appendix K: Effects of Temperature Reduction and Flow Augmentation on Spring-run Chinook Salmon

- pg. 7 “Previous habitat modeling using the EDT model indicates that temperature and flow modulation would likely increase the potential of habitat downstream of the dam to support spring-run Chinook salmon (ASEPTC 2014).” During what life stage? Based upon temperature and regulated flow alone – yet, “habitat” cannot and should not be classified as having only one primary criteria – habitat is suitable because of unique three dimensional interactions of numerous components (substrate structure, water chemistry, food supply, refugia areas, presence/absence of predators, competition, etc...) “This result was largely influenced by the

assumption that the cool water released would improve survival of adult spring-run Chinook salmon without addressing the uncertainty around behavioral adaptations and summer use of the reaches below the dam raised earlier in this memorandum.”

- There needs to be significantly more emphasis in the PEIS that “EDT is a model of habitat and does not evaluate fish behavior; therefore, the range of behavioral responses to flow and temperature modulation cannot be evaluated directly using EDT and that if fish do not respond as behaviorally planned, population spawning in the reach just below the dam would decline by approximately 59%.”
- We fully support the statement that: “There are uncertainties associated with the conclusion that temperature limits the spring-run Chinook salmon population productivity in the Chehalis Basin. For instance, fish kills were not observed during summer 2015, which had atypically high temperatures and low water flows. The observed fish kills in the Chehalis River also point to inter-annual variability in the suitability of summer holding locations for spring-run Chinook salmon. The seasonal stability of cool water refuges and the availability of cool water refugia may vary depending on hydrologic conditions (Liedtke et al. 2016). Areas that are suitable for holding in some years may have lethal conditions in other years. Spring-run Chinook salmon that currently spawn in the upper Chehalis River may hold over the summer elsewhere in the Chehalis Basin. Few adult spring-Chinook salmon have been observed using the upper Chehalis River for summer holding based on results of August snorkel surveys conducted in three consecutive years, 2013 to 2015 (Zimmerman and Winkowski 2016). Suggests that there is some behavior or local adaptation that has allowed them to maintain a sustainable and harvestable run by using other areas as refuge despite high water temperatures. Flow and temperature are not the only habitat factors that affect salmon survival that could be changed downstream of an FRFA dam; other habitat factors that are predicted to change with the FRFA dam include retention of substrate downstream of the dam that could cause changes in spawning habitat and stream channel structure downstream of the dam (ASEPTC 2014). The potential behavioral response of spring-run Chinook salmon to the availability of cool water released from a dam in the upper Chehalis River is uncertain. If spring-run Chinook salmon continue to hold during the summer months elsewhere in the Chehalis Basin, there may be minimal to no response to cool water releases from an FRFA dam.”
- From a salmon recovery standpoint, rather than constructing a dam, moving people and businesses out of the floodplains is a more effective and permanent flood protection solution, and a relatively more cost-effective solution in comparison.

Appendix H: Support Documentation: Flood Retention Facility Long-term Impacts and Mitigation

- pg. 41 – We fully support the assessment that: “The change in flow and temperature could have the unintended effect of altering the timing and intensity of biological cues for fishes downstream of the Flood Retention Facility by providing cool-water pulses earlier in the year than under natural conditions (Young et al. 2011)”.
- We fully support the assessment that: “Effects to hyporheic flows downstream of the Flood Retention Facility may occur (Arntzen et al. 2006), though the changes would be complex and have not been quantified. Hyporheic zones where the river gains cool, oxygenated water provide high-quality spawning habitat for salmon (Geist et al. 2002) and lamprey, and can provide refugia when temperatures in the water column are higher than is optimal for other cool-water associated fish species currently observed near the potential dam site (juvenile trout and salmon, prickly sculpin, rifle sculpin, torrent sculpin). Additionally, we argue that the best way to protect salmon in a warming world is to improve their access to cold water refugia.

- pg. 43 – We fully support the assessment that: “Results suggest that all four-salmon species would experience some decline in abundance. The decline in abundance reflects the adverse impact of the Flood Retention Facility on population productivity and population life history diversity, both of which are measures of population resiliency (McElhany et al. 2000).”

Support

- We support the comments submitted by: The Quinault Indian Nation, Trout Unlimited, the Wild Fish Conservancy, and American Rivers.

3) Questions:

We recommend that you answer the following questions in the Final Programmatic Environmental Impact Statement prior to making a decision as to which Alternative, or combination of actions, to pursue.

- If the FRO were proposed as discussed, how will wood from the reservoir reach the FRO tunnels for transport?
- Similarly, how will the wood be sorted- as the tunnels can only accommodate specific sizes?
- How are the outlet tunnels cleaned when they get clogged with sediment?
- pg. 7 - What defines a small basin? When multiple small headwater basins converge do these results change? Or is it simply that there is no current research conducted at this scale?
- pg. 32 - How would the tunnels in the proposed FRO facility be designed so as not to become velocity barriers to fish migration over time?
- pg. 32 - How would the FR 1000 bypass or detour be constructed to avoid sediment inputs or undermining of the road surface during periods of and following the proposed inundation?
- pg. 33 - How would the proposed cold water releases account for the low DO levels coming out of the reservoir without mixing with solar heated surface water during the release process? How frequently would sediment transport require mechanical assistance? How would the flow rates be ramped up and down to avoid juvenile fish stranding?
- pg. 34 - How was the additional 3 to 5 feet of freeboard above the maximum pool as a factor of safety determined to be enough if atmospheric river events were not analyzed for incorporation into this calculation?
- Why is there a timeframe for achieved benefits on Alternative 4 (pg. 47 Chapter 2- Alternatives) “within 10 years of installation” but the same time frames are not provided for the other alternatives? (i.e. time before flood protection is realized, longevity of the alternative, risk of aging structures for some alternatives, etc.)
- Why is the restoration of the floodplain to historic, natural conditions considered an adverse impact in Alternative 4?
- What is the definition of substantial (pg. 244)? How can substantial benefits in flood reductions in downstream areas be realized if the primary source of flooding (atmospheric river events) was not part of the analysis?
- pg. 245 - Why does a functioning riparian forest constitute a significant adverse impact to visual quality?
- pg. 248 - To what extent in both distance and temperature will released flows improve downstream temperatures? What aquatic species will be present during this time and what life stages will be there at that time to reap the “benefits”?

- pg. 248 - Do aquatic species have precedence in state law over water right holders?
- pg. 248 - What is the feasibility and cost of relocating and changing the water supply for Pe EII?
- pg. 250 - How would the adverse impacts to surface water quality identified here not negate the assumed benefits to cold water releases?
- pg. 250 - How would pollutant loading behind the proposed facility be handled so that the assumed beneficial cold water releases would not be contaminated and toxic for aquatic species downstream?
- pg. 250 - How will ramping rates facilitate sediment transport so as not to suffocate or injure fish in reservoir and downstream during all life stages?
- pg. 252 - How will juvenile fish, concentrated for collection at the surface not be susceptible to lethal surface layer temperatures?

From: Amanda Milledge [REDACTED]
Sent: Wednesday, October 12, 2016 11:52 AM
To: Info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy

Follow Up Flag: Follow up
Flag Status: Completed

Hello,

This email is in regards to the brochure that was sent out about the Chehalis basin strategy. In my opinion, the problem is the fact that buildings are being put up everywhere, and the water has no where to go. I think it's best to restrict the building, or at least come up with an option for somewhere for the water to go. In all reality, it is time to stop talking about this, and actually do something about it. I myself, have been affected by flooding at least 3 times and one of those times was catastrophic damage and would appreciate a solution to this problem.

Thank you,
Terry Hetzel

[REDACTED]

From: Robin Hill [REDACTED]
Sent: Thursday, October 20, 2016 7:30 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Robin Hill

EMAIL
[REDACTED]

MESSAGE

We are in CA for the better part of the winter but want our wishes known that we do not support any proposal that would put Bethel Church and its properties in danger of flooding. We were not able to attend this past Tuesday's meeting due to our travel plans but would like to be put on the email list for future reports, etc. Thank you

Sent from (ip address): 174.21.113.188 (174-21-113-188.tukw.qwest.net)

Date/Time: October 21, 2016 2:30 am

Coming from (referer): <http://chehalisbasinstrategy.com/eis-library/>

Using (user agent): Mozilla/5.0 (Windows NT 6.1; WOW64)

AppleWebKit/537.36 (KHTML, like Gecko) Chrome/53.0.2785.143

Safari/537.36

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 17, 2016 4:01 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Follow Up Flag: Follow up
Flag Status: Completed

Comment Form

First Name: Sharlene

Last Name: Hoffman

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I have been unable to read all of the proposal...however I am very much against option 4. To force that many people to relocate would be detrimental to our community for many reasons.

File Upload

(1):

File Upload

(2):

File Upload

(3):

This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, November 12, 2016 11:30 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Holgerson_EIS-comments.docx

Comment Form

First Name: Meredith

Last Name: Holgerson

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments:

Overarching Thoughts
Wildlife other than Salmon

There is little discussion or evaluation on effects of the alternatives on non-salmonid wildlife species. All of the modeled changes to population numbers and habitat suitability focus on salmon, but they do not live in isolation; salmon require healthy and resilient ecosystems. In particular, one major unresolved question is how reduced flooding events will alter the extent of ephemeral wetlands, connectivity of floodplain wetlands to the mainstem, and wetland hydroperiod. While the EIS acknowledges that wetlands and periodically inundated areas will be reduced under Alternative 1, the quantitative data is missing. Summary tables, maps, and models are needed to assess the impact to species, such as amphibians, that use these wetlands to overwinter or breed.

Additionally, it is not clear if all wetland types are included in the “Modeled Wetlands Inventory” (page 127). For instance, many temporary wetlands cannot be identified from aerial photographs, especially if photos were taken in the late summer or early fall under dryer conditions. Temporary and isolated or semi-connected wetlands provide critical overwintering habitat for fish and waterfowl, while also providing habitat for amphibian breeding and development in late winter. These wetlands are likely very sensitive to reduced flooding events.

Lastly, the first two alternatives mention that wetlands will be lost or damaged during various construction projects, but that this will be mitigated. Yet, consensus from scientific literature is that created and restored wetlands often do not functionally match natural wetlands. The EIS appears to boldly assume that any wetland damage can be

mitigated.

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Alternative 1 will dramatically alter water quality both in the reservoir and downstream. While the EIS discusses and models DO and temperature, it glosses over or omits other serious concerns such as summertime phosphorus releases, harmful algal blooms, methylmercury bioaccumulation, and carbon emissions.

- First, cool-water summertime releases will come from the reservoir's benthic waters (hypolimnion), which will be largely anoxic. Under anoxic conditions, phosphorus is released from sediments into the water column, which means that summertime cool-water releases could flush phosphorus downstream and cause algal blooms and possible oxygen depletion. This needs to be modeled and evaluated.
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Presentation of Alternatives in Conjunction with Restoration

The combined approach of integrating restoration into each alternative seems disingenuous by obscuring the detrimental effects of the dam alternatives on wildlife. To my knowledge, there have been no incidents where dams are beneficial to wildlife. It would be more sincere to address restoration actions and their benefits separately from the flood-control alternatives.

Specific Comments

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- Page 471-472: Does the loss of wetlands due to Alternative 1 include temporary wetlands / flooded fields?
- Page 471-472: The loss of wetlands would likely have significant adverse effects to amphibian populations as well as possibly invertebrate and waterfowl populations as well. This is largely overlooked in the EIS.
- Page 475: It seems like a large assumption that cold-water releases will benefit salmon in the summer when the releases may adversely affect water quality with harmful algal blooms and phosphorus releases.
- Page 479: Again no mention of CO₂ or CH₄ emissions from creation of a reservoir. CH₄ emissions in particular may be quite high.

**File Upload
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http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Holgerson_EIS-comments.docx

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(3):**

Comments on Chehalis Basin Strategy EIS

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Section 5- Combined Alternatives: Impacts and Mitigation

- Figure 5.3-1: This is a great figure, but it would be nice to see something like it in Section 4 just showing the influence of the dam vs. the airport levee / other actions. As is, it is difficult to assess the direct impact of the dam on flooding in Chehalis and Centralia.
- Page 471-472: Does the loss of wetlands due to Alternative 1 include temporary wetlands / flooded fields?
- Page 471-472: The loss of wetlands would likely have significant adverse effects to amphibian populations as well as possibly invertebrate and waterfowl populations as well. This is largely overlooked in the EIS.
- Page 475: It seems like a large assumption that cold-water releases will benefit salmon in the summer when the releases may adversely affect water quality with harmful algal blooms and phosphorus releases.
- Page 479: Again no mention of CO₂ or CH₄ emissions from creation of a reservoir. CH₄ emissions in particular may be quite high.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 9:23 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Darlene

Last Name: Holmes

Organization:

Address:

[Redacted Address]

Phone:

[Redacted Phone]

Email:

[Redacted Email]

Comments:

I vote for: Alternative 1 – Governor’s Work Group Recommendation and the one I am recommending, as well - After reviewing all the studies, it became apparent that this alternative was the best choice. It includes fish habitat restoration, local projects that help with flood reduction, the completion of a levee system in Aberdeen, and the Chehalis Airport levee improvements. The thing that makes this alternative different is the flood retention facility (Dam & Associated Reservoir).

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 17, 2016 9:57 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Michele

Last Name: Hulbert

Organization:

Address:



Phone:



Email:

I own four homes and over 25 acres in the Boistfort Valley.

A DAM IS THE ONLY OPTION THAT MAKES SENSE!

Comments: My family has been here for generations, our school is the heart of the community, relocating homes and farms to the surrounding hold doesn't make sense.
#2,3,4,5 absolutely NO!

YES #1

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 17, 2016 9:46 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Michele

Last Name: Hulbert

Organization: Home owner

Address:



Phone:



Email:

Comments:

#2, #3,#4 does NOT solve the problem. I5 would benefit but the surrounding businesses and property would not, and probably make the flood damage much worse.

#5, is not really an option. something needs to be done.

#1, would be my choice. It just makes sense .

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From: Bonnie Ione [REDACTED]
Sent: Tuesday, November 1, 2016 6:18 PM
To: info@chehalisbasinstrategy.com
Subject: flooding

Just when I thought possibly a strategy would be adopted for controlling flooding, it all becomes mass confusion and indecision again. This attempt at resolution has been going on since the 1930's and millions of dollars in studies have been spent. When will all the different groups start looking at the benefits to MOST instead of their own particular group's needs. It reminds me of children squabbling. Sometimes it's even hard to understand the arguments. For example, why would residents in Gray's Harbor not realize that if there's less water coming at once from a river that causes much of their flooding that less damage will occur in their area? Something needs to be decided soon or it will be handled by the legislature, and you know what they will protect--I-5. A specific "solution" like that would be ludicrous. This has been studied and talked to death for decades. Please, BUILD THE DAM! Bonnie Jean Ione

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 11:40 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Theresa

Last Name: Julius

Organization:

Address:



Phone:

Email:



NO on alternative 1. No more dams. Yes on alternatives 3 or 4.
Before building any structures fixes please require jurisdictions to make MAJOR changes to their land use practices and ordinances. The communities in GH county are just completely their shoreline master program update. Most of the shoreline updates do nothing to protect shorelines but continue to place industrial uses within the shoreline. This land use pattern repeats the the cycle of building up the shoreline and then requesting millions of dollars to be spent to protect the buildings in the shoreline. This must stop.

Comments: Mary's river lumber in Montesano a prime example. After complaints of flooding public money (no private) was spent to protect the lumber mill, which promptly went out of business. Meanwhile Montesano updated its shoreline program and continue to encourage industrial uses within the shoreline. The is bad practice and throwing money more away.

To restate my point. Before putting ANY money into structural flood fixes the communities in the basin MUST show good faith by PROTECTING and DESIGNATING as natural/non developed their shorelines. No more industrial in the shoreline.

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From: Shad Kears [REDACTED]
Sent: Tuesday, November 1, 2016 2:50 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comments

Greetings:

First, let me say thank you for putting together an EIS that is reasonably easy to follow and does a great job of describing the proposed impacts of each of the four alternatives to inaction.

I am a citizen of Elma who would like to see reasonable measures to control flooding in the Chehalis Valley put in place. I do not believe building a dam in the upper basin should be considered reasonable, due to the inevitable, negative impact dams have on native fish, as well as the enormous cost. Further, I believe the value of a dam comes into question when one considers that a dam such as the one proposed would be not be expected to prevent I-5 from becoming inundated during a major flood event like what occurred in 2007.

I would like to express my support for any of alternatives 2-4, with an extra nod to alternative 4. Each seems like a reasonable, moderate means of reducing flood impacts in the Centralia/Chehalis area, which I believe should be the primary focus of your task force, since the most economic damage associated with a flooded Chehalis River occurs there.

Thanks again for what I thought was a good document and clear evidence that your group is on task.

Regards,
Shad Kears

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 14, 2016 3:48 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Catherine

Last Name: Kilty

Organization:

Address:



Phone:

Email:



Comments: Alternative 1 please-the retention dam on the upper Chehalis river please

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 2:57 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: M

Last Name: Knipp

Organization:

Address:

Phone:

Email:

Comments:

The only plan that makes sense is Alternative 1. Building a dam that can hold back water close to the source to be released in a controlled manner provides immediate flooding relief with the ultimate benefit of releasing retained water to be released during low river levels in the summer. Huge benefit to the area from the forests through the fertile farmlands to the ocean - not to mention very happy fish!

The Chehalis/Centralia/I-5 corridor need never be underwater again. Businesses and homes will be affected only by the rivers and streams that flow through them. Holding back the waters of the Chehalis River branches will ultimately reduce the in-town flooding of China Creek as it will have a place to go rather than backing up in town. That will make for very happy home and business owners in the cities.

A dam serves the needs of all the people and protects the waterways at the same time. Reduces erosion and protects fish habitat. It's a win-win and we have only one chance to do it right without wasting taxpayer money.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 17, 2016 12:00 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Donald

Last Name: Koidahl

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

We owned the Curtis Store from 1984 until 2008 and we lost many of our belongings in the 2007 flood. Having the water level several feet lower would have saved us tens of thousands of dollars. Please use Alternative #1 as the best possible way to save this kind of deviation in the future
Sincerely Donald Koidahl

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 11:56 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Lauren

Last Name: Kuehne

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments:

I am a researcher at UW who has spent the last few years doing ecology research along the Chehalis River (mainly invasive plants but also fish distributions). The research group that I am part of at UW studies many different aspects of freshwater ecology and conservation, from invasive species to fish habitat, and so I spend a lot of my professional and personal time thinking about water, rivers, and fish. I've paddled many miles of the Chehalis many times, all the way from Chehalis to Montesano, and like to think I know a bit about this unique river. My husband also grew up in Chehalis, so my connection to the area is personal too. I'd like our kids to get the chance to know something like the same river that he knew as a kid and I know now. I'm also deeply aware of how important agriculture and logging (and fishing) are to the cultural fabric of the basin, and ideal flood control and restoration alternatives would also result in long-term support and persistence of these industries.

I was glad to see the Alternative 4 has been brought into the EIS. Over the last many years, I have seen great excitement and state-funded investment in the "Floodplains by Design" approach to Floodplain Management (<http://www.ecy.wa.gov/programs/sea/floods/floodplainsbydesign.html>) in other basins as a means to control flooding, but didn't see it being considered in the Chehalis. Although there is still much about that alternative to be evaluated, the co-benefits that it presents in terms of flood reduction and habitat restoration are worth strong consideration. Inviting the many unknown ecological consequences associated with Alternatives 1 and then (hopefully) balancing those out with habitat restoration elsewhere is not a scenario where the ecological outcomes can be predicted. Given the somewhat tenuous status of some

aquatic species in the basin (especially some of the salmon), alternatives that fragment and inundate habitat and disrupt fish movements or amphibian habitats should definitely be examined critically for potential to push species into Threatened or Endangered status under the ESA, and all that would entail. Also, while the flood reduction benefits for transportation is fairly clear under the flood retention alternatives (reduced days of I5 closures) the metrics used to measure flood reduction benefits for landowners are less clear. Given the potential ecological effects of these alternatives, the benefits landowners should expect should be explicit as possible.

I particularly recommend examination of combinations of Alternative 4 with aspects of Alternative 2 (levee improvements and I5 projects) to potentially maximize flood reduction benefits while minimizing ecological impacts.

I also wanted to note that Alternative 1 seems to assume that the state of “environmental flow” science is sufficient to mimic the critical components of the flow regime, but this is a risky assumption at best. Flow augmentation for ecological purposes is typically done to try and counteract some of the more excessive downstream impacts of dams, and success or failure often isn’t even measured in experimental releases. It may be possible to predict the effects of water storage and flow releases for water supply purposes, but the ecological effects associated with changing flow patterns are very unpredictable.

Lastly, I have had some concerns over the last few years that options are being evaluated based on climate change projections, which are described throughout the EIS documents and seem fairly generalized. Incorporating climate projections and forecasts is really important and I’m glad that recent climate-hydrologic modeling was done (by UW Climate Impacts Group). I am familiar with those forecasts published this year, and wanted to point out that the recent forecasts are incredibly variable around the peak floods (variability is less around summer low flows). Decision making has to consider those kinds of uncertainties, and I recommend that the role of climate continues to be examined as specifically and accurately (including evaluating uncertainty) as possible regardless of which alternatives are adopted going forward.

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From: Debbie Lane [REDACTED]
Sent: Monday, October 17, 2016 5:42 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

Follow Up Flag: Follow up
Flag Status: Completed

To:
Webmaster

NAME
Debbie Lane

EMAIL
[REDACTED]

MESSAGE

Option#4 is fiscally a nightmare and totally beyond the logical option. Farms would be condemned based on poor land management by political entities who rely on theory. Dogma is great, but isn't always practical. I have personal experience from King County that expansion of why's and poorly designed housing ended up with farmers (us) being relocated.

#4 is the only option that seems to meet most of the points you have made with the least tax burden. Thank you.

Sent from (ip address): 172.242.247.48 (172.242.247.48)

Date/Time: October 18, 2016 12:41 am

Coming from (referer): <http://chehalisbasinstrategy.com/hello-world/>

Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 10_0_2 like Mac OS X) AppleWebKit/602.1.50 (KHTML, like Gecko) Mobile/14A456

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From: Dawn Lawson [REDACTED]
Sent: Wednesday, October 19, 2016 12:17 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Dawn Lawson

EMAIL
[REDACTED]

MESSAGE

I am in favor of building the dam near PeEll. I was unable to attend the public meeting this evening.

Sent from (ip address): 73.169.240.240
(c-73-169-240-240.hsd1.wa.comcast.net)

Date/Time: October 19, 2016 7:16 am

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, October 29, 2016 9:16 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: RIMS-2016_-Sea-Level-Rise-Will-Be-Worse-and-Come-Sooner.pdf

Comment Form

First Name: Jim

Last Name: Lazar

Organization:

Address:



Phone:

Email:



The draft EIS contains an inadequate range of options.

An option of retreating development from the flood zone should be analyzed, the costs and environmental impacts measured, and it should be considered a viable option.

Comments:

Due to anticipated sea level rise of approximately 3 meters by 2100, the Aberdeen / Hoquiam levee improvement will not provide any flood protection. That option must be revised significantly to recognize expected sea level rise. NOAA discussion at the Risk Management Society 2016 annual meeting of the 3 meter estimate is attached.

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http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/RIMS-2016_-Sea-Level-Rise-Will-Be-Worse-and-Come-Sooner.pdf

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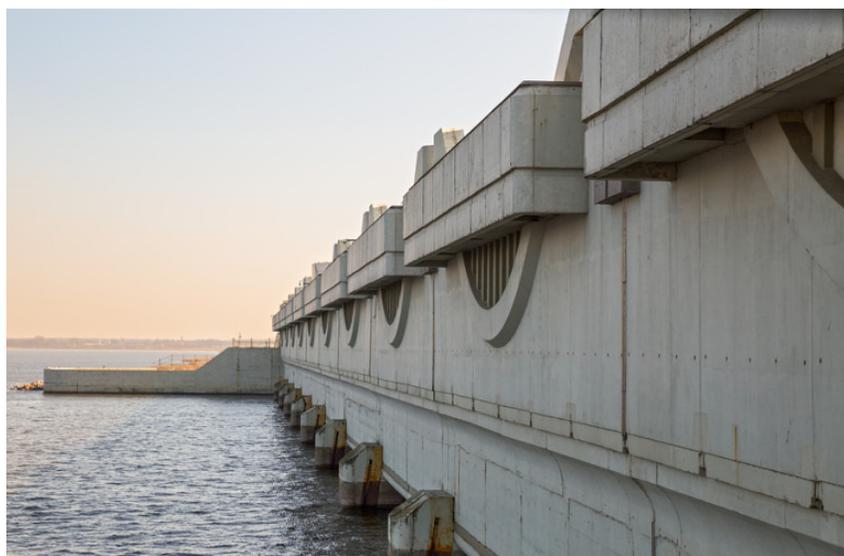
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RIMS 2016: Sea Level Rise Will Be Worse and Come Sooner

By Don Jergler | April 12, 2016



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Think sea level rise will be moderate and something we can all plan for? Think again.

Sea levels could rise by much more than originally anticipated, and much faster, according to new data being collected by scientists studying the melting West Antarctic ice sheet – a massive sheet the size of Mexico.

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That revelation was made by an official with the National Oceanic and Atmospheric Administration on Tuesday at the annual RIMS conference for risk management and insurance professionals in San Diego, Calif.

The conference is being attended by more than 10,000 people, according to organizers. It was day No. 3 of the conference, which ends Wednesday.

Margaret Davidson, NOAA's senior advisor for coastal inundation and resilience science and services, and Michael Angelina, executive director of the Academy of Risk Management and Insurance, offered their take on climate change data in a conference session titled



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Davidson said recent data that has been collected but has yet to be made official indicates sea levels could rise by roughly 3 meters or 9 feet by 2050-2060, far higher and quicker than current projections. Until now most projections have warned of sea

level rise of up to 4 feet by 2100.

These new findings will likely be released in the latest sets of reports on climate change due out in the next few years.

"The latest field data out of West Antarctic is kind of an OMG thing," she said.

Davidson's purpose was to talk about how NOAA is sharing information with the insurance community and the public, and to explain how data on climate change is being collected.

She explained that reports like those from the Intergovernmental Panel on Climate Change and the National Climate Assessment, which come out roughly every five years, are going on old data.

By the time the scientists compiling those reports get the data it's roughly two years old, because it took those gathering the data that long to collect it. It takes authors of the reports a few years to compile them.

"By the time we get out the report, it's actually synthesizing data from about a decade ago," she said.

Angelina's focus was also on the data. He spoke about the ongoing development of the Actuaries Climate Index and the Actuaries Climate Risk Index.

The goals of the projects are to create climate change indices that reflect an actuarial perspective, to create an index that measures changes in climate extremes, use indices to inform the insurance industry and the public, and promote the actuarial profession by contributing statistically to the climate change debate.

So far their findings show the climate is definitely changing – though neither Davidson nor Angelina addressed the cause of this change, which they said was not the purpose of their talk.

Angelina said a new way of looking at weather is required when dealing with climate change, and that just looking at averages isn't enough to give an accurate picture of climate change and the risk it presents.

The projects he's involved with have instead looked at weather extremes.

"By looking at extremes I can actually acknowledge that I have a problem," he said.

He used the notorious Bell Curve grading system to illustrate his point.

The goal of the curve is to achieve a 70 percent average among students. But if a teacher got



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to that 70 percent figure by having half the students failing poorly and half doing excellently, there's a problem: half of the students aren't getting it.

Looking at extreme temperature indices from more than 40 years ago and now, "things are different," he said.

So too are days of excessive rain, and excessive dry days, wind power and the sea level index.

"They're all up," he said.

He added: "We're in a different climate. The climate has changed."

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 Bill, while Congress is at it, they can ban solar flares as well.

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- Most will fail and the overall impact of insurtechs on the P/C industry will be minimal
- They will morph into more traditional carriers and brokerages
- They will spur development of new insurance coverages and risk management services
- Traditional carriers and brokers will adopt similar technologies
- Venture capitalists will get bored and move onto another industry
- They will have the most impact on distribution
- They will change underwriting and claims processing
- They will start attracting top talent in the P/C industry
- There will be more startups and more disruption than the current industry expects

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 21, 2016 12:47 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

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First Name: Randy

Last Name: LeDuc

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments: I favor Alternative 1

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From: Elijah J Liske [REDACTED]
Sent: Thursday, October 27, 2016 9:54 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Elijah J Liske

EMAIL
[REDACTED]

MESSAGE

A dam??? No way! Not a good idea.

Sent from (ip address): 70.199.145.158 (158.sub-70-199-145.myvzw.com)
Date/Time: October 28, 2016 4:54 am
Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 10_0_2 like Mac OS X) AppleWebKit/602.1.50 (KHTML, like Gecko) Version/10.0 Mobile/14A456 Safari/602.1

From: Mike Little [REDACTED]
Sent: Tuesday, October 18, 2016 4:44 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

Follow Up Flag: Follow up
Flag Status: Completed

To:
Webmaster

NAME
Mike Little

EMAIL
[REDACTED]

MESSAGE

How to protect your bank from erosion

Sent from (ip address): 70.199.150.7 (7.sub-70-199-150.myvzw.com)

Date/Time: October 18, 2016 11:43 pm

Coming from (referrer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 9_2 like Mac OS

X) AppleWebKit/601.1.46 (KHTML, like Gecko) Version/9.0 Mobile/13C75 Safari/601.1

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 9:38 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: John

Last Name: Long

Organization: Private citizen

Address:



Phone:

Email:

Comments:

I wish to continue to live at my current residence without the fear of flooding or need to release my property as would be required in one of the alternate recommendations. I favor alternate one which seems the only choice for a long range solution. Let's build a dam and resolve the issue.

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This email was built and sent using [Visual Form Builder](#).

November 4, 2016

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

Dear Department of Ecology,

This letter serves as our input on the draft EIS. We have lived in Adna since 2006 and have been impacted every time there's been a flood event on the Chehalis River and the Bunker Creek and Lincoln Creek tributaries. When Ingells and Bunker Creek roads become impassable with flood water we have no other way to get to/from our home. We've lost work, had to stay in hotels, lost power and had damage to our property. We've assisted neighbors with flood cleanup and have seen the effect flooding has on this community.

We absolutely do **not** support Alternative 1. We do not support wasting millions to billions of tax payer funds to build a dam that is not guaranteed to solve the flooding problems and will harm fish and wildlife habitat. Do not waste our money on something that will be astronomically expensive, that we have no idea if it will work. A dam will wipe out fish populations and wetland animals. We can't believe this option is even being considered!

There's a solution to the impacts of flooding and it's called preparation and planning. We support Alternative 4. Provide assistance to elevate homes in the floodplain, construct flood pads, and enhance forecasting and early warning. Stop allowing people to build in flood prone areas. As a community we can prepare ahead of a flood to ensure people and livestock are out of harm's way. We have no way of predicting future weather events but we can lessen the impact by getting prepared.

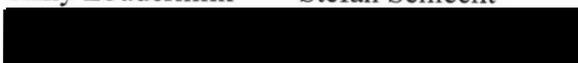
Regards,



Amy Loudermilk



Stefan Schlecht



From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 11:09 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jami
Last Name: Lund
Organization: landowner

Address: [REDACTED]

Phone:

Email: [REDACTED]

Comments: Option 1. Retention with a dam.
I think the stars have aligned, and we should not miss the opportunity to make an infrastructure change to improve water management. Willing reservoir land owner, the potential of improving fish runs, and the ability to manage water flow. These chances don't come often. Take it!

File Upload (1):

File Upload (2):

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 2:43 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jessica

Last Name: Marshall

Organization: lewis county resident

Address:



Phone:

Email:

Comments: in favor of alternative 1 lewis county basin

File Upload (1):

File Upload (2):

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 2:39 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Ray

Last Name: Marshall

Organization: lewis county resident

Address:



Phone:

Email:

Comments: in Favor of alternative 1 on the chehalis basin strategy

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File Upload (2):

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 2:42 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Raymond

Last Name: Marshall

Organization: lewis county resident

Address:



Phone:

Email:

Comments: in favor of alterinative 1

File Upload (1):

File Upload (2):

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: [Guillaume Mauger](#)
To: [Jim Kramer](#); [Bailey, Chrissy \(ECY\)](#)
Subject: clarifications on my comments to the PEIS
Date: Wednesday, December 07, 2016 10:31:20 AM
Attachments: [PEIS_Mauger_Comments_20161207.pdf](#)

Hi Jim, Chrissy --

It sounds like I may have caused some confusion in my comments on the PEIS. Sorry for that -- I'm still learning about the process and how best to contribute.

I wanted to know how I could submit a formal clarification, or even a retraction if that is necessary. (Given the choice, I would prefer to retract my comments rather than have them be misconstrued).

In brief, the corrections are as follows:

- (1) The comments were *not* the official UW or CIG position, but my own personal opinions.
- (2) In my comments about Alternative 4 (the restoration alternative), my ambiguous use of the term "feasibility" was meant to denote *political feasibility*, not technical feasibility. In addition, neither the technical nor the political feasibility of this alternative is within my area of expertise.
- (3) My comments about the political feasibility of Alternative 4 might be interpreted to imply that the dam alternatives (FRO and FRFA) are not subject to the same concerns about political feasibility. That was not my intention, and it was a mistake on my part mention one and not the other.

Finally, I just wanted to note that the PEIS clearly states that any of the restoration actions discussed could be implemented in part instead of in full. Setting aside the fact that I do not have a basis for knowing what is and isn't politically feasible in the Chehalis, my general sense is that partial implementation of Alternative 4 could alleviate or even obviate my concerns.

I'm attaching an edited version of my comments with the my previous statement about political feasibility removed. I'd like my official comments on the PEIS to be replaced with these.

Sorry for the trouble.

-Guillaume

--

@guillaumemauger
gmauger@uw.edu
mauger.org/guillaume
(206) 685-0317

--

[@CIG UW](#)

--

Pronunciation:

[Guillaume Mager](#)

Overall I am impressed by the quality and completeness of this analysis, and look forward to seeing future drafts. My comments below are largely focused on the clarity and treatment of climate change impacts.

Overarching comments:

(1) The climate/hydrologic projections are preliminary (not based on calibrated models), which makes it difficult to interpret what is adequate and what isn't in terms of design. The text should clarify that these are preliminary estimates, briefly summarizing the caveats (listed in Mauger et al. 2016), and also note that there is a wide range among projections. Although the range could be constrained in future work it will not go away – this means that no decision on the EIS can be made without explicit consideration of both the high and low end projections and the associated implications for each alternative.

(2) Similarly, the modeling to assess climate impacts (e.g., ecosystem models, flood models) does not clearly state the uncertainties in both the modeling (e.g., EDT model uncertainty/caveats), nor is there any discussion of the range among projections. To my knowledge this is not always covered in the source documents either. A more thorough analysis would be helpful for gauging the adequacy of the alternatives.

(3) The Flood Retention Facility (Dam alternative) also includes the I-5, airport and airport levees. This conflates the benefits of the two and makes it difficult to compare the relative merits of each.

(4) Similarly, the combination of the Aquatic Species Habitat Actions with the other alternatives makes it difficult to discern which benefits would occur as a result of each Alternative alone. This is particularly ambiguous with the Restorative Flood Protection alternative.

More detailed comments:

(5) Exec Summary, page 7 claims that floods, droughts, and heavy rains are all increasing. This is not supported by the literature: both because few trends are statistically significant, and because the research lacks definitive proof that the observed changes are not due to natural variability.

(6) Section 3.7.3 Wind Velocity -- this section should emphasize that models do not currently indicate any significant changes in wind speed for our region.

(7) Section 3.7.5 Streamflow -- this section should incorporate the results from Mauger et al. 2016, in which hydrologic projections were developed specifically for use in the Chehalis SEPA process. The current text says that the 100-year flood would increase by 20%, then later states the 66% projection developed by Larry Karpack -- this is confusing. It should also be noted that these projections

are preliminary -- additional work is needed to improve model performance and constrain the range among projections.

(8) Section 3.7.7 Forests -- the wildfire and insect projections are not applicable to forests west of the Cascades. As with the wind section above, this statement should emphasize that little is known about either for this region, though modeling studies could address the question.

(9) Section 5.2.2.3 Climate Change – this section includes a nice summary of the climate change impacts. However, as in previous comments some areas overstate what is known about climate change and its implications. Suggest reviewing this section for accuracy/content.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 12:28 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: PEIS_Mauger_Comments_20161114.pdf

Comment Form

First Name: Guillaume
Last Name: Mauger
Organization: University of Washington

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

(I've copied my comments here, and also uploaded them as a pdf).

Overall I am impressed by the quality and completeness of this analysis, and look forward to seeing future drafts. My comments below are largely focused on the clarity and treatment of climate change impacts.

Overarching comments:

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(3) It seems to me that the Restorative Flood Protection alternative is not feasible. If this alternative is indeed a non-starter, then the analysis is fundamentally flawed – if this is not an apples:apples comparison of feasible alternatives, then no reasonable judgement can be made about which is the better one to implement. Although the “Nonstructural alternative” partly addresses this concern, it seems to me that there could be an option that falls somewhere between the restorative and nonstructural alternatives.

(4) The Flood Retention Facility (Dam alternative) also includes the I-5, airport and airport levees. This conflates the benefits of the two and makes it difficult to compare the relative merits of each.

(5) Similarly, the combination of the Aquatic Species Habitat Actions with the other alternatives makes it difficult to discern which benefits would occur as a result of each Alternative alone. This is particularly ambiguous with the Restorative Flood Protection alternative.

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(10) Section 5.2.2.3 Climate Change – this section includes a nice summary of the climate change impacts. However, as in previous comments some areas overstate what is known about climate change and its implications. Suggest reviewing this section for accuracy/content.

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http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/PEIS_Mauger_Comments_20161114.pdf

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This email was built and sent using [Visual Form Builder](#).

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(10) Section 5.2.2.3 Climate Change -- this section includes a nice summary of the climate change impacts. However, as in previous comments some areas overstate what is known about climate change and its implications. Suggest reviewing this section for accuracy/content.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 11:22 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Daniel
Last Name: Maughan
Organization: Local resident, self

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: To whom it may concern.
I own a farm above Chehalis next to the Chehalis River. My home was built in 1931 and flooded in 2007 for the first time. I have a MS in geology and understand river dynamics. My personal and professional experiences have shaped my opinion to agree with alternative 1. Any responsible work to be done on the Chehalis River system must be for the benefit of those most affected by its massive uncontrolled flooding. Alternative 1 is the only option that benefits the local community specifically and the State of Washington generally. Alternative 1 would be best implemented if it included a water retention facility that held the water year around.
Sincerely,
Dan Maughan

File Upload (1):

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 10:27 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Larissa

Last Name: Maughan

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I would like to voice my support for the alternative 1 option that includes the larger scale dam and year round reservoir. In this area we face both winter floods and summer droughts that would both be mitigated by this alternative. The other options are all ineffective or impractical for basin-wide relief.

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This email was built and sent using [Visual Form Builder](#).

From: Bonnie Maynard [REDACTED]
Sent: Tuesday, October 18, 2016 8:33 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Bonnie Maynard

EMAIL
[REDACTED]

MESSAGE

I believe that Alternative No. 1 would be the best to protect our Hoquiam , Aberdeen, Cosmpolis areas from the terrible flooding problems. This area is already economically impacted by lack of jobs ,and flood insurance is also another burden on the home owners, if nothing is done we will continue to to decline in this area .

Sent from (ip address): 73.42.198.8
(c-73-42-198-8.hsd1.wa.comcast.net)
Date/Time: October 18, 2016 3:33 pm
Coming from (referer): <http://chehalisbasinstrategy.com/eis-library/>
Using (user agent): Mozilla/5.0 (Windows NT 10.0; WOW64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/53.0.2785.143
Safari/537.36

From: Larry McFarlane [REDACTED]
Sent: Friday, October 28, 2016 8:34 AM
To: info@chehalisbasinstrategy.com
Subject: Dam

What happened to tearing down dams that destroy fish and wildlife habitat. People that build in a flood plain should be accountable for their own issues. Apartments, parking lots malls all built in flood areas should be moved . Natural flooding happens this is Washington and I decided not to live in flood danger areas. I am a 67 year old senior and will stand against another dam that doesn't stop flooding but destroys watershed habitat.

Sent from my iPhone
Larry D. McFarlane

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 2:53 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: LArray
Last Name: McGee
Organization: retired Centralia College

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I have lived in Chehalis since 1985 and the recurring flooding doe snot affect my personal home as we live on a hill. However, flooding is the major issue when we want to attract people to live and work here. The integrated solution that is Alternative 1 is the solution that makes sense to me. This is not a simple problem and not surprisingly , the Governor's Task Force did not recommend a simple solution.

Let's do this right.

Larry McGee

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 10:45 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Merinda

Last Name: McGrath

Organization: Na

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: I have shared custody of my 6 year old son who attends the Pe Ell school. It is a condition of our divorce that he continues to attend that school. My home is located in an area that would be impacted by option 4. If I was asked to move and was only paid appraised value I would have a difficult time obtaining a comparable home. The majority of inventory available would be similarly effected by option 4. Due to limited inventory and high demand prices would be high. Even at low market prices homes locally sell for more than assessed value but in a low supply, high demand market I would not be able to get a comparable home with the amount of money I was paid even if one were available. Option 4 would impact a large portion of property owners similarly and there is simply not enough local property and homes available to accommodate those who would be displaced. If we were merely asked to raise our homes and plant timber it is not clear to me who would foot the bill of additional costs of higher flood insurance due to a more commonly flooded area or other additional costs like loss of work during flooding due to road closures or additional feed costs for my livestock after converting pasture to timber. The model does not appropriately reflect these issues. I think that the 4th option is not well prepared or thoroughly considered. It is well understood that upland timber property would not make good farmland due to soil conditions and water supply. it concerns me that if that model shows so many obvious issues to a lay person that option 1 which seems like the best option may be equally flawed.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 26, 2016 6:48 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Luke

Last Name: Moerke

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

After reviewing the information made available, and attending several meetings regarding the issues, it seems clear that Alternative #1 is the clear logical choice. Continued ignorance by doing nothing will only hurt the economies of the Chehalis Basin, and the state, through issues in flooding along the I-5 corridor. Other solutions are no feasible, and wishful at best.

Please, consider the urgent need for action on the Alternative #1 plan.

Thank you.

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From: Dick Morrison [REDACTED]
Sent: Monday, October 31, 2016 10:00 AM
To: info@chehalisbasinstrategy.com
Subject: my vote on the proposals

I think we should build a flood retention facility (Dam). That plan is the best one for Lewis county period! Thanks, Dick Morrison

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 1:54 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Scott

Last Name: Morrison

Organization: Self

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: After decades of watching the devastating effects dams have had on riverine ecosystems it's time we started making proper land use decisions that take into account the long term impacts of proposals such as the one proposed. There are much better alternatives than damming the river. I believe that a cost/ benefit ratio (CBR) calculated with the long term impacts to fish and wildlife habitat and quality of life for the residents of the Chehalis Basin would show a negative. The CBR must be calculated for the entire project prior to implementation. It's all too common to build a segment of a project where that particular segment has been singled out with a positive CBR while the overall project has a net negative CBR. The Chehalis Basin is the second largest watershed in the state. It's a complex and vital system to the environmental health of the region.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 4:53 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Colleen

Last Name: Morse

Organization: Citizen

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

We have been proud to watch the economic efforts being made in Lewis County since we moved here in 2000. However, during that time we've also watched the devastation caused by two floods on the Chehalis River, and the necessary rebuilding needed by our county and its citizens. We support Alternative #1, as it gives the most flexibility and potential for long-term protection to the homes, businesses, and livelihood of the citizens in the Chehalis River Basin.

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This email was built and sent using [Visual Form Builder](#).

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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

October 21, 2016

Ms. Bailey,

Mr. Keith Douville of the Washington Department of Fish and Wildlife and I spoke on an unrelated matter recently. During the course of our discussion it became related to your (our) issue at hand: The flooding in the Chehalis Basin and its problems for all in that area.

In a very simplistic view not having read the Programmatic Environmental Impact Statement for the Chehalis Basin Strategy I have a suggestion.

The accumulation of water in certain established areas and/or areas wherein the anticipated accumulation will be, in the Chehalis Basin, would be met with pump stations and the waters guided to a centrally located water treatment facility. The water then treated as needed, loaded onto floating barges, sold and delivered to areas in need of water. An example of places in need of various types of water, Nevada, California, delivered by barges or to other areas locally in Washington through a pipeline, (or other suggestions.)

Another area that could be profitable would be dredging the area riverbeds so the barges could pass easily through the waterways; the gravel and sludge can be harvested and also sold.

These suggestions could begin the creation of new industry that would be both profitable and offer relief to the flooding problem of the Chehalis Basin.

Again this is a simplistic view with no research or studies done to prove its feasibility, however, it is based on the thought of taking the problem(s) of one area to address the problem(s) of another area.

Thank for your consideration and if possible let me know your thoughts.

Sincerely,

Sal Nastasi

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, October 29, 2016 10:29 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: John

Last Name: Newman

Organization: Property Owner

Address:



Phone:

Email:



Comments: Any dam is too expensive. Option 4 is the only choice I support. Limiting development and limiting Building Houses in flood plain areas will diminish the impacts on people.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, November 9, 2016 12:37 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Frederick

Last Name: Norquist

Organization:

Address:



Phone:

Email:

Comments: I am 100% against building a dam on the chehalis river. have we not already learned that hydropower is not clean energy. Not to mention the impact on species such as fish, and other wildlife.

**File Upload
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This email was built and sent using [Visual Form Builder](#).

From: DAVID E ORTMAN [REDACTED]
Sent: Sunday, November 13, 2016 10:50 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy EIS Comments
Attachments: Chehalis Basin Strategy EIS comments.pdf

November 14, 2016

Chehalis Basin Strategy EIS

c/o Anchor QEA

720 Olive Way, Suite 1900

Seattle, Washington 98101

TO: Department of Ecology

The following are comments on the Chehalis Basin Strategy Draft Programmatic Environmental Impact Statement:

General Comments

It is again disappointing that the Department of Ecology continues to form non-representative “work groups” to promote disruptive and environmentally damaging dam projects across our state, with the small Chehalis Basin Work Group presented as “broad agreement,” “progress across the basin,” with a “basin-wide strategy.” In reality, this is merely a return to hard, structural, engineering dam and levee projects of the last century. https://www.ezview.wa.gov/Portals/_1492/images/Outreach%20Presentation%20--%20Dena%20Horton%20--%201122015.pdf

While Alternative 4, Restorative Flood Protection, should be the preferred alternative, it is not clear why Alternative 3’s Nonstructural Flood Protection measures do not appear to be included (p. 12, Ex. Summary). The PEIS should present the maximum amount of nonstructural measures that have been developed by FEMA and other flood response agencies.

It is also disappointing that Ecology ignores the Grays Harbor Estuary Management Plan and does not even list it as a reference. Similarly, the DPEIS does not appear to have an analysis of local Shoreline Master Programs, under the State Shoreline Management Act and no shoreline master program is listed as a reference. How do any of these proposals, particularly more levees in Aberdeen and Hoquiam meet the goals and policies of the local Shoreline Master Programs? This is precisely the type of dam promoting “silo” mission within Ecology that for the last decade has overridden other Ecology programs, including Water Quality and Shoreline Management.

More specific comments are as follows:

p. 3, Ex. Summary. This page states: “The Chehalis Basin has a high proportion of forestlands (80%), with 54% classified as managed forests.” This should be restated as “mismanaged forests.” It is disappointing that the Department of Ecology does not even have a grasp of the mismanaged forests that result in the immense amounts of sediment that have altered the Grays Harbor (and Willapa Bay) estuary. For example, Ecology would benefit from reviewing the following Corps of Engineers study: *Grays Harbor and Chehalis River Improvements to Navigation Environmental Studies. Sources of Sediment to Grays Harbor Estuary*, Corps of Engineers, Seattle District, (David M. Kehoe, January 1982). This study is an examination of the origin and amount of sediments filling the navigation channels of Grays Harbor from the Chehalis River basin and the means by which this sediment discharge rate could be reduced. It determined that due to excessive logging and poorly maintained forest roads, the Satsop and Wynoochee sub-basins had erosion rates ten times higher than the famous Tillamook burn area in Oregon. The PEIS needs a clear analysis of private, state, and National Forest mismanagement in the Chehalis River Basin.

In addition, as part of its review of the Chehalis River Basin, the PEIS should include an alternative of removal of the Wynoochee Dam, which was built in 1972. Prior to the construction of the dam, approximately 1,500 coho salmon, 1,400 steelhead, and 500 cut-throat trout spawned above the dam site. Mitigation consisted of a hatchery and attempts at trap and haul returning fish over the dam.

P. 21, Ex. Summary. This page states under Alt. 1: “Due to the ongoing regional debate about the pros and cons of construction and operation of dams and associated reservoirs, construction of either the FRO or FRFA facility is controversial.” This is correct, but does not disclose that levees in the lower Chehalis River Basin are also controversial. This should be disclosed in the FPEIS.

P. 83, Sec. 3.1.2.2. This section fails to state the historic facts about natural floods and floodplains. This page says that “Major floods have affected Lewis, Thurston, and Grays Harbor counties in 1972, 1975, 1986, 1990, 1996, 2007, and 2009.” This implies that floods prior to 1972 were not “major,” suggesting that either no major floods occurred, or, more likely, that major human alteration and incursion into known floodplains had not yet occurred. Either way, it is a striking example of the limited blinders that Ecology has put on as if the problem is floodplain flooding, rather than human blunders in building infrastructure in places where it does not belong. Please provide a clearer analysis of flooding and flood damage before 1972.

