

Lower Nooksack River Floodplain Integrated Planning (FLIP) Team Meeting

April 12, 2018

10 am to 2:20 pm

Central County Shop Training Room

Participants:

Andy Wisner, Bo Westford, Chris Clark, Chris Elder, Chris Konrad, David Radabaugh, Deb Stewart, Denise Doezema, Dennis Clark, Doug Channel, Duane Holden, Elizabeth Sjostrom, Eric Grossman, Frank Corey, Fred Likkel, Gary Goodall, Guillaume Mauger, Harry Williams, Jason Hall, Jeff DeJong, Jerry Juergens, Joel Ingram, John Thompson, Kara Kuhlman, Karin Boyd, Kelly Turner, Leah Kintner, Lonni Cummings, Mark Ewbank, Michael Maudlin, Mike Swenson, Ned Currence, Paul Knippel, Paula Harris, Rich Appel, Richard Kessler, Rod VanDeHoef, Rolf Haugen, Rollin Harper, Ron Bronsema, Scott Anderson, Scott Hulse, Seth Ballhorn, Sherrie Chang, Steve Banham, Thomas Brewster, Travis Bouma, Treva Coe, Percy Hoekema, Ed Blok, Dan Noteboom, Andy Ross, Josh Fleishman

Meeting facilitation: David Roberts (Kulshan Services), Nathan Rice (Kulshan Services)

Opening – Welcome, introductions, agenda review, meeting norms – David Roberts

Review Mission, Goals, and Process – David Roberts, Paula Harris, Mark Ewbank

David reviewed the draft mission of the FLIP Team. Public comment will be taken on the draft mission statement. Seven goals of the FLIP process and plan were also reviewed. Specific goals and strategies will be developed on a reach scale as the process continues.

Mark Ewbank from Herrera Environmental Consultants described the overall integrated planning process and how the work brought to the FLIP Team to date fits into it. Herrera will be gathering information about land uses over the summer. The technical groundwork is now being laid by the geomorphic assessment, sedimentation study, habitat assessment, and hydraulic modeling efforts to provide a strong foundation to inform definition of reach- and subreach-scale floodplain management objectives and thereafter to inform development of specific future project actions. It is important for all involved in the FLIP Team to gain a common understanding of this technical information, and to ask questions as we proceed to be sure the information is not being disseminated too quickly or in ways that are not understandable.

Guillaume Mauger from the UW Climate Impacts Group reviewed his talk from the FLIP Team meeting in November 2017 about climate change and flooding. So far, the sea has risen eight inches. The estimated middle range of sea level rise projected in the next 100 years is another 24 inches. River discharge is expected to increase during flood events around 20% due to less snow and more rain with climate change. A loss of 15 – 20% flow during lowest flow (summer) months is also predicted.

Lower Nooksack River Geomorphic Trends – Karin Boyd, AGI

Karin reviewed AGI's geomorphological assessment, including the influence of wood and levees on the energy of the river, Lower Nooksack River reaches, historical avulsion, and water surface slope. She also

reviewed anthropogenic impacts including primary channel length reduction; side channel length reduction; anabranching channel (multiple channels with forested islands) density reduction; belt width narrowing; channel area reduction; changes in land cover types; vegetation patch persistence increase; floodplain turnover rate reduction; levee extents, erosion, bank armoring; and historic channel migration zone isolation. All of these changes have caused higher energy water flowing through a narrower, less complex corridor. This has caused a loss of habitat and ecosystem benefits, increased stream power, and increased stress on levees and bank armor.

Questions and comments

- You compare everything to 1933. What about comparing it to the 1950s flood?
 - o The 1950s flood may have created changes but not in the long-term trends.

- How are you going to do all of this and still shove the water under the bridges? I live upstream from the Everson bridge. Now there are trees in the older channels if you do get a flood. Is resilience reduced from a big flood now?

- The 1976 flood was the biggest flood I remember but impacts were less due to repairs on the levee. If you gained 10 feet of gravel in that river, that's not to anyone's advantage.

- What about bank height?
 - o It appears that banks are less perched in the lower reaches.

- Is the Reach 2 and 3 channel straightening due to an avulsion or was it man-made? The end date is critical for land ownership. I've heard that the Army Corps of Engineers (USACE) straightened the river at that time.
 - Karin is gathering that information now.