P. 394, Sec. 4.6. Water work within the Chehalis, Hoquiam, or Wishkah rivers is mentioned. Why does it list Hoquiam “or” Wishkah rivers? How can additional hardening of the Hoquiam River shoreline be mitigated?

In summary, it is time for the Department of Ecology to show some leadership in moving Washington State toward non-structural measures in response to flood events. Structural dam projects have destroyed most of the Yakima River Basin's fish runs. All Ecology has proposed in the Yakima River Basin is untried and untested engineering fish passage proposals at existing dams. The Chehalis River Basin does not deserve the same fate. Please select Alternative 4.

David E. Ortman

Attorney-at-Law

[REDACTED]

[REDACTED]

November 14, 2016

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

TO: Department of Ecology

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David E. Ortman
Attorney-at-Law



From: Michael O'Leary [REDACTED]
Sent: Sunday, October 30, 2016 9:37 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Michael O'Leary

EMAIL
[REDACTED]

MESSAGE

Please add me to the email list. Thanks.

Sent from (ip address): 73.96.161.105
(c-73-96-161-105.hsd1.or.comcast.net)
Date/Time: October 30, 2016 4:36 pm
Coming from (referer): <http://chehalisbasinstrategy.com/events/>
Using (user agent): Mozilla/5.0 (Macintosh; Intel Mac OS X 10.11; rv:49.0) Gecko/20100101 Firefox/49.0

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 26, 2016 11:41 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jennifer

Last Name: O'Neal

Organization:

Address:



Phone:

Email:



Comments:

The comparison of alternatives in the PEIS fails to take into account the long term effects of the action alternatives in terms of increasing or decreasing flood protection through time. The long term costs in terms of maintenance were also not presented in the comparison of alternatives. Restorative Flood Protection is likely to increase the ability to store water through time as floodplains become more developed with increased flows, where as the dam capacity and life span is limited and is likely to decrease over the life of the dam.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 11:05 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: John

Last Name: Panesko

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

Without knowing the cost of each choice, this is like choosing among four cars without knowing the prices. This is a waste of our time. Since we'll be paying for it, you should tell us the costs up front.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 12:59 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Vince
Last Name: Panesko
Organization: Panesko Tree Farm - PeEll

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: The scientific community treats models with caution not as certainties. The DPEIS and some authors of EIS support documents have this backwards and treat models as certainties without appropriate caution. This lack of scientific caution is evident throughout the DPEIS in the failure to identify uncertainties. The most obvious evidence of the lack of scientific caution is the phrase, "Alternative 1 will yield a significant reduction in floodwaters." The more cautionary approach typical in the scientific community is "Alternative 1 will yield a tentative reduction in floodwaters." The word "significant" should be replaced by "tentative" whenever the DPEIS addresses the expected results from flood modeling. This subtle change is important to prevent decision makers, the public and the media from entering into a rush to judgement with unsupported expectations.

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Summer Flow Augmentation

The EIS takes credit for summer flow augmentation from the FRFA dam, yet how does Ecology monitor water withdrawals from the river by farmers and residents living along the river to ensure that the summer flow augmentation intended for fish stays in the river, i.e. how does Ecology prevent farmers living along the river from just withdrawing more water? Given the reality of water pumping from the river, is flow augmentation just an assumption by Ecology without any evidence that it will benefit fish beyond Doty?

Ecology Battles for water

The EIS appears to take credit for summer flow augmentation having a benefit all the way to Chehalis and beyond, yet Ecology has found it necessary to restrict the Boistfort Water District with its pumps under the Adna bridge, and to restrict the City of Chehalis with its pumps just downstream of the Newaukum River. How does Ecology monitor the water withdrawal limitations imposed on the Boistfort Water District and the City of Chehalis? If Ecology has no means of controlling water withdrawals, does that mean the entire concept of summer flow augmentation benefiting the fish is based on assumptions of no water withdrawals, and the assumed benefit to fish may just reside in our imagination?

Groundwater and River Flow

Groundwater flow and river flow for rain-dependent rivers is an important factor for summer flow augmentation expected from the FRFA dam, especially if the benefits of flow augmentation are eliminated by the installation of groundwater wells near the river. Does Ecology have plans to restrict new groundwater wells from being installed near the river?

Removal of Topsoil at FRO Dam

Early site characterization revealed a minimum of 25 feet of dirt over the proposed dam site. The August 22, 2016 revised cost estimate stated that 25 acres at the FRO proposed site needed "clearing, grubbing and stripping of topsoil" which would result in a million cubic yards or 50,000 truck loads (using a 10 yard truck with a 10 yard trailer). Where will a million cubic yards of dirt be placed? The dam and reservoir site are located in steep terrain, and any dirt located there would slide into the reservoir. The closest flat location is near PeElI 2-3 miles away. Associated question: Does the placement of a million cubic yards of dirt require permitting by the Dept of Ecology to ensure that surrounding water flow in creeks and streams is not harmed? Where is this environmental impact described in the EIS?

Placement of Topsoil

The August 22, 2016 updated cost report for the FRO dam shows item 5.1 Excavation Foundation General = 458,519 CY and item 5.2 Excavation Foundation Rock = 111,488 CY. Where will the 570,000 CY of removed material be permanently placed?

Programmatic versus Project EIS

Given that unsupported and unsound statements in the programmatic EIS... if not challenged in the draft PEIS...become part of the administrative record and can be used to support the draft project EIS without legal challenge, how can Ecology deflect comments on the programmatic EIS by claiming (quote): "The impact assessment in a programmatic EIS is more qualitative than a project specific environment review?" In other words, Ecology is telling reviewers to wait until the project EIS is issued to make the comment. The problem is that when an unsound technical statement is unchallenged in the programmatic EIS, the unsound technical statement cannot be challenged when the draft project EIS

is issued. So when reviewers get to the project EIS, they may find they are legally unable to make the comment, originally intended for the PEIS.

And if the PEIS authors have never experienced a legal challenge of a PEIS and the follow-up project EIS, it is perhaps understandable they would not appreciate the situation where PEIS reviewers have to challenge every questionable aspect of the PEIS, just to prevent unsound technical material from being used to justify project decisions in the project EIS.

Can Ecology explain how unsupported statements in the programmatic EIS (once the programmatic EIS becomes part of the administrative record) can still be challenged when the same unsupported statement appears in the project EIS? In other words, if reviewers don't challenge it in the PEIS (qualitative or not), the reviewers will lose their legal right to challenge it in the project EIS. How can Ecology explain to their reviewers how to keep from losing their legal rights to raise certain issues on the project EIS?

Ecology needs a qualified legal expert to answer this question.

Seepage Around Dam

The blog stated, "The Chehalis roller compacted concrete (RCC) construction is not expected to be subject to the seepage issues given our understanding of the foundation and the planned foundation treatment associated with the dam construction." However, page 2 of the September 2016 report by HDR and Shannon & Wilson, entitled PHASE 2 SITE CHARACTERIZATION, TECHNICAL MEMORANDUM, stated, "Additional highly fractured zones in the bedrock were identified in the Phase 2 Program. These zones will act as preferential seepage pathways beneath the dam foundation and abutment." Which of these statements is the public supposed to believe?

Quarry Rock

Page 27 of Section 2, Alternatives, states that the most promising quarry location is located approximately 2 miles from the potential dam location mainly along Weyerhaeuser Road 1000. Where is the rock-testing data documented?

The PEIS statement is confusing because previous documents have concluded that none of the rock at or near the proposed dam site was suitable for dam construction, and that rock for dam construction had to be obtained from the Hope Creek Quarry north of PeEll or the Alderbrook Quarry closer to Chehalis. And there was another report which stated that the hard rock suitable for dam construction was located in the region north to northeast of Centralia whereas rock in the Willapa Hills southwest of Chehalis was softer rock not suitable for dam construction. Where can we find a copy of the report that dismisses the earlier documents and presents data that shows the Road 1000 Quarry to be the quarry-of-choice?

Climate Change

Section 3.7.5 of the PEIS (page 180) STREAM FLOW states "The increase in peak flows under climate change conditions is estimated to be 66% for a 100-yr flood." Does that mean I can take the 1996 100-yr flood peak flow at Grand Mound of about 75,000 cfs and add 66% which equals about 50,000 cfs for a climate change peak flow total of 125,000 cfs? That is about 45,000 cfs larger than the 2007 flood at Grand Mound.

Where in the PEIS does it state that alternatives are designed to reduce flood damage from peak stream flows 66% higher than current 100-year levels?

Explain how the dam would be managed to handle an increase in stream flow of 66%. Is this discussed in the PEIS?

Since a 100-yr flood put 2 feet of water in my home in Chehalis in 1996, and the proposed dam would lower a future 100-yr flood in Chehalis by 1.5 feet, how many feet of increase would Chehalis and other localities along the river experience due to a peak flow increase of 66%?

BACKGROUND THOUGHT: What I am trying to understand is whether or not any of the alternatives are designed to handle a 66% increase in peak stream flows. If not, then the PEIS should be tossed in the trash and a new PEIS created based on alternatives that take into consideration a 66% increase in peak stream flows.

BACKGROUND THOUGHT: With a predicted increase of 66% peak stream flows, doesn't that make the current building strategy in floodplains seem silly. In other words, if current regulations allow building in a flood plain if structures are 2 feet above the all time historic flood level, and we know that future floods will be above that 2 foot cushion, are the Governmental agencies at risk for future lawsuits for allowing building to occur in flood plains?

BACKGROUND THOUGHT: Are there similarities with the OSO Landslide where the State had information which was not properly handled which resulted in a \$50 million dollar lawsuit settlement? In other words, if the State knows flooding can increase by 66% over time, is the State therefore liable for allowing new construction in the floodplain which will eventually be flooded?

BACKGROUND THOUGHT: With the information that peak stream flows can increase as much as 66%, should the State be requiring everybody to move out of the floodplains?

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 9:44 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Complete-Major-Comments.docx; Section-2-Alternatives.docx

Comment Form

First Name: Vince
Last Name: Panesko
Organization: Panesko Tree Farm - PeEll

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: Major Comments attached. Comments on DPEIS Section 2 also attached.
Comments on specific pages will be sent by sections.

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Complete-Major-Comments.docx>

File Upload (2): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Section-2-Alternatives.docx>

File Upload (3):

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MAJOR COMMENTS

PANESKO - MAJOR COMMENT #1: CREATE ALTERNATIVE 5, COMBINING ALTERNATIVES 2 AND 3.

SUMMARY: The draft PEIS has not considered all the combination of alternatives available for flood reduction. Alternative 5 would incorporate Alternatives 2 and 3 to provide greater flood damage reduction than each alternative can provide by itself.

Providing Alternative 5 as combined Alternatives 2 and 3 gives the decision makers more tools to work with to reduce flood damage in the Chehalis River basin.

EXPLANATION OF BENEFITS: The logic for a combination of both levees and buyouts is simple. Let the floodplains be for floods (buyout as many residents as possible). Protect those people on the edge of floodplains from flooding (levees, flood walls).

Alternative 5 should consist of levees along both sides of the river all through the Chehalis/Centralia area. The levees would create a channel through which water is moved quickly through the Chehalis-Centralia area.

Alternative 5 should also include a permanent prohibition on building new structures in the floodplain. Only farming or temporary recreation uses would be allowed, Most of the impacts and mitigation are already explained in the draft PEIS. Only a small amount of additional information would be needed.

PANESKO - MAJOR COMMENT #2: FLOOD DAMAGE REDUCTION NOT ACHIEVED.

The purpose of the PEIS alternatives is to reduce flood damage. Any alternative which has an un-intended consequence of creating future increases in flood damage does not belong in this PEIS. Future development inside floodplains eventually increases flood damage, especially since minimum standards for building do not take into account the estimate of 66% increase in peak flows due to climate change.

Flood damage reduction in floodplains has to focus on buying out property owners and stopping all new development. Appendix L Build-Out Analysis reveals that the DPEIS Alternatives will fail if the perception is that the alternatives will make floodplains safe for development. The tone of Appendix L has to be changed from predicting floodplain development to explaining why such predicted development must be stopped in order to maintain the gain in flood protection offered by the DPEIS alternatives.

PANESKO - MAJOR COMMENT #3: I-5 CLOSURE DAYS

The PEIS makes statements that Alternative 1 will reduce the number of I-5 closure days from 4 to 1. The reference for these statements is the November 26, 2014 WSDOT report entitled, "Chehalis River Basin I-5 Flood Protection near Centralia and Chehalis."

The WSDOT report states: "Model results show that a dam would significantly reduce flood levels and shorten the duration of I-5 closures during major flood events. In a simulated 100-year flood event with current baseline conditions, model results show that I-5 would be closed for approximately five days; with construction of a dam, in a simulated 100-year flood event, model results show that I-5 would only be closed for approximately one day."

The WSDOT report provided no reference to the modeling. There are no further details provided in the WSDOT report.

Therefore, one of the biggest benefits of Alternative 1 is entirely unsupported in the PEIS. The PEIS fails to explain how 5 days closure would be reduced to one day by a dam or by levees.

A further puzzle is that the WSDOT report attributes the reduction of I-5 closure days to the dam. The dam only reduces flood levels in the Chehalis area by about 1.5 feet which is an insignificant reduction where there was 10 feet of water over I-5 under the Chambers Way overpass in both the 1996 and 2007 floods.

I discussed this puzzle with Larry Karpack at the October 11th Workshop. He agreed that the dam does little to affect I-5 closure. He said the levees were responsible for keeping water off of I-5 at the Chambers Way intersection. There does not appear to be any documentation which explains how this happens. There is no explanation in the draft PEIS. It is an unsupported statement.

PANESKO - MAJOR COMMENT #4: FAILURE TO ADDRESS IMPACT OF DAM COLLAPSE ON PE ELL.

The draft PEIS does not disclose the significant adverse impacts of Alternative 1 on the City of PeEll. In the past 55 years there have been at least 20 dam failures in the United States.

Dam failures have been due to seepage under the dam foundation or side abutments (see failure of St. Francis Dam in 1928 in Los Angeles which killed 431 people)(and failure of Hope Mill Dam in North Carolina in 2010 one year after construction). Most dam failures have been due to unexpected amounts of rainfall which overtopped the dam. Unexpected sediment is an on-going problem in 2016 (see Glen Canyon Dam in Arizona). Certain dam failures have been due to operator error (see failure of Taum Sauk Reservoir in 2005).

Site Characterization at the PeEll dam site in 2015 and 2016 revealed weaknesses in the surrounding geology which are a recipe for dam failure. The possibility of another 2007 flood with landslides cutting loose into the reservoir have the potential to destroy the dam. Finally, operator error in making judgements to keep the reservoir full when unexpectedly heavy storms cause dam overtopping are all possibilities that need to be addressed as possible adverse events on Alternative 1.

The PEIS needs to address possible dam failure which kills 632 people in PeEll and an additional 300 kids in school next to the river. The PEIS needs to discuss mitigation which involves relocating the town of PeEll and the PeEll school out of harms way. WAC 197-11-080(2)(b) requires Ecology to use worst case analysis if the agency were to decide to proceed in the face of those uncertainties which face the proposed PeEll dam.

PANESKO – MAJOR COMMENT #5: FAILURE OF DRAFT PEIS TO DESCRIBE ADVERSE IMPACTS OF DAM ON INCREASING FLOODING IN DOWNTOWN PE ELL.

The business district of PeEll does not flood from the Chehalis River which is in a canyon on the west side of town. Once out of the canyon in the north part of town, flooding spread in 2007 and destroyed the PeEll Sewage Treatment Plant along the river. Flooding of the PeEll City Hall and southern business district is caused by overflowing of Stowe Creek which originates in the valley to the east of the Chehalis River Valley and runs through the southern portion of PeEll.

The reservoir of the proposed dam will increase the groundwater to the level of the reservoir, and will increase seepage through the hill into Stowe Creek. Past floods in PeEll have used sandbags to keep water out of businesses. And adverse impact on PeEll will be the seepage and increase of groundwater leaking into Stowe Creek which will increase winter flooding of PeEll.

The draft PEIS fails to mention this adverse effect of Alternative 1 on PeEll. The draft PEIS also fails to describe mitigation which could be to build dikes in PeEll to keep floodwaters of Stowe Creek contained through the southern portion of the town.

The adverse effects and mitigation need to be described in the draft PEIS.

PANESKO – MAJOR COMMENT #6: FAILURE OF DRAFT PEIS TO ANALYSE IMPACTS OF ALTERNATE ONE, i.e. over-stating benefits of dam in Alternative 1.

Table 4.2-2 on page 261 of the draft PEIS states that a dam would offer 12,200 cfs of water retention in a 100-year flood.

That means the dam retains 24,300 acre-feet of water per day. The reservoir has a 65,000 acre feet capacity, so the reservoir would be full in 2.7 days. In other words, the dam has a benefit for only those 2-3 days after which river flooding occurs as in the no-dam scenario. By day 3 the full force of the upper Chehalis river flows over the top of the dam into the flooded areas downstream.

Table 4.2-2 states that a dam would provide 19,000 cfs reduction in a 500-year flood. That means the dam holds back 36,700 acre-feet of water per day which fills the reservoir in 1.8 days. The dam would have a benefit for less than two days. After two days, the additional flood water coming down the river in PeEII would have to be released over the top of the dam offering no further protection to downstream areas, already in flooding conditions.

Table 4.2-12 on page 310 of the draft PEIS says that a dam would reduce peak flow at Grand Mound from 137,900 cfs to 108,600 cfs in a 100-yr flood after a 66% increase in peak flows from climate change. This means the dam collects 55,100 acre-feet per day and the reservoir fills up in just over one day.

Therefore, for the greatest flood in future history, the dam would be of benefit for one day after which the huge mass of water would over-top the dam, possibly causing collapse. In this situation, the dam is hurting people downstream, not helping.

The PEIS does not provide a realistic description of the benefits of a dam which are realized for less than 3 days during a 100-year

flood and only exist for one day during future flooding which is increased by 66% due to climate change. This data has been with-held from decision makers. With this data available, the decision makers can easily see that the dam is under-sized, and is not built for future flooding due to climate change. The dam is only sized to provide limited protection for past 100-year floods such as the 1990 flood and the 1996 flood.

In other words, the draft PEIS misleads the public by failing to provide a programmatic strategy that works for the next 100 years. What Alternative 1 gives us instead is a strategy in Alternative 1 that would have helped for 3 days in 1990 and in 1996.

The above numbers are for the FRO dam which has a reservoir capacity of 65,000 acre-feet. The FRFA has a reservoir capacity of twice that volume, but most scenarios explain that the FRFA reservoir will be maintained half full with a free-board of 65,000 acre-feet to accommodate a period of heavy rain.

The weakness of this strategy is the possibility of a second intense storm on the heels of the first, when the FRFA reservoir is full and has not had time to be lowered. In such a case with a full reservoir, there would be no protection afforded downstream by the dam. All of the new storm water would over-top the dam.

There are examples where the number of spillways in dams were reduced to save money, leading to collapse of the dams in unexpectedly heavy rainstorms (1975 collapse of Banqiao Reservoir Dam killing 171,000 people in Henan Province, China).

There are examples of over-topping US dams where the floodgates stuck in closed or partially closed position, leading to dam failure due to excessive pressure on the dam. The draft PEIS has avoided such an analysis.

PANESKO – MAJOR COMMENT #7: FAILURE OF DRAFT PEIS TO ADDRESS SIGNIFICANT COST RISKS AND UNCERTAINTIES ASSOCIATED WITH SUBSURFACE CONDITIONS AT THE PROPOSED DAM SITE

The August 22, 2016 Memo from HDR to EES Consulting and Anchor QEA entitled, “Cost Estimate for Use in EIS Dam Design and Fish Passage Cost Estimate” contains Section 8: Summary of Risk/Uncertainty Information Needed. This risk and uncertainty information was not adequately addressed by the DPEIS in the evaluation of Alternative 1.

Decision makers in the SEPA process cannot make an informed decision if they do not understand the important facts. I have copied the entirety of Section 8 so that readers can see for themselves how there are important technical uncertainties associated with Alternative 1 which have not been made public.

The August 22, 2016 HDR Memo was not referenced in the DPEIS. This suggests that the DPEIS authors may have never read it. Quote:

Section 8: Summary of Risk/Uncertainty Information Needed

At the present time, there is significant cost risk and uncertainty associated with the subsurface conditions at the site, and the unit price of the RCC. As additional phases of site explorations are performed, much of this uncertainty will be reduced as additional information is obtained. For example, more information about RCC aggregate quarry sites as well as additional RCC mix testing will reduce the uncertainty of the RCC unit price. Similarly, additional subsurface information will reduce uncertainty of the foundation excavation, foundation treatment, and grouting costs.

A list of specific items associated with risk and uncertainty are as follows:

- 1) Confirmation of annual and seasonal diversion overtopping risk and mitigating strategies
- 2) RCC mix design program results and incorporation plan

- 3) Final quarry characterization, potentially including a test quarry and crush investigation
- 4) Development of risk register, emphasizing construction risk, including delivery and procurement, and CM strategies
- 5) Initial and ongoing assessment of cementitious material price and availability
- 6) Thorough construction schedule development and sensitivity analysis
- 7) Built-up cost estimate, risk-based sensitivity development including risk-based contingency development, and re-visited market analysis and sensitivity
- 8) Development and determination of project design alternatives, i.e. facing selection, seepage control strategies
- 9) Confirm final foundation investigation and characterization includes confidence in the river bed bottom and/or includes mitigating strategies to address potential surprises during construction
- 10) Same confirmation for the diversion tunnel geotechnical design

End of Quote from the August 22, 2016 HDR Memo.

Note that Item 1 on the above list addresses the risk of over-topping the dam and its effect on structural integrity of the dam. The over-topping issue is important because in a 100-yr flood, the reservoir is full after 2.6 days and the rest of the flood water over-tops the dam. In a 500-yr flood, the reservoir over-tops in 2 days. With a 66% climate change increase in water, the reservoir over-tops in one day. Once over-topping occurs, all the water in the upper Chehalis flows downstream into the already-flooded areas around Chehalis and Centralia. Of greater concern is that over-topping is the most frequent historical cause of dam failure.

The DPEIS fails to address the topic of over-topping the dam and fails to address the limited capacity of the reservoir thereby misleading the public into thinking the dam provides more protection than it actually provides.

PANESKO – MAJOR COMMENT #8: FAILURE OF DPEIS TO COMPLY WITH WAC 197-11-090 TO PROVIDE SUPPORTING DOCUMENTS

WAC 197-11-090 alludes to making supporting documents available to the public. Most of the documents referenced in the DPEIS are not available to the public.

One example: The August 22, 2016 Memo from HDR to EES Consulting and Anchor QEA is entitled, “Cost Estimate for Use in EIS Dam Design and Fish Passage Cost Estimate.” There is no evidence that this memo was made available to the public. This memo was not referenced in the DPEIS reference section.

Another example: The September 2016 Phase Two Site Characterization Technical Memorandum issued by HDR and Shannon & Wilson is listed as a reference to the PEIS, but the copy made available as EIS Supporting Documentation on the Chehalis Basin Strategy website is a draft copy, thrown quickly together without proper editing. All of the appendices are missing. Half way through the memo, the page numbers start all over from one. The absence (and unavailability) of Appendices makes that information unavailable to decision makers and the public. This September 2016 report references a HDR 2016 Conceptual Design Report which has not been made available to the public to my knowledge.

The November 26, 2014 WSDOT report on flood waters over I-5 is referenced by the DPEIS. The WSDOT report makes a statement that a dam will reduce the I-5 closure from 5 days to one day without explaining how that happens. This statement has no reference and is thus an unsupported statement. Decision makers are left in the dark and technical reviewers are left unable to verify the conclusions. The DPEIS continues the façade by repeating the closure day reduction caused by a dam without providing any explanation of how the closure reduction days were obtained.

With just these errors in the DPEIS alone, decision makers have been prevented from seeing important information which explains adverse effects of Alternative 1. Without critical technical information, decision makers cannot make informed decisions.

PANESKO – MAJOR COMMENT #9: FAILURE TO ADDRESS UNCERTAINTIES ASSOCIATED WITH ALTERNATIVE 1:

The DPEIS evaluation of the adverse impacts of Alternative 1 does not adequately examine most of the uncertainties of Alternative 1. This failure has misled the decision makers, the Flood Authority Members, local governments and local businesses into recommending Alternative 1 before the final PEIS is issued. The DPEIS violates WAC 197-11-080(3)(b) by failing to address information relevant to adverse impacts that are important to the decision process.

The list of some of the uncertainties for Alternative 1 is as follows:

1. Uncertainty in the foundation of the dam. Significant fracture zones have been discovered in the bedrock beneath the proposed dam site. The strength of the bedrock has been discovered to be 2 to 5 times below the optimum strength of basalt rock, i.e. the bedrock is soft and could break apart under the extreme weight of the dam.
2. Uncertainty in how the weight of the dam would cause the bedrock layer to sink into the soft, marine sediment layers under the dam, causing the dam foundation and the entire dam to crack, seep and finally collapse.
3. Uncertainty in the extent of soft marine sediment layers recently discovered to be located under the dam foundation. Recent boreholes reveal layers of soft marine sediment layers sandwiched between basalt layers in every borehole, meaning that the soft marine layers cover the entire dam site. There is uncertainty as to how to anchor the dam foundation to the alternating layers of rock and marine sediments in a manner to keep the layers from sliding over each other and to keep the dam from collapsing.
4. Uncertainty in installing grout curtains (injected concrete) behind the dam to keep reservoir water from seeping through the soft marine sediments which have been recently discovered beneath the dam

foundation. “Grout curtains may not have a significant influence on the seepage conditions” (quote from Professor Arthur Casagrande).

5. Uncertainty about seepage of reservoir water through the soft marine layers discovered on the east side of the dam site which are located under the proposed Wing Dam. Since the east edge of the proposed dam site is not high enough to support the FRFA dam at 287 feet, an extension to the dam, called a “Wing Dam” almost 500 feet long has to be added to reach higher elevations. This extension is over soft marine sediments which are seepage pathways.
6. Uncertainty in the landslide potential at the dam site from 4 ancient landslides.
7. Uncertainty in 23 landslides located on the reservoir, one site the same size as the OSO Landslide. The adverse effect of these landslides in causing dam collapse is completely ignored by the DPEIS. Also ignored is the potential liability of the State of Washington for allowing a dam to be built where a known ancient landslide exists. In the OSO case, the Court awarded the affected families \$50 million dollars.
8. Uncertainty in the cost of removal or stabilizing the landslides, i.e. no cost estimates have been included in the DPEIS. The DPEIS evaluation of Alternative 1 does not adequately examine the potential adverse effects of landslides and proper mitigation measures.
9. Uncertainty in the amount of topsoil and unstable rock that will be required to be removed from the dam site.
10. Uncertainty (1) in the cost of purchasing property for the excavated material, (2) in the cost of transporting the excavated material and (3) in the cost for installation of proper environmental protections applicable to a newly created mountain somewhere near PeEll (think about the surrounding network of creeks and small streams affected by this fill.)

11. Uncertainty in where the dam will obtain hard rock for making concrete.
12. Uncertainty in how much the rock-for-concrete will cost.
13. Uncertainty in transportation costs of the rock-for-concrete.
14. Uncertainty in scenarios for catastrophic failure of dam.
15. Uncertainty for warning systems in PeEll of dam failure.
16. Uncertainty for adverse impacts of catastrophic failures of dam such as the deaths of 600 people in PeEll and 300 students in the school near the river.

17. Uncertainty in mitigation of catastrophic dam failure such as relocation of the town of PeEll and the PeEll School District facilities.

18. Uncertainty in where the town of PeEll will get its water once the implementation of Alternative 1 eliminates the PeEll reservoir, Water Treatment Plant and the water line from the reservoir into the treatment plant into town. A completely new water system will be required.

19. Uncertainty in the cost of a new water system for PeEll.

20. Uncertainty in the annual operational cost of dam in Alternative 1 (one consultant says 3.5 million; another says 2 million). \$3.5 million per year over 100 years is \$350 million dollars total. The DPEIS does not use this number and misleads the decision makers and the public into thinking the dam is \$350 million dollars cheaper than the actual cost.
21. Uncertainty as to who will pay for building the dam.
22. Uncertainty as to who will operate the dam.
23. Uncertainty as to who will pay for the annual operating costs of the dam.
24. Uncertainty as to how much a dam will lower floodwater in any given flood. This uncertainty is due to previous dam operating experience (e.g. Howard Hanson Dam, Mud Mountain Dam) where personal judgements by operators have often led to increase in flooding rather than expected flood damage reduction.

25. Uncertainty in the benefits of summertime augmented flows expected from a FRFA dam. The benefits of greater flow and lower water temperatures on fish will only be realized if the extra water is not pumped out of the river by farmers for irrigation of their fields between PeEll and the South Fork. This uncertainty is due to the fact that there is no metering of water withdrawal by the State and there are no exact controls on the pumps of farmers.
26. Uncertainty in flood damage created by Alternative 1 insomuch as the reservoir fills up in 2 to 3 days in a 100-yr flood, 2 days in a 500-yr flood and 1 day in a 66% climate change increased flood. Once the reservoir is full, the remaining flood waters (1) over-tops of the dam possibly causing damage to the dam or causing its collapse and (2) contributes to downstream flooding at the worst time possible, i.e. just when downstream flooding is peaking from other sources. This adverse effect has not been addressed by the DPEIS.
27. Uncertainty in archaeological sites close to river. Page 212 of Section 3 provides percentages of possible archaeological finds. The DPEIS also fails to address any of the historical value of the dam site and reservoir area.
28. Uncertainty in the future development of the floodplain if people now believe the floodplain safe for development. Appendix L addresses this uncertainty; however, without a mandate for no new building in the floodplain, future reduction of flood damage cannot be accurately predicted.
29. Uncertainty in climate change. One source quoting the 2009 UW study says there could be up to a 66% increase in peak flood flows. Another source is the author of the 2009 UW study who cautions that the effects of climate change may not be noticeable for decades to come.

PANESKO – MAJOR COMMENT #10: FAILURE OF DPEIS TO ADDRESS IMPACTS OF EXCAVATION OF OVERBURDEN

The DPEIS evaluation of Alternative #1 does not adequately examine the cost of excavation of overburden, its transport out of the valley and final environmental protections for the new mountain of debris that has to be created somewhere.

The August 22, 2016 updated EIS cost estimate shows that preparation for dam construction would require the removal of top soil and underlying fractured bedrock with estimated volumes of 600,000 cubic yards (for FRO dam) and 900,000 cubic yards for FRFA dam.

The assumption was made that 90,000 truck loads (10-yd capacity) of dirt and rocks would be placed near the dam site. There are no flat areas near the proposed dam site which means transportation costs must be added. And there is no discussion of the adverse impact on the ecosystem of flat spots near PeEll which would receive the overburden from the dam site.

This adverse impact of Alternative #1 needs to be analyzed in the DPEIS and the costs added to the construction cost of the dam.

PANESKO – MAJOR COMMENT #11: FAILURE TO ADDRESS WEAKNESS OF ROCK AT PROPOSED DAM SITE.

The DPEIS evaluation of Alternative 1 fails to address the recent findings of the 2016 Phase 2 Site Characterization Report which revealed that 22 out of 33 samples of basalt had inferior strength, and 9 more were marginal for a total of 31 samples of weak rock strength in the area of the proposed dam site.

Basalt typically has an unconfined compressive strength (UCS) of 14,500 to 43,500 pounds per square inch (psi). Unconfined compressive strength is the pressure it takes to make a rock crumble into pieces when squeezed in a vise.

Compressive strength is an important quality because if a rock can easily crumble under pressure, it would crumble under the tremendous weight of a concrete dam. Rock with low UCS numbers (weak rock) under the dam foundation could crumble, creating pathways for seepage and eventual sink holes under the dam (see 2010 Hope Mills Dam failure in North Carolina) leading to collapse.

Tables 4.4 and 4.5 of the 2016 Phase 2 Site Characterization Report provide the UCS numbers for 36 samples. Three samples were taken of the soft marine sediments called claystone UCS=540 psi and 2598 psi, and breccia UCS = 5,237. These soft sediments located throughout the dam site are well below the UCS standard of 14,500 psi to 43,000 psi.

What is surprising is that 22 of the 33 basalt samples were very unsuitable weak rock, testing below the 14,500 psi level with the lowest three being 1,229 psi, 1,834 psi and 2,450 psi. Clearly, these basalt samples were weak rock which broke apart under light loads similar to the soft marine sediments with UCS numbers of 540 to 5,237 psi. A total of 8 basalt samples were between 5,000 psi and 10,000 psi with 11 samples between 10,000 and 14,500 psi.

A dam should never be built over rock formations that break apart so

easily when put under pressure. Yet, that is exactly what Alternative 1 intends to do, and the decision makers are clueless because the DPEIS never presented the data in a manner which can be understood by the decision makers or the general public. The DPEIS actually avoids the topic.

Of the 11 basalt samples which tested over 14,500 psi, 9 fell into the range of 14,500 to 20,000 psi (low end of hardness scale) with two samples reading 20,663 and 26,083 psi (more hard and more suitable basalt rock). The fact that so many of the basalt samples failed to meet the typical hardness of expected basalt introduces the issue that the weak basalt layer beneath the site of the proposed dam is not strong enough to hold the weight of a concrete dam. The DPEIS avoids this issue.

The DPEIS also fails to address the findings of the 2016 Site Characterization Report which states: (see Section 6, Conclusions and Recommendations) “Highly fractured zones of bedrock were identified in the Phase 2 program. These zones will act as preferential seepage pathways beneath the dam foundation and abutment unless they are treated.”

Treatment is typically the injection of grout to plug zones of seepage. However, finding the right location to inject grout is more a stroke of luck than a science. Engineers at Howard Hansen Dam have been grouting for years and have reduced seepage after spending about \$100 million dollars. And seepage issues continue at that dam.

Professor Arthur Casagrande stated that “Grout curtains may not have a significant influence on the seepage conditions, i.e. they cannot be implicitly trusted to eliminate seepage flow beneath or around a dam.” The DPEIS contains no such warnings for decision makers. Because the DPEIS failed to address this important issue, decision makers are completely in the dark about the adverse geology and adverse impacts of Alternative 1.

PANESKO – MAJOR COMMENT #12 FAILURE TO ADDRESS GEOLOGIC LAYERS AT THE PROPOSED DAM SITE.

The DPEIS evaluation of Alternative 1 does not adequately examine the layers of soil found at the proposed dam site. Each of the 18 boreholes associated with the dam revealed multiple layers of weak strength basalt and soft marine layers.

The DPEIS has failed to inform decision makers and the public that these layers create problems for building a dam at that location.

Table 4.2 of the 2016 Phase 2 Site Characterization Report reveal multiple layers at every drill hole. There is not a single borehole without soft marine sediment. There is not a single borehole without multiple layers of basalt and sediment and basalt and sediment etc.

For example, borehole DB-1 with weak basalt of UCS of 11,407 psi (below the typical range of basalt at 14,500 to 43,000 psi) is located underneath the proposed foundation of the dam. The layers in this borehole are as follows:

30 foot layer of top soil

43 foot layer of basalt (weak basalt, UCS of 11,407 psi)

8.6 foot layer of claystone (very soft, seepage pathway)

8 foot layer of basalt

15 foot layer of siltstone/claystone (seepage pathway)

40 foot layer of claystone only (seepage pathway)

71.3 foot layer of basalt

??? Layer of claystone, thickness unmeasured.(seepage pathway)

This single borehole is representative of other boreholes which reveal multiple layers beneath the dam foundation. Each of the soft marine sediments such as claystone and siltstone are seepage pathways under the dam foundation, and are potential pathways for seepage leading to dam collapse.

It is very easy for an engineer at HDR or Shannon & Wilson to state that grouting will be used to block these underground pathways under the dam; however, once the reader sees the multiple layers coupled with the fact that a few feet away, these layers may change their depth. Therefore, anybody can see it will be extremely difficult if not impossible to grout the extensive layering that you can see from Table 4.2.

Another example is borehole DB-7 with the following layering under the dam foundation.

- 37 foot layer of topsoil (to be removed)
- 45 foot layer of basalt (UCS = 13,318 psi, indicative of weak rock)
- 69 foot layer claystone (How do you grout a 69ft layer? Impossible)
- 1 foot layer of basalt
- 2 foot layer of claystone (seepage pathway)
- 16.7 foot layer of breccia (soft marine sediment, seepage pathway)
- 4.6 foot layer of basalt
- 11 foot layer of breccia (seepage pathway)
- ??? foot layer of basalt (thickness unmeasured)

The purpose of presenting this information in these comments is to convince the authors of the DPEIS that they have missed important technical analysis of the adverse conditions which affect the site of the proposed dam. Another purpose is to alert decision makers that the site of the dam is completely unacceptable for a high safety standard dam.

Another purpose is to show the multiple seepage pathways in the multiple layers of soft marine sediments under the dam. Nobody can be expected to grout all those pathways.

Furthermore, the 2016 Site Characterization Report revealed multiple zones of significant fracturing in the bedrock. Even those fractured zones will be pathways of seepage as pointed out earlier.

Focusing on just the area under the foundation of the dam, there are unmarked zones of fractured basalt to be grouted if they can be found. And there are 3 or more layers of soft marine sediment with thicknesses up to 70 feet that must be grouted. It is pure fantasy to imagine that huge underground volume can be grouted.

Decision makers need to understand that the multiple layering beneath the dam site and the weak character of the basalt layers make this location unfit for a dam.

The problem is that the DPEIS provides no indication of the geology problems facing dam engineers (and decision makers). The DPEIS provides no indication of the safety issues associated with the unfavorable geology. This suggests that the DPEIS authors do not have the technical background to understand the fundamental geological issues which normally would lead to stopping further consideration of Alternative 1.

One of the more interesting aspects of historical dam failures is the decision to locate dams in unfavorable geologic conditions. There is a strong tendency for decision makers to only focus on the need for a dam and totally ignore the technical findings which reveal the proposed location to be unsafe. The ground swell of support for a dam always seems to push a project forward.....regardless of consequences.

PANESKO – MAJOR COMMENT #13: FAILURE OF DPEIS TO ADEQUATELY EXAMINE ROCK SOURCES FOR DAM CONCRETE

The DPEIS evaluation of Alternative #1 does not adequately examine the importance of obtaining rock with adequate strength to be used for the concrete to make the foundation, the main dam and the wing dam in case of the FRFA.

The original cost estimate made the assumption that rock from the dam site could be used to make concrete for the dam. This assumption was made because (1) the rock would be free and (2) there would be no transportation cost.

Early rock testing determined the rock at the dam site was unsuitable for building the dam. Initial reports indicated that rock needed to come from the Hope Creek Quarry on Hiway 6 or from the Alderbrook Quarry closer to Chehalis. These two sources had the disadvantage of adding the cost of rock procurement and the cost of rock transportation (which was more than the cost of the rock).

Another report indicated that rock southwest of Chehalis was weaker rock while rock northeast of Centralia was stronger rock, more suitable for use in building a dam.

The current Phase 2 Site Characterization Technical Memorandum presents Table 4.18 which gives results of quarry rock testing. Their preferred quarry #1 is located two miles away but has UCS numbers of 1,834 psi, 5,237 psi and 5,763 psi, all of which are far below the 14,500 to 43,000 psi range for hard basalt.

Table 4.18 states that Quarry #2 is 7 miles away with UCS numbers of 9,655 psi and 13,210 psi, also below the 14,500 to 43,000 range for typical basalt. The DPEIS fails to evaluate the need for strong rock in the foundation of the dam where there are tremendous pressures. Weak rock in concrete would crumble leading to water seepage leading to eventual collapse of the dam.

PANESKO – MAJOR COMMENT #14: FAILURE TO ADDRESS GEOLOGICAL CONCERNS RAISED IN SITE CHARACTERIZATION REPORTS.

The September 25, 2015 Phase 1 Site Characterization Technical Memorandum prepared by HDR and Shannon & Wilson made the following statements.

Page 49: “A number of the landslides need further investigations and evaluation to determine whether remedial stabilization is needed. Landslide remediation/stabilization represents a potential significant cost and should be further evaluated in the next phase of work including additional site characterization.”

Page 51: “The information gathered to date suggests jointing and fractures in the bedrock may create a potential for sliding surfaces beneath the dam and along temporary and permanent excavated slopes.”

Page 52: “Highly fractured zones or locations where large open fractures occur in the bedrock were identified in the Phase 1 program. Unless treated, these fractures could act as preferential seepage pathways beneath the dam foundation and abutment. This may result in excessive water pressures acting on the base of the dam or other structure/tunnel elements, or result in unwanted loss of stored water.”

Page 53: “The ground motion hazard at the potential Chehalis dam site is significant and will be a primary consideration in the development of the RCC or rockfill dam cross-section as well as the structural design of spillway and outlet works facilities.”

The DPEIS evaluation of Alternative 1 does not adequately examine the above warnings. Furthermore, the DPEIS did not adequately examine the warnings in the following report:

The 2016 Phase 2 Site Characterization Technical Memorandum
(exists only as an un-edited draft with no Appendices attached)

Page 2: “Results of the combined Phase 1 and 2 Site Characterization programs continue to demonstrate that the site is complex from the standpoint of the design of a large and high-hazard RCC dam and the associated hydraulic structures.”

Page 2: “Additional highly fractured zones in the bedrock were identified in the Phase 2 program. These zones will act as preferential seepage pathways beneath the dam foundation and abutment.”

Page 3: “Remediation/stabilization of some of these landslides in close proximity of the dam represents an important design and cost consideration.”

Page 3: “Angled borings should be considered to advance the requirement for foundation excavation and evaluate the potential risks of slope failure during construction....”

Page 3: “Further evaluation of the saddle dam embankment including additional boreholes along representative cross-sections in order to characterize the extents of a large weaker claystone/siltstone rock zone identified in Phase 2.”

Page 30: “Subsequent site characterization work will be targeted to address these areas in order to better define the risks associated with lower quality rock...”

Table 5.3 on page 33 lists zones of uncertain hydraulic conductivity and the need for grouting treatment. The zones are areas where injected water disappears indicating the existence of underground pathways for water flow.

Page 35 Section 5.2.8, Saddle Dam Embankment: “As seen in DB-6 a weaker claystone locally extends to a depth of 144 feet and may create some challenges related to excavation stability and possible

seepage through the ridge. This large zone of weaker material is unsuitable for RCC foundation therefore the transition from RCC to embankment has been shifted closer to the main dam area.”

This discussion makes it clear that the Wing Dam or the Saddle Dam Embankment does not appear to be constructed with concrete, and the discussion makes it clear that there are issues with a large layer of soft marine sediments under the proposed saddle dam.

None of the above topics, uncertainties or technical issues are adequately addressed in the DPEIS evaluation of Alternative 1. This failure to address the many technical issues or uncertainties has led the DPEIS to inadvertently paint a picture of Alternative 1 as being far more rosy than justified by technical facts.

The DPEIS has failed to adequately position the gaps in knowledge in such a way as to make it clear to decision makers that there are many adverse impacts of a dam in that location, e.g. the geology two miles upstream from PeEl does not support a high-hazard dam.

PANESKO – MAJOR COMMENT #15: FAILURE OF DPEIS TO EXPLAIN THE IMPACTS OF ALTERNATIVE 1 ON FLOODED STRUCTURES

The DPEIS states that modeling predicts a dam will reduce the level of the next 100-yr flood by 1.5 feet in Chehalis.

A reduction of 1.5 feet in Chehalis is not significant considering there was 10 feet of water over I-5 under the Chambers Way overpass in the 1996 flood. A reduction of 1.5 feet in Chehalis does not seem significant when the 1996 water level at the Dairy Bar on Main Street was up to the bottom of the drive-in window, or about 4 feet deep.

A theoretical reduction of 1.5 feet was not significant when there was 2 feet of water in the Panesko home in the 1996 flood on the corner of Prindle Street and Quincy Ave (demolished in 2008 due to excessive flood damage).

There is a puzzle because both the Dairy Bar, and the slightly elevated Panesko home were on the edge of the floodplain and only suffered damage during the 1990, 1996 and 2007 floods while hundreds of houses closer to the river suffered flood damage on a more regular basis. In 1996 there were hundreds of houses closer to the Chehalis River which had more flood water than either the Dairy Bar or the Panesko home, i.e. more than 4 feet of water on the outside of the house. A reduction of 1.5 feet meant nothing to them.

Yet Alternative 1 is supposed to save 559 houses (out of a total of 1,379 structures flooded in 1996) from flooding with only a drop of 1.5 feet in the flood level. Verification of this miracle was impossible.

This miracle was not explained in the DPEIS. The supporting documents available to the public on the Chehalis Basin Strategy website were too complicated to understand.

PANESKO – MAJOR COMMENT #16: FAILURE OF DPEIS EVALUATION OF ALTERNATIVE 1 TO INCLUDE ACTUAL OPERATING COST

The July 30, 2014 report by Shannon & Wilson, entitled “Reservoir Vegetation and Debris Management, and Related Operational Considerations” stated that the annual operating costs for the Howard Hanson Dam and the Mud Mountain Dam were about \$3.5 million each. The report compared these two dams with the proposed PeEll dam and concluded that the annual operating cost of the PeEll dam would be about \$3.5 million.

There is a requirement to include the 100 years of the operating cost of the dam with the capital cost. Therefore, the 100 year operating cost of the PeEll dam should be \$350 million.

The August 22, 2016 EIS Cost Update by HDR decided to change the annual cost of the PeEll dam to \$2 million per year, and then to discount that cost to lower numbers. These lower numbers mislead decision makers and the public into thinking the cost of the dam will be lower than it will actually be.

The cost of operating the FRO dam for 100 years will be a minimum of \$350 million, not the \$32 million in the PDEIS. This raises the true total cost of the dam from \$327 million to \$645 million.

Likewise, the 100-yr cost of operating the FRFA dam will be a minimum of \$350, not the range of \$71 to \$112 million in the PDEIS. This raises the true cost of the FRFA from about \$658 million to \$904 million.

The ratio of benefit (\$702 million) divided by cost (\$904 million) is about 0.8 which is below one. In other words, the cost of the dam exceeds the benefit which makes Alternative 1 a questionable choice simply on the basis of costs alone.

PANESKO COMMENTS ON SECTION 2, ALTERNATIVES

Page 26 Section 2.3.3.1 Large-Scale Flood Damage Reduction Actions

Quote: “The Flood Retention Facility (a dam and associated reservoir) would not protect communities from all flooding; however, it is intended to substantially reduce damages during a major flood.”

COMMENT: The PEIS states that the dam would reduce the level of a 100-year flood in Chehalis by 1.5 feet. A reduction of 1.5 feet is insignificant when...in Chehalis... there was 10 feet of water over I-5 and 5 to 10 feet of water in houses west of the freeway. A reduction of 1.5 feet cannot be considered “substantially reducing damages during a major flood.” The words “substantially reduce” are misleading because the general public and decision makers get the idea that a dam will almost eliminate flooding.

Insomuch as the flood retention facility would only reduce flood water over I-5 from 10 feet to 8.5 feet in a major flood, there would be little or no impact on reducing days of I-5 closure. At the October 11, 2016 PEIS Workshop in Grand Mound Larry Karpack agreed that the dam had little effect on I-5, and that the reduction in I-5 closure days from 4 to 1 was a result of the levees, not the dam.

In addition, Page 327, Section 4.2.15.2 states the following: “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.” The FACT that most areas would continue to be inundated after building a dam is proof that the dam does not yield a substantial reduction in damages.

RECOMMENDED ACTION: Delete the word, “substantially.” Add the words that the dam only reduces flood waters in Chehalis by 1.5 feet and quote the depth of water at that location during the 100-yr flood before the dam was built (i.e. the 1996 flood).

Page 26, Section 2.3.3.1

Quote: “The proposed Flood Retention Facility would be located on Weyerhaeuser property, south of State Route (SR) 6 in Lewis County, on the mainstem Chehalis River about 1 mile south of Pe Ell (see Figure 2.3-1).”

COMMENT: The proposed Flood Retention Facility includes the dam and the reservoir. The reservoir would also be located on the Panesko Tree Farm.

RECOMMENDED ACTION: Insert the words “and Panesko Tree Farm” immediately after the word, “Weyerhaeuser.”

Page 26, Section 2.3.3.1

Quote: "Ownership of the Flood Retention Facility, as well as other acquisition details, has not been determined..."

RECOMMENDED ACTION: Include the ownership of the Flood Retention Facility in the section on uncertainties for Alternative 1.

Page 31, Section 2.3.3.1 Last paragraph states "Concrete aggregate would be mined within the FRO facility site..."

COMMENT: Page 27 of this Section states that the most promising quarry location is 2 miles south of the dam site on Weyerhaeuser Road 1000. Previous supporting documents have identified the Hope Creek Quarry on Hiway 6 northeast of PeEll and the Alderbrook Quarry near Chehalis as the source of rock for dam construction.

RECOMMENDATION: If the search for a quarry is still underway, the uncertainty section should say so. To maintain some kind of continuity, it would be helpful to make a statement about the closest commercial quarries which were once considered the only source of quality rock.

Page 31, Section 2.3.3.1 (Last paragraph): Quote:

"Construction activities would necessitate a detour or bypass road for FR 1000, which is a main access road for Weyerhaeuser forestry operations. The FR 1000 bypass or detour would also be needed during flood conditions while the dam is in operation and FR 1000 is inundated. Up to 6 miles of FR 1000 would be inundated and unavailable during flood retention, at which time, a detour could be used from FR A-line, FR F-line, and FR 2000 to rejoin FR 1000 upstream of the reservoir."

COMMENT: The first two sentences suggest that detours around the inundated Road 1000 would be temporary, only used when no reservoir is maintained. Since the land flooded by use of the FRO dam will be purchased from Weyerhaeuser and Panesko, it appears that a new Road 1000 needs to be built to provide permanent access around the reservoir. The use of existing Weyerhaeuser roads to direct Weyerhaeuser operations around the reservoir is questionable due to the complicated nature of the road system. On the other hand, there is no route that appears as efficient and direct as the existing Road 1000.

RECOMMENDATION: Delete the first two sentence and replace with the following statements: The Weyerhaeuser Road 1000 will have to be permanently relocated around the dam and reservoir to allow Weyerhaeuser access to their operations and to allow Panesko access to his tree farm not utilized by the reservoir. The cost of this relocation has not been determined and remains an uncertainty.

The same statements need to be added to the re-routing of Weyerhaeuser Road 1000 under the discussion of the FRFA dam.

Page 53, Land Use Management

COMMENT: Add the action of prohibiting all new development in the floodplain and prohibiting filling in the floodplain. The ultimate goal of the PEIS is reduction of flood damage. Allowing fill or new development in the floodplain is an invitation for more flood damage which is exactly opposite from the intention of the PEIS.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 5:46 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Section-5.docx; Excutive-Summary.docx

Comment Form

First Name: Vince

Last Name: Panesko

Organization: Panesko Tree Farm - PeEll

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: Comments on Section 5 and the Executive Summary are attached.

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Section-5.docx>

File Upload (2): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Excutive-Summary.docx>

File Upload (3):

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PANESKO COMMENTS ON SECTION 5

COMMENT #1: PAGE 464, SECTION 5.3.1.1 BENEFITS FROM IMPLEMENTING ETC.

The first sentence states as follows: “Alternative 1 could help to moderate the extent and depth of flooding in downstream areas from more intense winter rains anticipated with climate change, and therefore broadly help to avoid future flood damage resulting from extreme floods in these areas.

Add the following sentences to follow sentence one.

“However, there is a caveat that given the prediction for a 66% increase in flooding peak flows, the reservoir would fill up in 1 day. All remaining floodwater would over-top the dam and contribute to downstream flooding as expected without a dam. While the design of the dam will take into consideration the tremendous pressure on the rim of the dam during over-topping, over-topping in unexpectedly heavy rainstorms is one of the leading cause of dam failure in the United States.”

COMMENT #2: PAGE 465 TOP OF PAGE (SECTION 5.3.1.1)

The numbers for flood reduction given in the first 3 sentence on page 465 are not consistent with Table 4.2-3. Quote:

“Alternative 1 would eliminate inundation in portions of the upper Chehalis Basin from Doty to the confluence with the South Fork Chehalis River, and reduce inundation by 1 to 10 feet in other portions of this area during a 100-year flood (see Figure 5.3-1). Downstream of the South Fork Chehalis River confluence to Centralia, inundation would be reduced by 1 to 5 feet in most locations, with portions of Chehalis behind the airport levee predicted to experience reductions of inundation up to 10 feet, or to be no longer inundated. Downstream of Centralia to approximately Elma, inundation is predicted to decrease by between 0.1 and 5 feet in the Chehalis River floodplain during a 100-year flood, depending on location.”

There is no area where inundation is reduced by 2 to 10 feet except within the Airport Levee. There is no reduction reaching 5 feet downstream from

the South Fork confluence. There are no reductions downstream from Centralia that reach 2 feet, thereby making the 5 foot prediction appear to be inconsistent with anything published on this subject. The quoted levels need to be made consistent with Table 4.2-3.

COMMENT #3: PAGE 470, SECTION 5.3.1.2 IMPACTS OF ALTERNATIVE 1

The DPEIS evaluation of Alternative 1 does not adequately examine the loss of western toad habitat and the loss of habitat with possible extinction of two salamander species identified by the Dept of Fish and Wildlife. The DPEIS does not adequately examine the raising of groundwater to reservoir levels in the hills surrounding the reservoir, and the effect on landslides as well as seepage pathways into the Stowe Creek valley where increased water during winter storms will increase the flooding of Stowe Creek and downtown PeEll. The extreme pressures caused by the weight of the dam and the weight of the reservoir are not adequately examined for their effect on the layers of basalt and soft marine sediment beneath the dam foundation and beneath the reservoir. The DPEIS does not address the need to move and place 900,000 cubic yards of excavated material from the dam site. The DPEIS does not address the potential adverse impact of landslides on the FRFA reservoir and thereby reducing water storage capacity. Catastrophic failure of the dam and its probable causes are not discussed as an adverse impact.

PANESKO COMMENTS ON EXECUTIVE SUMMARY

COMMENT #1: Page 18: Gross Mis-representation of Flood Reductions

Page 18 of the DPEIS Executive Summary appears to have been written to mislead the public and decision makers. The statement of benefits for Alternative 1 are disingenuous because they are inconsistent with the scientific facts as presented in the supporting documents.

Table 4.2-3 on page 261 of the DPEIS tells one story. Page 18 of the Executive Summary tells a completely different story, most of which is false and misleading.

The first error is the statement that flood reductions of 10 feet are obtained in many areas. There are no areas of flood reductions of 10 feet.

Table 4.2-3 says there would be a flood reduction of 11.1 feet at Doty; however, there has never been a flood of 11 feet at Doty in a typical 100-year flood. The flooding in Doty has been about 4 feet in 1990 and 1996 which are considered the typical 100-year floods.

How can I explain that?

The bottom of the river near Doty is 302 feet above sea level.

The flood level is 13 feet deep or at 315 feet above sea level.

A normal 100-year flood is at 319 feet, 4 feet above flood stage; this is consistent with Table 4.2-3.

A dam would reduce the water level from 319 feet to 308 feet, a lowering of the water level by 11 feet. Once the water level is reduced below 315 feet there is no flooding. The river is now back in its channel.

The problem with Table 4.2-3 is that it says the difference in flood elevation near Doty is 11.1 feet when the flood elevation reduction is actually 4 feet. There is no flood elevation reduction below 315 feet because at that point the river is back in its channel and is no longer flooding.

The problem with Table 4.2-3 is that the flood reduction number of 11 feet misleads decision makers and the public, and the authors of the DPEIS. They see that 11 foot flood level reduction and are mightily impressed with the great goodness of the PeEll dam.

Another misleading statement is that most areas downstream from the South Fork receive a 0.1 to 5 foot reduction in flooding. As you can see in Table 4.2-3, the benefit of a 5 foot reduction quickly disappears downstream from the confluence with the South Fork. Table 4.2-3 explains that the flood reduction downstream from the South Fork is less than two feet, excluding the airport which is protected by a levee and should not be included in this discussion of dam-caused flood level reductions.

So where does the 5 foot reduction downstream from the South Fork come from? Models only predict less than a 1.7 foot reduction; therefore, the statement that there are 2 to 5 foot reductions is absolutely false and unsupported by the modeling studies.

COMMENT #2: PAGE 19:

On page 19 of the Executive Summary, there is a strange sentence, “Even with reduced flood elevations, some structures would be damaged by floods.” This sentence is extremely misleading and disingenuous.

A more accurate statement is “Even with slight reductions in flood elevation, most structures will still be flooded.” The dam only reduces the flood elevation in Chehalis by 1.5 feet which is insignificant for anybody who was flooded by 3 to 10 feet of water.

The DPEIS (see Table 5.7-1) claims that 559 structures will be kept dry by a dam in a 100-year flood when there are a total of 1,379 structures affected by the 100-year flood. That means that 800 structures remain flooded. To suggest that Alternative 1 will almost eliminate damage to “most” structures is disingenuous and misleading to decision makers, and the public.

COMMENT #3: PAGE 19 EXECUTIVE SUMMARY.

The Executive Summary cleverly avoids discussing a catastrophic failure of the dam which could result in 630 fatalities in PeEll in addition to the loss of lives of 300 students in the PeEll school located next to the river. The DPEIS also avoids discussion of re-locating the town and school out of harms way. The Executive Summary cleverly skips around these sensitive topics (might frighten somebody) by using the words that damage to the dam might have an “adverse impact on downstream communities.” I recommend that the DPEIS clearly state that collapse of the dam with PeEll

fatalities is a worst case scenario that is one of the adverse impacts of a dam, although every effort will be made to avoid such an event including the possibility of not building the dam in a location with unsuitable geology.

COMMENT #4: PAGE 31

Page 31 contains a section on “AREAS OF CONTROVERSY.” This section should be added to every alternative. This section, whether named “controversy” or “uncertainties” is helpful for decision makers (and the public) to recognize issue they may have otherwise missed.

COMMENT #5: EXECUTIVE SUMMARY

The Executive Summary of the DPEIS fails to make it public that a subcontractor has been hired to create the conceptual design report for the dam. The writing of such a report as well as work on other reports-in-preparation are kept secret from the public.

To the extent that a conceptual design report for the dam limits the choice of reasonable alternatives, the preparation of the conceptual design report for the dam is a violation of WAC 197-11-070 Limitations on actions during SEPA process.

COMMENT #6: PAGE 32

The bias in the executive summary is incredible. The best thing that is said about levees (Alternative 2) is that they increase flooding of 14 acres. The DPEIS completely avoids the aspect of putting levees on both sides of the river to channel water through the Chehalis-Centralia area more quickly.

This concept should be added to the alternatives so that the DPEIS would evaluate the benefits and impacts.

The best thing that can be said about Alternative 3 on page 32 is that it would not redirect flood extents. Page 32 needs to add the sentence that Alternative 3 removes people PERMANENTLY from harms way. And

page 32 could have added that buying out people in the floodplain is a guaranteed way of reducing future flood damage.

COMMENT #7: PAGE 34

The DPEIS presents data which states that I-5 closure days would be reduced by 3 days or up to 3 days. There is no document available to the public which explains how this happens. The very puzzling thing is that the DPEIS refers to a WSDOT report in 2014 that makes a one-sentence statement with no reference. At that point, it becomes a dead end without being able to trace who and where such information is available.

This is completely unacceptable for a process that is supposed to be transparent. Transparency requires that the DPEIS to make available all supporting documents that are needed to make a decision.

Supported statements should not be allowed in a SEPA process, yet the DPEIS is full of them.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 1:50 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Section-3-Affected-Environment.docx; Section-4-Action-Elements-Impacts-and-Mitigation.docx

Comment Form

First Name: Vince
Last Name: Panesko
Organization: Panesko Tree Farm - PeEll

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: Comments to DPEIS Sections 3 and 4 are attached.

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Section-3-Affected-Environment.docx>

File Upload (2): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/Section-4-Action-Elements-Impacts-and-Mitigation.docx>

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Page 118 Section 3.2.4.1.2 LATERAL CHANNEL MIGRATION

COMMENT: Add to Section 3.2.4.1.2 the lateral channel migration which occurred at River Mile 108 (the proposed dam site) where the 2007 flood washed out 50 to 70 feet of hillside, destroying a couple of hundred feet of Weyerhaeuser Road 1000.

Also add to Section 3.2.4.1.2 the lateral channel migration which occurred at River Mile 108.5 (the west end of the proposed dam) where the 2007 flood washed out about 20 feet of the fragmented river-edge bedrock and obliterated the road and PeEll waterline across the Panesko property leading up the north side of Crim Creek to the PeEll reservoir on Lester Creek. PeEll obtained permission from Panesko and State agencies to blast the hillside enough to create a new road upon which a new water line was installed.

Add to Section 3.2.4.1.2 the lateral channel migration which is occurring yearly at a rate of 10 to 20 feet per year on the Panesko property at River Mile 108.6. Surprisingly, this migration is easily removing the fragmented bedrock at river level which supports about 30 to 40 feet of soil yielding a cliff above the river of about 50 feet high.

These three lateral channel migrations illustrate the nature of the instabilities in the vicinity of the proposed dam site and thus should be included in the discussion of affected environment in Section 3.2.4.1.2.

PAGE 208, SECTION 3.11.4.1 UPPER CHEHALIS RIVER (Weyerhaeuser Property).

COMMENT: Add the following paragraph to the end of Section 3.11.4.1:

“The 160-acre Panesko Tree Farm is located on the Chehalis River immediately south of the proposed dam site and surrounded by Weyerhaeuser property. The tree farm is privately owned and is closed to the public. The public is not allowed to use the forest roads, the Chehalis river and Road 1000 within the tree farm, i.e. the public is not allowed to use their Weyerhaeuser permit to use Road 1000 to cross the Panesko property.”

PAGE 212, SECTION 3.12.1 CULTURAL AND HISTORIC SITES

COMMENT: Add the following sentence to the end of Section 3.12.1:
“There are artifacts within the reservoir site of historic logging activities dating back to circa 1905 when there were railroads operating on both sides of the Chehalis River at the proposed dam site. The railroad on the west side of the river connected to the mill in McCormick. The railroad on the east side of the river connected to the mill in PeEll. The tracks went up the Chehalis River and both sides of Crim Creek to logging camps with a main junction located on the Panesko property just south of the current site of the Panesko bridge. Logging camps were located up the main stem and up Crim Creek which housed logging crews during the week. The camps were closed in 1930 when the demand for lumber disappeared. The steel rails were removed by CCC crews in the 1930s. A concrete structure and a cable crossing the river are visible on the lower Crim Creek. The locations of other logging remnants from 1905-1930 within the reservoir site remain to be documented.”

PANESKO COMMENTS

SECTION 4

ACTION ELEMENTS: IMPACTS AND MITIGATION

COMMENT #1:

PAGE 244 SECTION 4.1.4 COMPARISON OF LONG-TERM IMPACTS:

Add impacts to list of bullets as follows:

1. Delete landslide potential for FRFA only. Landslide potential exists for both dam scenarios.
2. Add landslide potential in heavy rains which has potential for catastrophic failure of both the FRO and FRFA dams.
3. Add long-term seepage under foundation of dam which has the potential for catastrophic failure of either the FRO or FRFA dams.
4. Add the significant loss of amphibian habitat with the potential of wiping out the breeding grounds for two species of salamander and the western toad from the Chehalis River basin.

COMMENT #2: PAGE 244 SECTION 4.1.4 COMPARISON OF LONG-TERM IMPACTS:

QUOTE FROM PAGE 244: "The long-term beneficial effects of the Flood Retention Facility include substantial reduction in the extent and depths of 100-year floods in downstream areas, including partially offsetting the anticipated effects of climate change on peak floods. Along the Chehalis River in the Chehalis-Centralia area, the flood level could be reduced up to 1.8 feet during a 100-year flood (WSE 2014d)"

BACKGROUND: The Flood Retention Facility only provides a 1.5 foot reduction in Chehalis as presented in the October 11, 2016 EIS Workshop in Grand Mound. My house on Prindle Street had 2 feet of water in the 1996 flood; the dam would reduce that depth to 6 inches which is not a substantial reduction in depth. The Dairy Bar nearby on Main Street in Chehalis had 4 feet of water up to the bottom of the drive-in window. The

dam would reduce that depth to 2.5 feet of water; again, not a substantial reduction. Until there has been an independent analysis of what is and what is not flooded in the dam-protected 100-year flood, any results of modeling should be labeled as “tentative.”

RECOMMENDATION: Replace the words, “substantial reduction” with the word, “tentative reduction” in the quoted sentence above. Change the flood level reduction of 1.8 feet to match the flood level reduction in Chehalis of 1.5 feet and in Centralia of 1.7 feet as described in Table 4.2-3 on page 261 of this PEIS.

COMMENT #3: PAGE 244 SECTION 4.1.4 COMPARISON OF LONG-TERM IMPACTS:

QUOTE FROM PAGE 244: “In the case of the FRFA facility, temperature reduction in the Chehalis River downstream of the dam to approximately the confluence of the Skookumchuck River would result in beneficial effects to water quality and fish as described in Section 4.2.”

RECOMMENDATION: Add the following words to the end of the quoted sentence: “as long as the additional water is not removed for irrigation by landowners adjacent to the river.”

COMMENT #4: PAGE 247, SECTION 4.2.1 WATER RESOURCES, SUBSECTION 4.2.1.1. SHORT-TERM IMPACTS:

The preparation of the dam site for construction will destroy the PeEll Water Line from Lester Creek and the PeEll Water Treatment Plant. Mitigation will require construction of a new PeEll Water Treatment Plant and a new water source for PeEll before construction begins on the proposed dam so that drinking water for PeEll is not interrupted.

COMMENT #5: PAGE 248, SECTION 4.2.1.2 LONG-TERM IMPACTS:

The groundwater in the hill to the east between the Chehalis River and the Stowe Creek valley will rise to the level of the reservoir. The pressure of the reservoir will force slow percolation into Stowe Creek. The amount of water is expected to be low; however, the net effect of seepage and increase in groundwater will increase the water flowing down Stowe Creek,

flooding the south end of the PeEll business district. The south end already floods during major storms. The presence of the reservoir during wintertime would be expected to increase that flooding.

COMMENT #6: PAGE 248, SECTION 4.2.1.2 LONG-TERM IMPACTS:
(LAST PARAGRAPH ON PAGE):

QUOTE: "Water stored in the FRFA reservoir during the winter and released during low-flow periods would augment flows and improve temperature (for the benefit of aquatic species; other uses would be secondary)."

RECOMMENDATION: Add the sentence: "The benefit to aquatic species would be contingent on current modeling which assumed the farmers using river water for irrigation would not use the augmented summer flow."

COMMENT #7: PAGE 261, TABLE 4.2-3 FLOOD ELEVATION
REDUCTIONS

The difference in flood elevation for the NEAR DOTY location is misleading. For the 100-year flood, there has never been 11 feet of flooding in Doty. Therefore, it is impossible to reduce the flood elevation by 11.1 feet.

Consider that the bottom of the river is at the 302 foot elevation and flooding occurs at 13 feet depth (315 foot elevation). That means that when the dam lowers the water level by 11.1 feet (from 319.2 to 308.1 feet) once the level is below 315 feet, the water level is within the river channel and is no longer a flood elevation. The 308.1 foot level is not a flood level. It is 7 feet below flood level.

A true statement would be that the reduction in flood elevation would be from 319.2 feet down to 315 feet, a reduction of 4.2 feet. People in the area can identify with a flood level reduction of 4.2 feet because that is what happened there. However, local residents will be puzzled because there has never been a 100-yr flood with flood waters 11 feet deep above the river bank.

I suggest adding an asterisk to the 11.1 number and a footnote that explains this is a reduction in the water level where the first 4.2 feet is flood reduction and the next 7 feet is water level reduction within the channel of the river.

The reduction of the flood level of 5.1 feet downstream of the South Fork may also be a water level reduction. Numbers downstream of the South Fork are all reductions in flood waters and are ok.

COMMENT #8: PAGE 262, SECTION 4.2.1.2.3.GROUNDWATER:

The groundwater in the hills holding the reservoir will increase to the level of the reservoir. There may be seepage through the hill to the east into the Stowe Creek valley thereby increasing wintertime flows of Stowe Creek, and exacerbating the flooding during major storms in the south portion of PeEll. Based on observations of other dams in Lewis County, this effect will occur but has not been quantified for the purpose of this PEIS.

-

COMMENT #9: PAGE 263, SECTION 4.2.1.3 MITIGATION:

Describe the replacement of the PeEll water supply, PeEll water line and PeEll water treatment plant as mitigation to dam construction.

COMMENT #10: PAGE 263, SECTION 4.2.1.3 MITIGATION:

Describe the installation of levees along Stowe Creek within the city limits of PeEll as mitigation for increased flood flows in Stowe Creek caused by the increased groundwater and increased seepage in the hill separating the dam reservoir and the Stowe Creek Valley.

COMMENT #11: PAGE 264, SECTION 4.2.1.3.3.GROUNDWATER
MITIGATION:

Add a paragraph pointing out that the groundwater adjacent to the reservoirs will vacillate according to the height of the water in the reservoir. Point out that the increase in groundwater coupled with seepage is expected to cause some increase in the wintertime flow of Stowe Creek located in the valley to the east of the Chehalis River. Mitigation of this effect would be to install dikes along Stowe Creek to protect the City of PeEll from flooding which already occurs during heavy rainfall.

COMMENT #12: PAGE 266, SECTION 4.2.2.2.1 GEOLOGY

The 2007 storm caused over 1,000 landslides upstream which was estimated to yield 5 to 7 million cubic yards of debris passing into the reservoir site. The 2007 storm also caused the sliding of an ancient landslide on the dam site which wiped out Weyerhaeuser Road 1000. If another 500-yr storm occurred with a full reservoir, there would be a potential for 5 million CY of debris slamming into the reservoir and another 10 million CY sliding into the reservoir from the largest ancient landslide the size of the OSO landslide. With 10 to 20 inches of rain in 24 hours, there is a possibility that all of the ancient landslides on the reservoir's edge could slam into the reservoir at once. That would bring the total volume slamming into the reservoir to 30 million CY or about one third of the reservoir's capacity. This scenario involving heavy torrential rains has happened many times in the United States resulting in catastrophic dam failures.

The leading cause of dam failures in the United States has been heavy storms that dumped 10 to 20 inches of rain in 24 hours resulting in water over-topping dams. Because of the huge amount of historical data of catastrophic dam failures, the scenario of over-topping and dam collapse has to be included in the PEIS as a possibility, just as dam failure was alluded to in Section 4.2.15.2 on page 327.

COMMENT #13: PAGE 266, SECTION 4.2.2.2.1 GEOLOGY

With the UCS values of below 14,500 psi for the basalt layer under the dam, it is apparent that the basalt is soft rock and not capable of supporting tremendous weight. One of the impacts on geology will be the tremendous weight of the dam causing deformation of the basalt layer. This will be more noticeable where there are zones of significant fracturing of the bedrock as recently discovered in the Phase 1 and Phase 2 Site Characterization technical memorandum. The ultimate conclusion in the DPEIS needs to be that the site of the dam is unsuitable to sustain the weight of the dam leading to foundation cracking, water seepage and ultimate collapse of the dam. While grouting has been proposed to control seepage, the multiple layers of soft, permeable marine sediments are as large as 70 feet thick which makes grouting out of the question.

COMMENT #14: PAGE 271, SECTION 4.2.2.3.1 MITIGATION

The second bullet on page 271 states that local quarries will be developed close to the dam site to avoid strain on local commercial rock sources. That statement remains an uncertainty (see Section 8 of the August 22, 2016 updated EIS cost report). The compressive strength tests for rock near the dam site are failing to meet standards. UCS numbers reveal soft bedrock, perhaps even unsuitable for dam construction.

The language of the second bullet needs to reflect the uncertainty.

Comment #15: PAGE 296, SECTION 4.2.4.2.2. WILDLIFE

The DPEIS evaluation of Alternative 1 does not adequately examine the adverse impacts and mitigation of those impacts on western toads and two listed species of salamanders. The 2016 DFW study (3rd Progress Report) shows that the dam and reservoir contains the only known concentration of western toads and the two species of salamanders in the entire basin. Loss of this habitat could raise the specter of extinction from the basin because of rare finds outside of this habitat area. The DPEIS needs to be clear that extinction is possible.

COMMENT #16: PAGE 308, SECTION 4.2.7.1.2 EFFECTS OF CLIMATE CHANGE ON THE FLOOD RETENTION FACILITY

The DPEIS evaluation of Alternative 1 does not adequately examine the effects of climate change on the flood retention facility. The recent record-setting warm spell in early November 2016 provided good weather for construction. However, the record rainfall in October 2016 could have made construction sites more difficult to navigate, and even destroy mitigations expected to hold back sediment from entering the river and damaging the fish population.

The biggest impact might be the severe rainstorms such as the December 2015 which hit central Lewis County and caused severe flooding. History has shown that typical construction sites are over-whelmed by unexpected severe rainstorms. While normal rainfall is expected and prepared for, the unexpected severe wind and rainstorms can cause havoc at a construction site.

COMMENT #17: PAGE 309, SECTION 4.2.7.2.2 EFFECTS OF CLIMATE CHANGE ON THE FLOOD RETENTION FACILITY

The DPEIS evaluation of Alternative #1 does not adequately examine the effects of climate change on the flood retention facility. The DPEIS fails to recognize that the 66% increase in climate change flooding as shown in Table 4.2-12 will fill up the reservoir in about one day. After that all the floodwaters over-top the dam and exacerbate the flooding downstream. The DPEIS fails to recognize that climate change makes the dam less effective, i.e. the reservoir takes 2 to 3 days to fill in a 100-year flood.

If decision makers fail to recognize that the dam's benefit is only for one day, they may be lulled into thinking they have protection that is not there. They may not be prepared for the onslaught of water to come raging down the Chehalis River within the next 24 hours. Hundreds of people could be trapped because they are unaware of the coming floodwaters.

In a climate change scenario with 66% increase in water peak flow, the Chehalis area would be dealing with flooding from the South Fork and Newaukum Rivers for the first 24 hours, then the floodwaters of the upper Chehalis would overtop the dam. Since most dam failures have been

caused by unexpected record-breaking storms and over-topping, the possibility of over-topping and dam failure has to be considered for the PeEll dam. One adverse impact of climate change on the dam is possible dam collapse and the resulting mass destruction and loss of life downstream. This needs to be discussed in the DPEIS.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 24, 2016 8:35 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Janean

Last Name: Parker

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

As a small business owner and the owner of a small 9 acre ranch in the Deep Creek Valley, I am writing to express my support of Alternative No. 1 in the EIS, and in particular the permanent reservoir described in the "FRFA" type facility. While I understand that this is a costly alternative that has significant adverse environmental impacts, I believe these may be mitigated to some extent by providing the higher end of the habitat restoration projects lower in the valley, which I also support. Further, as I understand under SEPA, a project may proceed despite having impacts that cannot be mitigated. I do not say this lightly, but I think this is a project is deserving of that consideration because of the significant positive impacts that it will have to protect the farms, homes, businesses and people that are affected by the ever increasing flooding in the Chehalis Valley.

Further I would like to express my very strong opposition to Alternative No. 4. In my review of the environmental documents it does not appear to me that adequate review of the impacts has been considered. First the range of potential impacts and potential benefits is so wildly broad with this alternative that meaningful review and comment is not possible. In addition I did not see realistic evaluation of the impacts of moving farmers out of the flood plain. This is clearly not an acre for acre exchange in light of the extremely different soils and access. In addition, such relocation would result in significant deforestation of the highland areas that will cause less groundwater uptake and greater surface runoff, causing more water in the already flooding areas. It would also cause greater impacts to those of us who are, now, on the outer edges of the floodplain and as such would experience more flooding and more restricted access when the flooding occurs.

As such I urge you to adopt alternative one as the preferred alternative under the EIS. While it is a costly alternative (in dollars and impacts) it is the one that provides the best and most permanent solution to the very costly flooding. Thank you for considering my comments.

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(1):

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 7, 2016 12:54 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Robert

Last Name: Parrish

Organization: no affiliation

Address:

[REDACTED]

Phone:

Email:

[REDACTED]

Comments:

I STRONGLY support adoption of Alternative 4--Restorative and Flood Protection--and its associated actions. In the last century we have learned that dams have created lasting negative consequences which require massive financial support and cause permanent, irreparable environmental impacts. We have learned that a better approach exists in the "construction" of green infrastructure or, in this case, the removal of many anthropogenic structures to ameliorate flooding and actually improve ecological functions. Please select Alternative 4 for the sake of our future environment, our children, and for the wise long-term use of taxpayer resources.

**File Upload
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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 3:15 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Cris

Last Name: Peck

Organization:

Address: [Redacted]

Phone:

Email:

Comments: Healthy wetland and channel migration zones in the floodplain of the Chehalis River can help curb some of the drastic flooding events in the area. More development and impermeable surfaces do not help. The Chehalis River Basin Land Trust works to improve riparian/flood zone ecosystems in the Chehalis Basin, but could use additional support from governmental agencies as they're a very small non-profit organization. Furthermore, a dam on the Chehalis for flood control is a cloak over a larger issue of development and poor flood zone/channel migration zone management. A dam would also change where wetlands exist, therefore potentially damaging known amphibian populations. It would also restrict the flow of sediment to the system which can further change and damage habitat. In short, prioritize protection and mitigation of channel migration zones, wetlands, and the flood plain in the basic over anything else. A dam would not be good in any scenario. Thanks for the opportunity to comment!

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 5:21 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Ryan

Last Name: Peplinski

Organization:

Address:



Phone:



Email:

Comments:

My wife's family has been in the Boistfort valley for over 100 years. Her father farms the family land. The river runs through my father in laws land. It is unreasonable to tell the residents of the valley that their land must be flooded and they have to move to surrounding hills. Do not use alternate #4. Please use alternate # 1.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 12:29 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Erin

Last Name: Peplinski

Organization:

Address: [Redacted]

Phone: [Redacted]

Email:

Comments: My family has been in the boistfort valley since the 1870's. My father inherited the family farm and is now farming it. The river runs through his property. It is unreasonable to tell us that my fathers land must now be flooded and Will have to move to the surrounding hills. Do NOT use Alternative #4! Please use alternative #1.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, November 4, 2016 6:15 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

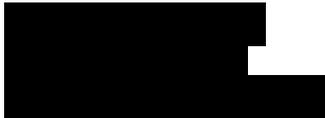
Comment Form

First Name: Amelia

Last Name: Petersen

Organization:

Address:



Phone:

Email:

Comments: Please implement Alternative 4, Restorative Flood Protection, for the Chehalis Basin.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 4:03 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Douglas

Last Name: Peterson

Organization: Douglas Peterson

Address: 

Phone:

Email:

Comments:

Plan #1 offers the only long term solution to this problem. One has to look no further than how the Howard Hanson dam helped the Auburn, Kent, Renton thrive, after being flooded annually.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 1:08 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Rebecca

Last Name: Peterson

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

Please select Alternative 1 for the Chehalis Basin Strategy. Much of our immediate family owns property in Boistfort Valley and we do NOT think it is reasonable for them to move. Alternative 4 is the WORST option and should NOT be considered.

Thank you for allowing community feedback on this issue.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 9:56 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: REBECCA

Last Name: PETHERAM

Organization:

Address:

[REDACTED]

Phone:

Email:

[REDACTED]

Comments:

Be careful in your planning. The recent huge flooding in Louisiana in and near Baton Rouge was caused, in part, by the unintended consequences of flood control efforts. Plan for contingencies.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 27, 2016 10:40 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jason

Last Name: Piper

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments:

Unfortunately the most effective plan to restore the Chehalis Basin will be the the most disruptive to the people and businesses along the river. It is hard to feel bad about flooding when everything that has been done to exploit the river for the last 100 years has led to the current state. So, cut down all of the trees, overharvest the fish, destroy thousands of acres of habitat to build a nuclear plant that never worked, allow people to build homes/farms/businesses in the known historic flood plain, then offer to build a dam to control flooding? And, make the taxpayer pay for it??? This is seems completely regressive and not forward-thinking at all. I support the idea of displacing the highest-risk people/homes/businesses(and compensating them for it), rebuilding the natural habitat, and working with nature to restore the vast fish stocks we had not that long ago. How much more revenue and benefit can we generate from recreation all along the river, from strong sustainable salmon runs(like Alaska)versus letting logging companies and farmers reap the benefits and continue to degrade the environment? I believe we have (re)entered an era where healthy natural fish is a much more sustainable, desirable, and environmentally-sound source of food than cows and dairy. The Pebble Mine in AK was stopped because of the threat to salmon runs; the salmon was found to be more valuable than the copper and gold. Why can't that be our River as well?? It can be, if we make the right choices.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 8:46 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Edward

Last Name: Pittman

Organization: citizen

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: I am writing to voice my opposition to Alternative 1 which includes a flood retention structure upstream of Pe Ell. I was taught to fly fish by my father in the area that would be flooded by the structure. My father was taught to fly fish there too, by his father. They are both dead and buried within the Chehalis River Basin now, both born along the banks of the River near Adna. I already am forced to spend extra money on a Weyerhauser permit (if I am lucky enough to get one) to even access that area now. Flooding it even seasonally would be completely unacceptable to me and my family history – another blow to my sense of place in Washington State. My Grandmother’s family lost home and land to the Cowlitz project that erased the town of Kosmos from the map. We are done losing our history to dams built in Washington Rivers.
The negative effects of dams on salmon are widely known. Restoration efforts have not shown clear results at the population level. It is hard for me to accept that restoration efforts will make up for the upper mainstem populations that the proposed retention structure would affect most.
I worry that you will confuse the public (your largest group of stakeholders) by installing a dam when three others were recently removed and touted as restoration at enormous cost. Keeping this stakeholder group interested in salmon recovery seems paramount right now.
Thank you for all your efforts and allowing me to comment.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 11:48 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Shelby

Last Name: Pothier

Organization:

Address: [REDACTED]

Phone:

Email:

Dear Chehalis Basin Strategy PEIS team,

Thank you for this opportunity to submit comments on this important issue. Washington's watersheds, and the people, fish and wildlife that depend on them, are important to me and my family.

As a concerned citizen and a supporter of wild fish, abundant wildlife and healthy ecosystems, as well as thriving tribal nations and local communities, I strongly support efforts to restore natural watershed functions in the Chehalis. And I strongly oppose proposals to construct a new fish-blocking dam in this watershed. Restoring the natural values of the Chehalis Watershed would reduce flood impacts and also improve vital habitat and connectivity for fish and wildlife, including iconic Chinook salmon.

Comments:

I recognize that flooding in the Chehalis Basin is a serious issue for local communities, agriculture and transportation. As such, it's important that efforts to repair watershed functions and restore natural water storage in this basin be accompanied by commonsense measures to reduce community impacts from ten- to hundred-year floods. Proposed measures from building raised platforms in dairy pastures to supporting commercial and residential structure protection would add to the resilience of local communities and reduce the need for a major dam.

Human activities have already altered this watershed over the past century, significantly impairing natural functions and resulted in increasing flood damage, degraded habitat, and fish population declines. In order to effectively address these issues we must rebuild natural processes and climate resiliency, not build new dams.

I want to emphasize that taking no action is not an option for the fish, wildlife and habitat of the Chehalis Basin, which are declining under current conditions and will decline faster as the climate changes. No action is also not acceptable for the people of the Chehalis Basin or for our region. Action is needed. However, given how long the flood proposals will take to implement, especially the dams which will be mired in controversy for years, early action on habitat and local flood damage reduction is needed now and should continue regardless of the status of other flood control proposals.

With this in mind, I strongly support Restorative Flood Protection Actions (RFP), Aquatic Species Restoration Actions (ASR), and Local Flood Damage Reduction actions, including bridge expansion to accommodate wildlife passage under I-5 at Salzer Creek. The Chehalis Basin is the second largest watershed in the state and it supports what is likely the largest floodplain matrix in the state. The watershed also supports the highest diversity of amphibians in the state, including species protected under the Endangered Species Act (ESA) such as Oregon spotted frog, as well as salmon and steelhead populations that have been on a downward trend toward ESA listings, and serves as a key upland habitat connection between the Cascades and Olympics. The RFP and ASR actions will have significant positive impacts on salmon, amphibians, and other species by restoring habitat, the natural river channel and floodplain processes, and landscape habitat connectivity. Restoring these natural processes will also reduce flood damage by buffering high flow events and work in concert with Local Flood Damage Reductions Actions. These actions should be selected.

The Restorative Flood Approach is an important and environmentally preferable alternative that was added very late in the PEIS development process. Its technical, economic and social details need to be further developed before a decision as to feasibility is possible. But it captures the right way to go – please give it a chance.

We also encourage you to take a closer look at the role of forest management in the uplands and its contributions to flood flows in the winter and unnaturally low flows in the late summer. We encourage additional modeling to examine whether changed forest management can play a role in improving watershed conditions.

Thank you for considering my comments, and for working to ensure a future in the Chehalis Basin that values fish, wildlife and human communities.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 6:58 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Chad

Last Name: Price

Organization:

Address:

Phone:

Email:

Comments: Please no more dams

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This email was built and sent using [Visual Form Builder](#).

From: [Vince](#)
To: kghalambor@rossstrategic.com
Cc: [Bailey, Chrissy \(ECY\)](#)
Subject: Programmatic versus Project EIS
Date: Wednesday, November 02, 2016 4:26:51 PM

Given that unsupported and unsound statements in the programmatic EIS... if not challenged in the draft PEIS...become part of the administrative record and can be used to support the draft project EIS without legal challenge, how can Ecology deflect comments on the programmatic EIS by claiming (quote): "The impact assessment in a programmatic EIS is more qualitative than a project specific environment review?" In other words, Ecology is telling reviewers to wait until the project EIS is issued to make the comment. The problem is that when an unsound technical statement is unchallenged in the programmatic EIS, the unsound technical statement cannot be challenged when the draft project EIS is issued. So when reviewers get to the project EIS, they may find they are legally unable to make the comment, originally intended for the PEIS.

And if the PEIS authors have never experienced a legal challenge of a PEIS and the follow-up project EIS, it is perhaps understandable they would not appreciate the situation where PEIS reviewers have to challenge every questionable aspect of the PEIS, just to prevent unsound technical material from being used to justify project decisions in the project EIS.

Can Ecology explain how unsupported statements in the programmatic EIS (once the programmatic EIS becomes part of the administrative record) can still be challenged when the same unsupported statement appears in the project EIS? In other words, if reviewers don't challenge it in the PEIS (qualitative or not), the reviewers will lose their legal right to challenge it in the project EIS. How can Ecology explain to their reviewers how to keep from losing their legal rights to raise certain issues on the project EIS?

Ecology needs a qualified legal expert to answer this question.

Vince Panesko



From: Julie Rabey [REDACTED]
Sent: Wednesday, November 9, 2016 11:18 PM
To: info@chehalisbasinstrategy.com
Subject: Comments on Chehalis Basin Strategy Plan EIS

From John Rabey
[REDACTED]

I also send a copy in the mail, but not sure it will arrive by Friday.

Comments on Chehalis Basin Strategy Plan EIS

I oppose Proposition 1 which supports the construction of a dam to solve the flood problem for the following reasons:

(1) Dams kill fish for a multitude of reasons. The dams built on the Elwha, for example, were responsible for the decline of fish runs there. The salmon that once numbered more than 400,000 adults have dwindled to less than 4000. The decline of fish runs on the Elwha River could not be improved by just building a fish ladder to remove the barrier that blocked the mature fish from reaching their spawning beds. Even if the ladder was installed, other issues made dismantling the dams the best option for fish recovery. This decline was partially caused by the drastic decrease in sediment delivery below the dam. The replacement gravel necessary for maintaining a suitable habit for spawning was trapped in the sediment load behind the dam. In addition the lakes resulted in an increase in water temperature. Salmon are temperature sensitive, and don't effectively spawn if the water is too warm. Warm water also causes parasite populations. Disease has been known to wipe out two thirds of the mature salmon before they have a chance to spawn.

I also witnessed the decline of the fish runs on the Wynoochee River after a dam was constructed. Before the dam, the Wynoochee was famous for its trophy sized wild steelhead that returned in December and January. It was a marvelous sight to watch large numbers of steelhead return to the fish trap below the dam for a few years. The steelhead were trapped and then trucked above the lake to spawn. A percentage of the juvenile steelhead hatched above the lake die going over the spillway or through the turbine in their attempt to reach free flowing water below the dam. By 1979 the returning numbers of steelhead were so low, the WDFW closed the river to all fishing for 5 years. There was a recovery of steelhead, but the number of returning adults have continued to

decline at an alarming rate ever since then. Last year's trap report release by WDFW showed only 1 wild steelhead was captured by the end of January 2016. It's too early to record early steelhead yet, but, the report for November 5, 2016 show that only 2 chinook salmon have been captured at the trap. Sadly this number has remained the same for the past 3 weeks.

(2) Dams don't always prevent flooding. I have lived below the Wynoochee Dam for over 40 years. During that time the dam didn't prevent flooding on two occasions because of extreme weather conditions. The first flood occurred when the run-off from heavy rains was about to exceed the capacity of the dam. The flood gates were opened, sending the river over the banks, and into my hay barn to a depth of about 9 inches. The second flood occurred in 2007. There were heavy flood predictions for all local rivers, except the Wynoochee. I was called by a county official that assured me the Wynoochee Dam had sufficient capacity to protect the valley from flooding. The river still went over the banks, flooding my barn with 13 inches of water. The next day I was called by the same official, apologizing, and explaining that the heavy rainfall fell below the dam. The water behind the dam helped to reduce the severity of the flood, but it had no control of run-off below the dam.

The flood damage was significant, especially for a tract of houses located northeast of the Wynoochee River Bridge. When the water exceeded flood stage, the water was trapped by Highway 12, causing the backup water to flood these homes. The dam could not provide the protection necessary to continue habitation of these homes. As a result the State bought the property owners out, condemned the property, and dismantled the houses. I believe a dam will spur development in marginal areas of the flood plain. When extreme weather conditions occur in the future, there will be greater economic loss because of the construction in these areas.

From: Julie Rabey [REDACTED]
Sent: Thursday, October 27, 2016 11:27 AM
To: info@chehalisbasinstrategy.com
Subject: Comment on the draft EIS

Comments on Draft EIS
Chehalis Basin Strategy

This issue has been on our minds for quite some time. Born and raised in the Chehalis Basin, we could like to make a statement about the action alternatives.

Alternative 1

This is the alternative with the greatest impact. The dam is our concern with this alternative. It is basic science that dams change the environment. Not just for good, but for bad. I don't think you can point to a dam that has not drastically decreased the fish runs. We live on the Wynooche River. When the Wynooche Dam was added, the fish runs of salmon and steelhead began to decrease and are now at an extremely low level. We have fished this river for 40 years and have record of the massive decrease of sports catch. It is just not honest to say that in some way an upper Chehalis Dam will help some fish and that other damage will be mitigated. We are still waiting for mitigation on the Wynooche and it will never happen, because it isn't possible to undo damage done by the dam.

We all know that dams are being removed, not added, to fish bearing streams. So this alternative of adding a dam, it just plane wrong. There is something else we have experienced as landowners on the Wynooche River. A dam does not eliminated flooding. When we had a large snowfall followed by a large warm rain (pineapple express) the flooding was post dam. That was actually our biggest flood, with 12 inches in our barn. The other major flood was when water was released from the dam during a high level of rain.

The biggest danger from these flood control ideas, is making people not only complacent, but also just plane misinformed about the dangers of living in a flood plain. The flood prone land will be built on, more businesses and houses in the floodplain, then another historic flood will happen and the damage will be far greater than if we just learned to live with the water. You can't be certain about what level of flooding will happen in the future. People need to be prepared for it, not complacent because they think they are protected by a dam and levees

Alternative 2

When we become complacent about floods because they become rare, then the damage is even greater when one happens. Complacency about flooding must not happen. It is deadly. Otherwise, the plans in Alternative 2 seem beneficial to some landowners.

Alternative 3

Without levy support for Aberdeen and Hoquiam, this plan is not helpful in our part of the basin.

Alternative 4

Is probably the most helpful over the longterm historic time line. However, for the present, it will not be very popular in much of the basin. The water is not going to disappear and amounts of rainfall will most likely increase. This alternative would actually turn out the best over the historic period.

In conclusion, living our entire lives in the Basin, we see the problems with a dam on the upper Chehalis. Causing destruction of a fishery that is already in decline. Also causing a false sense of safety just so some people can obtain economic benefit from their lands. To add the cost of the dam alternative to the taxpayers, this is a poor choice.

John Rabey has details about the fishery impact from the Wynooche River Dam and will address that separately.

John and Julie Rabey



From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 25, 2016 11:29 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Linda

Last Name: Raschke

Organization:

Address:



Phone:

Email:

“I agree and endorse Alternative 1 which is a flood retention dam on the upper Chehalis river and an aggressive aquatic species enhancement effort across the basin. “

Please encourage anyone else you know to fill out this survey because if we don't come together as one voice from the community, the State will think our community doesn't care, and no more money or options will be put towards flooding in our community, and if that is the case, our little community will never climb out of a negative economy because businesses won't locate here and our community will not grow. In addition many people's property as well as lives will continue to be put in jeopardy.

Comments: Years of work and study of the Chehalis Basin has lead us to a point where there are now options for solutions to address flooding. As the Director of United Way of Lewis County I commend all those involved in making this multijurisdictional process successful. I encourage all community members to participate in the comment period for the Environmental Impact Statement. The comment period ends on October 31st. I urge you to take a few minutes and make an official comment to this EIS and to ask everyone else who cares as much as you do about the future of our community. If you can attend the hearing on October 18th that is best. If not, we encourage you to comment on line. It is vital that the state agencies hear loud and clear from our communities.

Provide comments at the upcoming public hearing on Tuesday, October 18th at 6:00 pm at the Veteran's Memorial Museum.

<http://chehalisbasinstrategy.com/get-involved/>

Submit comments online
<http://chehalisbasinstrategy.com/eis-comments/>

The EIS presents 5 options including "no action" and 4 alternatives.

Alternative 1 is the action endorsed by virtually every local government and civic organization in our area, and many in Grays Harbor. That is, a flood retention dam on the upper Chehalis river and an aggressive aquatic species enhancement effort across the basin. The aquatic species work is included in all 4 alternatives.

Alternative 2 is an updated version of the old Army Corp plan to wall off I-5 while leaving the communities in the basin to face the same, in some cases slightly worse, flood risk.

Alternative 3 would do only more local small projects plus aquatic species work.

Alternative 4 would move 460 landowners out of the flood plain in the upper basin. To do this the state would buy 21,000 acres purchasing those landowners replacement property on the hillsides. The state would put wood structures in the river starting at the confluence of the Newaukum and Chehalis rivers (Lintott Alexander Park) and plant trees across the bottom land so as to increase flooding in the upper Chehalis and Newaukum rivers with the goal of reducing flooding in the twin cities by an estimated 5 inches of at the airport levee and less than that across Centralia.

Alternative 1 has by far the best cost benefit ratio. Using the state's capital budget formula it returns \$1.6 dollars for every dollar invested. The other alternatives are below a 1.1 ratio or right at 1.1.

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This email was built and sent using [Visual Form Builder](#).

From: Joe Reid [REDACTED]
Sent: Sunday, October 23, 2016 11:51 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Joe Reid

EMAIL
[REDACTED]

MESSAGE

I am writing to address the issue of flooding out the area that the Bethel church resides on in order to save a few other areas. I believe that there is another way that flooding could be redirected. This property was bought under the directions that it is only to be used for God's work and I don't believe that flooding it out would be the proper course of action. I and many others will be protesting and voting against this part of the strategy. I believe there are other ways. Please consider this message and the direction that you choose to take this new strategy. Thank you for you time.
Concerned citizen, Joe

Sent from (ip address): 65.117.200.58 (65.117.200.58)
Date/Time: October 23, 2016 6:50 pm
Coming from (referer): <http://chehalisbasinstrategy.com/contact/>
Using (user agent): Mozilla/5.0 (Linux; Android 6.0.1; SM-G920R4 Build/MMB29K) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/53.0.2785.124 Mobile Safari/537.36

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 7:56 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Daniel

Last Name: Rich

Organization:

Address:



Phone:

Email:

Comments: Alternative 1 is the option I believe is going to provide the most benefit to all involved.

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File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: Lynn Richard [REDACTED]
Sent: Sunday, October 16, 2016 8:17 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Lynn Richard

EMAIL
[REDACTED]

MESSAGE

Please do the only true alternative #1. I have lived here my entire life and this action needs to be taken.

Sent from (ip address): 73.11.145.196
(c-73-11-145-196.hsd1.wa.comcast.net)
Date/Time: October 17, 2016 3:17 am
Coming from (referer): <http://chehalisbasinstrategy.com/eis-library/>
Using (user agent): Mozilla/5.0 (Linux; Android 6.0.1; SAMSUNG SM-N920V 4G Build/MMB29K) AppleWebKit/537.36 (KHTML, like Gecko)
SamsungBrowser/4.0 Chrome/44.0.2403.133 Mobile Safari/537.36

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 11:55 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Haley

Last Name: Richards

Organization:

Address:



Phone:

Email:



Comments: Alternative 1

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This email was built and sent using [Visual Form Builder](#).

From: [Lund, Perry \(ECY\)](#)
To: [William Teitzel](#)
Cc: [Bailey, Chrissy \(ECY\)](#)
Subject: RE: [Environmental Health] Chehalis Basin Flood issues
Date: Friday, October 28, 2016 10:08:50 AM

Thanks, Bill.

Sending Mr Riener to the project webpage is probably the best way to do it. Just so you know, however, Chrissy Bailey is the Project Manager for the EIS.

Take care

Perry J Lund
360-407-7260

-----Original Message-----

From: William Teitzel [<mailto:Bill.Teitzel@lewiscountywa.gov>]
Sent: Friday, October 28, 2016 10:05 AM
To: [REDACTED]
Subject: RE: [Environmental Health] Chehalis Basin Flood issues

Dear Mr. Riener,

I am in receipt of your email. Lewis County Public Health & Social Services is not involved with this particular project in which you are opposed to. I have included the address, and on-line comment option for this project, which is being coordinated by the Washington State Department of Ecology.

I'm sorry, I do not know the direct individual at Washington State Dept. of Ecology to send you to. I hope this helps.

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

<http://chehalisbasinstrategy.com/eis-comments/>

Sincerely,

William "Bill" Teitzel
Lewis County Public Health and Social Services Supervisor, Environmental Services Division

2025 NE Kresky Avenue
Chehalis, WA 98532-2626
Phone: (360) 740-1261
Fax: (360) 740-3374

bill.teitzel@lewiscountywa.gov

-----Original Message-----

From: webmaster On Behalf Of [REDACTED]
Sent: Friday, October 28, 2016 9:52 AM
To: Danette York; William Teitzel; Sandi Andrus
Subject: [Environmental Health] Chehalis Basin Flood issues

L. Riener [REDACTED] sent a message using the contact form at <http://lewiscountywa.gov/contact>.

Hello;

Please put me on your email list.