- Do landowners retain ownership if an avulsion happens quickly?
 - o That depends on pre- or post-statehood events.

- Does the USACE have records of channel straightening? The County has incomplete records from Corps.
 - o Possibly.

- What are the effects on stream temperature?
 - o We did not look at water quality or biology. It's a good question.
 - Ned Currence – We are concerned that as glaciers recede we will have less water and warmer water. Riparian shading will be more important in the future than it is now.

- Regarding channel avulsion in Reach 2, most features are historically mapped channels. It probably was migrating but not a whole lot. We don't have a lot of evidence.

- If the river is down-cutting near Everson, does that affect the aquifer north of Everson?
 - o We don't know. That's not being studied right now.

Nooksack River Sediment Transport and Geomorphology – Chris Konrad and Scott Anderson, USGS

Scott reviewed the changes in volume and distribution of sediment storage between 2005/2006 and 2015. Changes were calculated by measuring mean active channel elevation and water surface elevation. He also reviewed long-term change in river bed elevation at USGS streamflow gages. Short-term bed responses are most apparent upstream and absent in the lower river. Longer-term trends seem to be a function of climate. Vertical channel change trends migrate downstream as a “bed wave.” Changes in channel elevation correspond to changes in climate. Warm and dry climate conditions cause aggradation while cold and wet climate causes incision. Changes in the North Fork lag climate patterns by about 20 years. The river at Ferndale is predicted to incise consistently over the next couple of decades while at Everson it is expected to aggrade as the sediment wave in the channel bed moves downriver. The estimated average total sediment load at Ferndale over the period 2012- 2017 is 970,000 tons per year of which 900,000 tons is suspended and 70,000 are bedload with the bedload estimate based on just a couple samples. There is a trend toward wetter springs from 1981 to 2013, and an increase in monthly median stage at Ferndale.

Questions and comments

- You are seeing waves of sediment but also incision? How does that work?
 - o It’s a matter of timing. The extra sediment is reaching Everson now but hasn’t reached Ferndale yet. The coarse sediment is moving about a half-mile to a mile per year.

- Will pinch points impact the sediment wave?
 - o That’s a very interesting question. There will likely be shorter-term trends. Constrictions may cause shorter-term aggradation followed by redistribution of the material downstream.

- Any stats based on new bridge in Everson?
 - o No. All of our information starts at around 2006.

- Any information on the amount of gravel taken out during that time period?
 - o Kerr Wood Leidal did a study which included a review of gravel extraction records. We don’t see anything in the gages that matches the history of extraction.

- Have you ever done a study of how much is stored upstream of Everson?
 - o Yes, we can see that the source of sediment is above Everson.

- As levee managers, do we need to look at elevating our levees a foot per decade?
 - o Good question. We will be answering that through this process.

Linking Geomorphology and Sediment with Flooding and Habitat – Mark Ewbank, Herrera

Mark briefly discussed some examples of the habitat and flooding impacts occurring in the lower river and how they relate to with the geomorphic assessment and sedimentation study findings discussed in detail before the lunch break. Channel straightening and reduction in secondary channels has caused a direct loss of habitat productivity and capacity. Changes in sediment delivery and routing affect the river bed elevation, causing channel degradation that isolates side channels. Instream wood depletion has caused a reduction in preferred habitats and reduced habitat rearing capacity and productivity. Altered riparian conditions cause a lack of shade, which creates higher temperatures and reduces wood recruitment and instream wood abundance. An aggraded and narrower channel causes more frequent overbank flooding.

Questions and comments

- What effect does deepening the channel have on temperature?
 - o Deeper pools tend to be cooler, but it depends on how quickly water is flowing.
 - o It also depends on the time of year. Multiple channels that have good shading may be cooler than one channel.
- One of the pictures of the nice clean banks doesn't show all the wood debris and log jams, which are dangerous for boaters and cause accidents.
 - o That's true but there is nowhere near the amount of wood now compared to historical amounts. Engineered logjams can be designed to be safe.
- The river is changing in different ways with side channel habitat and belt width. What is making those changes? Are they natural or human-caused? How can we find a balance if nature is fighting against it? What's the end goal with habitat restoration if humans aren't causing it?
 - o That's a big question and it's a lot of what we as a group need to work through. A lot of these impacts are from human influence and it is important to understand the natural system and how it may change. It's a very complicated question and it's hugely important.
 - o It will probably have to be handled reach by reach. There are certainly some climate drivers affecting sediment. It's important to recognize those characteristics in each reach. There's no general answer, you need to get into each reach and think through it.