I want to know about meetings.

I have lived in the Grays Harbor area for 30 years.

I am against a dam for this flood project.

The dam costs too much, the dam will hurt fish.

I support Alternative 4, below;

Alternative 4: Restorative Flood Protection

Restorative Flood Protection (Alternative 4) would address flooding in the Chehalis River floodplain as well as in tributary areas of the Chehalis River—the North and South Fork Newaukum rivers, South Fork Chehalis River, Stearns Creek, Bunker Creek, Deep Creek, Lake Creek, Stillman Creek, and Elk Creek—largely through supporting relocation and adaptation of at-risk land uses under existing conditions. Alternative 4 would increase the areal extent and depth of 100-year floods upstream of Newaukum River confluence. Downstream of the Newaukum River confluence, including in the Chehalis-Centralia area, Alternative 4 would reduce flood extents and depths, but to a lesser degree than Alternative 1.

As compared to the No Action Alternative and Alternatives 2 and 3, Alternative 4 would decrease flood extents and depths to a greater extent in the Chehalis River floodplain.

Because Alternative 4

would relocate 16,000 acres of land uses, including 8,500 acres of agriculture, upstream of the Newaukum confluence, it would result in greater flood damage reduction compared to the No Action Alternative and other action alternatives (see Appendix C).

Over the long term, Alternative 4 would benefit aquatic species habitat function to a much greater degree compared to the No Action Alternative and other action alternatives; this would be achieved through implementation of the Aquatic Species Habitat Actions and Restorative Flood Protection treatments proposed under Alternative 4. Restorative measures, including placement of engineered wood structures, associated with implementation of this alternative are intended to reduce flood damage by slowing and storing the flow of floodwaters in the floodplain, and would be coordinated with Aquatic Species Habitat Actions. These actions would complement, rather than replace, the actions associated with Aquatic Species Habitat Actions.

I do not support a dam.

I do not support hurting our fish. I support the tribes. They also do not want the dam,

this effects treaty rights.

Thank you,

L. Riener

[REDACTED]

[REDACTED]

[REDACTED]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 9:36 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Chris

Last Name: Ringlee

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

I do not support the proposed dam in the upper chehalis river. This proposal is simply a bandaid that will not fix the real issues of development in the flood plain downstream.

**File Upload
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**File Upload
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**File Upload
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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 26, 2016 5:40 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Cindy

Last Name: Riskin

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: Washington and the federal government are spending millions of dollars taking out dams and trying to restore their ecological damage--for instance, the two dams on the Elwha River. Restoration of river and habitat health is never fully possible once the damage is done. As a restoration practitioner and Washington resident, I implore you to make the right move for the environment in the first place rather than install a dam, which will increase downcutting, further damage the ecology, and require massive restoration later that would not be fully effective.
You have the opportunity to restore the floodplain now. In the long run, doing so will be your least-expensive option fiscally and environmentally.
Thank you for your consideration.

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File Upload (3):

From: Larry Robertson [REDACTED]
Sent: Monday, October 17, 2016 7:29 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Larry Robertson

EMAIL
[REDACTED]

MESSAGE
We support you!

Sent from (ip address): 69.10.193.184 (69-10-193-184.localaccess.com)
Date/Time: October 18, 2016 2:28 am
Coming from (referer): <http://chehalisbasinstrategy.com/eis-comments/>
Using (user agent): Mozilla/5.0 (Windows NT 6.1; WOW64; Trident/7.0; rv:11.0) like Gecko

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 7, 2016 8:04 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: COMMENTS-TO-PEIS.doc

Comment Form

First Name: Jan

Last Name: Robinson

Organization:

Address:



Phone:

Email:

Comments: see attached document

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/COMMENTS-TO-PEIS.doc>

File Upload (2):

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

As a citizen who lives in the basin and have a strong commitment to the health of the basin and our local communities, I sympathize with families, farmers, and businesses that have been impacted by flooding. I understand the desire for that to be fixed, or at least to reduce the extent of damage from flooding.

I am pleased to see the multiple-action approach to the problem of flooding in the basin as described in the PEIS, and especially the realization that nothing will stop all flooding. Flooding is a natural process and essential to the health of the river. Future climatic conditions will most likely result in even more flood events and related environmental challenges.

Large scale proposals:

Alternate 1 includes a **dam** that may reduce flood damage to the Chehalis-Centralia portion of the basin. I believe this action is a short-sighted and has the potential to create problems in the future. The proposed dam may protect a portion of the basin for a short time during a flood event such as occurred in 2007, but it does nothing to mitigate extreme weather in other drainages and their local communities.

The proposed dam will do nothing to mitigate flooding or reduce damage from flooding along the other rivers in the basin -- rivers such as the South Fork Chehalis, Skookumchuck, Black, Satsop, Wynoochee, Wishkah, and Hoquiam. And this means the small communities along those rivers will not see significant flood reduction because of the dam.

Also, recent history and scientific studies repeatedly cite the environmental damage caused by dams. In the Chehalis basin, which is just now receiving attention and studies to identify species and wildlife population characteristics, the potential for such damage is increased. Any type of dam will have significant negative impacts on identified fish species, amphibians and lamprey; wetlands and nearby forested areas. Loss of wetlands and riparian habitat in the dam footprint is a serious concern and the work to create replacement sites will take many years to reach a condition the replicates what will be lost.

The proposals for **restorative flood protection** certainly sound positive, but I believe this will never reach a significant number of acres. I believe the PEIS is wildly optimistic about citizen support or this action.

How can you expect farmers, families, and even commercial lands to be essentially sold to create "river management corridors"? People live and conduct business near the cities and I-5 corridor because that is most cost-effective for them. To expect that they will move to another site in the county and be able to conduct a livelihood of comparable quality is overly optimistic.

The other actions proposed to reduce flood damage (the **levee proposals**) do not have as many attendant negative impacts to the environment or local neighborhoods. Since they relate to existing levees or are proposed for cities rather than natural areas and agricultural sites, the damage to the natural environment is reduced. If continued analysis shows flood reduction can be attained by these actions, they should be the primary effort moving forward.

Local scale projects:

I believe the local projects such as elevating buildings, farm pads and early warning systems will be the most beneficial. But building flood walls around certain buildings would have a negative impact on quality of life and values of the buildings; these should only be considered where the infrastructure is extremely valuable and necessary (such as wastewater treatment plans).

Changes to **land use management** and enforcement of those rules may have the largest potential to reduce future flood damage. The benefit-cost evaluations must be prepared and studied carefully as the impact to business and families could be largely negative. But the reality is that poor land use management has resulted in greater flood damage.

Aquatic Species Habitat Actions

I am strongly in favor of proceeding with studies and actions to improve riparian habitat—that is to re-create a natural river and floodplain. Some of these plans require citizen participation and a long-term investment, but that should not delay the effort. Many species are already challenged by degradation and loss of habitat yet these natural areas and species support the way of life enjoyed by residents.

From: [Mike Roble](#)
To: [Bailey, Chrissy \(ECY\)](#)
Subject: you have to be kidding???
Date: Wednesday, October 26, 2016 10:51:27 PM

what the hell? idiots developed a flood plain with outlet malls?

do you even have a clue about hydrology and flood plains?

NOWHERE is TPL'S negligent operations of the wynoochee dam addressed????

WTF??????

From: [Mike Roble](#)
To: [Bailey, Chrissy \(ECY\)](#)
Subject: Re: Chehalis Basin Strategy SEPA Draft Programmatic EIS | comment period extension
Date: Wednesday, November 02, 2016 8:36:08 PM

just crap, where is the wynoochee damn oversight, why build a damn, just force the centralia area and chehalis cities to vacate the flood plain with a 1 time minimum cash offer with a hold harmless flood damage agreement, and declare the outlet mall area uninsured under federal flood insurance.

On Fri, Oct 21, 2016 at 5:25 PM, Bailey, Chrissy (ECY) <chr461@ecy.wa.gov> wrote:

Please note:

The Department of Ecology received and considered 5 requests for an extension of the Chehalis Basin Strategy SEPA Draft Programmatic EIS comment period.

Per the attached notice, Ecology is granting a 14-day extension to the public comment period. The new closing date for the public comment period will be **November 14, 2016**.

Thank you,

Chrissy Bailey

Chehalis Basin Strategy Programmatic EIS PM

Mobile: [\(360\) 790-8822](tel:(360)790-8822)

Desk: [\(360\) 407-6781](tel:(360)407-6781)

chr461@ecy.wa.gov



Before printing, please consider the environment.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 28, 2016 9:45 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Colton

Last Name: Rogers

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: I think placing a dam on the upper chehalis would be detrimental to fish spawning and rearing habitat. I frequently fish the chehalis river by raft from the town of Pe Ell to Doty. The chehalis is in my opinion one of the best rivers to catch wild steelhead in. I fear that placing a " water retention facility " on the river would greatly impact the future of wild steelhead and salmon including the spring chinook. The constant flow of cold water from a reservoir tricks steelhead smolt and they don't end up leaving for salt water. They need the warm summer water to trigger the migration. Placing a dam above Pe Ell would also block miles of crucial spawning grounds. The section from Pe Ell to Doty is full of steelhead redds, while I haven't floated above Pe Ell I don't think the river would support many more spawning fish congregating below the proposed dam site. Loss of spawning habitat would greatly decrease the run as fish compete for space they dig up other redds causing very poor returns. Without fishing opportunity my friends and I would not be traveling in that direction upwards of 20 times a year. We would not be stopping for lunch or dinner and stopping for gas in the small towns. I hope you take the time to read this comment and understand the chehalis is a beautiful river that needs to be left free for generations to come!

Thank you
Colton Rogers

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 11:04 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Joe

Last Name: Rosbach

Organization: self

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments: I favor alternative 1. The dam will reduce flooding in our area.

File Upload (1):

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 11:00 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Susan

Last Name: Rosbach

Organization: self

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I support Alternative #1. a flood retention dam on the upper Chehalis river with fish enhancements by far does the most good for the entire basin.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Saturday, October 29, 2016 7:45 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Sandra
Last Name: Roubal
Organization: Lewis County Resident

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

Alternative 1 is the only reasonable solution presented. We need long-term control of flooding. A permanent reservoir will also assist with water-flow throughout the year. Dredging should also be performed to eliminate natural dams from debris.

Alternative 4 is ridiculous and should even be considered. It would destroy Lewis County. It would destroy family farms and communities. It would destroy the tax base. It would cost tremendously more than projected. It should be eliminated as a choice.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 1:54 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jamie
Last Name: Roundtree

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: Please use Alternative #1. I am a lifetime resident of the Boistfort Valley. I absolutely DO NOT want Alternative #4. My family has had a farm in this Valley since they settled out here in the 1860's. I want my children and grand children to be able to enjoy growing up and raising their families out in the Valley, just like previous generations.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, November 11, 2016 8:14 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Erika
Last Name: Rubenson
Organization: University of Washington

Address: 

Phone:

Email:

Comments: After having read each of the options and having worked in the field of freshwater ecology for the past several years, I give my support to Alternative 4. I recognize that there is real impact, especially on those citizens that will be asked to move their home and livelihood, but the benefits to the greater community are so significant, they are not to be ignored. We have the rare opportunity to learn from lessons in the past and keep our freshwater resources healthy, provide increased viability to our fishing industry and decrease flooding. Please implement Alternative 4!

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This email was built and sent using [Visual Form Builder](#).

From: Erik Sandgren [REDACTED]
Sent: Sunday, November 13, 2016 11:28 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy Comment

I am against a dam for this flood project.

I support Alternative 4 below:

Alternative 4: Restorative Flood Protection

Restorative Flood Protection (Alternative 4) would address flooding in the Chehalis River floodplain as well as in tributary areas of the Chehalis River—the North and South Fork Newaukum rivers, South Fork Chehalis River, Stearns Creek, Bunker Creek, Deep Creek, Lake Creek, Stillman Creek, and Elk Creek— largely through supporting relocation and adaptation of at-risk land uses under existing conditions. Alternative 4 would increase the areal extent and depth of 100-year floods upstream of Newaukum River confluence. Downstream of the Newaukum River confluence, including in the Chehalis-Centralia area, Alternative 4 would reduce flood extents and depths, but to a lesser degree than Alternative 1.

As compared to the No Action Alternative and Alternatives 2 and 3, Alternative 4 would decrease flood

extents and depths to a greater extent in the Chehalis River floodplain. Because Alternative 4 would relocate 16,000 acres of land uses, including 8,500 acres of agriculture, upstream of the Newaukum confluence, it would result in greater flood damage reduction compared to the No Action Alternative and other action alternatives (see Appendix C).

Over the long term, Alternative 4 would benefit aquatic species habitat function to a much greater degree compared to the No Action Alternative and other action alternatives; this would be achieved through implementation of the Aquatic Species Habitat Actions and Restorative Flood Protection treatments proposed under Alternative 4. Restorative measures, including placement of engineered wood structures, associated with implementation of this alternative are intended to reduce flood damage by slowing and storing the flow of floodwaters in the floodplain, and would be coordinated with Aquatic Species Habitat Actions. These actions would complement, rather than replace, the actions associated with Aquatic Species Habitat Actions. I do not support a dam. I support the tribes. They also do not want the dam.

Thank you,
Erik Sandgren

[REDACTED]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 11:17 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: erik
Last Name: sandgren
Organization: Grays Harbor College

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

I am against a dam for this flood project, projected to cost around \$200,000,000.

The dam costs too much, the dam will hurt fish.
I support Alternative 4, below;

Comments:

Alternative 4: Restorative Flood Protection
Restorative Flood Protection (Alternative 4) would address flooding in the Chehalis River floodplain as well as in tributary areas of the Chehalis River—the North and South Fork Newaukum rivers, South Fork Chehalis River, Stearns Creek, Bunker Creek, Deep Creek, Lake Creek, Stillman Creek, and Elk Creek—largely through supporting relocation and adaptation of at-risk land uses under existing conditions. Alternative 4 would increase the areal extent and depth of 100-year floods upstream of Newaukum River confluence. Downstream of the Newaukum River confluence, including in the Chehalis-Centralia area, Alternative 4 would reduce flood extents and depths, but to a lesser degree than Alternative 1. As compared to the No Action Alternative and Alternatives 2 and 3, Alternative 4 would decrease

flood extents and depths to a greater extent in the Chehalis River floodplain. Because Alternative 4 would relocate 16,000 acres of land uses, including 8,500 acres of agriculture, upstream of the Newaukum confluence, it would result in greater flood damage reduction compared to the No Action Alternative and other action alternatives (see Appendix C). Over the long term, Alternative 4 would benefit aquatic species habitat function to a much greater degree compared to the No Action Alternative and other action alternatives; this would be achieved through implementation of the Aquatic Species Habitat Actions and Restorative Flood Protection treatments proposed under Alternative 4. Restorative measures, including placement of engineered wood structures, associated with implementation of this alternative are intended to reduce flood damage by slowing and storing the flow of floodwaters in the floodplain, and would be coordinated with Aquatic Species Habitat Actions. These actions would complement, rather than replace, the actions associated with Aquatic Species Habitat Actions. I do not support a dam. I do not support hurting our fish. I support the tribes. They also do not want the dam, this effects treaty rights. Thank you, Erik Sandgren

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Wednesday, October 19, 2016 10:27 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Ron & Kathy

Last Name: Sandrini

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

Yes to proposal #1 with retention.
NO TO PROPOSAL 4!!!!!!!!!!!!!!!

File Upload (1):

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 3:45 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Lanette

Last Name: Scapillato

Organization:

Address: 

Phone:

Email:

Comments:

I am recommending Alternative 1. It includes fish habitat restoration, local projects that help with flood reduction, the completion of a levee system in Aberdeen, and the Chehalis Airport levee improvements.

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This email was built and sent using [Visual Form Builder](#).

From: Kathy Schaeffer [REDACTED]
Sent: Monday, November 14, 2016 11:38 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Kathy Schaeffer

EMAIL
[REDACTED]

MESSAGE

I support the following:

Removing flood-prone development through demolition or buyouts from willing owners and flood proofing buildings.
Long-term protection through conservation easements and land acquisition.

Creating, restoring or enhancing wetlands for use by semi-aquatic species.

Reconnecting the floodplain allowing floodwaters to spread out onto floodplains to help support productive fisheries and provide important habitat for birds and other wildlife.

Reduce bank erosion.

Restore river bank habitat on the Chehalis River and selected tributaries by adding native plants and vegetation.

Removing or repairing culverts and other manmade structures, eliminating fish passage barriers. Restore off-channel habitat on the mainstem and key tributaries of the Chehalis River.

I am opposed to any dam, which would cause destruction of fish and other wildlife habitat and not prevent flooding in many areas, including Grays Harbor.

I also support the option of "rebuilding the natural flood storage capacity of the Chehalis Basin by reversing landscape changes that contribute to downstream flooding and erosion. This would be achieved through actions including raising areas of the riverbed, replanting native trees and vegetation, and building back-up channels into areas that have a history of flooding."

Sent from (ip address): 207.118.76.162

(207-118-76-162.dyn.centurytel.net)

Date/Time: November 15, 2016 7:38 am

Coming from (referer): <http://chehalisbasinstrategy.com/strategy/>

Using (user agent): Mozilla/5.0 (Windows NT 6.0) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/49.0.2623.112 Safari/537.36

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, November 13, 2016 4:31 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: SchanzComments-ChehBasinDEIS.docx

Comment Form

First Name: Robert

Last Name: Schanz

Organization: Landowner in upper Chehalis basin

Address:



Phone:



Email:



Comments: I own property in the upper Chehalis Basin and was evacuated from my former residence during the 2007 flood. I have some serious concerns about the alternatives that involve construction of dams in the upper Chehalis. See the attached letter for more details.

File Upload (1): <http://chehalisbasinstrategy.com/wp-content/uploads/2016/11/SchanzComments-ChehBasinDEIS.docx>

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This email was built and sent using [Visual Form Builder](#).

November 13, 2016

Re: Draft Programmatic EIS, Chehalis Basin Strategy

EIS authors and decision makers,

This letter provides my comments on the September 29, 2016 Draft Programmatic EIS for the Chehalis Basin Strategy for flood reduction and habitat improvement. I own property in the floodplain of the upper Chehalis near Rainbow Falls, and my family was evacuated from our former home along River Road during the 2007 flood. We lived along the river for 14 years and developed a deep appreciation for the unique Chehalis river ecosystem as well as the risks it can pose to local communities. My 30 years as a hydrologist and geomorphologist also provides me unique perspectives on how the river functions.

The Chehalis Basin is in many ways an incredible resource that provides unique habitat and economic values. Many groups have been working tirelessly to restore this system and preserve these values. The Alternative 1 described in the DEIS represents a massive step backwards in this work, primarily because of the destruction of habitat and natural river functions caused by the proposed retention facilities. It is particularly ironic to propose a new reservoir in the last major undammed river system in Western Washington, while major dam removal projects are being done at great expense throughout other western basins.

My specific concerns with Alternative 1 and the DEIS analysis include:

1. The DEIS unfortunately overstates how speculative habitat restoration actions could offset the many permanent and significant project impacts to existing and relatively healthy aquatic habitat. Habitat restoration projects involve many risks and potential for failure, and rarely match the values provided by properly functioning natural systems. There is high certainty in the impacts the dams will have on wetland and aquatic habitat, and great uncertainty in the effectiveness of downstream habitat restoration activities. Even under the best case scenarios habitat restoration activities will take years to decades to become effective, resulting in a significant temporal loss in habitat.

2. The DEIS provides a good summary of the significant and unavoidable impacts that would be caused by the retention options. These are unacceptable impacts in an age when we are working desperately to restore highly vulnerable salmon populations and aquatic ecosystems, and include:

- Interruption of natural sediment and wood delivery to reaches downstream as far as the Skookumchuck. Much of the upper Chehalis is severely incised, and healthy wood and sediment supply are needed to create spawning and rearing habitat. Loss of this habitat is a key limiting factor for salmonid populations, and it cannot only be restored by discrete and localized habitat restoration projects.

- Loss of wetland, riverine, and riparian habitat in the reservoir footprint. WDFW studies have shown these areas to be key for not only resident and migrant fish, but also for amphibian species that are facing catastrophic declines.
- Blockage of fish migration for species such as Pacific Lamprey that are poorly adapted to artificial fish passage structures.
- Increased landslide risk. The 2007 flood created massive landslides in this area, and it is unacceptable to increase these risks and the associated excessive delivery of fine sediment.
- Increased seismic risk. The DEIS recognizes that seismic activity could damage the dam and cause significant risks downstream, but soft-pedals this risk by saying earthquake risk is “low” within the life of the structure. In other contexts geologists have been saying we are overdue for a large and catastrophic earthquake event in Western Washington.

3. The DEIS fails to address how the effectiveness of the alternatives will vary greatly depending on the type and spatial distribution of flood-generating storms. The 2007 flood was strongly centered in the Willapa Hills where the Alternative 1 dams would be constructed. The 2009 flood on the other hand arose from the eastern portion of the basin and would have been poorly mitigated by retention in the Chehalis headwaters. The 1996 flood was strongly affected by rain-on-snow. The DEIS does not describe this variability, and instead quantifies flood reduction for a generic 100 year flood with unspecified spatial distribution.

4. In describing flood reduction benefits the DEIS (particularly the Executive Summary) places too much emphasis on reduction of flood elevations. It is far more important to look at the number of structures removed from hazard. Table 5.7-1 clearly shows that Alternative 4 is more effective in reducing hazards.

5. The DEIS overstates the potential benefits of flow augmentation for the FRFA option. River systems depend on a variable flow regime and the structure provided by dynamic sediment deposits and large wood accumulations to provide suitable water quality and quantity for fish habitat. This cannot be mimicked by “turning a valve” on a storage facility. This artificial flow augmentation idea represents outdated and technically unsupported thinking on how rivers function.

6. The DEIS fails to adequately describe the economic impacts of the retention options. These will require massive land purchase and will take large areas out of timber production. These kinds of impacts are described for the Alternative 4 Restorative Flood Protection as if this were the only alternative that would require land purchase and land owner cooperation, so the DEIS does not fairly compare Alternative 1 and 4 in this aspect.

7. The DEIS does not address the costs and impacts of future de-commissioning of the dams. The upper basin has a high load of sediment from steep unstable terrain severely impacted by timber removal. This will eventually fill the reservoir and shorten its effective life. The Elwha dam removal project provides insight into how expensive and difficult it is to remove dams and restore the associated damaged river systems.

Alternative 4 (Restorative Flood Protection) in contrast is a forward-thinking approach that recognizes the importance of natural processes in flood retention and habitat restoration. It also represents a

better use of public funds to balance capital projects with buyouts and removal of structures from hazard areas. It provides less reduction of I5 closures, but could be used in concert with some targeted elements of Alternative 2 to provide the needed flood protection in a much more effective way.

Thank you for the opportunity to provide comments on this important work,

Robert Schanz

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 1:17 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Nate

Last Name: Schmidt

Organization: Earthcorps

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I am in favor of watershed restoration but completely OPPOSE the idea of constructing a dam. That will negatively impact the dynamic ecology of that watershed and threaten its biodiversity.

File Upload

(1):

File Upload

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(3):

This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 28, 2016 4:53 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Carolyn

Last Name: Schuster

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: A critical mistake to dam this region. When you drive through the lowland areas, it is clear to see a lack of planning, foresight or proper wetland mitigation. Drive through Chehalis and see where Walmart and Home depot are. They filled wetland, drained them and then wonder why they have nothing but problems. Trying to control CRITICAL rivers that foster endangered salmon for the sake of poor planning and ambitious development is insane. You cannot change the environment this drastically and achieve any balanced success. You are trying to transform one of the last healthy regions into one where long-term consequences are blatantly ignored. It really is shocking to see the happen in this day and age where this mindset has been rejected and dam removal is occurring. Some dams are necessary , this is not. PLEASE reconsider-please

File Upload (1):

File Upload (2):

File Upload (3):

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 28, 2016 12:37 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Brian

Last Name: Scott

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments: Please do Not build a Dam.

File Upload (1):

File Upload (2):

File Upload (3):

This email was built and sent using [Visual Form Builder](#).

From: Carol Seaman [REDACTED]
Sent: Friday, October 14, 2016 8:39 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

Follow Up Flag: Follow up
Flag Status: Completed

To:
Webmaster

NAME
Carol Seaman

EMAIL
[REDACTED]

MESSAGE

Please send me list of names heading up the "chehalis River strategy."
Are they appointed & by whom? How is this related to The River Authority? Who represents private property owners?
How is it funded?
Thank you. Carol Seaman

Sent from (ip address): 172.58.40.152 (172.58.40.152)

Date/Time: October 15, 2016 3:39 am

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 8_3 like Mac OS

X) AppleWebKit/600.1.4 (KHTML, like Gecko) Version/8.0 Mobile/12F70

Safari/600.1.4

From: Carol seaman [REDACTED]
Sent: Monday, October 24, 2016 7:23 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Carol seaman

EMAIL
[REDACTED]

MESSAGE

After reading parts of this Chehalis Basin Strategy, I am left with many more questions than answers regarding this overarching plan for what is called reservoirs but really sounds like dams. The questions regarding impacts on stakeholders & property owners downriver have still not been answered.

Also, the water rights which are affected for PeEll, and others must be determined before this is implemented. This plan does not once mention the studies and species identified, nor the flood control & fish enhancing projects undertaken by DNR with the designation of The Chehalis basin NAP (Natural Area Preserve). (DNR) in which It was understood that the sloughs in the basin are a natural assist in flood control in tidal areas.

My main question is the impact these holding reservoirs will have in heavy rains, high winds & high tides? This Chehalis Estuary is a unique echo system and before you jump in and begin taking out Douglas fir and acres of other species of trees whose roots hold water in high rains, you need to know the impact this will have on additional levels of silt and impacts downstream. Silt is currently a serious problem in the Chehalis River and you will exacerbate this problem. Look also to the Green River and the problems there with control and management! Look at the mess imposed. I am adamantly opposed to your strategy/ projects on this Chehalis River and believe it does not comprehensively consider or mitigate problems downriver .

I live on this river and realize the problems of flooding when you allow building in the flood zone-it's a roll of the dice. It is nature. Invest money in helping raise I-5 in Lewis County. When you allow thousands of acres of clear cutting in the head waters of all the creeks: Gibson, Porter, Cedar, Mox Chehalis Cloquallum-you are going to have silt and flooding. This is not a river that can be managed as you plan without answering more questions than this study answers. I am getting very tired of Environmental Studies that look good on paper-and allow projects to proceed that really are not serving the interests they purport to serve! This is a ridiculous proposal. Almost as ridiculous as allowing crude oil terminals at the Port of Grays Harbor in a Tsunami and Earthquake zone with certainty of an oil spill which will kill the fish you are trying to save with your reservoirs on the Upper Chehalis. It seems a little crazy...inexplicably crazy to me. Thank you for reading and considering my comments. Carol Seaman, Chehalis River

Sent from (ip address): 172.56.42.145 (172.56.42.145)
Date/Time: October 25, 2016 2:23 am
Coming from (referer): http://chehalisbasinstrategy.com/ Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 8_3 like Mac OS

X) AppleWebKit/600.1.4 (KHTML, like Gecko) Version/8.0 Mobile/12F70
Safari/600.1.4

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 27, 2016 9:01 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Lizbeth
Last Name: Seebacher
Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Hello,
Thank you for the opportunity to comment on this important issue.

I understand that flooding in the Chehalis region has led to I-5 closures which along with that, businesses incur economic losses and damage. Regarding traffic on I-5, why is it ok to dam a river that has closed the interstate for a day or so once, but we allow JBLM to clog up the interstate for hours twice a day, five days a week for well over a decade? I-5 has been fixed by raising the interstate, that is no reason to spend millions on a unnecessary dam.

Comments: I would like to go on record opposing the implementation of a dam on the Chehalis river. This state and the country are spending millions trying to remove dams as we finally realized how damaging they are to the river system and the floodplain, why are we proposing to spend millions on building a new one?

This area is flooding due to the lack of the flood plain that was originally a part of this system. This river has been so extensively channelized, that there is almost no connection to this water storage area and therefore, when we have a lot of rain, of course it will flood, where is the water supposed to go now that it is so channelized?

The best option is the Restorative Flood Protection alternative. The surrounding forests of the Chehalis Basin are so heavily logged, the massive amount of water is not able to be stored in the surrounding forest land. This logging needs to stop and the land in the basin

restored with forests. If there are land owners in the basin that have been repeatedly flooded, the state should buy these parcels and restore them back into the river floodplain. There are very few people affected in this way, to spend millions on a dam to "protect" so few property owners is a waste of the tax payers money and the worst thing we could do for salmonids.

Allowing a dam would choke off the sediment supply to an already incised system, increasing the degradation of the instream habitat and this would allow the continued development within the floodplain, where development should not be allowed. Let's correct the mistakes of the past, not continue to make them.

If we allow a dam and more development in the floodplain, and then a large earthquake happens breaking the dam, then what? The state would be liable for this as the state knew this could potentially happen.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 8:29 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Judy

Last Name: Selleck

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

The only alternative that will effectively reduce water levels during flooding events for a reasonable price is obviously Alternative #1.
Lewis County has waited long enough for action on this problem.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 4:47 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: James

Last Name: Shannon

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

I support alternative #1 of the governor's work group. Western Washington is growing, creating livable flood free space within the I-5 corridor will manage growth in Washington State. Lewis county has the potential to provide space for growth without infringing on wilderness areas.

Flood retention is a proven solution to control flooding.

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This email was built and sent using [Visual Form Builder](#).

From: Andrew Short [REDACTED]
Sent: Sunday, October 23, 2016 11:33 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy

To whom it may concern:

Option four would be a devastating blow to our community and should not be considered as an option. This would take away the home for me and my kids, to include the church we've learned to love and are regularly a part of.

The option to build a dam makes the most sense for our community.

Thanks,

Andrew D. Short

From: Mike and Glenda Smell <[REDACTED]>
Sent: Wednesday, November 2, 2016 9:35 AM
To: info@chehalisbasinstrategy.com
Subject: Draft Programmatic EIS for the Chehalis Basin Strategy
Attachments: Flooding - EIS ltr 10-31-16.rtf

9:30 a.m. 2 November 2016

Hello:

The attachment is my input on the subject. Thank you for having the workshop and public meetings.

By, on, and in the Newaukum River

Michael L. Smell
[REDACTED]

Washington State
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

31 October 2016

Hello:

I was not going to comment on the EIS after the 11 October 16 workshop and the public meeting on 18 October 2016 since I felt the “die was cast”. I feel the presentations were slanted since, like the WSDOT presentations several years ago about safeguarding I-5 during a flood event, the presentations had 1 preposterous alternative, 2 already rejected alternatives, and 1 “to good to be true” alternative. Did you all really think an alternative that would increase flooding, take over 21,000 acres of land, and put farms on a hillside would be believable? The CRBFA had already rejected the WSDOT alternative since it would only protect I-5. The CRBFA doesn’t want to continue with small projects because they are not the BIG project they want plus they are running out of small projects to propose. That leaves the “to good to be true” project. Ever since the Lewis County PUD paid for the first dam study around the start of the CRBFA, several members have had this as their pet project and are very tenacious about it. However, they have ignored or dismissed as irrelevant two keys flaws of a dam. The first concerns the FRFA dam, which your own spokesperson said would forever change the ecology at and below the site. It would have a “conservation pool” equal to ½ its capacity. This means to me that it would only be 50% effective during a major rain event. If it was at 75% capacity, it would only be 25% effective. Would the dam be able to release either of these amounts of water to be empty before the major rain event to be 100% effective without causing a major flood downstream? I think not. The second item I want to comment about is the areas covered by the major rain events in the Chehalis area since 1986. Two different types of dams have been proposed near Pe Ell to mitigate flooding but only based on the major rain event anomaly of 2007. By their own study completed several years ago, the CRBFA has shown that the other major rain events have been over different sections of the area in Lewis County. I feel the CRBFA has ignored or dismissed this fact as irrelevant. I do not know if you all took this phenomenon under consideration. A case to show the diversity of major rain events is that the Newaukum River had 4 floods in 2015. One was the 4th and one was the 6th highest flood of record while the Chehalis and Skookumchuck Rivers had zip. My point is that a dam located above Pe Ell would not be worth one if the major rain event was below the site. If the FRO dam would have been closed and had a reservoir behind it or the FRFA dam had a reservoir ½ to ¾ full, then the dam would be less effective to mitigate a major flood. The original concept for a dam was for flood mitigation only. Getting fish around either dam is also problematic. Fish restoration had only been added to sweeten the idea for a dam. The fish have been surviving without a dam for many years. I feel that the projects that governmental agencies have been doing such as culvert replacement are more beneficial for the fish. Adding more wetlands and reconnecting horseshoe bends would also be an improvement. This leaves the 5th alternative which no one seems to want to accept: no large-scale project to be completed. This is a hard one which many people won’t accept and is probably politically incorrect. Why do we humans always have to try to control nature?

I remain by, on, and in the Newaukum River.

Very truly yours,

Michael L. Smell



From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 31, 2016 6:48 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Blake

Last Name: Smith

Organization:

Address:

[Redacted]

Phone:

[Redacted]

Email:

[Redacted]

Comments:

No dam. That would be catastrophic to the ecosystem. Buy up habitat in the watershed with the money. Stop logging, let trees grow.

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This email was built and sent using [Visual Form Builder](#).

From: Eileen Smoke [REDACTED]
Sent: Thursday, November 3, 2016 6:59 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Eileen Smoke

EMAIL
[REDACTED]

MESSAGE

Please consider "Alternative 4" would provide restorative flood protection, relocation, and aquatic species habitat restoration. At a time when we've realized the detrimental impacts of dams and are taking them down, we cannot allow WA to build a dam and remove our last hope for wild salmon and the wildlife that depend on it.

Sent from (ip address): 24.19.243.135
(c-24-19-243-135.hsd1.wa.comcast.net)

Date/Time: November 4, 2016 1:58 am

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (Macintosh; Intel Mac OS X 10.7; rv:48.0) Gecko/20100101 Firefox/48.0

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 7:01 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Randall

Last Name: Snell

Organization:

Address: [REDACTED]

Phone:

Email: [REDACTED]

Comments: As a lifetime resident of Lewis County, the last forty-some in Centralia, I have to say that I cannot fully agree with any of the "alternatives". That would be because none of them include addressing the rock outcropping in the river bed near Centralia High School. That being said, If I had to pick from the four, I lean towards #1. I also believe that any of the other schemes which would force property owners off farms and family property, are tyranny.

None of these ideas will be successful until the rock outcropping near Centralia High School is dealt with.
Water, my friends, runs downhill.

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 9:47 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: W. Thomas

Last Name: Soeldner

Organization: Earth Ministry

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

I urge Ecology to reject Alternative One of the Chehalis Basin Strategy, i.e. proposing a dam and reservoir as a flood retention facility. Instead the strategy should focus on local actions to reduce flood damage; there should also be aquatic restoration.

The FRFA (dam/reservoir) proposal may improve a small amount of habitat just downstream of the dam, but the reservoir coverage would destroy a substantial amount of spawning habitat and wipe out juvenile lamprey. The risks are too large, and the benefits, too speculative.

Comments: In addition, dams will affect the movement of large woody debris and sediment in the river, with negative impacts all the way down the system. They will also disrupt water supply, and, given the over-allocation of water rights in the Chehalis Basin, it will be difficult, if not impossible, to protect flow releases from the FRFA reservoir.

Finally, the draft PEIS does not assess how much the proposed reservoirs will contribute to GHG emissions. A recent WSU study indicates that reservoirs in our latitudes release much more methane than previously thought.

Thank you for considering my comments. Daming the free-flowing Chehalis River is not a satisfactory or wise strategy to address flooding in the Chehalis River Basin.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 4:02 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: barbara

Last Name: soto

Organization:

Address:



Phone:



Email:

Comments: number one leaves in Chehalis and Aberdeen

File Upload (1):

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 11:21 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Debra

Last Name: Sparkd

Organization:

Address: 

Phone:

Email:

Comments:

The majority of Pe Ell citizens expressing their opinions about a dam being built above their community are strongly opposed to it. The citizens also feel they have not been given the opportunity to have input regarding the Town of Pe Ell's decision to support any proposals. Notifications of Public Meetings regarding the flood control and DOE presentation held in our town wasn't publicized which inhibited public participation.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 9:16 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Patricia & Larry

Last Name: Stafford

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

We do not like option #4 - moving all the people out of the valley. To expensive and to much trauma for the people, all of us.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 6:19 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Merrill
Last Name: Stulken
Organization: Land owner and tax payer in Boistfort Valley

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

I have a farm in the Boistfort Valley on Lost Valley Road as of 2012. Although my immediate location is not subject to flooding I am not new to the problems. I have experienced many floods as I grew up on Ceres Hill Rd from 1963 through 1998 as my father and mother had a large there.

I do not support flooding the farm lands and asking the resident families and businesses to move out. I believe this is not the best use of our resources and it will cause undo strife and burdens to many of my neighbors, possibly myself included.

Comments:

I do support Alternative 1 as it seems to accomplish the much needed control of and storage/reservoir of high volumes of rain water in a safe and reasonable manner. This option also mitigates the down stream flooding on a long term basis.

I know this has been a long time problem and I appreciate the support and the comprehensive study you have under took on our behalf.

Thank you for listening to my concerns and opinion.

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This email was built and sent using [Visual Form Builder](#).

From: Lance Succo [REDACTED]
Sent: Friday, October 21, 2016 6:50 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Lance Succo

EMAIL
[REDACTED]

MESSAGE

After reviewing all 4 options, I believe Option 1 is the best option for reducing flooding along the Chehalis River Basin. I believe Option 4 is the worst option, as it displaces many homes and businesses and doesn't improve the flooding significantly.

Sent from (ip address): 69.131.226.110
(h69-131-226-110.slkmwa.dsl.dynamic.tds.net)
Date/Time: October 21, 2016 1:50 pm
Coming from (referrer): <http://chehalisbasinstrategy.com/eis-library/>
Using (user agent): Mozilla/5.0 (Windows NT 6.0; rv:49.0)
Gecko/20100101 Firefox/49.0

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 1:07 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Randy

Last Name: Sullivan

Organization: Realtor

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments: I fully support Alternative # 1 - The governor's Work Group Recommendation.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, November 4, 2016 7:25 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Jeremiah

Last Name: Sutton

Organization:

Address: 

Phone:

Email:

Comments:

As a state we have spent millions removing dams in the past decade. We shouldn't be building them elsewhere. It's time to move beyond traditional engineering approaches that negatively impact our salmon, our native communities, and ultimately our tax dollars.

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This email was built and sent using [Visual Form Builder](#).

From: Robert B Thompson [REDACTED]
Sent: Thursday, October 20, 2016 3:02 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Robert B Thompson

EMAIL
[REDACTED]

MESSAGE

As a life long resident,property owner and business owner, I have participated in every flood event. These have cost my family perhaps a million dollars not to mention untold anguish. It seems to me that Alternative #1 is the only solution which solve the flood problem and vastly improve the Chehalis River as a home to self propagating salmon runs. Thank You, Bob T

Sent from (ip address): 173.160.168.233
(173-160-168-233-Washington.hfc.comcastbusiness.net)

Date/Time: October 20, 2016 10:01 pm

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (iPad; CPU OS 8_1_2 like Mac OS X)

AppleWebKit/600.1.4 (KHTML, like Gecko) Version/8.0 Mobile/12B440

Safari/600.1.4

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 4:05 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: VIRGINIA

Last Name: TICHACEK

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

I BELIEVE THE ONLY ALTERNATIVE THAT MAKES SENSE IS ALTERNATIVE #1

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 28, 2016 12:50 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Arielle
Last Name: Tonus Ellis
Organization: University of Washington
Address: United States of America
Phone:
Email: [REDACTED]

Comments: Greetings,
Upon briefly reviewing the state's proposals for preventing flooding of the Chehalis River, I wish to make a comment as a local environmentalist and concerned citizen: As we have been experiencing vast global changes in the past years (e.g. record temperatures these past years) we need to approach these issues with long term solutions that will be flexible with these changes. Building dams is not the long term solution nor is it the best solution for combating flooding. Restoration of floodplains, forests, and rivers takes much time to plan and execute, however these projects are also the most long term solution to preventing flooding. Roots of plants and trees in the area to be restored help retain extra water that would otherwise move quickly down the path of least resistance. Additionally there are other benefits that come with completing restoration projects that building a dam would not achieve.
The money spent of these projects will have more benefit with the long term solution of restoring the floodplain than with building dams that will only somewhat help flooding peaks slightly.
Thank you,
~Arielle

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This email was built and sent using [Visual Form Builder](#).

From: Brian Tornow [REDACTED]
Sent: Monday, October 24, 2016 2:02 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Brian Tornow

EMAIL
[REDACTED]

MESSAGE

Option #1 would seem to be the best long term value and would be the least controversial.

Sent from (ip address): 50.203.173.9
(50-203-173-9-static.hfc.comcastbusiness.net)
Date/Time: October 24, 2016 9:02 pm
Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (Windows NT 6.1; WOW64; Trident/7.0; rv:11.0) like Gecko

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 4:54 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Dave

Last Name: Tracy

Organization:

Address:



Phone:

Email:

Comments: Alternative 1 would be the best option for homeowners and business owners throughout our county.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Sunday, October 16, 2016 6:43 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Russell

Last Name: Trentlage

Organization: Retired

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: I agree with alternate 1, but also think this will still leave a flooding problem in the are as the Centralia and Chehalis city storm water handling systems are inadequate as with the minor rainfall of Oct 38, 39, 2016 several of the city streets were flooded. This really had nothing to do with the Chehalis river so there is more to consider with the very ancient drainage systems.

I live up on top of Davis Hill, but am very concerned with the frequent flooding problem we have in the area.

Russ Trentlage

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From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 10:21 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Desiree

Last Name: Tullos

Organization:

Address: [REDACTED]

Phone:

Email: [REDACTED]

Comments:

I am writing to express my strong opposition of the proposed Flood Retention Facility on the Chehalis River.

As a professor of water resources engineering, I have spent the last 15 years studying the costs and benefits of dams, reservoir operations, and the physical, economic, and ecological impacts of dam removals. I have published over twenty papers on these various aspects of dams, and currently have a manuscript in preparation comparing the tradeoffs between a dam, floodplain expansion, and early warning systems on the Chehalis River system. It is this deep knowledge on dams, rivers, and flood management that is the basis of my opposition for the reasons detailed below. I want to emphasize that I am not opposed to all dams. I understand and appreciate the great value of hydropower produced by dams and the benefits of flood regulation by dams. However, the proposed project on the Chehalis fails basic criteria for what I consider to be a sensible dam.

Briefly, my key points of opposition:

- Flood mitigation practices that reduce exposure (i.e. floodplain expansion, land use regulations), rather than modifying flood characteristics, have been repeatedly shown to be more robust in systems undergoing hydrologic change, like the Chehalis. As a result of growing uncertainty around future climate and flood regimes, the standard of practice around the globe is shifting towards the practices more consistent with the proposed Restorative Flood Protection, as well as land use regulations that restrict development in floodways and other flood proofing activities. Dams lack the flexibility to be responsive to changing hydrology, as demonstrated by the \$1B spillway that was just added to Folsom Dam in California. Washington has the opportunity to demonstrate progressive,

truly long-term, resilient flood management, which in this case does not include a new dam.

- Dams produce a moral conflict surrounding intergenerational equity, which represents the idea that future generations should not be burdened with the maintenance and/or decommissioning of infrastructure that provided benefits to previous generations. This issue is already playing out across the US today, as our dams are old and thousands are considered deficient (ASCE 2013). The costs of decommissioning old dams are astounding. I have worked on dam removal projects that range in cost from \$500,000 (for a 1.5m tall) dam to over \$310,000,000, for which taxpayers have paid the tab. Managers should be extremely cautious in committing our grandchildren to this financial burden and only consider it when all other options have been eliminated, which the EIS has not convincingly argued.

- Experts in flood management (i.e. World Commission on Dams, 2000) assert that dams should only be considered as a last resort due to their known and irreversible impacts on ecological and cultural resources. The impacts of dams on river ecosystems is not news to anyone, and studies over several decades have demonstrated that many of the ecological impacts of dams cannot be mitigated.

It is my informed opinion that the new dam is not consistent with the goal of the strategy to develop “a long-term, Basin-wide, integrated approach to substantially reduce damage from major floods and restore degraded aquatic species habitat.” While flooding is clearly an issue on the Chehalis, there are much more sustainable and resilient options for managing floods in the basin. Frankly, a dam on the Chehalis represent an unimaginative, short-sighted, and destructive solution. Washington can and should do better for its people and its ecosystems.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 28, 2016 4:16 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Laurel

Last Name: Turner

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: I was at the hearing last evening and felt that we could benefit from a fifth proposal that leaves out both the dam and the relocation of farms and focuses on all other possible alternatives to the solution including compromises on the part of the farmers by selling off portions of their lands for wetlands and levees as most of the farmers are there as urban farmers anyway.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 31, 2016 9:32 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Mert

Last Name: Turner

Organization:

Address:



Phone:

Email:

Comments: I support Alternative 4: Restorative Flood Protection.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, November 14, 2016 4:53 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Christopher

Last Name: Vandenberg

Organization: Mr.

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: I believe there needs to be a cost benefit analysis on the installation of a temperature control tower on any dam that is approved. Being able to control the temperature of the river below the dam is critical to ensuring that the river does not violate 303d pollution standards and also is needed to allow proper growth of juvenile salmonids downstream.

I envision a tower connected to any structure used for smolt passage that remotely allows water to be drawn from various levels of the lake to mix and be released at optimal temperature. Such a device can be remotely controlled by telecommunications cables from a distant location.

Also, Construction of the dam should be consistent with Bureau of Reclamation construction standards so that there is the possibility of that agency assuming control of the dam and the expenses needed to run it. Lewis and Gray's Harbor counties should consider forming reclamation and flood control districts to take advantage of any extra irrigation water and to help create further flood and fish mitigation projects.

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This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 31, 2016 2:04 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Roby

Last Name: Ventres-Pake

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

To all who care about the future of the Chehalis River Basin:

Comments:

I am writing to express my deep concerns with the proposed flood retention dam on the Upper Chehalis River. Over the last century the Chehalis River Basin has been abused through diking, dredging, dam construction, river channelization, removal of large woody debris and stream substrate, destruction of wetlands and riparian areas, and intensive upland timber harvest. The flooding problem we currently face is aggravated by these abuses, and a true solution to the problem cannot come from continued degradation of the Chehalis River. Peer-reviewed science has shown time and again that the artificial containment of a river within its banks increases peak flows and water surface elevations during flood events, and that peak flood elevations can be reduced by restoring wetlands and reconnecting rivers with their floodplains. The construction of a dam would represent the furthest continuation of an outdated mentality that has stripped rivers like the Chehalis of their potential to support diverse and robust biological communities while providing natural flood reduction and other crucial ecosystem services that we all depend on.

Touting habitat restoration plans and the potential for a reservoir to provide cooler water in summer months masks the fact that all dams negatively impact anadromous fish. My experience as a biologist surveying salmonid habitat across the Columbia River Basin has shown me that any such benefits are heavily outweighed by the destruction of critical spawning habitat, loss of habitat connectivity, disruption of spawning gravel and sediment transport, acceleration of channel incision, and corruption of other crucial

riverine processes. I seriously doubt the integrity of any habitat restoration plan that includes the construction of a dam.

Additionally, I am alarmed by the lack of attention given to upland forest management practices in the consideration of flood reduction options. Changes in upland vegetation communities have direct impacts on flood severity. The exhaustive logging practices on timberlands of the Chehalis Basin have increased surface runoff, reduced water quality, and intensified floods.

Finally, we should pursue flood management and habitat restoration solutions that will endure in the face of our changing climate. From a flood reduction perspective, this means looking beyond stopgap solutions to address the root of the problem: poor land use practices and loss of riverine ecological services. From a biological perspective, this means fully promoting the ecological resilience of the Chehalis River instead of simply attempting to mitigate for damage done. The lack of mainstem dams on the Chehalis River greatly increases the recovery potential for Pacific salmon and other biotic communities threatened by climate change. Across all river ecosystems, biodiversity is best protected in rivers where physical regimes are the most natural.

Now is the time for us to set a precedent that we can work with rivers instead of against them. I urge you all to reject any flood management or habitat restoration proposal that includes the construction of a dam in the Chehalis River Basin.

Sincerely,
Roby Ventres-Pake

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This email was built and sent using [Visual Form Builder](#).

From: Richard Walker [REDACTED]
Sent: Monday, October 31, 2016 8:23 AM
To: info@chehalisbasinstrategy.com
Subject: comment on proposed dam

To Whom it May Concern:

I am a resident of Adna. The floods of 2007 and 2009 were horrible events that left our area devastated. Homes and farms that thought they were safe from flood damage were shocked to have massive flows on their property. There was major property loss, however, in spite of all the damage, there was no loss of life. Flood zone mapping established new borders and we now know who is in the flood plane and life goes on. Some of our community relocated and growth may have been slowed. But for many area residents such as myself, we are ok with a slower growth. It's important to acknowledge that these massive floods present minimal life threatening problems. So then it becomes largely an economic issue.

What is special about the Chehalis River is that it is not dammed. I am an avid fisherman and have a good feel for the river. This project is touted as a fish rehabilitation project. While restoring habitat in the form of restoring creeks etc is great, it will largely benefit the coho runs which stack the numbers of "salmon enhancement" disproportionately. The what are being largely ignored is that a dam will destroy the spawning habitat for winter steelhead and spring chinook that spawn above Crim Creek. There is minimal mention of the wonderful run of wild winter steelhead that the upper basin has. The steelhead is our state fish. It is sacred to me and many others. Few people realize how many spawn up there where the proposed reservoir is. My guess is that it is because sportfishing access is poor and the fish come an go in the high water with little trace. If a person is up there at the right time, the numbers spawning are impressive!

I am concerned about the quality of the data that has been collected. The first rains of the late summer and early fall bring large numbers of spring chinook to the upper river to spawn as well. They are readily visible. I have become aware of researchers tracking the spring kings in the early summer but the fish largely stage in the lower river where they have adapted over centuries to the unique warm water challenges this basin presents. Tracking them early mainly shows springers in the lower river. They need to be tracked in the early fall to see where they will be potentially lost. Appendix K of the Environmental Impact Statement discussing the effects the dam will have on the spring chinook concludes the dam will have a loss in the total spring chinook run of 3% ideally (with fish responding to a positive response of increased flows) or a loss of 6% of the run if these fish have adapted to warm temps and don't respond to the increased flow. First, I question the data knows just how many spring kings spawn up there. I add some other unknown variables that present a loss potential as well. Increased flows will change variables that are challenging to account for. Anglers (nets and sportfishers) will likely be able to target the fish more effectively with increased flows. The river may have a larger carrying capacity for northern pikeminnow or smallmouth bass that would adversely effect runs. Summer steelhead may become established that could indirectly effect springers (by more sportfishing pressure). Who knows what other variable a dam will create. Point is, the effects of a dam will be negative under the best projected models to spring chinook and steelhead (which are unaddressed), by how much, we won't know until it's too late.

The Flood Authority is well organized but maintaining the fish runs is an inconvenience to getting the flooding controlled. I am no expert on flood control but the flood of 2009 was largely driven by the Newaukum with minimal impact from the upper Chehalis. Would a dam have stopped it? The flood of 2007 had the South Fork

being a huge contributor the flood. A dam would not have stopped any damage to the Boistfort Valley this round. The flood of 1996 was largely the Skookumchuck which already has a dam. We built our community in a challenging place to control flooding. It would be tragic for me to see a dam destroy the wild runs I cherish so dearly without accomplishing the intended purpose.

Sincerely,
Richard Walker

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 9:40 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Shari

Last Name: Watt

Organization:

Address:



Phone:

Email:

I am writing from the perspective of one who lost my home and belongings in the flood of 2007. We still own the piece of property in Curtis where my family resided for 18+ years.

I am not in favor of option 1. After seeing how forceful rains washed away hillsides, I do not feel that a dam is a safe alternative for the people living below the dam/s in the path of potential overflow and mudslides.

Comments:

I am also not in favor of option 4. The proud communities and schools in these communities would cease to exist. Communities that have been in existence for 100+ years that hold much of our local history.

I do not know what the BEST option is, but feel very strongly that neither 1 or 4 should be considered. Both could have devastating effects on our Lewis County communities.

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From: William Watt [REDACTED]
Sent: Sunday, October 23, 2016 5:26 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
William Watt

EMAIL
[REDACTED]

MESSAGE

I am very concerned. My entire property of 1.28 acres is under water. In some places 3 feet deep and in others 3 inches. I can even walk out my back door. My property needs drainage. Please contact me. I have some very interesting photos of the water and that is on a good day after the water has gone down 5 inches. Davidwatt27@hotmail.com 360 970 5802

Sent from (ip address): 71.212.27.8 (71-212-27-8.tukw.qwest.net)

Date/Time: October 24, 2016 12:26 am

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (iPhone; CPU iPhone OS 10_0_2 like Mac OS X) AppleWebKit/602.1.50 (KHTML, like Gecko) Version/10.0 Mobile/14A456 Safari/602.1

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 25, 2016 1:31 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: IMG_9725.jpg; IMG_9724done.jpg; IMG_9730.jpg

Comment Form

First Name: William

Last Name: Watt

Organization: Teacher

Address: [REDACTED]

Phone: [REDACTED]

Email: [REDACTED]

Comments: I am a property owner and have major complaints. My house is flooded right now. I need some relief. It has been flooded for over 2 weeks. Last year when it flooded, it erupted my electricity cable to my septic tank and shorted out. Cost \$300+ to have replaced/fixed. My septic alarm goes off and trees are falling due to wet ground and unstable foundations. The water is backed up and has no where to drain. I am sick of people telling me I can dig a ditch on my property only. That is not the issue nor is it an answer to my problem. I have documented pictures of everything. My \$60K garage's foundation has split down the middle falling off its raised slab due to the wet and sinking ground. In addition, there was 3 days last year I was flooded in and could not go to work. I need help with this issue. Please contact me with with matter via phone or e-mail. Thank you. Mr. W. David Watt, 3rd grade teacher Fords Prairie Elem.

File Upload (1): http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/IMG_9725.jpg

File Upload (2): http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/IMG_9724done.jpg

File Upload (3): http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/IMG_9730.jpg





All Water - Over 3 feet deep.

All new drive way - Added over 12 feet. It was taken away last year causing over \$1300 in repairs out of pocket.

From: Jacob Waunch [REDACTED]
Sent: Monday, October 31, 2016 8:47 AM
To: info@chehalisbasinstrategy.com
Subject: Chehalis River Dam public comment

To Whom it May Concern:

I am a resident of Washington and a small business owner in Chehalis, WA. The floods of 2007 and 2009 were horrible events that left our area devastated. Homes and farms that thought they were safe from flood damage were shocked to have massive flows on their property. There was major property loss, however, in spite of all the damage, there was no loss of life. Flood zone mapping established new boarders and we now know who is in the flood plane and life goes on. Some of our community relocated and growth may have been slowed. But for many area residents such as myself, we are ok with a slower growth. It's important to acknowledge that these massive floods present minimal life threatening problems. So then it becomes largely an economic issue.

What is special about the Chehalis River is that it is not dammed. I am an avid fisherman and have a good feel for the river. This project is touted as a fish rehabilitation project. While restoring habitat in the form of restoring creeks etc is great, it will largely benefit the coho runs which stack the numbers of "salmon enhancement" disproportionately. The what are being largely ignored is that a dam will destroy the spawning habitat for winter steelhead and spring chinook that spawn above Crim Creek. There is minimal mention of the wonderful run of wild winter steelhead that the upper basin has. The steelhead is our state fish. It is sacred to me and many others. Few people realize how many spawn up there where the proposed reservoir is. My guess is that it is because sportfishing access is poor and the fish come an go in the high water with little trace. If a person is up there at the right time, the numbers spawning are impressive!

I am concerned about the quality of the data that has been collected. The first rains of the late summer and early fall bring large numbers of spring chinook to the upper river to spawn as well. They are readily visible. I have become aware of researchers tracking the spring kings in the early summer but the fish largely stage in the lower river where they have adapted over centuries to the unique warm water challenges this basin presents. Tracking them early mainly shows springers in the lower river. They need to be tracked in the early fall to see where they will be potentially lost. Appendix K of the Environmental Impact Statement discussing the effects the dam will have on the spring chinook concludes the dam will have a loss in the total spring chinook run of 3% ideally (with fish responding to a positive response of increased flows) or a loss of 6% of the run if these fish have adapted to warm temps and don't respond to the increased flow. First, I question the data knows just how many spring kings spawn up there. I add some other unknown variables that present a loss potential as well. Increased flows will change variables that are challenging to account for. Anglers (nets and sportfishers) will likely be able to target the fish more effectively with increased flows. The river may have a larger carrying capacity for northern pikeminnow or smallmouth bass that would adversely effect runs. Summer steelhead may become established that could indirectly effect springers (by more sportfishing pressure). Who knows what other variable a dam will create. Point is, the effects of a dam will be negative under the best projected models to spring chinook and steelhead (which are unaddressed), by how much, we won't know until it's too late.

The Flood Authority is well organized but maintaining the fish runs is an inconvenience to getting the flooding controlled. I am no expert on flood control but the flood of 2009 was largely driven by the Newaukum with minimal impact from the upper Chehalis. Would a dam have stopped it? The flood of 2007 had the South Fork being a huge contributor the flood. A dam would not have stopped any damage to the Boistfort Valley this round. The flood of 1996 was largely the Skookumchuck which already has a dam. We built our community in a challenging place to control flooding. It would be tragic for me to see a dam destroy the wild runs I cherish so dearly without accomplishing the intended purpose.

Sincerely,

--

Jacob Waunch



From: Alyssa westall [REDACTED]
Sent: Tuesday, October 18, 2016 10:09 PM
To: info@chehalisbasinstrategy.com
Subject: Comment on Draft EIS

Dear Department of Ecology,

I would like to express concerns about Alternative 2. This alternative does nothing to protect residents. Constructing levees and other measures to protect I-5 do nothing to protect local residents. It will lower property values and drown us out of our homes. The brunt of a natural disaster should not be artificially pushed onto some residents and farms in favor of protecting businesses and I-5.

Regarding Alternative 1, if this is adopted, do not begin work on to improve the levee without mitigating the impacts on residents who live on the wrong side of it. Alternative 1 does not go far enough to protect residents on the other side of the levee. Based on figure 5.3-1, the reduction in impact to my home would be minimal with Alternative 1. Some of the mitigation efforts described in Alternative 4 would still be necessary for this to be a permanent solution.

I am skeptical about Alternative 4. I fear that funding would fall short of the level of mitigation needed to offset the increase in flooding to many residents.

Please do not continue delaying implementation of an action that would protect residents. As studies continue to be conducted, it appears that the levee is being raised.

Thank you for the opportunity to comment,
Alyssa Westall
Chehalis resident

From: Bryce Westman [REDACTED]
Sent: Monday, November 14, 2016 3:41 PM
To: info@chehalisbasinstrategy.com
Subject: Public comment regarding dam proposal

Hello,

My name is Bryce Westman and I oppose the construction of any dam in the Chehalis River Basin.

From: Megan Whiteside [REDACTED]
Sent: Monday, November 14, 2016 5:20 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Comment
Attachments: ChehalisComment.docx

Hello,

I have attached a document commenting on the proposed flood management strategies in the Chehalis Basin.
Thank you.

-Megan Whiteside

To Whom it May Concern:

I am writing to advocate for intelligent, practical, and innovative decision making in regards to flood management in the Upper Chehalis River basin. If we are to listen to the best available science, if we care about conserving and restoring vibrant fisheries that our communities can depend on, and if the ultimate goal of these projects is to reduce peak flows and water surface elevations during flood events, then there can be no doubt: there is no place for dams in the future management of the Upper Chehalis River.

The implementation of a dam may appeal to those who favor a dependable outcome over an unfamiliar alternative, and it is true- we know what we can expect from dams. We can expect dams to degrade spawning habitat for fish that are vital to both our environment and our economy. We can expect dams to rob watersheds and deltas of sediments that are crucial for maintaining fertile floodplains, deltas, and critically important floodplain and coastal wetlands. Dams incise rivers and lower water tables which limits access to groundwater for both riparian plants and human communities. Reservoirs impair fish migration and contribute to greenhouse gas emissions through the release of methane.

Given these known consequences, the implementation of a dam for flood control would only make sense if there were no viable alternatives, and this is simply not the case. In fact, dams have the potential to increase peak flows during flood events when they constrict and oversimplify riverine systems. By contrast, healthy floodplains have the potential to both significantly decrease peak flows while improving the overall ecological condition of watersheds. Studies have shown that healthy floodplains have the potential to outcompete dams as tools for flood mitigation. Wetlands improve water quality, provide habitat and greatly reduce peak flows by slowing velocity and temporarily retaining surplus water. Intact riparian plant communities decrease water yields during storm events while providing habitat and food resources for diverse wildlife. Restored floodplains afford greater opportunities for beavers to provide far reaching ecological services that include impressive water retention and wetland creation. These benefits would be further compounded by improved management of the drastic upland logging practices in the Chehalis Basin, which worsen flood severity.

The solution to the issue of flooding in the Chehalis Basin is not further environmental degradation and mismanagement of natural resources. A dam would be a band aid fix that would only serve to worsen the overall ecological condition of the Chehalis Basin. By restoring natural floodplain processes, we can allow river systems to work for us while maintaining the ecological integrity and services of this important watershed.

Sincerely,

Megan Whiteside

Bellingham, WA

[REDACTED]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 27, 2016 9:48 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

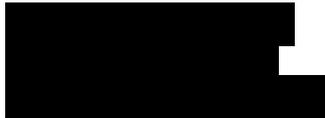
Comment Form

First Name: Stacy

Last Name: Wilson

Organization:

Address:



Phone:

Email:

Comments: I have been through two floods of my place of work. I believe Alternative #1, the flood retention dam on the Chehalis is best choice for our area.

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This email was built and sent using [Visual Form Builder](#).

From: Dave Wright [REDACTED]
Sent: Friday, October 28, 2016 1:26 PM
To: info@chehalisbasinstrategy.com
Subject: Chehalis Basin Strategy website

To:
Webmaster

NAME
Dave Wright

EMAIL
[REDACTED]

MESSAGE

Please, do not dam the chehalis river. Flood plain is just that, flood plain. Please leave it be.

Sent from (ip address): 216.128.108.71
(ten-calix1-216-128-108-071.tenino.com)

Date/Time: October 28, 2016 8:25 pm

Coming from (referer): <http://chehalisbasinstrategy.com/> Using (user agent): Mozilla/5.0 (Linux; Android 5.1.1; D6708 Build/23.4.B.0.319; wv) AppleWebKit/537.36 (KHTML, like Gecko)

Version/4.0 Chrome/54.0.2840.68 Mobile Safari/537.36 [FB_IAB/FB4A;FBAV/100.0.0.20.70;]

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Monday, October 24, 2016 1:55 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Les

Last Name: Wright

Organization:

Address: [Redacted]

Phone: [Redacted]

Email: [Redacted]

Comments: I read that the committee has recommended strategy #1, building a dam above Pe Ell. Has anyone on that committee read the information on the WA Emergency Management website? When (Not If) a large earthquake will hit of the coast possibly a 7 or higher, you will be responsible for the lives of over 600 people when the dam collapses. The money lost to flooding issues is nothing compared to the lives that will be lost. State, county and city governments are responsible for allowing businesses to fill in the natural flood plain areas to construct their buildings. Flooding has been happening in these areas since the river was formed.
Earthquakes have caused dams to collapse before try using Google to do research.

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From: Les Wright [REDACTED]
Sent: Monday, October 31, 2016 2:33 PM
To: info@chehalisbasinstrategy.com
Subject: Recommendation for a dam above Pe Ell

Question, Has the group ever discussed the possibility of an earthquake effecting an earthen dam? Try Google and you will see it has happened before.

The following is a partial copy of the article (The Chronicle, Oct 25, 2016) explaining the recent drill Cascadia Rising.

The "Cascadia Rising" scenario, developed by (FEMA), estimates that a magnitude 9 quake and tsunami could kill 14,000 people and injure more than 30,000 in Washington and Oregon alone. More than 7,000 highway bridges and 16,000 miles of roadway are expected to suffer moderate to severe damage, including all routes to the Pacific Coast and Washington's major east-west corridors.

State, County and City governments were responsible for allowing the natural flood plain to be filled in and built on which in turn forced the river flooding to cause so much damage. Now they want to build an earthen dam that will only be about 60 miles from a fault zone that the Washington State Emergency Management office believes will cause a 7 to 9 earthquake sometime in the future. The 100 year flood in 2007 caused a lot on monetary damage but a dam that fails will cause a loss of life which is much more valuable.

Would any of you be willing to buy a home in Pe Ell with the dam just a mile away?

Thank You
Les Wright

OCTober 26, 2016

TO: Chehalis Basin Strategy
Draft Environmental Impact Statement
Aberdeen/Hoquiam North Shore Levee

As of writing this letter, the City of Aberdeen and their consulting group have yet to agree as to where the North Shore Levee's boundaries are going to be located. Therefore, it's not clear whether or not my neighborhood will be inside or outside the levee. It is difficult to respond to this EIS when I don't know if I'm going to be blessed with certified flood protection, no flood insurance costs, and rising house values or outside the levee with large flood insurance costs, lower house values, the probability of not being able to sell my house (if needed), potential repair costs for flood damage, and the cost to combat bank erosion. And, maybe some sort of compromise will be worked out.

I have included in this response a packet of information, maps, and questions concerning the cumulative impacts to the Wishkah and Chehalis Rivers in the City/Limits of Aberdeen. This packet was sent to Aberdeen's City Engineer as a Freedom of Information request. Please refer to the map entitled "Existing Flood Protection" which shows eleven specific areas that already have some sort of flood protection. The Courts have ruled that diking of numerous parcels of land situated within a floodplain, each displacing only a relatively minor amount of floodwater, in aggregate can lead to disastrous consequences.

"Cumulative impact" is defined as the impact to the environment which results from the incremental impact of past, present, and reasonably foreseeable actions. It is of my opinion that the total cumulative impact to the Wishkah and Chehalis Rivers has not been calculated and used to make informed decisions concerning the North Shore Levee. Furthermore, I wonder if the "best available science" was used for calculations and decision making, especially when phrases like "potential moderate adverse impacts" and "the potential to redirect high velocity flows" are used. To me, it seems the issue of mitigation is being sidestepped. Many mitigation issues in this EIS state "same as those described for the Airport Levee and/or I-5 project". Other mitigation issues state they are "similar" to the other proposed projects. I would think for a document as important as this EIS, all mitigations would be included for each specific project.

Section 4.6.4.2 states, "The levee would reduce flood extents in urban areas, but would shift flood extents in other areas of the lower Wishkah River, lower Hoquiam River, and lower Chehalis River estuary flood plains. The potential for river channels to migrate in these areas is already highly constrained by urban infrastructure and other constraints on the floodwater extents created by the levee are likely to increase flood extents and force changes in the river channel upstream. Constraints on river migration and floodplain inundation in these areas reduces habitat function for fish by

reducing areas of refuge from high velocity flows.

Redistribution of floodwater could result in redistribution of fish in newly flood areas upstream."

Section 4.6.2.2 states "with the placement of the levee, there is the potential to redirect high velocity flows downstream or to an adjacent or opposite bank, causing erosion or damage to aquatic habitats".

The two above mentioned Sections speak for themselves. The North Shore Levee will adversely affect and damage adjacent properties. As per the City of Aberdeen's Chapter 15.52, Flood Damage Prevention, Sections 4.6.4.2 and Section 4.6.2.2 define "an adverse affect", and therefore flood damage mitigation measures must be made a condition of a permit.

Inclosing, I am asking for a cumulative calculation of all impacts to the Wishkah and Chehalis Rivers from the City's past, present, and foreseeable future projects. As stated before, the Courts have ruled that diking of numerous parcels of land situated in the floodplain, each displacing only a relatively minor amount of floodwater, in aggregate can lead to disastrous consequences. And, it is government's responsibility to make this determination with the best science available. It can no longer be argued that the City of Aberdeen has no knowledge of the significance of the total cumulative impacts caused by the total number of flood control measures that have been installed within their City limits. At common law, all individual,

including public employees, have a duty to other members of society to act "responsibly" in a manner not to cause damage to other members of society. "Actionable" negligence results from the creation of an unreasonable risk of injury to others. Negligence is the primary legal basis for public liability for improper design of hazard reduction measures such as flood control structures, and inadequate processing of permits. This EIS deals with the impacts to the environment from the proposed North Shore Levee. Much is said about the various types of fish and the impact to their environment. I think these environmental reviews should have a section entitled, "Home, Businesses, and Families". It's disturbing to think your life and your home of 40 years could be so impacted by someone drawing a line on a map. This EIS states "that repeated flooding causes significant psychological and emotional costs to communities". If the North Shore Levee is built with our neighborhood between the river and the levee, this action could redefine the definition of "significant psychological and emotional costs".

I would ask that this draft EIS not be approved, and that there be a new comment period allowed only after the City of Aberdeen produces the total cumulative impacts caused by all flood control measures installed within their City limits. Government can be held liable for inadequate dissemination of hazard information.

I would hope that the five other diking projects proposed upstream on the Wishkah River would be evaluated as a cumulative total impact as well. (see enclosed material)

These five project could impact people living along the Wishkah with no flood protection.

Thanks for your time,
Steve A. Wyckoff



3/16/16

Grays Harbor County - Wishkah Road Comprehensive Flood Study Project

[Portal ID #1937]

Updates	Overview	Contacts	Events	Library
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Summary of the project

Last Updated: **September 12, 2016**

Click [HERE](#) To Return To Main Flood Authority Website

Click [HERE](#) to Return To Grays Harbor County Flood Relief Projects
(www.ezview.wa.gov/graysharborcounty/floodrelief)

Click [HERE](#) To See Project Financials

2015-17 Funding – \$500,000 (3/01/2016, click [here](#))

Project Financials – See separate project financials website [here](#).

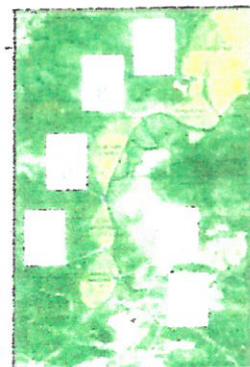
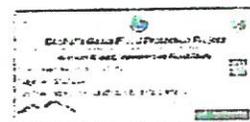
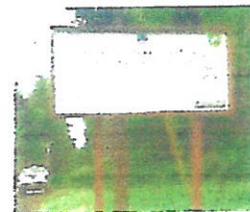
Description – Purpose of the project is to study the frequency, duration and extent of flooding on the Wishkah Road between M.P. 2.2 and M.P. 7.6 and identify cost effective flood hazard reduction alternatives for the following:

- o Study Area #1 – Baretich Flats (M.P. 2.2).
- o Study Area #2 – Ellison Dip (M.P. 3.8).
- o Study Area #3 – Long Swamp (M.P. 5.0).
- o Study Area #4 – Monarch Creek (M.P. 5.8).
- o Study Area #5 – Vienna Tracts (M.P. 7.6).

The project will:

- o Review and evaluate previous studies, reports, and information.
- o Determine flood elevation, depth, duration and frequency for various low points within the comprehensive study area.
- o Identify and evaluate alternatives that eliminate or reduce Wishkah Road flood closures within the comprehensive study area.
- o Prepare preliminary plan, design and construction cost estimates for each alternative proposal within the comprehensive study area.
- o Determine feasibility and adverse impacts/effects for each alternative proposal within the comprehensive study area.

Pictures





NEIGHBORHOOD 2

CHICAGO AVE

E 1ST ST

STANTON ST

MADISON ST

YOUNG ST



City of Aberdeen

Date Requested:

Time:

Request No.:

Name Steve Wyckoff
Address [REDACTED]
City, State, Zip [REDACTED]
Phone [REDACTED] E-mail: _____

Nature of your request / information requested:

Impacts to the Wishkah and Chehalis Rivers

Record Requested:

I am requesting the cumulative calculations for the total impact to the Wishkah and Chehalis Rivers from all City of Aberdeen's past, present, and foreseeable future flood control measures.

Steve Wyckoff
Signature

Oct 26, 2016
Date of Request

Please note information on reverse side of form relating to charges for copies.

FOR OFFICE USE ONLY

Please return original request form and copies of all records provided to requester to the Finance Department after signing & filling request. Questions can be directed to the Finance Department.

APPROVED DENIED

EXPLANATION:

Human Resources – Refer to Personnel Rule Book, Section 5. Central Personnel Records, 5.25.
Employee(s) notified: _____
Date _____

Signed: _____ Date: _____

OCTOBER 26, 2016

To: Kris Koski
City of Aberdeen
Public Works Engineer
200 E. Market Street
Aberdeen, Wa. 98520

RE: Freedom of Information Act Request for Information
regarding the total impact of all flood control projects
in the City of Aberdeen.

Dear Kris,

15.52.040 states "the City Engineer is to review all permits to determine if proposed development affects the flood carrying capacity of the area of special flood hazard. Adversely affects means damage to adjacent properties because of rises in flood stages, attributed to physical changes in the channel and adjacent overbank areas. It is the responsibility of the applicant to provide engineering data and studies as may be required by the City Engineer to make this determination".

The City must provide the engineering data and studies to you, the City Engineer, to personally make the determination whether or not the North Shore Levee will have any adverse effects. The Courts have ruled have ruled that diking of numerous parcels of land situated within a floodplain, each displacing only a relatively minor amount of floodwater, in aggregate can lead to disastrous consequences. The City of Aberdeen has built, or allowed to be built, miles of levees and various types of flood protection within its City limits. I would guess that

at least 90% of Aberdeen's shorelines have some sort of flood protection installed by, or approved by, the City.

The following is a list of ten projects that the City is responsible for. Please answer each set of questions:

1) Southside Levee (from Cosmopolis to the Bishop Center)
a) enclose calculations as to how this levee system affects the flood carrying capacity of the Chehalis River.

2) Environment Blocks along the Wishkah River in numerous locations

- a) was this done with grant money and if so, provide the Agency and type of grant.
- b) did this project comply with all provisions of City and State Shoreline Master Programs?
- c) was this project permitted by any State Agencies?
- d) enclose calculations as to how this flood control project impacted the flood carrying capacity of the Wishkah River.

3) Earthen levee around railroad bridge at foot of "F" street

- a) was this done with grant money, and if so, provide the Agency and type of grant.
- b) did this project comply with all provisions of City and State Shoreline Master Programs?
- c) was this project permitted by any State Agencies?
- d) enclose calculations as to how this flood control project impacted the flood carrying capacity of the Wishkah River.

4) Earthen Levee between the Heron and Wishkah bridges at Zelasko Park

- a) was this done with grant money, and if so, provide the Agency and type of grant.
- b) did this project comply with all provisions of City and State Shoreline Master Programs?
- c) was this project permitted by any State Agencies?
- d) enclose calculations as to how this flood control project impacted the flood carrying capacity of the Wishkah River.

5) the cement Bulkhead (wall) along the sidewalk by Breakwater Seafoods

- a) was this done with grant money, and if so, provide the Agency and type of grant.
- b) did this project comply with all provisions of City and State Shoreline Master Programs?
- c) was this project permitted by any State Agencies?
- d) enclose calculations as to how this flood control project impacted the flood carrying capacity of the Wishkah River.

6) Earthen levee, with walking path, from Heron Street along the Wishkah River to an area behind Staples store.

- a) did this project comply with all provisions of City and State Shoreline Master Programs?
- b) was this project permitted by any State Agencies?
- c) enclose calculations as to how this flood control project

impacted the flood carrying capacity of the Wishkah and Chehalis Rivers.

- 7) Cement wall behind the Mall to Wilson Creek
 - a) did this project comply with all provisions of City and State Shoreline Master Programs?
 - b) was this project permitted by any State Agencies?
 - c) enclose calculations as to how this flood control project impacted the flood carrying capacity of the Chehalis River.

- 8) Earthen levee at the foot of "F" street in the area where the Wishkah meets the Chehalis River.
 - a) was this done with grant money, and if so, provide the Agency and type of grant.
 - b) did this project comply with all provisions of City and State Shoreline Master Programs?
 - c) was this project permitted by any State Agencies?
 - d) enclose calculations as to how this flood control project impacted the flood carrying capacity of the Wishkah River.

- 9) The area that was filled around Stewart's Field and the Robert Gray Elementary School.
 - a) enclose calculations as to how this fill impacted the flood carrying capacity of the Wishkah River.

10) Area Filled Around Log Cabin

- a) enclose calculations as to how this fill impacted the flood carrying capacity of the Chehalis River

I am requesting the cumulative calculations for the total impact to the Wishkah and Chehalis Rivers from the City of Aberdeen's past, present, and foreseeable future projects. The Courts have ruled that the diking of numerous parcels of land situated in a flood plain, each displacing only a relatively minor amount of floodwater, in aggregate can lead to disastrous consequences. And, it is government's responsibility to make this determination with the best science available because of the fact that government can be held liable for inadequate dissemination of hazard information. It can no longer be argued that the City of Aberdeen has no knowledge of the probable significant cumulative impacts caused by the total impacts of all flood control measures installed within the City limits.

These are references taken from the North Shore Levee Environmental Impact Statement:

- Potentially moderate adverse impacts by increasing the velocity in the river and restricting channel migration. There is the potential to redirect high velocity flows downstream or to an adjacent or opposite bank, causing erosion or damage.
- increases in floodwater elevations upstream and adjacent to the levee improvements along the Wishkah.
- changing flood extents and elevations upstream and downstream during flooding
- river channels to migrate / force changes in river channel upstream
- reduce areas of fish refuge from high velocity flows
- redistribution of fish in newly flooded areas upstream
- the impacts on estuarine habitat would diminish the productivity and abundance of juvenile salmon and steelhead.
- a moderate affect on wetlands (approx. 1/2 acre)
- liquefaction of ground during an earthquake would be a concern in the area of the levee.
- reducing habitat for the Environmentally Sensitive listed Bulltrout, Eulachon, and Southern Green Sturgeon. These are listed as Threatened under ESA.

Please reference the above list of adverse affects to the following page entitled Flood Damage Prevention

Chapter 15.52
FLOOD DAMAGE PREVENTION

Sections:

- 15.52.010 Purpose.
- 15.52.020 Definitions.
- 15.52.030 General provisions.
- 15.52.040 Designation and duties of the city engineer.
- 15.52.050 Establishment of permit criteria.
- 15.52.060 Appeal board.
- 15.52.070 Appeals.
- 15.52.080 Variances.
- 15.52.090 General standards for flood hazard protection.
- 15.52.100 Specific standards for flood hazard protection.
- 15.52.110 Floodways.
- 15.52.120 Violations—Penalties.
- 15.52.130 Elevation Certificates.

15.52.040 Designation and duties of the city engineer.



The city engineer is appointed to administer and implement this chapter by granting or denying any city of Aberdeen permit applications in accordance with the provisions herein stated. Duties of the city engineer shall include but not be limited to:

A. *Permit Review.*

1. Review all permits to determine that the permit requirements of this chapter have been satisfied;
2. Review all permits to determine if proposed development adversely affects the flood carrying capacity of the area of special flood hazard. For the purpose of this chapter, "adversely affects" means damage to adjacent properties because of rises in flood stages attributed to physical changes in the channel and adjacent overbank areas. It is the responsibility of the applicant to provide engineering data and studies as may be required by the city engineer to make this determination.
3. If the city engineer determines that there is no adverse effect, the permit shall be granted consistent with provisions of this chapter without further consideration of these effects.
4. If the city engineer determines that there is an adverse effect, then flood damage mitigation measures shall be made a condition of the permit.

B. *Use of Other Base Flood Data.* When base flood elevation data has not been provided in accordance with Section 15.52.030(B), the city engineer shall obtain, review and reasonably utilize any base flood elevation data available from a federal, state or other source, in order to administer Sections 15.52.100(A) Specific Standards, Residential Construction, and 15.52.100(B) Specific Standards, Nonresidential Construction.

C. *Information to be Obtained and Maintained.*

1. Obtain and record the actual elevation (in relation to city of Aberdeen datum) of the lowest floor (including basement) of all new and substantially improved structures.

Grays Harbor County - Wishkah Road Comprehensive Flood Study Project

[Portal ID #1937]

Updates	Overview	Contacts	Events	Library
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Summary of the project

Last Updated: [September 12, 2016](#)

Click [HERE](#) To Return To Main Flood Authority Website

Click [HERE](#) to Return To Grays Harbor County Flood Relief Projects
(www.ezview.wa.gov/graysharborcountyfloodrelief)

Click [HERE](#) To See Project Financials

2015-17 Funding -- \$500,000 (3/01/2016, click [here](#))

Project Financials -- See separate project financials website [here](#).

Description -- Purpose of the project is to study the frequency, duration and extent of flooding on the Wishkah Road between M.P. 2.2 and M.P. 7.6 and identify cost effective flood hazard reduction alternatives for the following:

- Study Area #1 -- Baretich Flats (M.P. 2.2).
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- Study Area #3 -- Long Swamp (M.P. 5.0).
- Study Area #4 -- Monarch Creek (M.P. 5.8).
- Study Area #5 -- Vienna Tracts (M.P. 7.6).

The project will:

- Review and evaluate previous studies, reports, and information.
- Determine flood elevation, depth, duration and frequency for various low points within the comprehensive study area.
- Identify and evaluate alternatives that eliminate or reduce Wishkah Road flood closures within the comprehensive study area.
- Prepare preliminary plan, design and construction cost estimates for each alternative proposal within the comprehensive study area.
- Determine feasibility and adverse impacts/effects for each alternative proposal within the comprehensive study area.
- Provide hydraulic modeling for each feasible alternative proposal within the comprehensive study area.
- Provide benefit/cost analysis for each feasible alternative proposal within the comprehensive study area.
- Identify permits and regulatory requirements for each feasible alternative proposal within the comprehensive study area.
- Identify property and easements needed for each feasible alternative proposal within the comprehensive study area.
- Recommend a comprehensive package of feasible alternatives for final design covering the comprehensive study area.
- Provide scope, schedule, and sequencing for final design and permits for recommended projects.
- Implement a community awareness and engagement strategy that will include community meetings at critical junctures of the project, publically accessible website containing critical information documents, advertisement of key decisions and the schedule for such, etc.

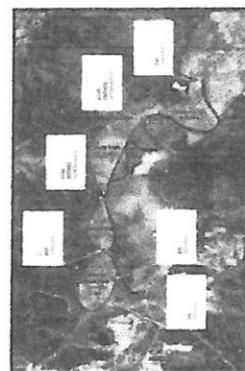
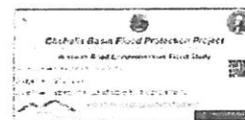
Flood Hazard Reduction Benefits -- Project will benefit residents of Grays Harbor County, particularly those who reside or travel north of Aberdeen on the Wishkah Road, by ensuring (ultimately) the passability of the Wishkah Road, particularly in times of flood emergency.

Project Status -- On-Track, Underway.

Schedule/Milestones -- Current schedule is as follows:

- May 2016 -- DRAFT Study Scope.
- June 2016 -- FINAL Study Scope.
- April 2017 -- DRAFT Study Completed.
- June 2017 -- FINAL Study Completed.

Pictures



ELEVATION MAP

These three projects, which would have provided much needed flood protection, were stopped and all funding earmarked for these areas by the State Legislature, were transferred to the design of the Northside Levee.

This 1986 map shows that the area proposed for the Northside levee already has a dike. Yet, funding given to protect other areas that actually flood, was taken away to fund the Northside Levee. Flood Authority money should be used for actual flood protection and not to lower flood insurance and raise property values for those fortunate enough to be inside a certified levee.



Figure 261. Critical flood levels for Aberdeen (north side of Chittabaw River) and South Aberdeen (south side of river). Low-lying areas will be subject to flooding during low tide; during high tide, the entire enhanced area will be subject to normal or flooding tide. Because of deeper water level, could have relatively high velocity. One bounded river flood boundary defined by FEMA in cooperation with NCEP (National Flood Insurance Program) in the 10-year return period. From Urban Regional Research (1986).



Elevations (Google Earth)
 ● 12' or less
 ● 13'
 ● 14'
 ● 15' or more

Hoquiam, Aberdeen will work toward dike system to raise property values
 BY KYLE MITCHELL
 The Daily World

Officials in Aberdeen and Hoquiam plan to work together toward a dike system to raise property values in the area. The dike system would create a barrier between the two cities for the plan begins in earnest on Monday night's Hoquiam City Council meeting, where Aberdeen Commissioner Keith Hender, speaking as a guest, urged council members to attend a meeting scheduled for early November to discuss the plan.

The project would, in part, build a dike around the Hoquiam River, create a set of parks that would double as water-recreation areas and make changes to the river flood areas to substantially reduce flood insurance costs.

"Public discussion between the two cities for the plan begins in earnest on Monday night's Hoquiam City Council meeting, where Aberdeen Commissioner Keith Hender, speaking as a guest, urged council members to attend a meeting scheduled for early November to discuss the plan."

SEE PAGE 4

FLOOD AUTHORITY Sept 20, 2014
New north side levee could reduce flood insurance rates
 BY ERIN HART
 The Daily World

In an effort to mitigate flood risk and help reduce flood insurance costs, the Chittabaw River Basin Flood Authority has approved a request by Aberdeen Public Works Director Malcolm Bovee to rezone just over \$1 million in funding in order to help pay for a new, larger north side levee.

The north side levee would help reduce the risk of flooding in the area. The levee would be an earthen embankment similar to the south side levee, which is being re-zoned to a higher risk zone. Flood insurance rates in the area are high, and the Flood Authority recently has had already obtained the funding of the project.

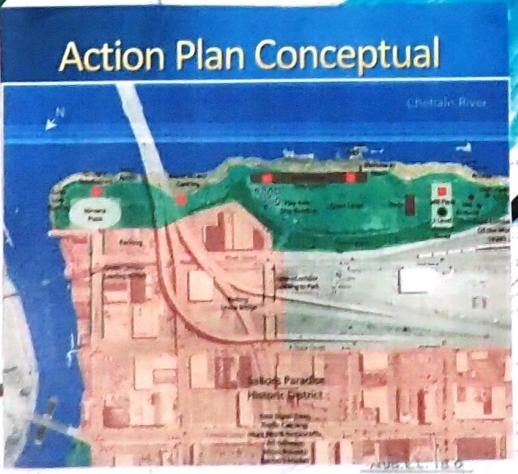
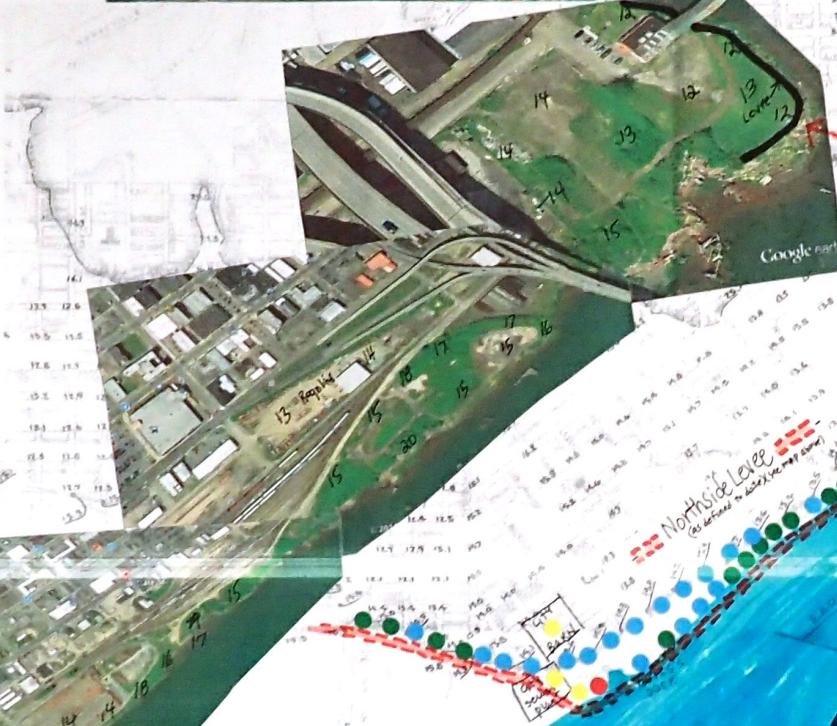
SEE LEVEE, PAGE 4

PROPERTY ADDRESS	ELEVATION	PROPERTY ADDRESS	ELEVATION
101 N. 1st St.	12.5	101 N. 2nd St.	13.0
102 N. 1st St.	12.8	102 N. 2nd St.	13.2
103 N. 1st St.	13.1	103 N. 2nd St.	13.5
104 N. 1st St.	13.4	104 N. 2nd St.	13.8
105 N. 1st St.	13.7	105 N. 2nd St.	14.1
106 N. 1st St.	14.0	106 N. 2nd St.	14.4
107 N. 1st St.	14.3	107 N. 2nd St.	14.7
108 N. 1st St.	14.6	108 N. 2nd St.	15.0
109 N. 1st St.	14.9	109 N. 2nd St.	15.3
110 N. 1st St.	15.2	110 N. 2nd St.	15.6



ELEVATIONS TAKEN BETWEEN 1967 AND 1976
 BY GUY CARDO
 ASST. CITY ENGINEER

DRAWN BY D. MORGAN
 MARCH 16, 72



Flood Authority Weighs Use of \$4.2 Million Surplus

Money Officials Seeking Input on Where to Spend the Funds After Construction Delays on Other Projects

If these projects were just delayed, they would have not taken the money and spent it elsewhere. These projects are cancelled... no funding! And now the Flood Authority wants input on where to spend our funds to keep other homes "safe and dry," unbelievable.

PROJECTS UNDERWAY IN GRAYS HARBOR COUNTY

Aberdeen	1	Burger King Trail/Dike
Aberdeen	2	Dike Bank of Washkah North of Highway
Aberdeen	3	Market Street Dike
Aberdeen		Northside Levee Construction

1 Aberdeen - Market Street Dike Project

Summary of the project
 Last Update: 10/26/12

2014-15 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2015-16 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2016-17 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2 Aberdeen - Dike Bank of Washkah North of Highway Project

Summary of the project
 Last Update: 10/26/12

2014-15 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2015-16 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2016-17 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

3 Aberdeen - Burger King Trail/Dike Project

Summary of the project
 Last Update: 10/26/12

2014-15 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2015-16 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

2016-17 Funding: \$100,000 - \$100,000 for preliminary engineering design and cost estimate.

As this elevation map shows, The Burger King Trail/Dike, the Market Street Dike, and the Dike Bank of Washkah North of Highway project were all identified as important flood control projects and funded by the State Legislature. During this period, a certified levee project, such as the Northside Levee, was not presented as a problem area needing funding. But for whatever reason, all funding for the three above mentioned projects was transferred to a newly created project named the Northside Levee.

As you can see by the elevation map, all three terminated project sites have lower elevations and therefore, more severe flooding issues than the area of the proposed Northside Levee. In fact, it might be safe to assume that the idea of the proposed Northside Levee experiences only minor river flooding. (Please look at the other enclosed map of the existing flood control measures the City has already built).

Newspaper articles state the City wants to build a dike system with the intent of lowering insurance rates and raising property values. The City even has a flood insurance manager. I would think that it is the City's responsibility to protect all at-risk properties, not just focusing on providing protection, part of financial benefits for some.

E44J

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Thursday, October 20, 2016 9:51 AM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Follow Up Flag: Follow up
Flag Status: Completed

Comment Form

First Name: Willard

Last Name: Young

Organization: none

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

Stop spending my children's money into a black hole and arrogantly stating flood control. There is no control. There is not one single project that you can point to that has had any impact on flooding. Millions on Millions of dollars spent and no measurable accomplishments of any kind. Please stop!! Now you want additional taxes (stealing) taking money from everyone for nothing. We could have moved the entire town of Chehalis, without exaggeration, onto the Napavine plateau with the money that has been spent in the last 30 years on this issue. You talk as if you care about downstream impact. The stream of money is the only impact you are concerned with. Does this organization even have a number for total dollars spent on this issue in the last 30 years. It is so much you could not tell me. I dare you to put an accountant on this and generate an accurate number. State, federal, county, tribes. and private money: I am sure this organization has no clue. I owned a flood house. The reporters from channel 13 would come there every time and film. Different angles etc. They would laugh " well how high this time". That house was raised after I sold it and it still flooded. Please stop! You will never have the power, I hope not anyway, to redesign the entire basin. This and all organizations like this are incompetent money grabbing, no hope of success money drains That's the only thing you can get to drain.

It is pouring down rain right now so I am going to clean out my gutters. It is a really easy way. I just stand at the down spout in the pouring down rain and clean the debris as it comes to me. Takes 45 seconds to clean the entire gutter. The downspout goes to a large

catch basin that I can never fill up. It works really well.

Please immediately disregard these comments as ignorant, uneducated, no clue redneck observations. But then isn't this a branch of the same outfit that I stood on the bank of a stream in the 70's arguing venomously as I was ordered to run my bulldozer down the middle of the creek for what was it. oh yea "fish passage"

File Upload

(1):

File Upload

(2):

File Upload

(3):

This email was built and sent using [Visual Form Builder](#).

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Tuesday, October 18, 2016 5:32 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form

Comment Form

First Name: Cecil

Last Name: Zellers

Organization:

Address:

[REDACTED]

Phone:

[REDACTED]

Email:

[REDACTED]

Comments:

Plan 1 which would dam 6 miles of upper Chehalis river is the best plan. Looking at the map the upper 12 straight line miles of river shows no homes, so no impact on the population of our area. If used as reservoir only at flood times would have least impact on river quality most of the year and would greatly reduce flood impact.

Plan 4 looks the worst as it will impact the most homes and commercial properties and looks like will do the least to reduce overall flooding.

File Upload

(1):

File Upload

(2):

File Upload

(3):

This email was built and sent using [Visual Form Builder](#).

Aileen Manley

From: Deanna Zieske [REDACTED]
Sent: Sunday, November 13, 2016 9:19 PM
To: info@chehalisbasinstrategy.com
Subject: Comments on the Draft EIS
Attachments: 2016 Group Comments on Draft EIS.pdf

Attached please find comments from the individual signers regarding the draft EIS.

Comments on Chehalis Basin Strategy Draft Programmatic EIS

The undersigned individuals have joined together to offer our shared comments on the Chehalis Basin Strategy Draft Programmatic EIS (hereafter referred to as Report) that was issued for public comment on September 29, 2016. Each of us is an individual concerned about the manner by which Lewis County approaches future growth and major changes to the environment in our county. Many of us were parties to multiple challenges to the Lewis County Growth Management Plan in the period between 2001 and 2006.

Integral to our concern about our county's future is the manner by which the very real problem of flooding is addressed. Our focus is upon Lewis County and the implications the Report has upon our county. In that regard we believe that the approaches being proposed in the Report are moving forward without adequate attention being paid to impacts associated with the various alternatives have upon our county's growth management plan with so little time given for widespread community input/comment. We will leave it to residents of both Thurston and Grays Harbor counties to address what we are certain will be the growth management implications the Report has for growth management planning in those two counties.

We are certainly aware that flooding in the Chehalis basin has been a significant issue that has been studied for generations without resolution. We are pleased that the current efforts leading up to the Report represent the greatest degree of inter county and interagency cooperation that has been seen since the issue of flooding became serious many years ago. At this point the undersigned are not "voting" for or against any proposal as presented in that report. Rather, we are pointing to issues of significance that seem to have been overlooked and that must be addressed before a final decision is adopted.

Correspondingly, we believe the recent vote by the Chehalis Basin Flood Authority as well as several local governmental entities to support Alternative 1 is premature and ill-advised.

The Lewis County Growth Management Plan addresses important issues pertaining to flood plain management and the use of both agricultural and forest lands. At least two of the alternatives for controlling flooding set forth in the Report have the effect of reducing one or both of the following – lands set aside as agricultural lands and lands set aside as forest lands.

Alternative 1, the flood retention facility, would, of necessity, involve taking the acreage under which the dam's reservoir will be located from agricultural and/or forest management uses. In addition, there is a substantial safety hazard arising from construction of a dam because it will be located on or near the Doty fault. The risk and/or intensity of a magnitude 6.5 to 7.0 earthquake near or at that fault may result in increased property damage and even compromise the structural integrity of the dam itself.

Alternative 4, restorative flood protection, involves relocation and adaptation of at-risk land uses under existing conditions, may have a similar – perhaps an even greater – impact on agricultural and forest lands. Moving many, if not all, of the affected landowners from agricultural lands in the current flood plain to higher ground will involve the double whammy of taking thousands of acres of farm land in the basin out of production while converting a significant amount of forest land to replacement agricultural lands. What studies, if any, exist to support the efficacy of converting forest lands to agricultural lands as proposed in the Report? Has anyone even considered the willingness of current landowners to move their farm operations from fertile bottom lands to hillside lands stripped of timber to allow conversion to new agricultural lands? Do we even know whether soils located on those hillsides would be suitable for productive farming?

Nearly all of the land impacted by Alternatives 1 and 4 is located in Lewis County. Redesignating those acres will require revising Lewis County's Growth Management Plan and potentially subject the revisions to scrutiny by the Western Washington Growth Management Hearings Board. Has this prospect has been considered in any manner?

Any of the alternatives being proposed in the Report will involve a very large investment of funds to bring them to fruition. Those costs will include planning, design and construction of structures that may be built, purchase of land needed to complete whatever alternative may be forthcoming, as well as relocating and/or building roads, rail lines and utilities that may need to be relocated, rebuilt or repaired. And if an alternative involving a flood retention dam is the result of this process there will also be significant annual costs associated with operation and maintenance of that structure and its accompanying impoundment.

What will the financial costs be for bringing each of the alternatives set forth in the report? Who will be responsible for paying those costs? If any of those alternatives involves annual operations and maintenance costs (e.g., alternative 1), what will those annual costs be and who will be responsible for the operation and maintenance costs? In other words, will state-wide tax payers be paying these costs or will it be only the taxpayers in the Chehalis River Basin?

Has anyone conducted a study to see whether the benefits to be derived from any of the alternatives proposed in the Report offset or exceed the cost to construct and operate the various alternatives?

The lower 68 miles of the Chehalis River between Aberdeen to near Chehalis is a navigable waterway that is subject to the jurisdiction of the U.S. Army Corps of Engineers. Has the Corps of Engineers been involved in or otherwise provided any input to the development of the Report?