Skagit Farm, Fish, and Flood Initiative (3FI) – Jenny Baker, TNC and Jenna Friebe, WDFW

Jenny presented the Skagit Multi-Benefit Alternatives Analysis, also known as the Skagit Hydrodynamic Model Project. This project helped change the conversation that was polarized by bringing everyone to the table. Twenty-three projects that ranged in size and type were analyzed for farm, fish, and flood effects based on a number of indicators, which were categorized as benefits and impacts.

Questions and comments

- Is this something that will be used through time or just with these particular projects?

- Some big projects were implemented already, and we are monitoring them to determine which projects produce the most smolts and habitat, how the smolts add up over time, and how the projects change over time. If the recovery goal is met before all projects are implemented, that's good for the community.
- You are looking at impacts and benefits but over what timescale? This is relevant for sea-level rise.
 - We didn't include that in our alternatives analysis. It's very important for all interests and we hope to look at it in the future.
- Did you ever evaluate a project and then return to it iteratively to improve it? To address the impacts and improve the projects?
 - We have a set of objectives and indicators and discussed what we could actually measure. There were a lot that we could not accurately measure but were important to the group such as groundwater and drainage. We did drop a lot of indicators along the way and hope to look at them again on a project basis.
- Was evaluation and scoring done in the silos?
 - Yes, in the silos.
- Where are your top projects? How are they moving forward?
 - We are starting to do the outreach now.
- Are the funding organizations just for the study?
 - Yes. Fisher Slough funding came from state and federal funding. There was not much local funding.
- Skagit River has dams on it, so can this information be used in Nooksack since it's all free flowing?
 - Nooksack has its own model. Ned noted that it will be more complex because we still don't know what our limiting factors are.
- You had a mandate to achieve these smolt numbers and this was driven by a court case. We don't have anything like that. We don't have a single goal to direct our process, do we?
 - We have a chinook recovery plan, but our project is much larger than this example and we will have more goals.

Discussion and Questions

- Looking at each reach in terms of sediment loading, aggradation, and belt width narrowing will be really important in coming up with solutions for each reach.
- Fish translation of habitat/geomorphic changes will be forthcoming and will add to this discussion.
- Is the increase in the gravel in the river good or bad?

- How are the channel and the floodplain interacting? We need to integrate beyond the channel.
- Was there better habitat in 1955 just because it was a bigger area?
 - o Juveniles like shallow water edge habitat.
- It was good to hear some expert-based reinforcement of what we've heard locally about sediment building up. The next question is: Are there options for removal of some of that material that would make sense given potential impacts?
 - o At what scale would gravel removal be beneficial for flood risk reduction?
 - o When a gravel bar forms it can put pressure on the opposite river bank/levee at a local scale, which is important to keep in mind from a management perspective compared to what could be accomplished (or not) with larger scale dredging.
- What is the vision or the goal for overflow? What's the plan?
- Try to define where you can get the most benefit if you were to allow some of those natural processes to occur.
- On a setback levee, you just set back the river wash. What are the pros and cons of setback levees?
- The reach scale information is fascinating. Do solutions need to go where changes have occurred? Can the solution be moved up or down from where the impact is to match constraints?
- How can water quality concerns be integrated to help fish?
- Can sediment removal be done in a way that would be beneficial for fish? It seems like so much sediment might not be good for fish.
- To what extent would addressing the pinch points be beneficial?

Send additional questions and comments to Paula.

Wrap-up

We will not be meeting as a big group until fall. A lot of field work and outreach and technical work will be taking place between now and then. We are hoping to have a farm tour over the summer months. When we do meet, please RSVP so we have enough food for everyone.

What did you like or not about the meeting?

- All presentations were excellent and packed full of good information. The Skagit example was really interesting and good.
- Lunch was great.
- Sound system was good.
- Circle layout is better than tight chair rows
- Thanks to all presenters for cutting out the big words for all of us.

Scott wins least acronyms prize with only one: LIDAR