Finally, the Report was not released on line to the public until September 29, 2016. Comments from the public must be received by not later than November 14, 2016 (an extension

from the original October 31st deadline). The report itself is over 1,300 pages in length. The cost of obtaining a hard copy of the report from the State Department of Ecology is up to \$220 and requires contacting the department to request a copy with the resulting delay in receiving it – thus shortening the time for comment by those who order a hard copy. Are copies of the Report at this time even readily available for the public to obtain from the Department?

Working with a report of this magnitude is best accomplished by being able to write notes on the hard copy, move pages back and forth and otherwise cross reference portions of the report. To say that one may get a hard copy by printing from one's home computer merely transfers the cost directly to the interested and affected public.

But more importantly, the public has been given insufficient time to access, review, digest, evaluate and comment on a 1,300-plus page complex and detailed report. That is simply insufficient. Thus we believe the time for review and public comment should be extended to at least January 15, 2017.

Thank you for this opportunity to address our concerns.

Submitted this 13th day of November, 2016.

Susan Jan Audick Batten

Regene Butler



Brenda Broadman

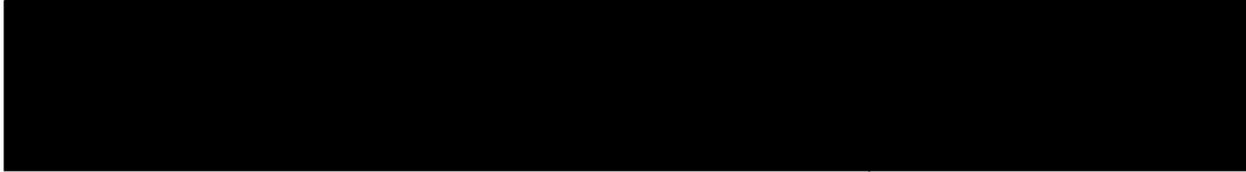
Karen Knutson

Michael J. Vnateri



Richard A. Batten *Bill Cich*

Jane A. Butler



Doreen H. Hoyle Annette H. Yarnall



Deanna M. Zwick Robert Zwick



Darlene M. Held Ted M. Held



From: Deanna Zieske [REDACTED]
Sent: Monday, November 14, 2016 10:52 PM
To: info@chehalisbasinstrategy.com
Subject: Comments on Draft PEIS
Attachments: Deanna Zieske Draft PEIS Comments.pdf

Attached please find my comments on the Draft PEIS. Thank you.

Deanna M. Zieske

**2016 Comments on Chehalis Basin Strategy
Draft Programmatic Environmental Impact Statement (EIS)**

by
Deanna M. Zieske

The Public Comment Process Has been Fatally Flawed. There have been several actions that have the impact of reducing and/or eliminating incentive for members of the general public to comment could hinder likelihood for general public to participate offering comment on the Draft PEIS. The executive summary states that Alternative 1 is the Governor's Work Group choice. The Governor's Work Group is charged with reviewing public comments and presenting recommendations to the governor for budget requests to address basin-wide flooding. Shortly after publication of the Draft PEIS, but before expiration of the public comment period, the Chehalis Basin Flood Authority voted unanimously to support Alternative 1. So, too did the Lewis County Commission and the Chehalis City Council. All of those public statements of support from political leadership in the basin make it appear that the outcome of this process has been predetermined. Under those circumstances why would typical community members believe their comments will have any impact of what gets approved by the governor.

Compounding this apparent prejudging by the Governor's Work Group, the Chehalis Basin Flood Authority and at least two major political governing bodies in the basin has been the unavailability for widespread access to the Draft PEIS itself. When first released the draft report was prohibitively expensive (\$220 per copy) to obtain in hard copy and was available only on line. It was not until October 24, 2016 that staff at the Department of Ecology told me that they would make hard copies of the Draft PEIS available to the public at no cost. I am unaware of any effort made to let the general public know of its availability at no cost.

Concerns About Alternative 1. I do not favor the Flood Retention Only (FRO) dam with a temporary reservoir nor the Flood Retention Flow Augmentation (FRFA) dam with a permanent reservoir. My opposition is founded on the myriad of uncertainties associated with that alternative. The following are but a few of those very real and concerning uncertainties – few of which are addressed in the Draft PEIS.

Pg 38 – Executive Summary - Area of Uncertainty –talks about the effects of Climate Change in the basin. If it takes two to three years to work out the uncertainties associated with those already raised in the Draft PEIS then moving forward with any alternative should be delayed to adequately address those uncertainties.

For example, at page 114 the report addresses the Doty Fault located near the proposed water retention facility. That fault “is capable of producing a 6.9-magnitude earthquake. . .” In 2015 The Chronicle ran an article in which Timothy J. Walsh, Chief Geologist with the Washington State Department of Natural Resources, is quoted as saying: “Whether this is active would be very important in . . . what the design of that should be.” A copy of that article is attached to these comments.

Several uncertainties arising from the proximity to the Doty Fault come to mind and must be addressed.

1. Is the Doty Fault active or inactive?
2. Will the weight of the FRFA reservoir trigger activity on the Doty Fault?
3. 23 landslides have been confirmed in the reservoir basin. It is uncertain how these landslides will affect dam operation. Section 6.1, page 49 of the Phase 1 Site Characterization Technical Memorandum, dated September 25, 2015, stated "Landslide remediation/stabilization represents a potential significant cost and should be further evaluated in the next phase of work including additional site characterization.
4. Page 51 of the Phase 1 Report: "The information gathered to date suggests jointing and fractures in the bedrock may create a potential for sliding surfaces beneath the dam and along temporary and permanent excavated slopes. These hazards require further characterization and analysis during future design work." These statements reveal the uncertainty in the strength of the dam foundation since it is over potentially sliding layers of basalt intermixed with marine sediments like saltstone and sandstone.
5. The same uncertainty applies to the side walls of the dam which are made up of layers of rock and marine sediments. Without more drilling, it is uncertain how far these layers go.

A number of additional uncertainties associated with Alternative 1 are also significant and demand study before a decision regarding what solution to basin-wide flooding should be made. These include:

1. There is uncertainty over how much overburden must be removed to reach hard rock. The amount to be moved varies from 600,000 cubic yards to a million cubic yards.
2. There is uncertainty over how much fragmented rock must be removed from the dam foundation to find hard rock suitable to support the dam.
3. There has been no consideration given as to where to relocate 600,000 to a million cubic yards of excavated dirt and rock. This remains an uncertainty as to purchase of additional property and hauling costs to that property.
4. Page 53 of the September 25, 2015, Phase 1 report states, "The ground motion hazard at the potential Chehalis River dam site is significant and will be a primary consideration in the RCC dam..." "The ground motion hazard is an uncertainty.
5. It is not certain how much flood reduction will occur in the Chehalis/Centralia area. The modeling contains uncertainty that is not discussed anywhere in the PEIS. For the 100 year flood the flood reduction in Chehalis is estimated to be about 1.5 feet, yet as a practical matter, nobody will have an idea of whether that reduction is actually achieved.
6. There are uncertainties associated with tunnel design. There is no mention of the emergency escape plan for citizens living in and around PeEll during a dam failure.

7. There is uncertainty regarding replacement of the PeEll water system since the Lester Creek intake and water line across the Panesko property will be flooded. PeEll must locate a new water source and a new route to get water into PeEll.
8. There is uncertainty in how many landslides might be triggered up the river in another major rainstorm like 2007. The 2007 storm caused over 1,000 upriver landslides. The impact on the reservoir and dam are uncertain.
9. There is uncertainty if the failure of reservoir landslides will cause catastrophic failure of the dam.
10. While there is credit being given for the FRFA dam to release cool water during the summer by augmenting summer flow, there is uncertainty how far that augmentation will actually go before the extra flow is pumped out of the river by farmers living by the river. Since Dept.of Ecology has no control over the farmers and has no monitoring or metering of pumps, land owners along the river have a lot of freedom in pumping water.
11. There is uncertainty in the operating cost of the dam. The August 22nd cost estimate use \$2 million per year even though actual experience of similar dams in Washington State have an operating cost of \$3.5 million per year.
12. There is uncertainty over how operators will properly operate the dam. The Cowlitz River dams experienced operator uncertainty that led to a flood downstream. Operators at Howard Hanson Dam have experienced operating mis-judgement in when to hold water and when to release water. The point is that dam operation depends on human judgement which is subject to error.
13. There is uncertainty in climate change.
14. There is uncertainty in archaeological reviews. The PEIS states there is a 35% to 42% chance of finding objects of archaeological significance along the river.
15. There is uncertainty over who pays for the dam construction.
16. There is uncertainty over who operates the dam.
17. There is uncertainty over who pays for the staffing, maintenance, and fish passage activity.
18. There is uncertainty over how much infill will occur into the floodplains, which would completely eliminate any flood damage reduction (i.e. more residents and commercial buildings are expected to move into the floodplain which will eventually drive up flood damage costs.)
19. Who will operate the dam? I asked this question at the Chehalis Basin Strategy Policy Workshop held at the Great Wolf Lodge on October 11, 2016 and was told that no one has come forward yet.

Alternative 3 is a favorable plan. I support the nonstructural flood protection resulting in a greater benefit to and abundance of aquatic species which enhance tribal and non-tribal fisheries. As stated in the Executive Summary, this alternative substantially increases the abundance of native aquatic species, reduces the potential for future ESA listings and enhances tribal and non-tribal fisheries. It also saves all of the expenditures associated with constructing and maintaining

a dam as well as the problems associated with moving rock and soil from the site in order to construct the dam itself.

Alternative 4 "Farms to Hills" is not a favorable alternative. Buy outs forcing farmers to move from their historic family owned farms to hills in designated forestland creates tremendous rifts in traditional family structures and is likely to engender strong resistance. Timber removal, stumping, and converting previously forested hillsides to new agricultural croplands subjects dedicated farmers to poor crop soil and unsatisfactory livestock areas and causes great disruption to proud farmers' lives. We learned long ago in the "dirty thirties" the devastation poor farming practices can work on crops and land. This alternative also fails to consider the implications of changing agricultural and forest land designations on Lewis County's Growth Management plan.

It also does not appear that in preparing the Draft PEIS that anyone investigated whether there were any examples of successful conversion of forest to agricultural lands that could be used to evaluate this option. On September 15, 2016 at a meeting during which the Draft PEIS was discussed by the Chehalis Basin Flood Authority I asked Jim Kramer if he could refer me to the studies used for the alternative that would move farmers from their existing lowland farmland to hilly forestland. He told me there are none. Then I asked, why would you put that in the draft PEIS? I did not receive an answer to that question.

Need for Improved Forest Practices. Not addressed in the Draft PEIS is the impact improved forest practices will have on controlling flooding in the basin. In the 2007 flood, because there were steep hill clear cuts out of PeEll, much of the cut timber was left lying on the hills. The heavy rains caused landslides to the river, taking with the mud many of the logs left there following cutting. This was an invitation for disaster. Cut timber jammed bridges, broke bridges, caused flooding, dams building dams and flooding property along Leudinghaus Road, River Road and elsewhere. Houses flooded to the ceilings, homes floating off foundations. Such destruction! Nowhere in the EIS does it address forest practices as a means for mitigating flooding in the basin. Nor does the report address what may happen when cutting timber to convert hillsides to agricultural lands occurs as proposed in Alternative 4.

Thank you for this opportunity to provide my comments on the Draft PEIS.

Respectfully submitted on November 14, 2016.

Deanna M. Zieske

Deanna M. Zieske

Geologists Plan to Study Doty Fault Line Between Centralia and Chehalis

By Kaylee Osowski / kosowski@chronline.com | Posted: Thursday, September 3, 2015 11:07 am

In a dimmed room in front of a slideshow presentation with an audience primarily made up of Lewis County fire chiefs, a geologist said a fault line between Centralia and Chehalis that has been researched very little crosses Interstate 5.

It is actually unknown whether or not the Doty Fault is active.

“Plans are underway to study this more intensively, and if it turns out that this is active, it’s a fault that would be capable of an earthquake between 6½ and 7 (magnitude),” said Timothy J. Walsh, chief geologist with the Washington State Department of Natural Resources.

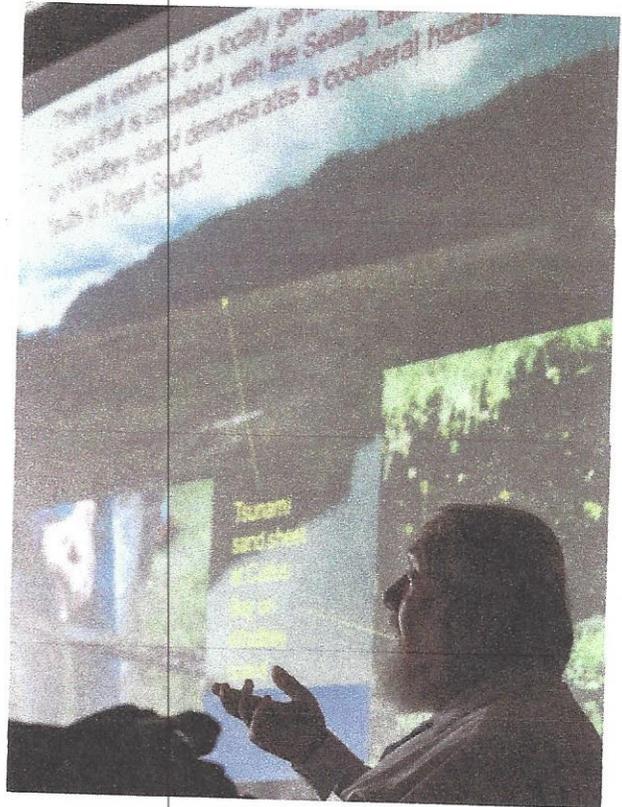
Walsh said part of the reason to study the fault more is to learn how it would affect the proposed water retention dam on the Chehalis River near Pe Ell.

“Whether this is active would be very important in ... what the design of that should be,” he said.

Scientists have recently started using LiDAR technology, which measures distance with a laser by analyzes the light reflected, to study faults and have not done so yet for the Doty Fault.

More research has been completed on the active Saint Helens Seismic Zone, which is partially located in Lewis County and has a capacity for a magnitude-7.0 earthquake.

In the more populated West Lewis County, a Saint Helens earthquake is estimated to cause little to no damage.



Earthquake Presentation

Tim Walsh, the chief geologist of the Hazard Section of the Department of Natural Resources, gives a presentation on the hazards of a possible earthquake in the Pacific Northwest on Wednesday afternoon at the Napavine Fire Department.

He said Lewis County should expect to see moderate damage from an earthquake of the entirety of the Cascadia subduction zone.

In fact, he said, if an earthquake of the entire Cascadia subduction zone were to occur, Washington wouldn't be as affected as the two states south of it. He also said that the Pacific Northwest isn't overdue for an earthquake of the entire zone.

The timeline for the potential magnitude-9.0 earthquake in the July 20 New Yorker article, "The Really Big One," was misleading, he said.

While the 1700 Cascadia earthquake referred to in the article was a rupture of the entire subduction zone, individual sections of the zone are also estimated to have experienced quakes in history.

The article says that the zone is 315 years into a 243-year cycle of its earthquake recurrence.

Of the 41 total Cascadia events in the past 10,000 years, about half are estimated to have only affected smaller areas in the segmented zone, Walsh said.

He said that the nearly 250-year cycle applies to both separate smaller earthquakes in the Cascadia Subduction Zone as well as earthquakes of the entire zone.

An earthquake of the entirety of Cascadia has a recurrence of 500 to 550 years that would affect northern California to British Columbia.

Scientists study recurrence by looking at landslides from the edge of the continental shelf that flow into submarine canyons, depositing in the Cascadia Basin.

Walsh said researchers are beginning to do models of the 1700 earthquake to better understand the effects it had.

From: info@chehalisbasinstrategy.com on behalf of Chehalis Basin Strategy
<info@chehalisbasinstrategy.com>
Sent: Friday, October 21, 2016 5:29 PM
To: info@chehalisbasinstrategy.com
Subject: EIS Comment Form
Attachments: Watershed-interviews-report_final.pdf; Climate-Change-101-Floodplains-by-Design.pdf; Stillaguamish-Climate-Impacts-Overview_6.2.15.pdf

Comment Form

First Name: Craig

Last Name: Zora

Organization: n/a

Address:



Phone:



Email:



I support ALTERNATIVE 4 along with funding for the levee construction project in Aberdeen.

Comments:

Link to 12/9/2007 Seattle Times article:
<http://www.seattletimes.com/seattle-news/did-development-logging-set-the-stage-for-disaster/>

File Upload (1):

http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/Watershed-interviews-report_final.pdf

File Upload (2):

<http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/Climate-Change-101-Floodplains-by-Design.pdf>

File Upload (3):

http://chehalisbasinstrategy.com/wp-content/uploads/2016/10/Stillaguamish-Climate-Impacts-Overview_6.2.15.pdf

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Flooding and climate change

Guillaume Mauger
Climate Impacts Group
gmauger@uw.edu
206.685.0317

FEMA Mitigation Summit
25 February 2015

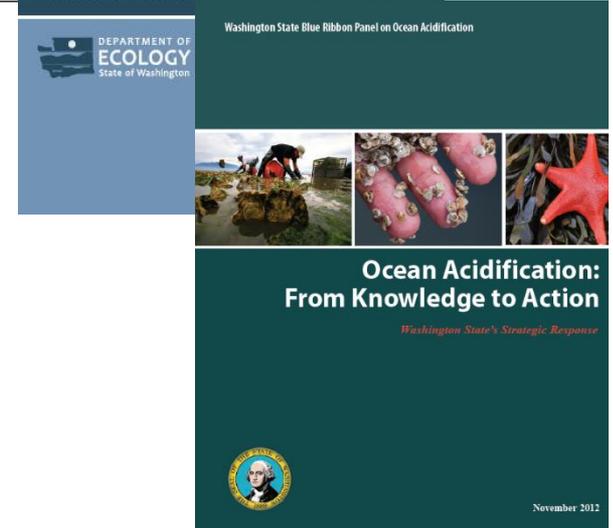


*Climate Science in the
Public Interest*



Technical Expertise in Support of Adaptation

- Locally-specific information about climate impacts for planning purposes
- Scientific synthesis and assessments
- Identification of emerging climate impacts, risks and vulnerabilities
- Expertise for adaptation planning processes and approaches
- Technical review of agency climate science

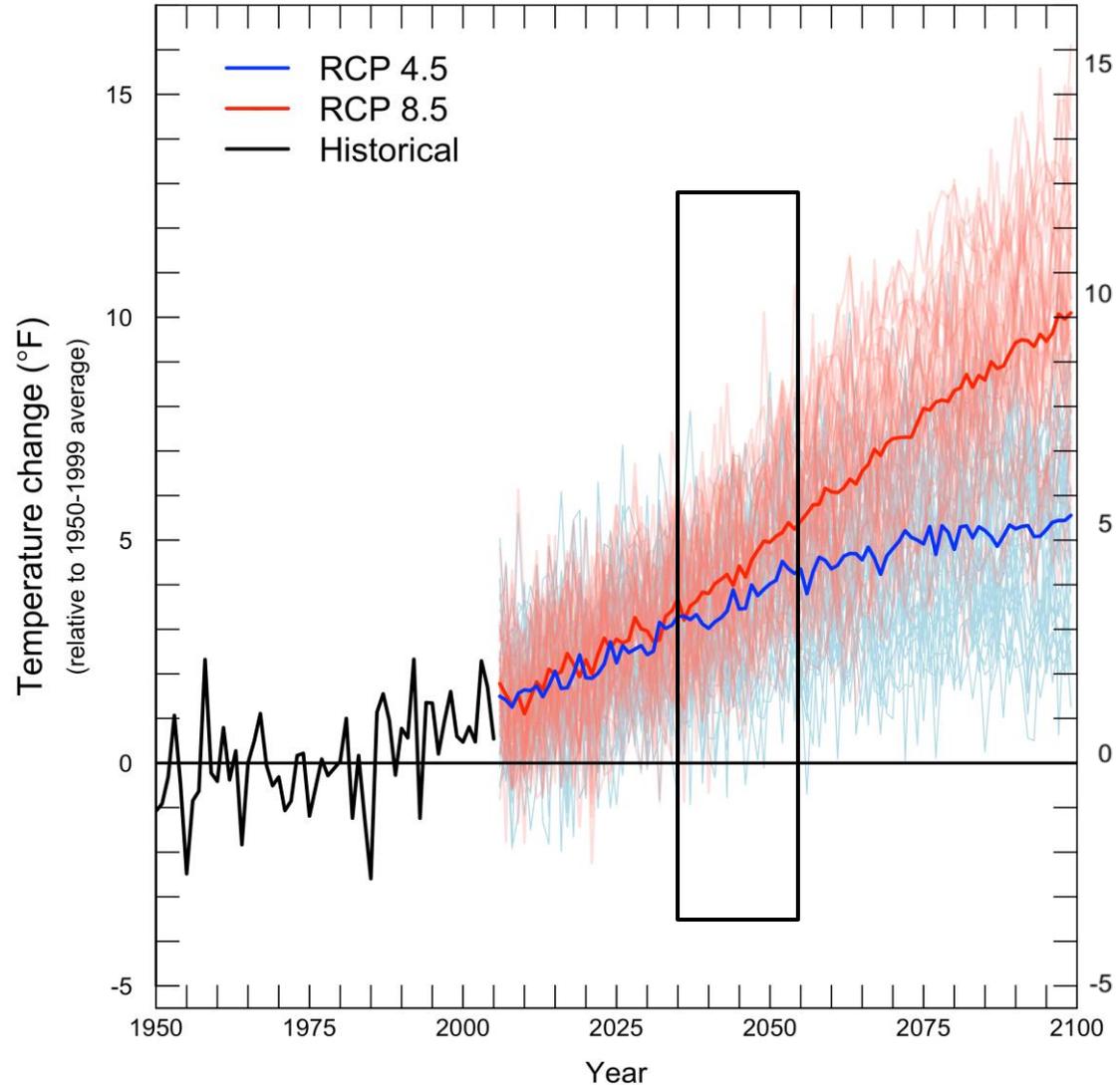


Background:
it's warming



All scenarios project warming

Projected Change in Average Annual PNW Temperature (relative to 1950-1999 average)



2050s (relative to 1950-1999)	
Low emissions (RCP 4.5)	+4.3°F (2.0-6.7°F)
High emissions (RCP 8.5)	+5.8°F (3.1-8.5°F)

Figure source: Climate Impacts Group, based on projections used in IPCC 2013; 2050 projections from Mote et al. 2013

Changing flood risk:

Sea level rise,

Snow, and

Heavy precipitation

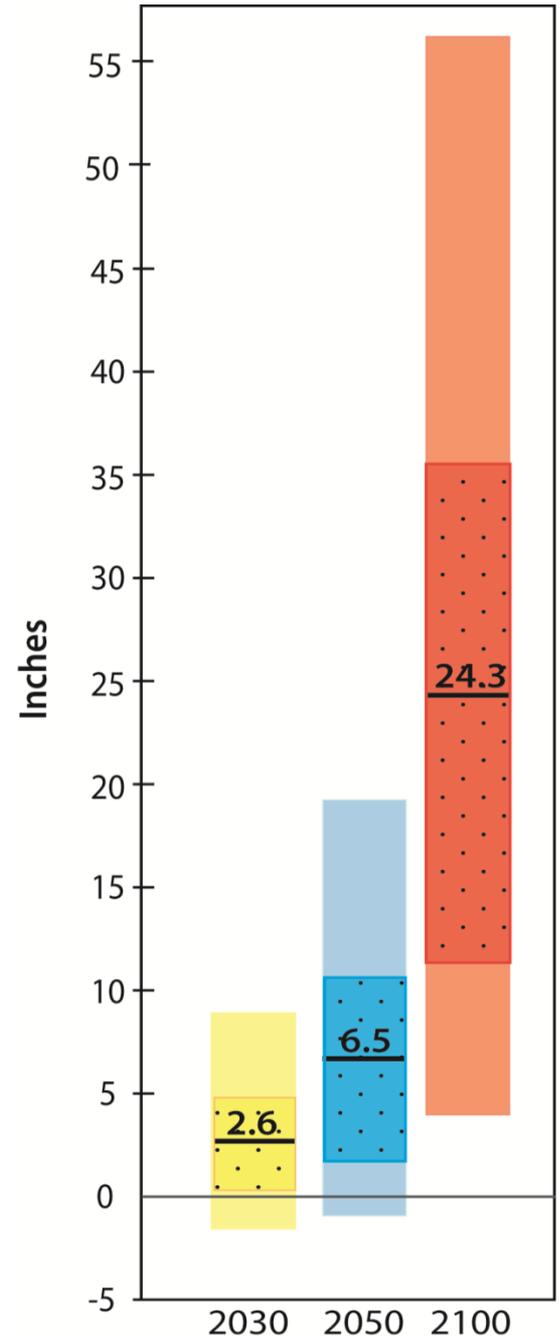


Sea Level Rise:

Projected in All Scenarios by 2100

Projected Range, Seattle Relative to 2000 (NRC 2012)

2030	-1.5 to +8.8 inches
2050	-1.0 to +18.8 inches
2100	+3.9 to +56.3 inches



Changing flood risk:

Sea level rise,

Snow, and

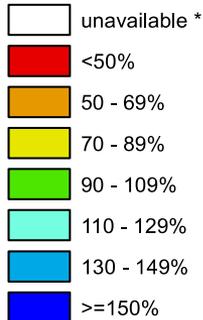
Heavy precipitation

Winter 2015: An analog for the future

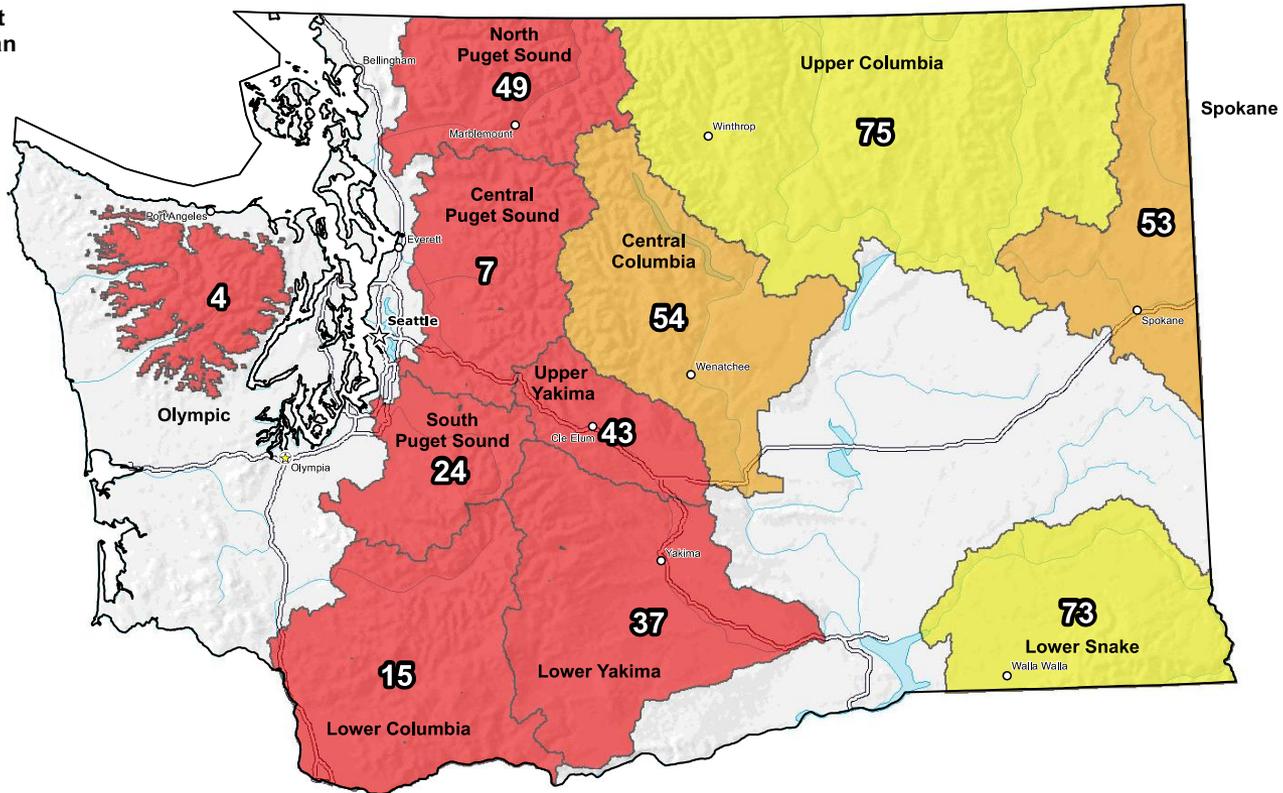
Washington SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Feb 25, 2015

Current Snow Water Equivalent (SWE)
Basin-wide Percent of 1981-2010 Median



* Data unavailable at time of posting or measurement is not representative at this time of year



Provisional Data
Subject to Revision



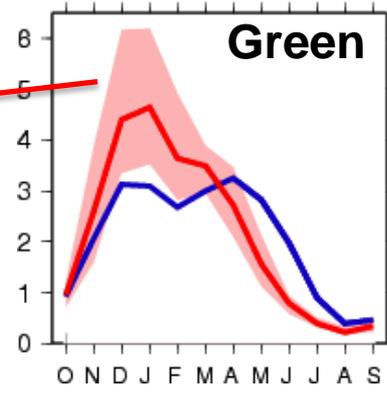
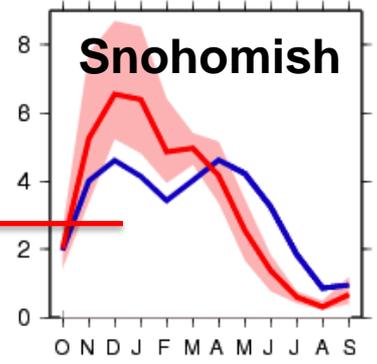
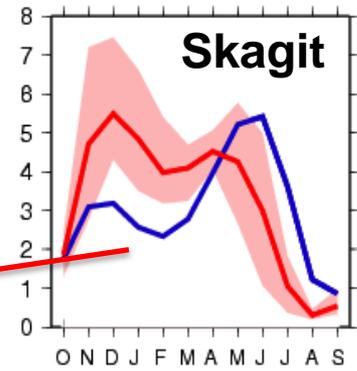
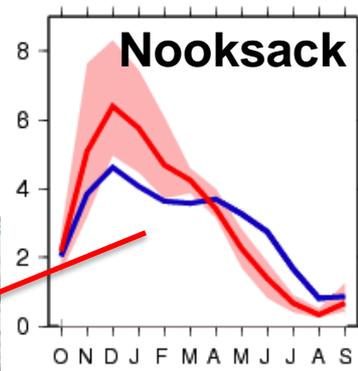
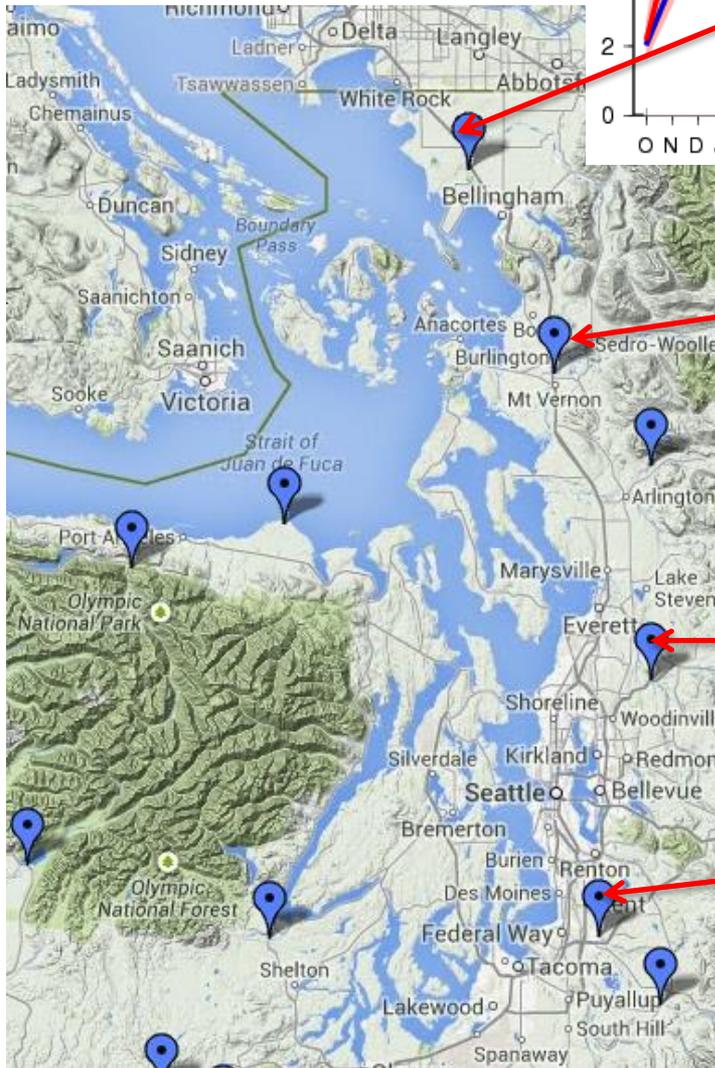
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).



Data downloaded on Feb. 25, 2015:
<http://www.wcc.nrcs.usda.gov/snow/>

Based on a majority of
climate models, this
year's conditions will be
the new normal **by 2050**

Less snow



= more winter runoff

Changing flood risk:

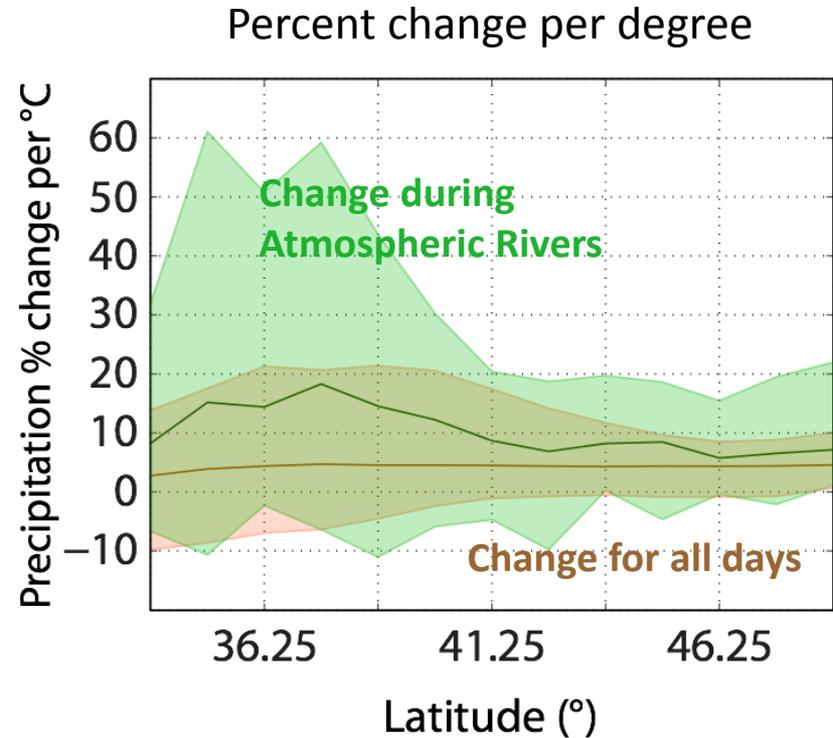
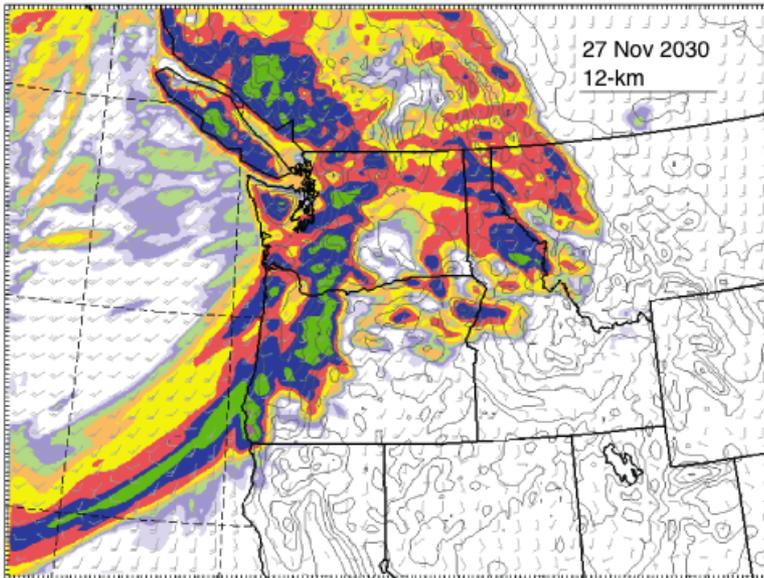
Sea level rise,

Snow, and

Heavy precipitation

Atmospheric rivers: *strong response to warming*

(aka "Pineapple Express")



- Changes in normal precipitation: 1.5-3.5% per degree
- **Changes in extreme:** 5-12% per degree

Changing flood risk:

Sea level rise,

Snow, and

Heavy precipitation

Others?

Other climate impacts on flooding?

- **Storm surge: No change**
- **Sediment: Increasing.**
 - Fewer glaciers, heavier precip
- **Forest cover: ???**
 - Wildfires, insect outbreaks, development/logging

Consequences:

Making our data useful

Skagit River:

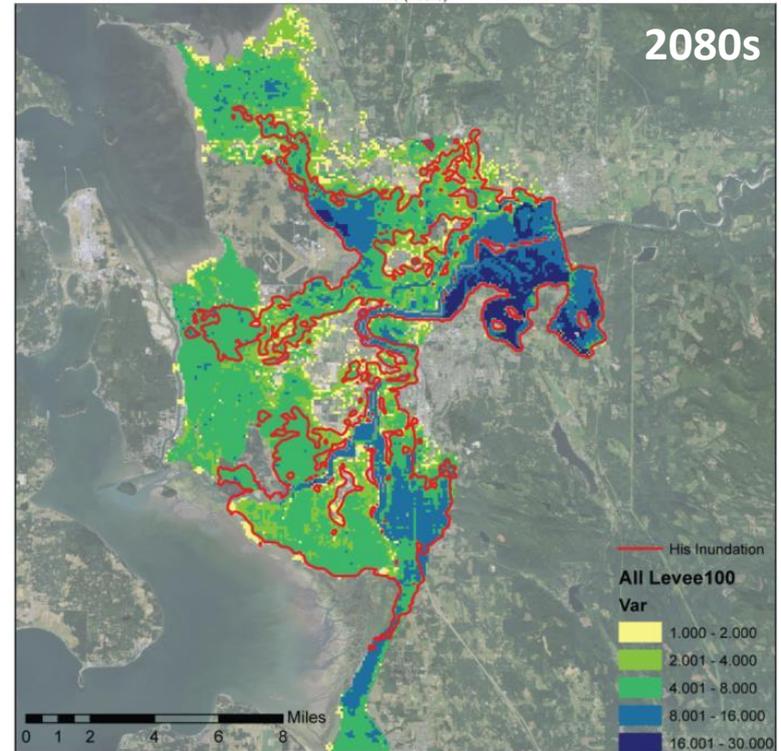
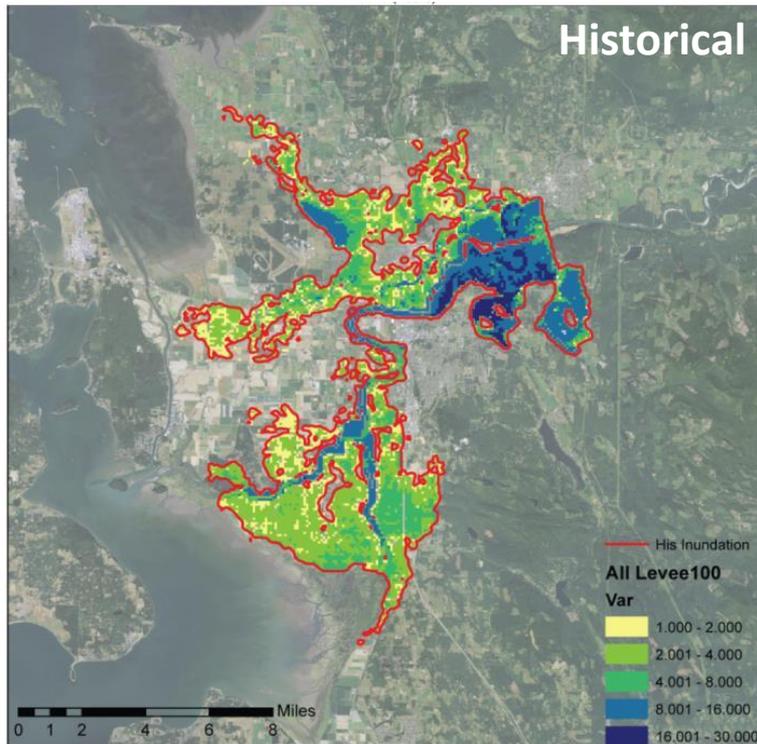
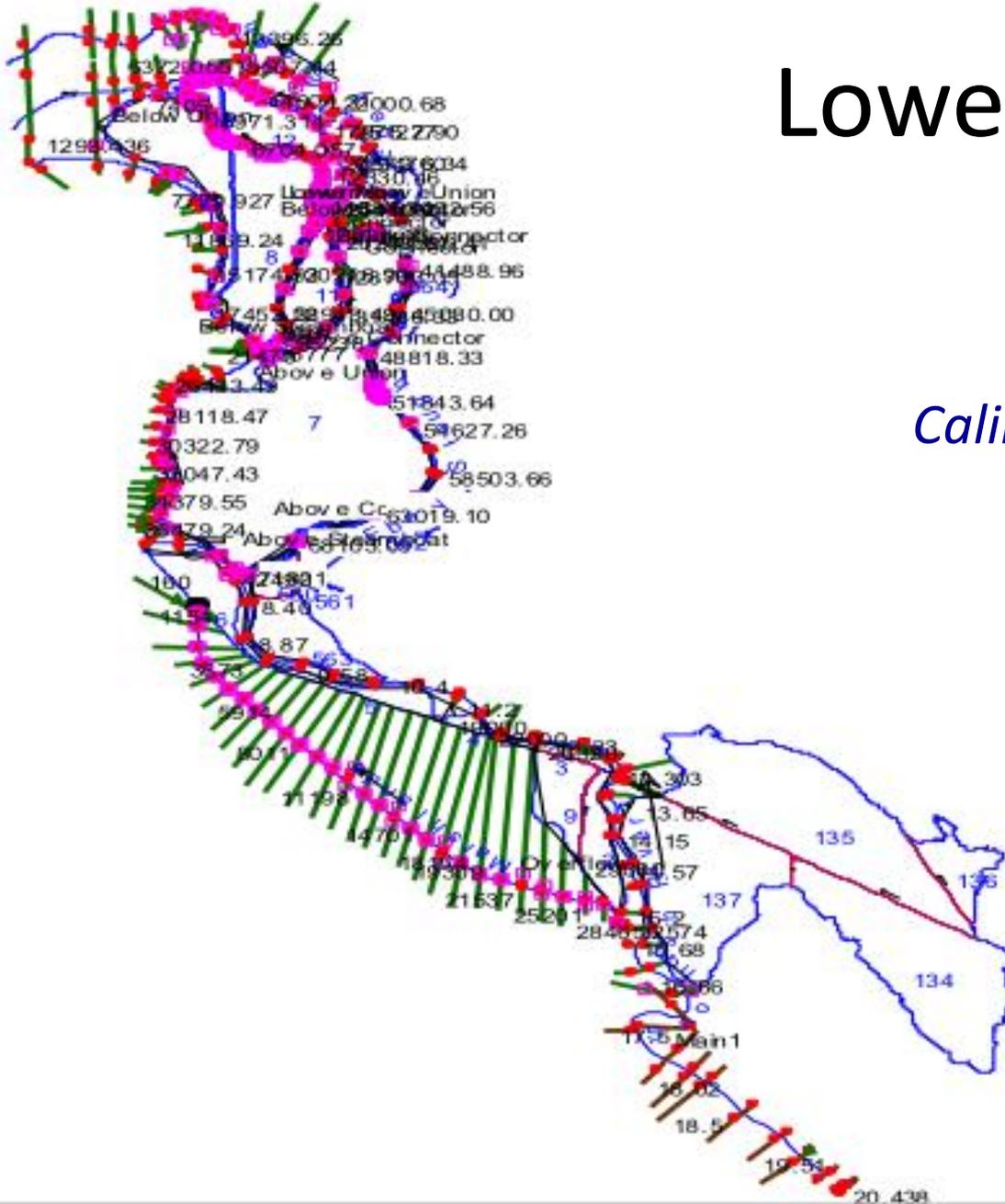


Figure Source: Joe Hamman, UW

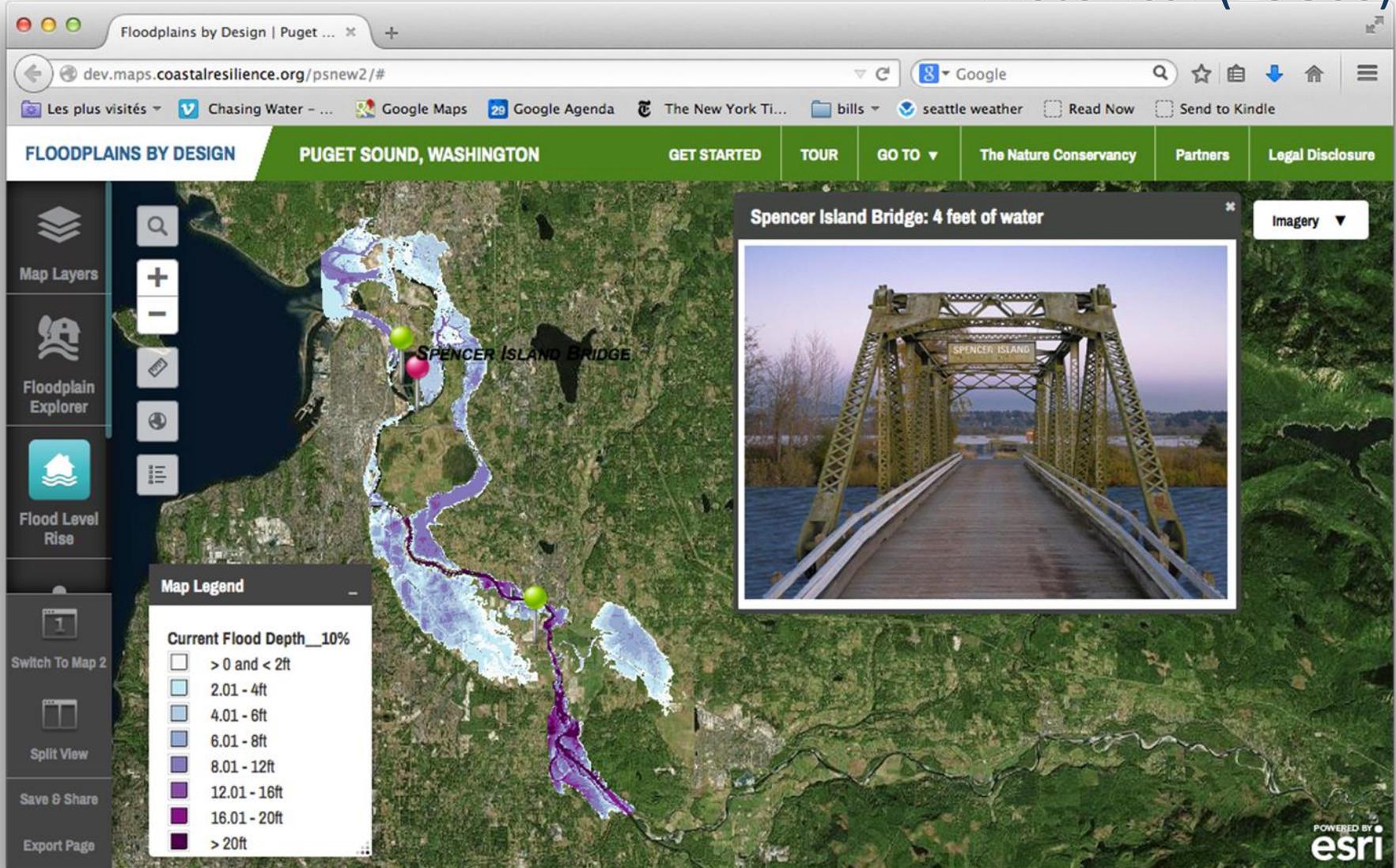
Lower Snohomish: 1D HEC-RAS

*Calibrated on Nov 1990 and
Jan 2009 floods*



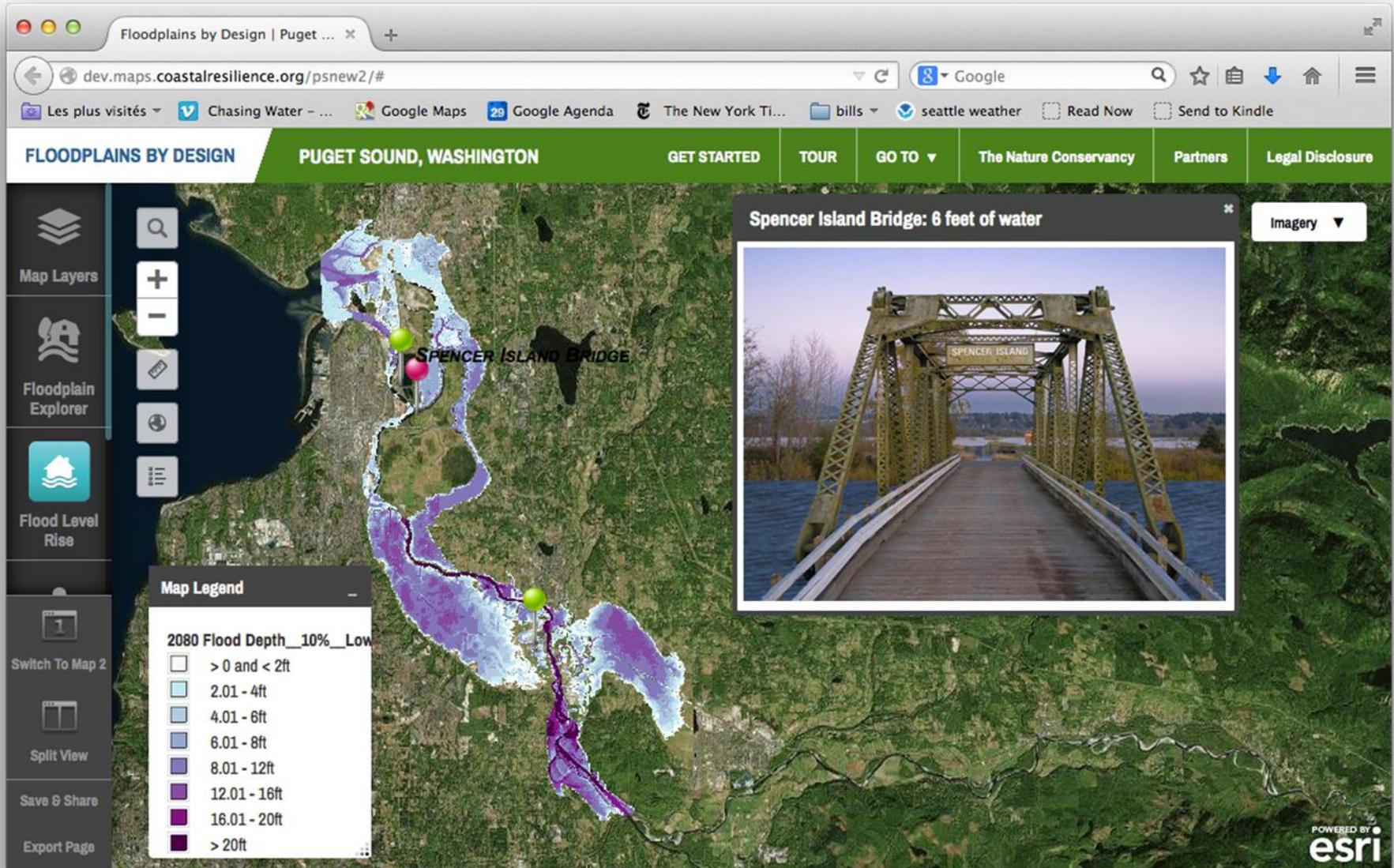
Results

10-year Flood, Historical (1980s)



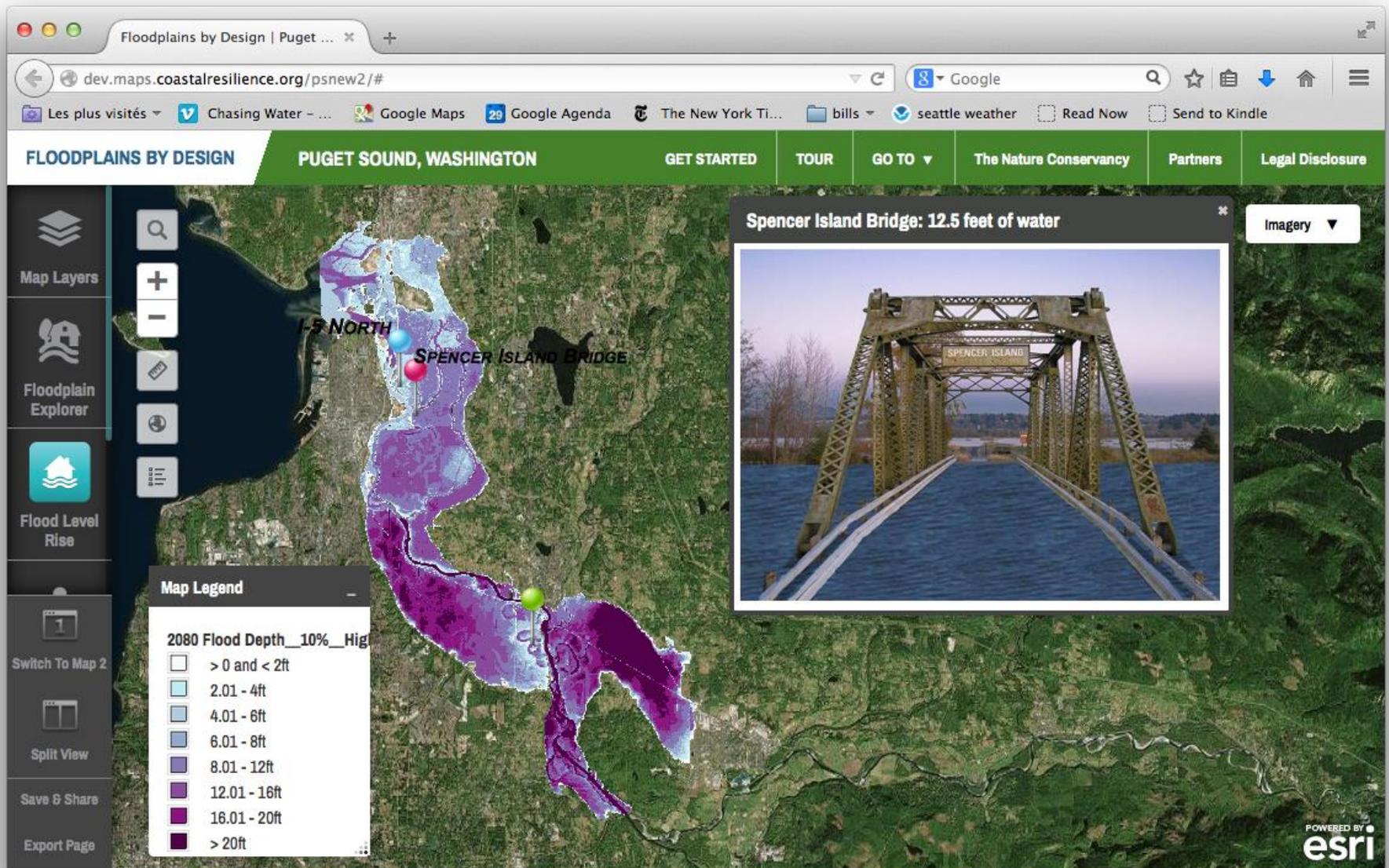
Results

10-year Flood,
A1b 2080s, Low



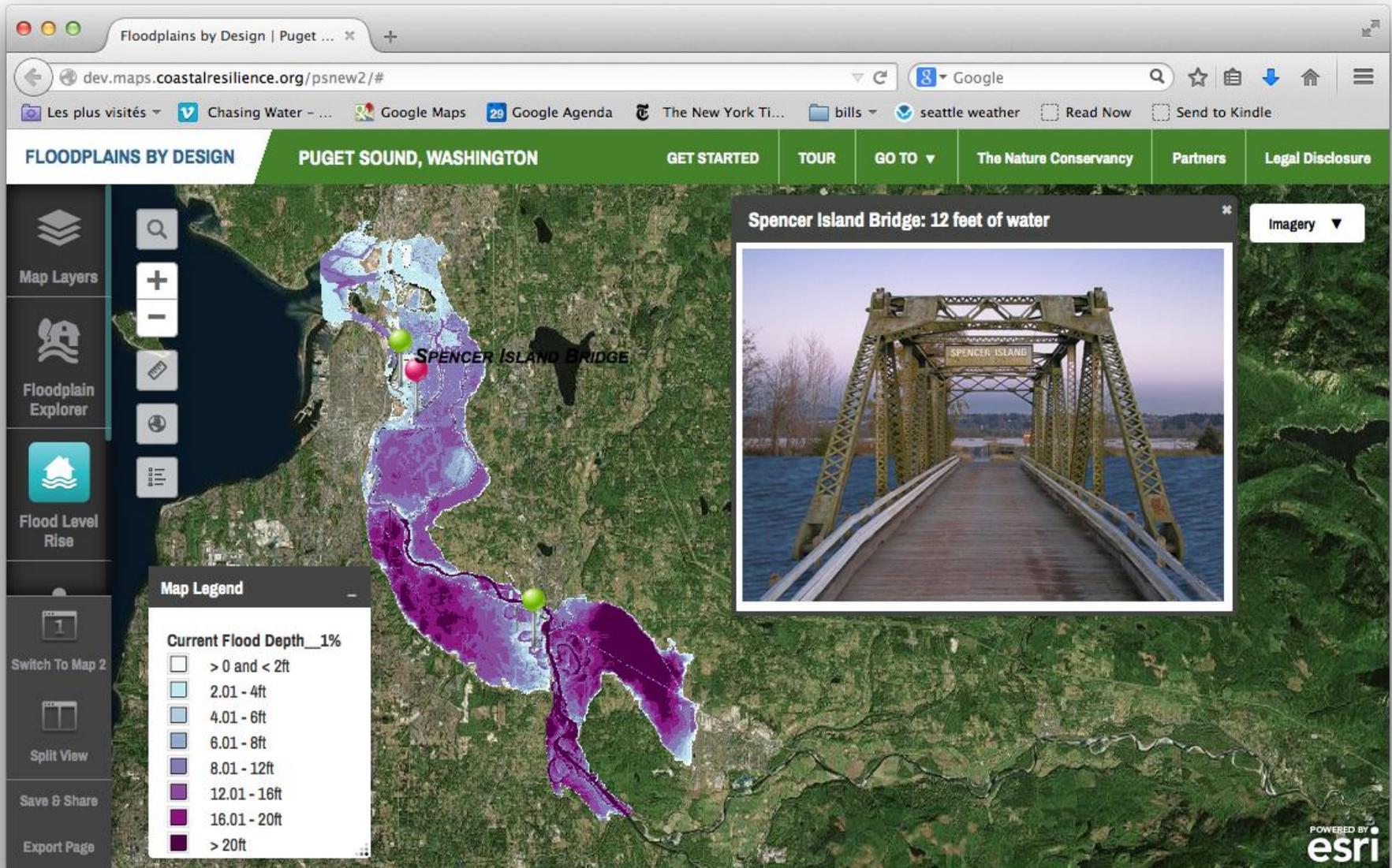
Results

10-year Flood, A1b 2080s, High



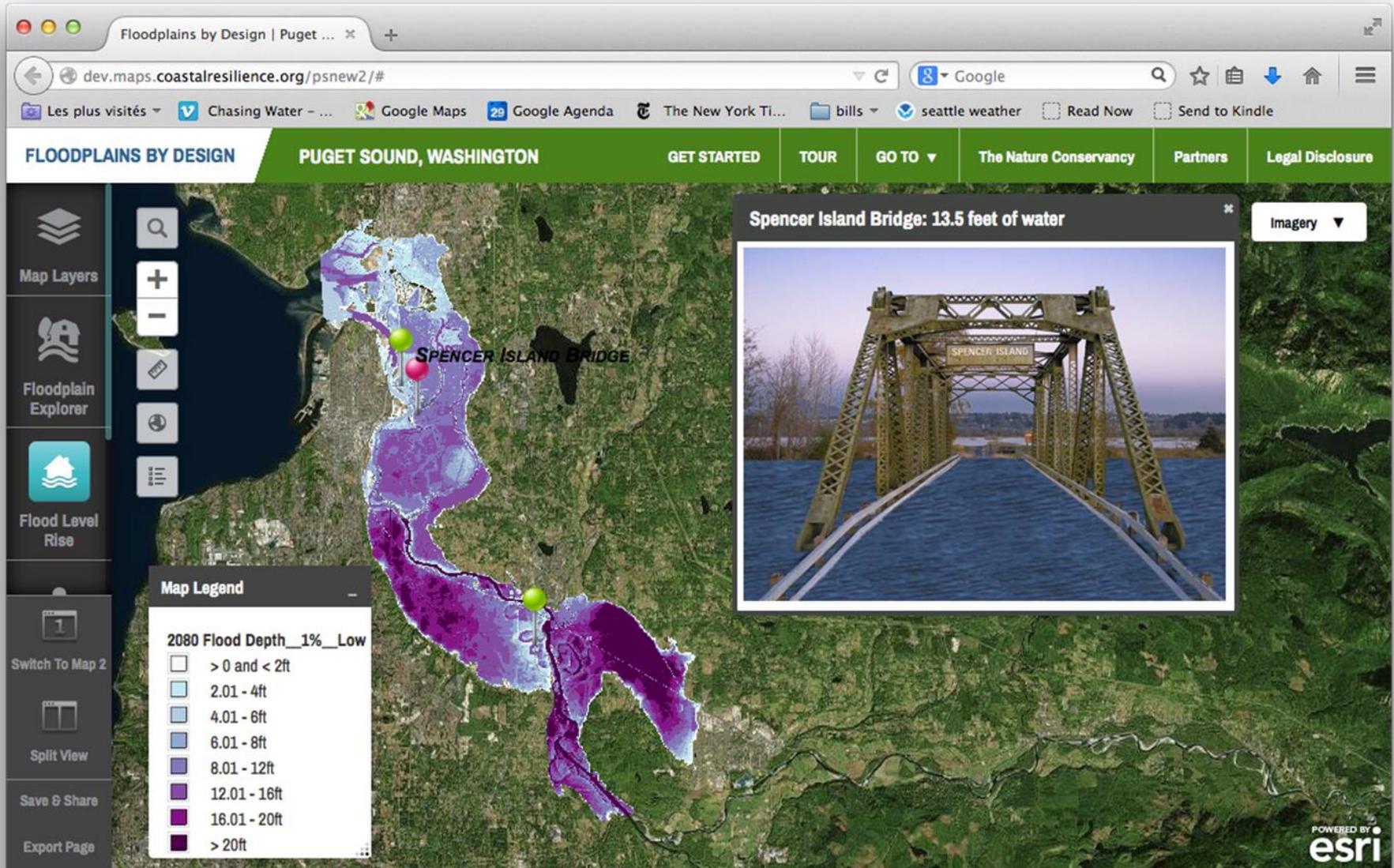
Results

100-year Flood, Historical (1980s)



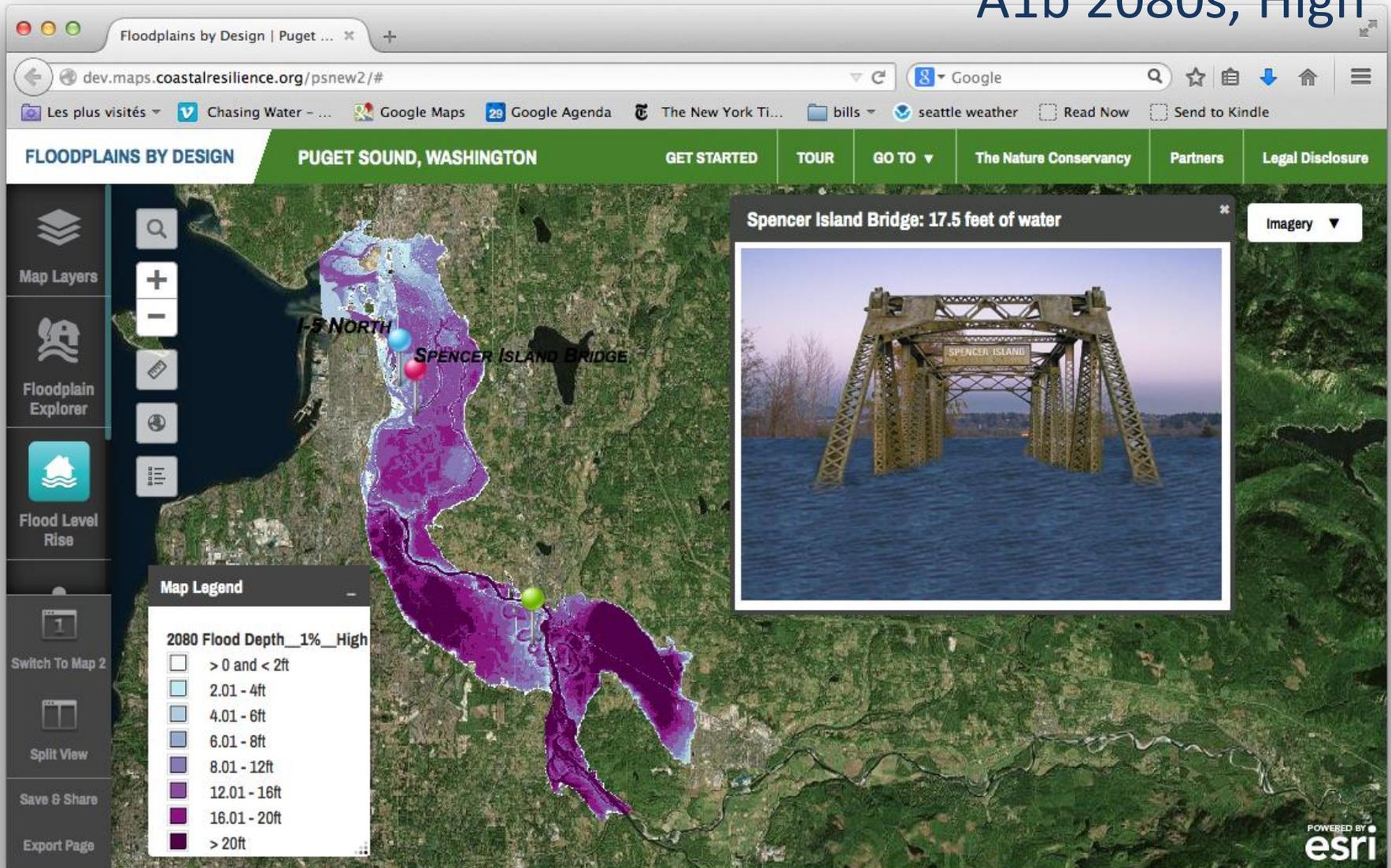
Results

100-year Flood,
A1b 2080s, Low



Results

100-year Flood, A1b 2080s, High





*Climate Science in the
Public Interest*

Guillaume Mauger
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COLLEGE OF THE ENVIRONMENT
UNIVERSITY *of* WASHINGTON

How Will Climate Change Affect the Stillaguamish Watershed?

Prepared by the University of Washington Climate Impacts Group, June 2015

Climate

Rapid warming is expected this century and the heaviest rain events are projected to become more intense. All scenarios project warming for the Stillaguamish Watershed as a result of rising greenhouse gas emissions. Although annual precipitation is not expected to change significantly, heavy rainfall events are expected to intensify and summers are expected to be drier.

Coasts

Sea level rise and ocean acidification will continue to affect the Stillaguamish delta. Both are projected to rise substantially under all greenhouse gas scenarios. Sea level rise in the Puget Sound region reflects the combined effects of a rising global sea level and subsidence of land surfaces due to plate tectonics, among other factors.

Water

The Stillaguamish watershed is projected to experience decreasing snowpack and widespread changes in streamflow timing, flooding, and summer minimum flows but little change in average annual streamflow volume. Warmer winter temperatures will reduce snowpack volume in the Stillaguamish watershed and shift the timing of snowmelt earlier (Figure 1). Lower snowpack in the upper watershed will also contribute to lower streamflow volume during the summer months. Flood risk increases in the fall/winter months due to expected increases in extreme precipitation and shifts in seasonal precipitation from snow to rain over larger portions of the watershed. While these seasonal changes are large, annual streamflow volumes are not projected to change substantially.

Water Quality

Stream temperatures in the Stillaguamish are projected to increase, along with sediment loading and possibly landslides. Warming air temperatures and declining snowpack result in warmer stream temperatures, while a receding snowline and increasing winter rain will cause greater erosion, increasing the sediment supply to rivers. Although future landslides are difficult to predict, several studies indicate that future conditions will favor an increase in landslide risk for the Stillaguamish.

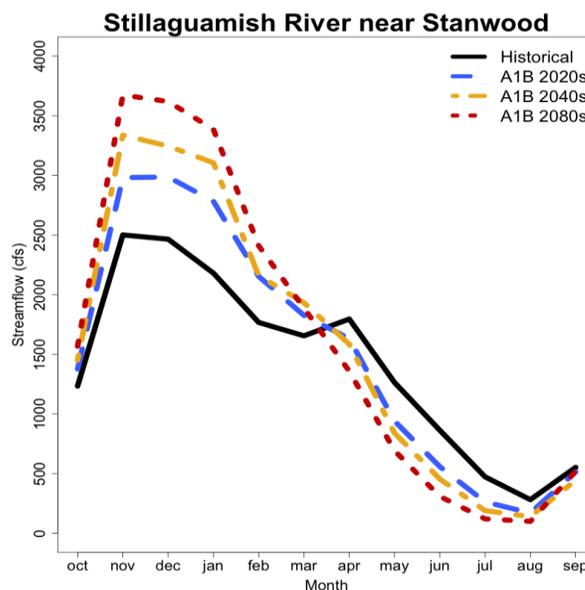


Figure 1. Change in the seasonality of streamflow, showing monthly average runoff for the water-year (Oct-Sep), for the 20th century (1916-2006; black line), the 2020s (2010-2039; blue line), the 2040s (2030-2059; gold line), and the 2080s (2070-2099; red line), all based on a medium (A1B^[1]) greenhouse gas scenario. Source: <http://warm.atmos.washington.edu/2860>.^[2]

^[1] To make projections, climate scientists use greenhouse gas scenarios – “what if” scenarios of plausible future emissions – to drive global climate model simulations of the earth’s climate. Wherever possible, scenarios used in this document include both a low and a high emissions scenario of 21st century greenhouse gas emissions.

^[2] Hamlet, A.F., M.M. Elsner, G.S. Mauger, S-Y. Lee, I. Tohver, and R.A. Norheim. 2013. An overview of the Columbia Basin Climate Change Scenarios Project: Approach, methods, and summary of key results. *Atmosphere-Ocean* 51(4):392-415, doi: 10.1080/07055900.2013.819555: <http://warm.atmos.washington.edu/2860/>

Observed and Projected^[1] Changes

Temperature	
<i>Annual Temp - Observed</i> ^[3]	<p>Increase in average historical temperature (1895-2014) for nearby stations</p> <p>Everett: +0.71 ± 1.05°F Sedro Woolley: +1.19 ± 1.11°F</p>
<i>Annual Temp - Projected</i> ^[4]	<p>Projected increase in average annual temperature for the 2050s (2040-2069), relative to 1970-1999, for the Stillaguamish watershed:</p> <p>Low emissions (RCP 4.5): +4.4°F (range: +3.0 to +5.6°F) High emissions (RCP 8.5): +5.7°F (range: +4.5 to +7.3°F)</p>
<i>Frost-free season</i> ^[4]	<p>Longer freeze-free period expected (average for the Stillaguamish watershed).</p> <p>Low emissions (RCP 4.5): +16 days (range: +12 to +22 days) High emissions (RCP 8.5): +22 days (range: +16 to +28 days)</p>
Precipitation	
<i>Seasonal Precipitation - Observed</i> ^[3]	<p>No historical trend in seasonal precipitation; large variations from year-to-year.</p>
<i>Seasonal Precipitation - Projected</i> ^[4]	<p>Increased winter precipitation and decreased precipitation in summer (2050s relative to 1970-1999), for the Stillaguamish watershed:</p> <p><i>Winter (Oct-Mar)</i></p> <p>Low emissions (RCP 4.5): +8% (range: +2 to +18%) High emissions (RCP 8.5): +9% (range: +4 to +19%)</p> <p><i>Summer (Apr-Sep)</i></p> <p>Low emissions (RCP 4.5): -8% (range: -19 to 0%) High emissions (RCP 8.5): -8% (range: -21 to +1%)</p>
<i>Heavy Precipitation - Projected</i> ^[4]	<p>Increased maximum daily precipitation totals in Stillaguamish watershed (2050s relative to 1970-1999):</p> <p>Low emissions (RCP 4.5): +13% (range: +7 to +25%) High emissions (RCP 8.5): +16% (range: +3 to +29%)</p> <p>Recent research indicates that heavy precipitation events may be larger than what is projected in the above models.^[5]</p>

^[3] Menne, M. J., Williams Jr, C. N., & Vose, R. S. (2009). *The US Historical Climatology Network monthly temperature data, version 2*. Bulletin of the American Meteorological Society, 90(7), 993-1007.

^[4] Integrated Scenarios of the Future Northwest Environment: <https://www.nwclimatescience.org/node/231>

^[5] Salathé, EP, AF Hamlet, CF Mass M Stumbaugh, S-Y Lee, R Steed (2014) Estimates of 21st Century Flood Risk in the Pacific Northwest Based on Regional Scale Climate Model Simulations. *J. Hydrometeorology*

Water Supply

Snow

Spring Snowpack – Projected^[4]

Substantial declines in April 1st snowpack, 2050s relative to 1970-1999, for the Stillaguamish watershed:

Low emissions (RCP 4.5): -66% (range: -75 to -54%)
 High emissions (RCP 8.5): -73% (range: -88 to -55%)

Streamflow

Winter – Projected^[4]

Increases in winter (October–March), 2050s relative to 1970-1999, for the Stillaguamish watershed:

Low emissions (RCP 4.5): +28% (range: +20 to +44%)
 High emissions (RCP 8.5): +32% (range: +19 to +52%)

Summer – Projected^[4]

Decreases in summer (April–September), 2050s relative to 1970-1999, for the Stillaguamish watershed:

Low emissions (RCP 4.5): -24% (range: -29 to -16%)
 High emissions (RCP 8.5): -27% (range: -34 to -18%)

Flooding – Projected^[2]

Most models indicate increases in volume associated with the 100-year (1% annual probability) flood event, 2040s (2030-2059), relative to 1970-1999, for the North Fork Stillaguamish:

Low emissions (B1): +12% (range: -15 to +38%)
 Moderate emissions (A1b): +20% (range: +5 to +57%)

Low flows – Projected^[2]

Most models indicate decreased volumes associated with the 7-day lowest flow in 10 years, 2040s (2030-2059), relative to 1970-1999, for the North Fork Stillaguamish:

Low emissions (B1): -16% (range: -30 to +1%)
 Moderate emissions (A1b): -22% (range: -31 to -7%)

Water Quality

Stream temperatures – Projected

Char^[6]: Decline in number of river miles within thermal thresholds for char spawning/rearing (mean August stream Temp. <54°F^[7]):

Historical (1993 – 2011): 205 miles
 2040s, Moderate emissions (A1b): 78 miles (-62% loss)
 2080s, Moderate emissions (A1b): 27 miles (-87% loss)

Salmonids^[6]: Decline in number of river miles within thermal thresholds for core summer salmonid habitat (mean August stream Temp. <60°F):

Historical (1993 – 2011): 650 miles
 2040s, Moderate emissions (A1b): 580 miles (-10% loss)
 2080s, Moderate emissions (A1b): 410 miles (-36% loss)

^[6] NorWest Regional Database and Modeled Stream Temperatures: <http://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html>

^[7] Note that these thresholds are actually intended for 7-day average stream temperatures, not monthly averages. This means that the projections shown here are optimistic – an overestimate of suitable habitat.

<i>Sediment & Landslides</i>	<p>Loss of snowpack and glaciers due to warmer temperatures contributes to the exposure of highly mobile sediment sources and increases in flood flows, which triggers faster sediment movement.</p> <p>Geomorphic hazards, like debris flows and landslides, could also increase in response to decreasing snowpack and glaciers.^{[8],[9]}</p> <p>Increasing heavy precipitation may increase erosion rates and also threaten slope stability.</p>
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Oceans	
<i>Sea Level – Observed^[10]</i>	Historical rise in sea level (Seattle is the closest long-term gauge) Seattle, WA: +0.8 in./decade (1900-2008)
<i>Sea Level – Projected^[11]</i>	Rising for all scenarios Seattle, WA: +4 to +56 inches (2100, relative to 2000)
<i>Ocean Acidification – Observed^[12]</i>	Global increase in ocean acidity since 1750 +26% (decrease in pH: -0.1)
<i>Ocean Acidification – Projected^[12]</i>	Global Increase by 2100 for all scenarios (relative to 1986-2005). Low emissions (RCP 4.5): +38 to +41% High emissions (RCP 8.5): +100 to +109%

This document was prepared by the Climate Impacts Group to support interviews planned as part of the ***Integrating Climate Resilience in Puget Sound Floodplain and Working Lands Programs*** project.

For more information on climate change impacts in Washington, see *Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers* (2013), available at <http://cses.washington.edu/cig/reports.shtml>, or contact the Climate Impacts Group (cig@uw.edu, 206-616-5350).

^[8] Miller, D.J. (2004) Landslide Hazards in the Stillaguamish basin: A New Set of GIS Tools. A report prepared for the Stillaguamish Tribe of Indians, Natural Resource Department

^[9] Lee, S-Y., and A.F. Hamlet. 2011. Skagit River Basin Climate Science Report. A summary report prepared for Skagit County and the Envision Skagit Project by the Department of Civil and Environmental Engineering and the Climate Impacts Group, University of Washington, Seattle. September, 2011.

^[10] NOAA Sea Level Trends: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.html>

^[11] (NRC) National Research Council 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*. Washington, DC: The National Academies Press

^[12] (IPCC) Intergovernmental Panel on Climate Change. 2013. *Working Group I, Summary for Policymakers*. Available at: http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf



Climate Resilient Floodplains:

***Local Perspectives on Integrating Climate Resilience into
Floodplain Management and Planning in the Stillaguamish
and Puyallup River Watersheds***

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The Nature Conservancy

Final Draft Report | *April 11, 2016*



The Nature
Conservancy 
Protecting nature. Preserving life.

“The regional consequences of climate change will be strongly shaped by past choices – of what to build where, what to grow where – and by the laws, institutions, and procedures that shape how natural resources are managed and allocated, risks from natural hazards are identified, and trade-offs among conflicting objectives resolved.”

Snover, A.K., Mauger, G.S., Whitely Binder, L.C., Krosby, M., Tohver, I. 2013. Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers. State of Knowledge Report prepared for the Washington State Department of Ecology. Climate Impacts Group, University of Washington, Seattle.

Acknowledgements

The authors would like to thank the 32 people in the Stillaguamish and Puyallup watersheds who offered their time and insights for this project. This project was made possible through support provided by the National Oceanic and Atmospheric Administration and The Nature Conservancy, under the terms of Agreement # NA13NMF4630139. The content and opinions expressed herein are those of the author(s) and do not necessarily reflect the position or the policy of such agency or The Nature Conservancy, and no official endorsement should be inferred.

Recommended citation:

Whitely Binder, L.C., and J. Morse. 2016. *Climate Resilient Floodplains: Local Perspectives on Integrating Climate Resilience into Floodplain Management and Planning in the Stillaguamish and Puyallup River Watersheds*. University of Washington Climate Impacts Group, Seattle, WA.

Cover photo: Flooding in the Stillaguamish watershed, November 18, 2015. Julie Morse, The Nature Conservancy.

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1 Introduction

The low elevation coastal floodplains of Puget Sound are among the region's most valuable natural assets. These lowland river valleys contain rich farmland, host the Sound's signature salmon runs, and support wetlands and forests that filter pollutants and recharge aquifers. They also contain commercial, residential, and industrial development worth over \$18 billion and provide recreational opportunities for the 4 million people living in the Puget Sound region. Finally, the Puget Sound lowlands are the ancestral homelands and cultural center for Puget Sound tribes.

Puget Sound lowlands are facing numerous pressures. Rapid development continues to change the landscape, affecting habitat, river function, and water quality. In some cases, development patterns are bringing more people and infrastructure into areas historically affected by floods and other hazards. The agricultural industry is trying to maintain its viability in the face of increasing development, habitat restoration needs, and regulatory pressure. Meanwhile, salmon runs continue to decline. Growing recognition that the protection and restoration of floodplain ecosystems is critical to salmon recovery is creating additional opportunities and demands on Puget Sound floodplains.

Climate change is another pressure that will exacerbate many of the issues already affecting Puget Sound watersheds. The region is already experiencing long-term warming, decreases in glacier area, and declining spring snowpack; many rivers are exhibiting earlier peak streamflows and lower summer streamflows as a result of long-term declines in snowpack and earlier spring snowmelt. Absent a significant reduction in greenhouse gas emissions, the region can expect an acceleration of these and other changes affecting the region's water resources. These hydrologic changes will have consequences on the economic, cultural, and natural resources supported by floodplains.

Floodplain managers and stakeholders are increasingly gravitating toward an integrated approach to floodplain management as a means for addressing challenges related to development, flood risk management, and salmon recovery. Several programs have been initiated to help identify management solutions that satisfy the multiple objectives of diverse floodplain interests in Puget Sound watersheds. These programs include the Floodplains by Design program, the Puget Sound Natural Resource Alliance, and the Alliance for Puget Sound Shorelines. Each seeks to create new solutions to conservation via collaboration among local stakeholders, rather than a prescriptive, single outcome approach that may lack support from the community.

The long term success of these efforts will be shaped in part by climate change and the ability to integrate climate change impacts into decisions affecting Puget Sound floodplains. Recognizing this, The Nature Conservancy and the University of Washington Climate Impacts Group partnered to conduct

Box 1. Goals of the Climate Impacts Interviews

1. Share the latest information regarding climate change impacts on floodplains with interview participants.
2. Identify how climate change could affect local floodplain management priorities and activities.
3. Identify additional actions or information needs that could help participants address climate change impacts discussed in the interviews.
4. Explore broader views on what a more climate resilient watershed would look like.

interviews with local stakeholders in two Puget Sound watersheds to better understand how climate change could affect current floodplain management planning priorities and activities. The interviews also sought to identify additional actions or information needs that could help participants address climate change impacts through their ongoing efforts. Finally, the interviews explored broader views on what a more climate resilient watershed would look like (Box 1).

This report summarizes what was learned in the course of those interviews. The report begins with an overview of the watersheds selected for the project and the interview process (Sections 2 and 3). Interview results for each watershed are presented in Sections 4 and 5. Closing thoughts, including ways in which the interviews revealed similarities between the two watersheds, are summarized in Section 6.

2 Watershed Selection

Two watersheds were selected for the project interviews: the Stillaguamish River and the Puyallup River watersheds. These watersheds were selected based on criteria and a guiding framework developed by the project team to evaluate candidate watersheds. The criteria used by the team reflected the team's desire to view the interviews as a first step in a longer-term engagement with the selected watersheds. For that reason, the criteria not only considered the current status and tenor of floodplain planning efforts in a watershed but also the potential for continued engagement and future implementation of on-the-ground climate adaptation projects. Evaluation criteria included:

- *Opportunity* - Does the watershed have high potential for measurable progress in planning over next year, and project implementation over the next five years?
- *Momentum* – Is the watershed already making progress on integrated planning and not stuck in intractable political situation?
- *Generalizability* – Will solutions to climate issues likely be relevant to other geographies?
- *Value Added* – Can the project team provide expertise/resources that the watershed partners don't already have?

The project team also solicited input from partners working in the candidate watersheds through informal discussions. More information on each watershed is provided in the following sections.

2.1 The Stillaguamish Watershed

The Stillaguamish Watershed is a relatively low elevation basin draining from the Central Cascade foothills into Puget Sound at Port Susan Bay (Figure 1). The watershed covers more than 700 square miles and includes about 3,100 miles in stream length, making it the fifth largest tributary draining into Puget Sound.¹

The Stillaguamish River floodplain is relatively large compared to the size of the river – an important feature resulting from the historical eruption of Glacier Peak, which cut off the Sauk River and redirected

¹ Source: The Puget Sound Partnership, http://www.psp.wa.gov/downloads/2014_action_agenda/LIO_Profiles/SnoStilly_Profile_20140408.pdf



Figure 1. Mouth of the Stillaguamish River in Port Susan Bay (above). Location of the Stillaguamish watershed in the Puget Sound region (left). Photo credit: Marlin Greene, One Earth Images. Map credit: USGS.

it north to drain into the Skagit River. The glacially deposited loose sandy soil makes this watershed prone to erosion and landslides. Snohomish County has had 25 Presidential Disaster declarations in the last 50 years, most involving flooding and/or landslides (Snohomish County Hazard Mitigation Plan, September 2015). Municipalities in the Stillaguamish watershed include the cities of Arlington (2010 population: 17,926) and Stanwood (2010 population: 6,231).

The majority of the Stillaguamish floodplain is prime agricultural lands and rural residential areas. Sixty percent of the upper watershed is forested, and primarily managed by the Washington State Department of Natural Resources. Integrated watershed planning efforts are underway in the Stillaguamish under Snohomish County's Sustainable Land Strategy. The Stillaguamish Tribe, the Stillaguamish Flood Control District, and Snohomish County are leaders in this effort, which is attempting to balance flood, fish recovery and agricultural interests. Eight salmonid species use the watershed for spawning and rearing, including two runs listed as threatened under the Endangered Species Act (Chinook salmon and bull trout).

2.2 The Puyallup Watershed

The Puyallup watershed is a high elevation watershed covering 1,053 square miles in south Puget Sound (Figure 2).² The watershed originates at over 14,000 feet from the glaciers on Mount Rainier, dropping steeply to the mouth of the Puyallup River and Puget Sound at the City of Tacoma. The major rivers in the watershed are the Carbon, White and Puyallup Rivers; combined, these rivers drain approximately 60% of Mount Rainier. The watershed includes 17 incorporated areas in Pierce and King County. The majority of the floodplain is medium to high development, with intense development (the Port of Tacoma) at the mouth of the river. The Muckleshoot Indian Tribe and the Puyallup Tribe of Indians have been the traditional stewards and inhabitants of the Puyallup Watershed.



Figure 2. Headwaters of the Puyallup River (above). Location of the Stillaguamish watershed in the Puget Sound region (left). Photo: Chris Margill, USGS. Map: US EPA.

² Puyallup Watershed statistics from *Puyallup River Watershed Council 2013 Annual Report*, available at: www.piercecountywa.org/ArchiveCenter/ViewFile/Item/2458

Over 400,000 people live in the Puyallup watershed, and the floodplain contains an estimated \$2.7 billion in assessed value. Some of the smaller cities, like Orting, are chronically at high risk of flooding. Numerous integrated watershed planning efforts are underway through Pierce County, the Puyallup River Watershed Council, and the Puyallup Watershed Initiative. The Pierce County Rivers Flood Hazard Management Plan, adopted in 2012, indicated a significant shift from seeking to provide 100-year protections everywhere to providing differing levels of flood protection across the floodplain.

3 Interview Process and Questions

Interview participants were selected based on project team knowledge of the organizations and individuals involved in floodplain planning in the Stillaguamish and Puyallup watersheds, as well as through referrals from partners working at the watershed scale in the Puget Sound region. A key objective in selecting participants was getting a range of perspectives. This required soliciting participation from federal, state, and local governments; tribal governments; the private sector; and the non-profit sector.

A total of 32 people were interviewed in 12 separate interviews conducted between June and October 2015. Most interviews were conducted in person with groups ranging from one to 10 people; three interviews were conducted over the phone to accommodate scheduling needs. Prior to the interviews, participants received a brief summary of projected climate change impacts for their watershed (see Appendix 1). The summary was developed by the Climate Impacts Group to spur conversation during the interviews and to provide a framework for discussing different categories of potential impacts.

The interview questions consisted of seven open-ended questions exploring:

- Current watershed issues, concerns driving near-term and long-term planning in the watershed,
- How today's weather and climate extremes affect what the interviewee does,
- How projected changes in climate ("tomorrow's weather") may affect what the interviewee does, and
- Broader views on what a more climate resilient watershed would look like.

Other topics discussed in the interviews included suggestions for additional actions or projects that would help address climate change impacts, and additional information or technical services needed to support those actions. The interview questions are provided in Appendix A.

Interviews took 60 to 90 minutes depending on the number of people being interviewed and schedule availability. In some cases, the number of people being interviewed, the nature of their organization, or schedule limitations required minor adjustments to the number of questions were asked. All responses were considered anonymous.

4 Interview Results: Stillaguamish Watershed

Thirteen interviews with staff or residents working in state, tribal, county, and local governments; a local watershed council; and farming were conducted for the Stillaguamish watershed (Box 2).

4.1 Current Planning Priorities and Climate Impacts

Current planning priorities identified by interview participants varied but generally fell within the context of economic growth/stability and salmon restoration. Related actions included economic development, supporting agricultural production in the lower watershed, replacing culverts, increasing floodplain connectivity, riparian planting, estuary restoration, increased stream temperature monitoring, placement of large woody debris in streams, and managing forests to meet sustainable timber harvest levels.

Climate change was widely recognized as an issue that will affect floodplain management and planning activities in the Stillaguamish. In most cases, climate change was expected to exacerbate existing challenges associated with today's extreme events (Table 1). For example, warmer summer temperatures, more extreme heat events, and lower summer streamflows will create additional stress for salmon and may reduce the efficacy of some salmon restoration projects (e.g., if dewatered). Warmer and drier summers also increase the risk of forest fires, which to date has not been a major concern in the Puget Sound region. Any increase in forest insects or disease would contribute to a higher fire risk.

In the lower watershed, climate change could put a squeeze on agricultural production if August temperatures are too warm for the crops typically grown in the Stillaguamish and wetter spring conditions make it more difficult to plant earlier to avoid the warmer August temperatures. This squeeze, it was noted, may occur even as climate change-induced drought in California creates higher demand for products grown in the Stillaguamish. This could lead to more intensive farming in the lower watershed and increase the need for on-farm water storage for irrigation.

When asked about more extreme precipitation and flooding, participants noted that a bigger concern would be if heavy rain events stick around longer. The Stillaguamish basin has a history of "flashiness" (i.e., quickly rising and falling flood flows). More prolonged rain events and larger floods could have more damaging effects in the basin, including increased scouring of salmon redds and increased sediment loading in rivers and streams. Larger floods could also lead to more frequent or longer closures of State Route 530 and damage to transportation infrastructure.

Sea level rise is another aspect of climate change that interview participants recognized as affecting their work or priorities. Sea level rise will accelerate marsh habitat loss and could cause the smoltification zone to shift higher in the watershed. Sea level rise also may exacerbate existing drainage problems in agricultural fields by making it harder to effectively use and maintain drainage ditches.

Box 2. Participating Groups: Stillaguamish Watershed

City of Arlington
City of Stanwood
Private sector (farming)
Snohomish County
Stillaguamish Tribe
Stillaguamish Watershed Council
Washington Department of Natural Resources

Table 1. Observed impacts of today’s extreme events in the Stillaguamish Watershed

<i>Today’s extreme events</i>	<i>Observed impacts</i>
Lower summer streamflows	Dewatering of salmon restoration projects Reduced efficacy of smolt traps Increased salmon poaching (lower flows increase stream access for people)
Summer heat events	Reduced opportunity for seining juvenile salmon due to temperature-related mortality Delayed migration and higher pre-spawning mortality (compounded by lower summer streamflows) Increased heat stress on young plants, affecting overall growth and requiring more irrigation Reduced crop quality (e.g., lettuce gets bitter) More agricultural pests (e.g., aphids) Accelerated ripening of crops, which has led to labor shortages (laborers still picking other crops) and difficulties getting crops to market (e.g., because berries from California are still in season) Increased wildfire risk and reduced fire response capacity as big fires in eastern Washington stretched resources Wastewater treatment plant discharges have been close to temperature limits on a few occasions
Flooding	Reduced incubation success, with multi-year impacts (e.g., big peak flow events during the 2012 incubation period led to low returns 3-4 years later) Increased siltation, particularly in the old channel for the Stillaguamish Closure of State Route 530 during larger events (2006, 2010, 2015 ³) Increased scour of salmon redds More incising on smaller channels in the watershed Risk of water quality problems for municipal water supplies (e.g., bigger flood events have “gotten close” to increasing turbidity in the groundwater wells used by the City of Arlington)
Extreme precipitation	Increased stormwater flooding in areas with poor drainage and/or undersized culverts (e.g., flooding of a business park in Arlington that supplies \$500,000 per day of real-time manufacturing to Boeing) More runoff from hillside developments onto agricultural lands Restrictions on timber harvest activities under heavy rain conditions if there is potential for sediment going into streams. Increased forest roads inspections Increased likelihood for landslides and culvert damage
King Tides/High tides	Difficulty draining stormwater and drainage ditches during high tides

³ SR 530 east of Arlington was closed on November 17, 2015 due to floodwaters from the South Fork of the Stillaguamish River. This flooding occurred after the interviews were conducted.

Efforts to explicitly address climate impacts in the Stillaguamish are in the early stages, where occurring. The City of Arlington added brief information on climate change in the natural resources section of their Comprehensive Plan. The inclusion is considered more of a place holder for future work on adaptation. The city is also considering planting more trees around town to mitigate heat impacts. The Stillaguamish Tribe has included climate change in their evaluation of what properties would benefit from restoration and is currently working on a natural resources climate change adaptation plan. At the state level, the Washington Department of Natural Resources (DNR) is completing a series of internal workshops in various programs on how climate change is likely to impact DNR programs. The agency is also working on a risk assessment for west side forests.

In some cases, climate change is creating new opportunities. For example, the Tulalip, Stillaguamish, and Sauk-Suiattle Tribes are partnering on a mountain goat (*Oreamnos americanus*) study designed to help the tribes develop a better understanding of the factors that could affect the species' population growth now and in a changing climate.⁴ The Stillaguamish have also formed a partnership with the USGS for stream temperature monitoring. These types of partnerships and new program opportunities are increasing as more grant applications start asking applicants to consider climate change in their work.

4.2 Suggested Actions for Addressing Climate Change Impacts in the Stillaguamish Watershed

After discussing how climate change could affect the Stillaguamish watershed and floodplain management and planning activities, participants were asked to identify specific actions that could help address the impacts and concerns discussed during the interview.

Thirty-nine specific actions, needs, or suggestions were noted during the interviews (Table 2). Responses ranged from technical data requests to general thoughts about what's needed to more broadly increase resilience in the watershed (e.g., trust-building steps). A general interest expressed in nearly all of the Stillaguamish interviews was the idea of looking at management of the upper watershed for ways to buffer the higher flood flows and lower summer streamflows expected with climate change. This could be done, for example, by managing the upper watershed to retain as much snowfall as possible and maximizing groundwater recharge.

*“We have to find ways to retain groundwater.
What good are engineered log jams if we don't
have any water?”*

- Stillaguamish watershed interview participant

⁴ Mountain Goat Status in the North Cascades: Population Dynamics, Habitat Selection and Seasonal Movement Patterns in a Changing Climate, US Fish and Wildlife Service Tribal Wildlife Grant (2015-2016)

Table 2. Suggested actions and information needs for addressing climate change impacts in the Stillaguamish Watershed

<i>Related to...</i>	<i>Suggested Actions and Needs: Stillaguamish Watershed</i>
Upper Watershed Management	<p>Better forestry practices</p> <p>Increase forest monitoring so DNR and others can build an understanding over time of how climate will affect vegetation</p> <p>Restore forest land (where needed) and keep existing forest land in forest cover to help reduce peak flows</p> <p>Manage forests to maximize snow cover</p> <p>Stop building in north County; need to save the trees to hold that water</p> <p>Need higher standards to capture runoff in upland developments</p> <p>Focus restoration on upper watershed, not just emergent marsh</p>
Floodplain Management	<p>Restore floodplains to allow the river to move more rather than incising</p> <p>Remove dikes, bank armoring in the estuary and river to help slow the river</p> <p>Look at opportunities to set back dikes</p> <p>Skim off the peak flows – bifurcate the river, create side channels, etc. Summer low flows could be helped if you can capture 20% of that high flow and meter it back into the system in the low flow season.</p> <p>Need to learn to live with flooding and its benefits (it’s helpful with the soils)</p>
Land Use Planning/Other Policy Measures	<p>End the use of exempt wells</p> <p>Possibly create a trust program for trading water rights</p> <p>Pursue land acquisition (needs additional funding)</p> <p>Link salmon recovery with Growth Management Act, comprehensive planning</p> <p>Reduce development in the floodplain (specifically at-risk areas)</p> <p>Allow expansion of the Urban Growth Area outside the floodplain</p> <p>Need a strong and multi-jurisdictional Growth Management Act to allow for resource sharing</p> <p>Technical assistance, e.g., grants to look at climate change and Growth Management Act analysis</p> <p>Maintain connected farmland in the fertile bottomlands</p> <p>Incentivize good behavior; provide <i>disincentives</i> to rebuilding in the floodplain</p>
Data/Information Needs	<p>Climate data and information needs to be tailored and translated for a wide range of audiences. Key is how the problem is presented. For example, how climate change affects the pocket books (via dike maintenance and design, pumping costs) will work for diking districts.</p> <p>Need to know how to best achieve greater forest cover – incentivizes? Regulation?</p> <p>Need better understanding of the genetics of local adaptation. After disturbance (natural or because of harvest), what trees, what species, what mixes should be planted given climate change?</p> <p>Can we better predict weather patterns better?</p> <p>Potential impacts on water supply</p> <hr/> <p>More information on/visualization of what impacts on the Stillaguamish look like. For example, we’ve seen inundation models but people are not</p>

	<p>understanding what that actually means because we haven't given people the numbers (quantification of impacts needed).</p> <p>Data about levees height on both sides of the delta</p> <p>More specific Skagit/Port Susan Bay sea level rise data</p> <p>More information on the impact of low summer flows. How do you measure pre-spawning stress?</p> <p>Better general data about the watersheds ("we are flying blind in a lot of watersheds; don't know a lot about them). Need a good store of knowledge so people can start making decisions rapidly.</p> <p>Need to look at how they are managing salmon in drier places.</p> <p>Updated FEMA flood maps</p>
Other	<p>Need to change the focus from salmon recovery to riverine function</p> <p>Strong leadership – it takes a strong leader to plan 40-50 years out. Need a champion in the urban planning and resource management community who can "carry water and get buy-in from a community that is living paycheck to paycheck"</p> <p>Focus on partnerships can be slow but beneficial. More networking would be good so they can learn about opportunities to share.</p> <p>Need to engage in lots of trust building. It will take 1-to-1 conversations and other actions to build trust.</p> <p>Need to take a more holistic, watershed perspective.</p> <p>Have to provide a solution and hope (and a couple of big floods to get the conversation going)</p>

4.3 Views on What a Climate Resilient Stillaguamish Watershed Looks Like

Interviews closed with discussion on what a climate resilient Stillaguamish watershed looks like. For this question, interview participants were asked what they would look for as signs of a more resilient watershed if they were transported to the watershed in the 2050s.

Participants described resilience in both ecological and socioeconomic terms. Ecologically, the watershed would have greater biodiversity and increased habitat connectivity in floodplains and the nearshore environment. One participant described the idea of a one mile wide riparian corridor with no houses or dikes; this corridor would allow for large channel migration zones and let the river "move the way it needs to."

In the upper watershed, a resilient watershed would include a good mixture of forest structures with older and more complex stands around water resources such as rivers and wetlands. Tree cover would be restored wherever possible to increase habitat and provide more buffering for floods. Sustainable forest practices in the upper watershed would still play a role in supporting a rural economy.

The continued viability of farming was also considered an important indicator of resilience. In addition to supporting the rural economy, local food production would reduce reliance on food produced from other regions. The continuation of farming in the lower watershed would also preserve the flood risk reduction benefits provided by farmland to developed areas.

Other signs of a resilient watershed include the availability of incentives to property owners to keep private property forested, no further development in high risk areas, continued emphasis on conservation, and awareness of climate change and what's needed "to be better stewards."

4.4 Other Issues That Can Affect Resilience Efforts in the Stillaguamish Watershed

Throughout the interviews, participants often commented on challenges and other issues that could directly or indirectly affect resilience planning or the outcomes of those efforts. For the Stillaguamish watershed, these issues included the following:

- *There is a desire for more economic development, but that development also creates challenges for addressing climate risks.* Some interview participants expressed the need for more economic development, including commercial and industrial development, to increase retail sales tax revenue, keep property taxes low, and to support public safety and other services. There is concern that discussions about climate risks could lead to reduction in value or lead to disinvestment in parts of the watershed. Additionally, some potential adaptation options, such as developing outside the floodplain to help reduce flood risk, may bump into Growth Management Act (GMA) restrictions. The GMA would have to change to allow for expansion of Urban Growth Areas outside of the current limits (currently required to build out all buildable areas within the GMA zone before changing the GMA zone).
- *Change takes time, particularly extreme change.* Major changes, including retreat from sea level rise or moving out of the floodplain, will have to be done via a gradual process. As noted by one participant, "it took 100 years to develop downtown Stanwood; it will take another 100 years to move out" (if that is what the community decided to do at some point in the future).
- *A lot of trust building is still needed within the Stillaguamish watershed.* Engagement around climate adaptation and resilience planning needs to occur through small steps (at least initially) to build trust between participants. As one participant noted, "the watershed is not ready for a big radical shift in thinking yet." You need to start with smaller efforts to build trust and then expand the conversation. The South Slough Project was mentioned as an example of a multiple benefit project that is (so far) working to build trust in the process and in different outcomes.
- *There are difficult tradeoffs in converting farmland (via levee removal) to estuarine habitat that are not fully resolved.* Farmland conversion is creating some concern that it will bring marine water (and with that, storm surge) closer to the City of Stanwood. These conversions have also raised concerns about the ability to drain storm water, an increased risk of coastal flooding, and losing productive farmland. It was noted, however, that some of the lands been converted are getting more difficult farm because of drainage problems and difficulties maintaining levees and drainage ditches.
- *Communities can be penalized for doing well at risk reduction.* The better communities get at addressing repetitive flood losses, the less funding communities receive to address the potential for repetitive flood loss. This, in effect, creates a financial penalty for doing a good job that makes it harder to continue flood mitigation efforts.

- *It is difficult to take a systems perspective.* Salmon recovery planning stresses on-the-ground salmon recovery projects, making it difficult to take a system-wide perspective for considering risks and opportunities across the watershed and across programs that heavily influence the watershed, including the Growth Management Act and comprehensive plans.
- *Changes in management of upland state forests (suggested as an opportunity in interviews) would need to navigate the balance that WA DNR has to strike between meeting conservation objectives and the agency's trust/fiduciary responsibility.* WA DNR currently manages 3 million acres in Washington as public trust lands; 17% of the Stillaguamish watershed (around 8,000 acres, 7,600 acres of which is forested) is DNR public trust lands. State trust lands have been managed since 1889 as an ongoing source of financial support for public K-12 schools, state universities, and other public facilities.⁵ They are also managed for habitat and recreation. Changes in upland forest management to maximize retention of flood waters, for example, could come into conflict with DNR's trust responsibilities for those lands.

5 Interview Results: Puyallup Watershed

Nineteen people were interviewed for the Puyallup River watershed, including staff from two tribes, local and federal government staff, and members of the Puyallup River Watershed Council (Box 3).

5.1 Current Planning Priorities and Climate Impacts

Interview participants identified salmon recovery (particularly Chinook and steelhead), flood risk reduction, stormwater management, water quality improvements, and continued viability of agriculture as the priorities guiding their floodplain management and planning activities.

Salmon recovery activities are focused on rebuilding salmon runs and habitat improvements. Efforts include riparian improvements, replacing large woody debris, addressing migration barriers (e.g., culverts), and finding partners for decommissioning old forest service roads in upper watershed.

Flood risk reduction efforts are a major focus due in part to large flood events in 1996, 2006, and 2009. Mud Mountain Dam (a federal flood control dam on the White River) is an important component of managing downstream flood risk, however the dam only regulates flood flows from 400 square miles of a 1,000 square mile drainage area. In a big flood event, there is still a lot of unregulated flow that can cause flooding. Buying out land,

Box 3. Participating Groups: Puyallup Watershed

Muckleshoot Tribe
 Pierce County Public Works
 Pierce County Conservation District
 Puyallup River Watershed Council (*including: Citizens for a Healthy Bay, City of Puyallup, City of Tacoma, King Co. River and Floodplain Management, Pierce Co. Conservation District, Pierce Co. Surface Water Management, Port of Tacoma, private sector consultant, Puyallup Tribe*)
 The Puyallup Tribe
 U.S. Army Corps of Engineers

⁵ For more on Washington's Public Trust Lands, see <http://www.dnr.wa.gov/managed-lands/forest-and-trust-lands>

setting back levees, and other efforts to “give the river more room” are being pursued in the Puyallup watershed to help mitigate flood risk.

Stormwater management is a priority due to the need to reduce flooding in urban areas and, increasingly, the need to reduce associated water quality impacts. Efforts are focused on ensuring effective stormwater treatment going forward but urban areas are also dealing with older infrastructure with no treatment or outdated treatment. Funding for stormwater management projects has been a continual challenge. A related priority is getting streams removed from the Total Maximum Daily Load list, with the goal of making every stream, lake, and beach swimmable and shellfish harvestable. Other noted priorities include public education and partnership building around the issues of clean water and clean air for fish, wildlife, and people, and ensuring that the watershed has a sustainable agricultural economy and local food access.

Interview participants identified several ways in which today’s extreme events have affected the watershed (Table 3). Responses were weighted towards impacts associated with summer heat events and low streamflow due presumably to the timing of most of the interviews (July 2015⁶).

Several participants noted that the summer drought and extreme low streamflows were prompting new conversations around traditional and non-traditional solutions. This has included questions about using Mud Mountain Dam to augment summer streamflows, the feasibility of shading ponds or chilling hatchery water, and the potential for transporting stranded fish in unregulated streams. At the other end of hydrologic spectrum, recent flood events have reinvigorated debate around dredging, which was halted in 1990s due to impacts on salmon habitat.

As in the Stillaguamish watershed, Puyallup watershed interviewees saw climate change as exacerbating the impacts associated with today’s extreme events. For example, lower and warmer streamflows would increase the prevalence of fish pathogens and reduce mainstem spawning habitat. Warmer streamflows could also lead to more temperature violations and ultimately the establishment of more Total Maximum Daily Load limits, which have expensive legal obligations for local governments.

With regards to flood risk and more extreme precipitation, participants noted that more intense atmospheric river events will increase winter flood risk in the Puyallup watershed. Mitigating the additional flood risk via Mud Mountain Dam could be challenging, however. The dam’s use in winter is already being maximized and structural changes (i.e., making the dam higher) would be difficult. Operational changes at Mud Mountain Dam to address projected summer low flow problems could be equally difficult. Because the dam is federal, operational changes require an act of Congress. Operational changes are not unprecedented (e.g., Howard Hanson Dam on the Green River) but it can take a decade or more before changes are implemented.

Another concern expressed was the potential that more extreme precipitation could reduce the effectiveness of infiltration and low impact development (LID) projects. This could make it more difficult to sustain support for installation of LID projects. Finally, it was noted that sea level rise could affect Port of Tacoma operations and the movement of cargo via roads and rail.

⁶ January-August 2015 was the warmest January-August period on record and the 9th driest for Washington State. June-August was also the warmest on record for the Puget Sound region (source: Office of the Washington State Climatologist)

Table 3. Observed impacts of today’s extreme events in the Puyallup Watershed

Today’s extreme events	Observed impacts
Summer low flows	Low dissolved oxygen in the river (exacerbated by warm water temperatures) Below normal fish catches Reduced water quality near wastewater treatment facilities (lower flows concentrate permitted effluent)
Summer heat events	Higher pre-spawning mortality due to higher prevalence of bacterial diseases (e.g., furunculosis) High summer water temperatures (exacerbated by low summer streamflows) Difficulty managing water temperatures in salmon hatcheries that rely on surface water (can lead to higher mortality of hatchery stock) More agricultural pests Earlier and more irrigation for agriculture in the watershed Growing concern about summer water availability for agriculture, including groundwater levels Wells going dry or getting really low
Flooding	Increased salmon egg scour mortality Increased awareness of flood risk from people who thought they were immune to floods Reinvigorated debate around dredging
Extreme precipitation	Increased river and urban flooding Increased difficulty with conversations around green infrastructure (perception that the green infrastructure will fail)
King Tides/High tides	Significant problems with bulkheads and overwater structures

5.2 Suggested Actions for Addressing Climate Change Impacts in the Puyallup Watershed

Interview participants identified 28 actions, needs, or suggestions for addressing climate change impacts in the Puyallup watershed (Table 4). This included actions related to forest management in the upper watershed, floodplains, habitat restoration, infrastructure, and land use planning. Numerous data and information needs were also identified.

“Salmon are very plastic and can adapt to a range of conditions. What’s different now is the rate of that change.”

- Puyallup watershed interview participant

Table 4. Suggested actions and information needs for addressing climate change impacts in the Puyallup Watershed

<i>Related to...</i>	<i>Suggested Actions and Needs: Puyallup Watershed</i>
Upper Watershed Management	<p>Increase work with small forest land owners (small land owners can have a big impact on little systems)</p> <p>Consider offering Conservation District services (i.e., technical assistance) related to forest management</p> <p>Increase canopy cover over streams</p>
Floodplain Management/ Riparian Habitat Restoration	<p>Increase channel maintenance, including selective dredging</p> <p>Reduce sediment loads wherever possible</p> <p>Increase levee setbacks (to give fish a chance to avoid high flows and to provide more room for sediment deposits)</p> <p>Ramp up riparian enhancement work</p> <p>Revegetate the lower watershed</p> <p>Restore riparian habitat with more native cover</p> <p>Account for lower flows in habitat projects</p>
Infrastructure	<p>Engineering changes could be made to hatchery, but they can be expensive</p> <p>Explore potential for chilling surface water coming into hatcheries</p> <p>Consider going to tertiary treatment for wastewater flows</p> <p>Provide more technical support related to irrigation efficiencies for farmers</p>
Land Use Planning/Policy	<p>Move people out of harm's way</p> <p>Need to find ways to demand and expect a multi-benefit result when it comes to land use planning and related decisions, e.g, are levee improvements to protect farmland or to stimulate suburban development? (projects argue they are multi-benefit when they really aren't)</p>
Data/Info Needs	<p>Guidance on how to integrated climate change impacts into levees design and construction</p> <p>Delineation of channel migration zones to accommodate lateral erosion. Accounting for lateral erosion is typically poor and need will become greater with climate change.</p> <p>Information on how Atmospheric River-driven flooding may change. Will the frequency get worse? Will the intensity get worse? Will the seasonality shift/get bigger?</p> <p>Would be good to know how the current 1-in-50 year flood event changes (changes in frequency, volume of flows).</p> <p>How will peak flows change? (what are the numbers?)</p> <p>How long does the flood risk get reduced by setting back a levee, removing gravel, or building higher? Pretty clear that the amount of sediment coming from Mt Rainier in the next 40 years is large.</p> <p>Need to update Pierce County's continuous record of rainfall for projects to include the last 15 years and then project out. Will use instantly on sizing facilities (integrate into models)</p> <p>How is flooding duration affected? Would use that information in set-back design</p> <p>What water is important to who and when?</p>

	<p>Need for agreement on the methodology that should be used for assessing the impact of changes in forested areas in the lower watershed; not sure there is a good forest assessment tool (but there are a variety of standards of how you might evaluate it)</p> <p>Need messaging about cumulative impacts</p> <p>More research on changes in Growing Degree Days specific to Pierce County</p> <p>1) What level of protection to be designing to? 2) what are the freeboard/safety factors, and 3) what do the potential flows mean for raising levels in the future....for a while it's been hard to get good information related to peak flows.</p>
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5.3 Views on What a Climate Resilient Puyallup Watershed Looks Like

Puyallup interviewees were asked to describe what a more climate resilient Puyallup watershed would look like if given the chance to visit the watershed in the 2050s. The responses were diverse, a finding that reflects the diversity of the watershed itself (from forested to urban) as well as the planning activities within the watershed. Responses are summarized below by major themes.

- *Resilient uplands.* In the upper watershed, the risk of large forest fires is eliminated because people will have planned for increasing fire risk and have managed the forests to improve forest health. Additionally, there will be more water retention in the upper watershed (possibly via more beaver dams) that has been designed to emulate glacier retention and release of water.
- *Resilient riparian and shoreline habitat.* Wider levee setbacks, wider floodplains, and more off-channel habitat are being used to improve habitat in the Puyallup watershed. Groundwater restoration is being used to maintain streamflows, particularly in smaller streams. More native vegetation has been planted along the streams to help with water temperatures and to create habitat. Coming into urban basins, innovative solutions are being used to address water temperature impacts. Shoreline habitat has improved despite increased storm surge reach because residents are seeing the value of green infrastructure for shoreline protection. Finally, the public supports habitat maintenance in the same way they are willing to support levee maintenance.
- *Salmon recovery and cultural connection.* Gains in salmon recovery continue to be made. A sustainable salmon fishery exists for tribal fishermen. More kids would be interacting on a regular basis with salmon and the resources required to sustain salmon (e.g., riparian habitat).
- *Flood resilience.* Communities have given a lot more latitude to the river. As noted by one interviewee, you can't keep putting "five gallons of water into a one gallon container." Channel capacity has been restored, and sediment is being safely removed from the river by shelving rather than dredging, for example. Through these and other activities, resilience to flooding has been increased throughout the whole watershed to the point that the flood warning threshold has been raised for all areas. Today, for example, the upper Puyallup River (upstream of the Carbon River) can now have twice the flood flow that used to trigger flood warnings; this higher threshold would apply everywhere in the watershed in the future.

- *Stormwater/infrastructure improvements.* Stormwater improvements are seen through improved conditions downstream of tributaries. Past practices that emphasized getting water off your property have been replaced with practices that promote more onsite retention and treatment. The condition of private culverts is improving via better enforcement of rules. More people in the urban/suburban areas see green projects as the preferred solution to stormwater issues, leading to more public demand for those approaches.
- *Water supply/Streamflows.* The watershed would not have flow issues; the watershed will have figured out how to have water for various competing interests. Culturally, people change habitats in ways that reduce water use.

5.4 Other Issues That Can Affect Resilience Efforts in the Puyallup River Watershed

Throughout the interviews, participants often commented on challenges and other issues that could directly or indirectly affect the ability to engage in resilience planning and/or affect the outcomes of those efforts. For the Puyallup watershed, these included the following points.

- *Participants are feeling process fatigue.* The number of ongoing planning efforts related to flooding, salmon recovery, and stormwater is considerable. These efforts often draw on many of the same individuals. This has led to planning process fatigue and the feeling of being “over-processed.”
- *Participants have to see the value in working on climate change at a watershed scale.* A recent effort to launch a watershed-scale climate change adaptation planning project for the Puyallup failed due, in part, to uncertainty about the usefulness of the effort. According to one participant, “people had a hard time wrapping their heard around expectations, deliverables, and outcomes.” Process fatigue and unfamiliarity with the group trying to organize the planning effort also affected the outcome.
- *There are difficult tradeoffs and conflicting priorities with levee setbacks.* While levee setbacks are often pursued to create habitat and increase flood resilience, conflicting project priorities (sometimes mandated by funding sources) can lead to compromises that reduce flood control and habitat benefits. For example, setback allotments for planting riparian habitat may be restricted to accommodate parks, trails, infrastructure, and views. In some cases, funding for those trails may be tied to recreation funding from the State. The additional restrictions that come with these multiple uses can limit the location, number, and types of trees that get planted, potentially reducing the shade, habitat, and flood buffering benefits provided by levee setbacks. Several interview participants also noted that the levee setbacks result in more development behind the levees, ultimately increasing what’s at risk if levees are overtopped.
- *Climate change would require larger levees, compounding issues with adequate planting space.* Adding to the existing challenge of preserving adequate planting space is the fact that projected changes in streamflow volume for the 100-year flood would require higher levees, resulting in a bigger structural footprint. Levee slopes can’t be more than 3:1 to support big trees. However, it will be difficult politically and economically to design bigger levees that preserve the 3:1 slope.

- *Sediment loading is a growing problem (again), creating pressure to dredge (again).* The Puyallup River is a dynamic system with large amounts of sediment coming off Mt. Rainier. The lower river channel is naturally filling itself in as a result, increasing flood risk and affecting habitat quality. Climate change and development will exacerbate this problem. There is social and political pressure to resume dredging, which was stopped more than a decade ago because of habitat concerns.
- *For some, it is difficult to accept the Puyallup as a dynamic system.* For some people, it was noted, “a river that moves is a poorly managed river.” This sentiment can create public and political pressure to constrain the river in defined channels.
- *Rapid development in the Puyallup Basin and increasing operating costs make it more challenging to implement some actions.* The last two decades have seen significant development in the lower Puyallup watershed. Areas that were primarily agricultural lands in the early 1990s have been converted into industrial, commercial, and residential land uses. The rapid development increases the cost of land acquisition for habitat restoration and flood reduction efforts, potentially limiting the pace and scale of implementation. Additionally, every time a piece of property is acquired, that acquisition adds to operating costs. The higher operating costs ultimately reduces the amount of funding available for future capital projects.
- *Big flood events get the attention – and the opportunities – while other problems don’t.* Big flood events are big news items with lots of compelling visual images. This creates political and public support for flood mitigation efforts, especially as the area gets more developed. Big flood events can also create funding opportunities that may not have been available otherwise. Other extreme events may not get the same level of attention, however. For example, more frequent heavy rain events are not seen as having a big impact even though stormwater runoff is known to be a major problem in Puget Sound waterways. Lower summer streamflows are also not getting much attention even though the impact on salmon can be widespread. As noted in the interviews, severe low flows tend to affect the whole basin while flood severity tends to vary by sub-basin. Additionally, low flows tend to last longer while flood flows move through the watershed quickly.
- *Coastal flooding is harder to get traction on.* Efforts to address coastal flooding tend to get less public support due to fewer examples of what coastal flooding looks like and public perception that when something happens along the coast, it is considered a private property issue.
- *Climate change impacts may make it harder to implement green infrastructure projects.* More extreme precipitation events and increasing storm surge are making it more difficult to convince private landowners to build green infrastructure. In coastal areas, people are expressing concern that non-traditional ways won’t protect their property against bigger storm surge. For stormwater runoff, there is a perception that the green infrastructure will fail under more extreme precipitation events.

- *More protective risk reduction measures are hard to keep in practice.* Even when communities adopt more aggressive risk reduction measures, it can be hard to implement those measures. For example, the threat of lahar flows from Mount Rainier has allowed for more conservative planning requirements (e.g., requirements for two feet of freeboard on the levees). However, the people who permit buildings are in a different department. Those folks are rewarded for ease of permitting, which can create incentive to reduce any requirements that make it harder to develop.
- *Resilience efforts focusing on the upper watershed will have to deal with a diversity of uplands ownership.* There is a fair amount of land cover in small and larger corporate/family forests. This can make it more challenging to proactively manage forest lands for resilience (e.g., to increase water retention).

6 Conclusions

The Stillaguamish and Puyallup watershed interviews provided an opportunity to share information about climate change impacts with a diversity of stakeholders engaged in floodplain management, and to learn how those impacts could affect floodplain management and planning priorities and activities. The interviews also identified additional actions or information needs that could help participants address climate change impacts through their ongoing efforts. Finally, the interviews explored participant views on what a more climate resilient watershed would look like.

While the two watersheds are different in a number of ways (e.g., size, degree of urbanization), several common issues related to climate change, floodplain management, and floodplain planning emerged from the discussions. First, and most significantly, all interview participants felt that climate change would exacerbate the challenges they are working to address through floodplain management and planning (salmon recovery, flood mitigation, habitat restoration, water quality improvements, stormwater management, viability of farming, etc.).

A second issue that came up frequently in both watersheds was interest in focusing more on the upper watershed as a tool for addressing increasing flood risk *and* lower summer streamflows. This could include optimizing forest management practices and land cover to retain as much snowfall as possible, reduce peak flows, and recharge groundwater. Diverse land ownership and the historical obligations of state trust lands could be factors in implementing actions in the upper watersheds, however.

Another view expressed in both watersheds (although not universally expressed) was the opinion that more extreme summer low flows could present bigger challenges in the future than increased flooding, particularly for salmon. The reasons related to differences in the geographic extent, duration, and familiarity of the two extremes. First, flood severity tends to vary within sub-basins while extreme low flow conditions are more likely to affect an entire watershed. Second, flood events move through a watershed fairly quickly while extreme low flow events tend to occur over a prolonged period of time (i.e., several weeks or longer). Third, flooding is not necessarily a new event (“we are flooding the same areas more frequently”) while the conditions experience in summer 2015 were considered unprecedented in many ways (a fact that may have biased the perspective reported here).

Interviews in both watersheds touched on the difficulty of balancing the tradeoffs that come with levee changes. In the case of the Stillaguamish, removing levees in the lower floodplain has created more habitat but may also increase the risk of coastal flooding and storm surge to nearby infrastructure, particularly with sea level rise. In the Puyallup, levee setbacks are allowing for riparian habitat improvements and flood risk reduction but they are also resulting in more intense development behind the levees, ultimately increasing what's at risk if levees are overtopped. The need to design for multiple-use levees (e.g., to include space for recreation) also creates difficult tradeoffs with the location, number, and types of trees that can be planted for habitat restoration.

Finally, the importance of relationships, trust, and the ability to see value in and ways of working at a watershed scale were raised in both watersheds.

Understanding each watershed's context and how that context can shape preparing for climate change at the watershed scale is an important first step in developing climate resilience at the watershed scale. While the views expressed during the interviews are only a small sample of the potential views on climate change and watershed planning within each watershed, the interviews underscored the fact that responding to climate change will not be a "one-size-fits-all" approach. Climate impacts and responses will vary by location and over time. In addition, floodplains and the effectiveness of floodplain management and planning activities in addressing climate change impacts will be affected by a number of issues that go beyond changes in climate. Many of these—including development, institutional barriers, and limits on funding—were discussed by interview participants in the course of responding to specific interview questions.

Appendix A: Supporting Materials for the Interviews

How Will Climate Change Affect the Stillaguamish Watershed?

Prepared by the University of Washington Climate Impacts Group, June 2015

How Will Climate Change Affect the Puyallup Watershed?

Prepared by the University of Washington Climate Impacts Group, July 2015

Interview Questions

How Will Climate Change Affect the Stillaguamish Watershed?

Prepared by the University of Washington Climate Impacts Group, June 2015

Climate

Rapid warming is expected this century and the heaviest rain events are projected to become more intense. All scenarios project warming for the Stillaguamish Watershed as a result of rising greenhouse gas emissions. Although annual precipitation is not expected to change significantly, heavy rainfall events are expected to intensify and summers are expected to be drier.

Coasts

Sea level rise and ocean acidification will continue to affect the Stillaguamish delta. Both are projected to rise substantially under all greenhouse gas scenarios. Sea level rise in the Puget Sound region reflects the combined effects of a rising global sea level and subsidence of land surfaces due to plate tectonics, among other factors.

Water

The Stillaguamish watershed is projected to experience decreasing snowpack and widespread changes in streamflow timing, flooding, and summer minimum flows but little change in average annual streamflow volume. Warmer winter temperatures will reduce snowpack volume in the Stillaguamish watershed and shift the timing of snowmelt earlier (Figure 1). Lower snowpack in the upper watershed will also contribute to lower streamflow volume during the summer months. Flood risk increases in the fall/winter months due to expected increases in extreme precipitation and shifts in seasonal precipitation from snow to rain over larger portions of the watershed. While these seasonal changes are large, annual streamflow volumes are not projected to change substantially.

Water Quality

Stream temperatures in the Stillaguamish are projected to increase, along with sediment loading and possibly landslides. Warming air temperatures and declining snowpack result in warmer stream temperatures, while a receding snowline and increasing winter rain will cause greater erosion, increasing the sediment supply to rivers. Although future landslides are difficult to predict, several studies indicate that future conditions will favor an increase in landslide risk for the Stillaguamish.

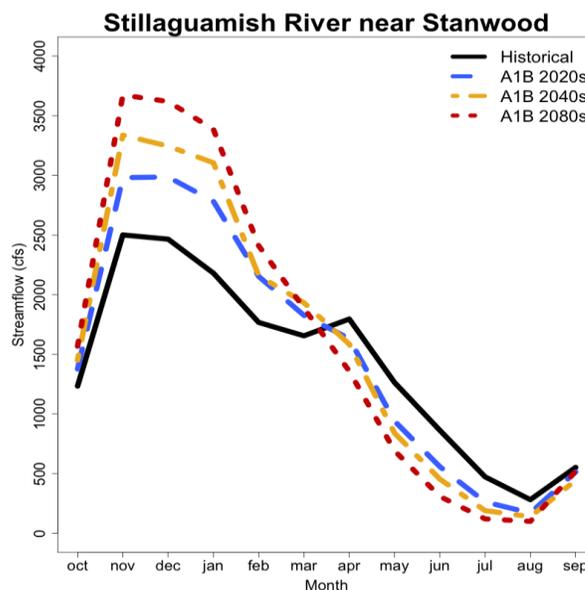


Figure 1. Change in the seasonality of streamflow, showing monthly average runoff for the water-year (Oct-Sep), for the 20th century (1916-2006; black line), the 2020s (2010-2039; blue line), the 2040s (2030-2059; gold line), and the 2080s (2070-2099; red line), all based on a medium (A1B^[1]) greenhouse gas scenario. Source: <http://warm.atmos.washington.edu/2860>.^[2]

^[1] To make projections, climate scientists use greenhouse gas scenarios – “what if” scenarios of plausible future emissions – to drive global climate model simulations of the earth’s climate. Wherever possible, scenarios used in this document include both a low and a high emissions scenario of 21st century greenhouse gas emissions.

^[2] Hamlet, A.F., M.M. Elsner, G.S. Mauger, S-Y. Lee, I. Tohver, and R.A. Norheim. 2013. An overview of the Columbia Basin Climate Change Scenarios Project: Approach, methods, and summary of key results. *Atmosphere-Ocean* 51(4):392-415, doi: 10.1080/07055900.2013.819555: <http://warm.atmos.washington.edu/2860/>

Observed and Projected^[1] Changes

Temperature	
<i>Annual Temp - Observed</i> ^[3]	<p>Increase in average historical temperature (1895-2014) for nearby stations</p> <p>Everett: +0.71 ± 1.05°F Sedro Woolley: +1.19 ± 1.11°F</p>
<i>Annual Temp - Projected</i> ^[4]	<p>Projected increase in average annual temperature for the 2050s (2040-2069), relative to 1970-1999, for the Stillaguamish watershed:</p> <p>Low emissions (RCP 4.5): +4.4°F (range: +3.0 to +5.6°F) High emissions (RCP 8.5): +5.7°F (range: +4.5 to +7.3°F)</p>
<i>Frost-free season</i> ^[4]	<p>Longer freeze-free period expected (average for the Stillaguamish watershed).</p> <p>Low emissions (RCP 4.5): +16 days (range: +12 to +22 days) High emissions (RCP 8.5): +22 days (range: +16 to +28 days)</p>
Precipitation	
<i>Seasonal Precipitation - Observed</i> ^[3]	<p>No historical trend in seasonal precipitation; large variations from year-to-year.</p>
<i>Seasonal Precipitation - Projected</i> ^[4]	<p>Increased winter precipitation and decreased precipitation in summer (2050s relative to 1970-1999), for the Stillaguamish watershed:</p> <p><i>Winter (Oct-Mar)</i></p> <p>Low emissions (RCP 4.5): +8% (range: +2 to +18%) High emissions (RCP 8.5): +9% (range: +4 to +19%)</p> <p><i>Summer (Apr-Sep)</i></p> <p>Low emissions (RCP 4.5): -8% (range: -19 to 0%) High emissions (RCP 8.5): -8% (range: -21 to +1%)</p>
<i>Heavy Precipitation - Projected</i> ^[4]	<p>Increased maximum daily precipitation totals in Stillaguamish watershed (2050s relative to 1970-1999):</p> <p>Low emissions (RCP 4.5): +13% (range: +7 to +25%) High emissions (RCP 8.5): +16% (range: +3 to +29%)</p> <p>Recent research indicates that heavy precipitation events may be larger than what is projected in the above models.^[5]</p>

^[3] Menne, M. J., Williams Jr, C. N., & Vose, R. S. (2009). *The US Historical Climatology Network monthly temperature data, version 2*. Bulletin of the American Meteorological Society, 90(7), 993-1007.

^[4] Integrated Scenarios of the Future Northwest Environment: <https://www.nwclimatescience.org/node/231>

^[5] Salathé, EP, AF Hamlet, CF Mass M Stumbaugh, S-Y Lee, R Steed (2014) Estimates of 21st Century Flood Risk in the Pacific Northwest Based on Regional Scale Climate Model Simulations. *J. Hydrometeorology*

Water Supply

Snow

Spring Snowpack – Projected^[4]

Substantial declines in April 1st snowpack, 2050s relative to 1970-1999, for the Stillaguamish watershed:

Low emissions (RCP 4.5): -66% (range: -75 to -54%)
 High emissions (RCP 8.5): -73% (range: -88 to -55%)

Streamflow

Winter – Projected^[4]

Increases in winter (October–March), 2050s relative to 1970-1999, for the Stillaguamish watershed:

Low emissions (RCP 4.5): +28% (range: +20 to +44%)
 High emissions (RCP 8.5): +32% (range: +19 to +52%)

Summer – Projected^[4]

Decreases in summer (April–September), 2050s relative to 1970-1999, for the Stillaguamish watershed:

Low emissions (RCP 4.5): -24% (range: -29 to -16%)
 High emissions (RCP 8.5): -27% (range: -34 to -18%)

Flooding – Projected^[2]

Most models indicate increases in volume associated with the 100-year (1% annual probability) flood event, 2040s (2030-2059), relative to 1970-1999, for the North Fork Stillaguamish:

Low emissions (B1): +12% (range: -15 to +38%)
 Moderate emissions (A1b): +20% (range: +5 to +57%)

Low flows – Projected^[2]

Most models indicate decreased volumes associated with the 7-day lowest flow in 10 years, 2040s (2030-2059), relative to 1970-1999, for the North Fork Stillaguamish:

Low emissions (B1): -16% (range: -30 to +1%)
 Moderate emissions (A1b): -22% (range: -31 to -7%)

Water Quality

Stream temperatures – Projected

Char^[6]: Decline in number of river miles within thermal thresholds for char spawning/rearing (mean August stream Temp. <54°F^[7]):

Historical (1993 – 2011): 205 miles
 2040s, Moderate emissions (A1b): 78 miles (-62% loss)
 2080s, Moderate emissions (A1b): 27 miles (-87% loss)

Salmonids^[6]: Decline in number of river miles within thermal thresholds for core summer salmonid habitat (mean August stream Temp. <60°F):

Historical (1993 – 2011): 650 miles
 2040s, Moderate emissions (A1b): 580 miles (-10% loss)
 2080s, Moderate emissions (A1b): 410 miles (-36% loss)

^[6] NorWest Regional Database and Modeled Stream Temperatures: <http://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html>

^[7] Note that these thresholds are actually intended for 7-day average stream temperatures, not monthly averages. This means that the projections shown here are optimistic – an overestimate of suitable habitat.

<i>Sediment & Landslides</i>	<p>Loss of snowpack and glaciers due to warmer temperatures contributes to the exposure of highly mobile sediment sources and increases in flood flows, which triggers faster sediment movement.</p> <p>Geomorphic hazards, like debris flows and landslides, could also increase in response to decreasing snowpack and glaciers.^{[8],[9]}</p> <p>Increasing heavy precipitation may increase erosion rates and also threaten slope stability.</p>
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Oceans	
<i>Sea Level – Observed^[10]</i>	Historical rise in sea level (Seattle is the closest long-term gauge) Seattle, WA: +0.8 in./decade (1900-2008)
<i>Sea Level – Projected^[11]</i>	Rising for all scenarios Seattle, WA: +4 to +56 inches (2100, relative to 2000)
<i>Ocean Acidification – Observed^[12]</i>	Global increase in ocean acidity since 1750 +26% (decrease in pH: -0.1)
<i>Ocean Acidification – Projected^[12]</i>	Global Increase by 2100 for all scenarios (relative to 1986-2005). Low emissions (RCP 4.5): +38 to +41% High emissions (RCP 8.5): +100 to +109%

This document was prepared by the Climate Impacts Group to support interviews planned as part of the ***Integrating Climate Resilience in Puget Sound Floodplain and Working Lands Programs*** project.

For more information on climate change impacts in Washington, see *Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers* (2013), available at <http://cses.washington.edu/cig/reports.shtml>, or contact the Climate Impacts Group (cig@uw.edu, 206-616-5350).

^[8] Miller, D.J. (2004) Landslide Hazards in the Stillaguamish basin: A New Set of GIS Tools. A report prepared for the Stillaguamish Tribe of Indians, Natural Resource Department

^[9] Lee, S-Y., and A.F. Hamlet. 2011. Skagit River Basin Climate Science Report. A summary report prepared for Skagit County and the Envision Skagit Project by the Department of Civil and Environmental Engineering and the Climate Impacts Group, University of Washington, Seattle. September, 2011.

^[10] NOAA Sea Level Trends: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.html>

^[11] (NRC) National Research Council 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*. Washington, DC: The National Academies Press

^[12] (IPCC) Intergovernmental Panel on Climate Change. 2013. *Working Group I, Summary for Policymakers*. Available at: http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf

How Will Climate Change Affect the Puyallup Watershed?

Prepared by the University of Washington Climate Impacts Group, July 2015

Climate

Increasing greenhouse gases will lead to warmer temperatures throughout this century for the Pacific Northwest region. Climate modeling studies indicate that the Puyallup watershed will become warmer under all future scenarios, and will also undergo more intense rainfall events under most future scenarios. Although average annual precipitation is not expected to change significantly, summer months are projected to be drier than they were historically.

Water

The Puyallup watershed will undergo shifts in streamflow timing, increased winter flooding, and lower summer streamflows as a result of warmer temperatures and lower snowpack projected for the region (Figure 1). The overall amount of annual streamflow is not projected to change, however. Flood risk is projected to increase during the fall and winter seasons as warmer temperatures cause more precipitation to fall as rain over a larger portion of the basin area and as more intense extreme rainfall events contribute to higher flows. Likewise, less snowmelt will cause the lowest flows to become lower in the summer months.

Water Quality and Sediment

The Puyallup watershed is projected to undergo higher water temperatures, increased sediment loading and possibly more frequent landslides. Warmer air temperatures and lower summer streamflow will increase water temperature, while receding snowlines and more winter rainfall enhance erosion, increasing sediment supply in the watershed. Predicting landslide risk is complicated, however projections of higher rainfall, increased soil saturation, and steep slopes in the Puyallup watershed provide the conditions that favor more landslide activity.

Coasts

Commencement Bay will experience sea level rise and increasing ocean acidification. Increased greenhouse gas emissions will exacerbate both of these marine conditions. Local characteristics of the Puget Sound region will influence the extent of sea level rise and ocean acidification in the region. Sea level rise could be amplified by land subsidence occurring as a result of plate tectonics. Ocean acidification could be locally magnified by nutrient rich runoff from the urban and agricultural areas surrounding the Puyallup delta.

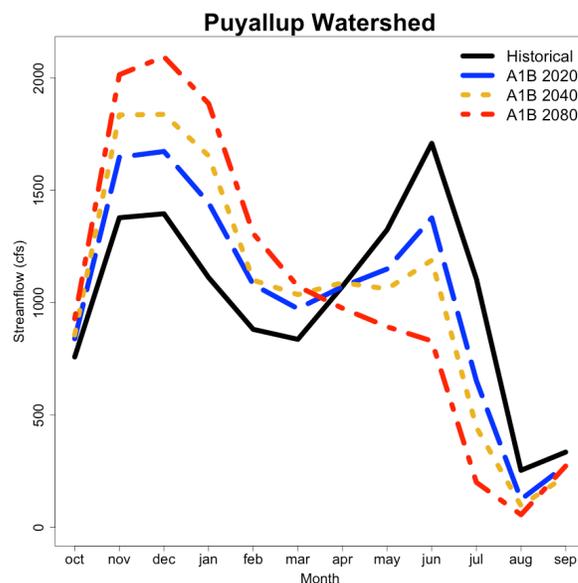


Figure 1. Change in the seasonality of streamflow, showing monthly average runoff for the water-year (Oct-Sep), for the 20th century (1916-2006; black line), the 2020s (2010-2039; blue line), the 2040s (2030-2059; gold line), and the 2080s (2070-2099; red line), all based on a medium (A1B^[1]) greenhouse gas scenario. *Source:* <http://warm.atmos.washington.edu/2860/>^[2]

^[1] To make projections, climate scientists use greenhouse gas scenarios – “what if” scenarios of plausible future emissions – to drive global climate model simulations of the earth’s climate. Wherever possible, scenarios used in this document include both a low and a high emissions scenario of 21st century greenhouse gas emissions.

^[2] Hamlet, A.F., M.M. Elsner, G.S. Mauger, S-Y. Lee, I. Tohver, and R.A. Norheim. 2013. An overview of the Columbia Basin Climate Change Scenarios Project: Approach, methods, and summary of key results. *Atmosphere-Ocean* 51(4):392-415, doi: 10.1080/07055900.2013.819555: <http://warm.atmos.washington.edu/2860/>

Observed and Projected^[1] Changes

Temperature	
<i>Annual Temp - Observed</i> ^[3]	Increase in average historical temperature (1895-2014) for nearby stations Buckley 1NE: +1.1°F ± 1.11°F McMillin RSVR: +0.6°F ± 0.98°F
<i>Annual Temp - Projected</i> ^[4]	Projected increase in average annual temperature (2050s, relative to 1980s): Low emissions (RCP 4.5): +4.2°F (range: 2.8 to 5.7°F) High emissions (RCP 8.5): +5.5°F (range 4.3 to 7.3°F)
<i>Growing Season and Growing Degree Days - Projected</i> ^[4]	Longer freeze-free period expected. Low emissions (RCP 4.5): +19 days (range: +14 to +23 days) High emissions (RCP 8.5): +25 days (range: +19 to +30 days) Increase in growing degree days (GDD) projected (base 50°F) ^[5] : Low emissions (RCP 4.5): +863 GDDs (range: +595 to +1140 GDDs) High emissions (RCP 8.5): +1119 GDDs (range: +800 to +1534 GDDs)
Precipitation	
<i>Seasonal Precipitation - Observed</i> ^[3]	No historical trend in seasonal precipitation; large variations from year-to-year.
<i>Seasonal Precipitation - Projected</i> ^[4]	Increased wet season precipitation and decreased dry season precipitation (2050s relative to 1980s): <i>Wet season (Oct – Mar)</i> Low emissions (RCP 4.5): +8% (range: -3 to +16%) High emissions (RCP 8.5): +9% (range: +2 to +17%) <i>Dry season (Apr – Sep)</i> Low emissions (RCP 4.5): -10% (range: -3 to -24%) High emissions (RCP 8.5): -9% (range: +1 to -21%)
<i>Heavy Precipitation - Projected</i> ^[4]	Increased maximum daily precipitation totals in Puyallup watershed (2050s relative to 1970-1999): Low emissions (RCP 4.5): +16% (range: +4 to +30%) High emissions (RCP 8.5): +20% (range: +1 to +39%) Recent research indicates that heavy precipitation events may be larger than what is projected in the above models. ^[6]

^[3] Menne, M. J., Williams Jr, C. N., & Vose, R. S. (2009). *The US Historical Climatology Network monthly temperature data, version 2*. Bulletin of the American Meteorological Society, 90(7), 993-1007.

^[4] Integrated Scenarios of the Future Northwest Environment: <https://www.nwclimatescience.org/node/231>

^[5] Growing degree days are measurements used in agriculture to estimate growing season potential. For the current calculation, a growing degree day is counted for each degree the average temperature for a day moves above 50°F. For example, if the average temperature for the day was 55°F, that would count as 5 growing degree days.

^[6] Salathé, EP, AF Hamlet, CF Mass M Stumbaugh, S-Y Lee, R Steed (2014) Estimates of 21st Century Flood Risk in the Pacific Northwest Based on Regional Scale Climate Model Simulations. *J. Hydrometeorology*

Water	
Snow	
<i>Spring Snowpack – Projected^[4]</i>	Substantial declines in April 1 st snowpack, 2050s relative to 1970-1999, for the Puyallup watershed: Low emissions (RCP 4.5): -52% (range: -59 to -36%) High emissions (RCP 8.5): -58% (range: -76 to -39%)
Streamflow	
<i>Winter – Projected^[4]</i>	Increases in winter (October–March), 2050s relative to 1980s: Low emissions (RCP 4.5): +27% (range: +21 to +37%) High emissions (RCP 8.5): +34% (range: +19 to +62%)
<i>Summer – Projected^[4]</i>	Decreases in summer (April–September), 2050s relative to 1980s: Low emissions (RCP 4.5): -18% (range: -25 to -10%) High emissions (RCP 8.5): -20% (range: -31 to -9%)
<i>Flooding – Projected^[2]</i>	Most models indicate increases in volume associated with the 100-year (1% annual probability) flood event, 2040s (2030 – 2059) relative to 1980s for the White River at Buckley ^[7] : Low emissions (B1): +39% (range: -14 to +85%) Moderate emissions (A1b): +56% (range: +22 to +115%)
<i>Low flows – Projected^[2]</i>	Most models indicate decreased volumes associated with the 7Q10 (or 7-day lowest flow in 10 years) low flow event, 2040s (2030 – 2059) relative to 1980s for the White River at Buckley ^[7] : Low emissions (B1): -13% (range: -26 to +2%) Moderate emissions (A1b): -16% (range: -30 to -2%)

Water Quality and Sediment	
<i>Stream temperatures – Projected</i>	<p>Char^[8]: Decline in number of river miles within thermal thresholds for char spawning/rearing (mean August stream Temp. <54°F^[9]):</p> <p>Historical (1993 – 2011): 726 miles 2040s, Moderate emissions (A1b): 531 miles (-26% loss) 2080s, Moderate emissions (A1b): 412 miles (-43% loss))</p> <p>Salmonids^[8]: Decline in number of river miles within thermal thresholds for core summer salmonid habitat (mean August stream Temp. <60°F):</p> <p>Historical (1993 – 2011): 988 miles 2040s, Moderate emissions (A1b): 934 miles (-5% loss) 2080s, Moderate emissions (A1b): 868 miles (-12% loss)</p>

^[7] Projected extreme statistics are reported here for the White River as a proxy for the Puyallup watershed since it is a major tributary and extreme flow data for the Puyallup is not available.

^[8] NorWest Regional Database and Modeled Stream Temperatures: <http://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html>

^[9] Note that these thresholds are actually intended for 7-day average stream temperatures, not monthly averages. This means that the projections shown here are optimistic – an overestimate of suitable habitat.

Water Quality and Sediment	
<i>Sediment & Landslides</i>	<p>Since the practice of dredging was halted in the mid-1990s for water quality improvement, the Puyallup watershed has aggraded, raising the channel elevations of the Puyallup, White and Carbon Rivers by 7.5', 6.5' and 2', respectively.^[10]</p> <p>Loss of snowpack and glaciers due to warmer temperatures contributes to the exposure of highly mobile sediment sources and increases in flood flows, which triggers faster sediment movement.</p> <p>Geomorphic hazards, like debris flows and landslides, could also increase in response to decreasing snowpack and glaciers.^[11]</p> <p>Increasing heavy precipitation may increase erosion rates and also threaten slope stability.</p>
Coasts	
<i>Sea Level – Observed^[12]</i>	Historical rise in sea level (Seattle is the closest long-term gauge) Seattle, WA: +9 inches (1899-2014)
<i>Sea Level – Projected^[13]</i>	Rising for all scenarios Seattle, WA: +4 to +56 inches (2100, relative to 2000)
<i>Ocean Acidification – Observed^[14]</i>	Global increase in ocean acidity since 1750 +26% (decrease in pH: -0.1)
<i>Ocean Acidification – Projected^[14]</i>	Global increase by 2100 for all scenarios (relative to 1986-2005). There are no projections for ocean acidification specific to Washington State. Low emissions (RCP 4.5): +38 to +41% High emissions (RCP 8.5): +100 to +109%

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^[10] Czuba, J.A., Czuba, C.R., Magirl, C.S., Voss, F. 2010. Channel-Conveyance Capacity, Channel Change, and Sediment Transport in the Lower Puyallup, White, and Carbon Rivers, Western Washington: US Geological Survey Scientific Investigations Report 2010-5240, 104p.

^[11] Lee, S-Y., and A.F. Hamlet. 2011. Skagit River Basin Climate Science Report. A summary report prepared for Skagit County and the Envision Skagit Project by the Department of Civil and Environmental Engineering and the Climate Impacts Group, University of Washington, Seattle. September, 2011.

^[12] NOAA Sea Level Trends: <http://tidesandcurrents.noaa.gov/sltrends/sltrends.html>

^[13] (NRC) National Research Council 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*. Washington, DC: The National Academies Press

^[14] (IPCC) Intergovernmental Panel on Climate Change. 2013. *Working Group I, Summary for Policymakers*. Available at: http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf

Interview Questions – Final

Subject to modification as needed for individual interviews.

Part 1. Introductions and Brief Review

- Introductions
- Review purpose and what the questions will cover.
- Brief summary of how climate change is expected to affect the watershed (referring to summary sheet)
- Review any handouts that may be useful to the interviewee

Part 2. Watershed Issues

2.1 What are the major issues, concerns, or priorities driving your near and long term planning (or interests) in the watershed?

Part 3. How does today's weather affect what you do?

3.1 Based on your experience, how has [fill in the blank] affected what you do?

[note: due to the conversational nature of the interviews, participant responses tended bounce between these different issues, as relevant]

- Prolonged summer heat or extreme heat events
- Cold air outbreaks, snow and ice events
- Flooding (river or stream/creek, localized flooding)
- Prolonged periods of above normal precipitation or extreme precipitation events
- Prolonged periods of below normal precipitation or drought
- Storm surge or unusually high tides

Related issues (if relevant):

- drainage,
- sediment loading,
- salt water exposure
- water supply

Part 4. How will tomorrow's weather affect what you do?

- | | |
|-------------------------------|---|
| Related supporting materials: | <ul style="list-style-type: none">● Impacts summary● Watershed map |
|-------------------------------|---|
-

After a general review the projected changes in climate...

4.1 In your opinion, how much does climate change affect the issues, concerns, or priorities you noted at the start of the interview?

4.2 More specifically, how do you expect [fill in the blank] will affect what you do?

[note: due to the conversational nature of the interviews, participant responses tended bounce between these different issues, as relevant]

- Increased temperatures and more extreme heat events
- Fewer cold air outbreaks, snow and ice events
- Increased precipitation and more extreme precipitation events

- Increased flooding (river or stream/creek, localized flooding)
- Prolonged periods of below normal precipitation or drought
- Sea level rise, higher storm surge, and/or higher high tides

Related issues (if relevant):

- drainage,
- sediment loading,
- salt water exposure
- water supply

4.3 In your opinion, what additional actions or projects are needed to better manage the impacts of today's weather extremes and projected climate change impacts?

4.4 What additional information or technical services are needed to support the actions discussed today?

Part 5. Stepping Back: Broader Views on Resilience

5.1 In your opinion, what does a more climate resilient watershed look like in the context of what you do and care about? In other words, what would you see as evidence of success in terms of adapting to the impacts of climate change?