DRAFT Meeting Summary

Sodom Dam Fish Passage Improvement and Flow Management Project

Landowner/Technical Team Meeting
September 30, 2009 9 am to 11:30 am
Pioneer Villa, Halsey, OR

Prepared by: Denise Hoffert-Hay, Project Manager
Prepared for: Project area landowners and Tech Team members, September 2009
Questions? Please call or email Denise at: (541) 619-5896 or hofferthay@peak.org

In attendance:

Bud Baumgartner, Calapooia Watershed Council	Tara Putney, Calapooia Watershed Council
Denise Hoffert-Hay, Calapooia Watershed Council	Scott Wright, River Design Group
Mark Running, Calapooia Watershed Council	Jared Rubin, OR Dept Env Quality
Megan Hilgart, NOAA Restoration Center	Greg Apke, OR Dept Fish and Wildlife
Michael Lambert, OR Dept Fish and Wildlife	Julie Whalen, OR Parks and Recreation Dept
Jim Morgan, OR Parks and Recreation Dept	Jan Houck, OR Parks and Recreation Dept
Bo Miller, OR Dept Transportation	Chuck Knoll, Linn County Roads Department
Ann Gray, US Fish and Wildlife Service	Jeff Norman, OR Dept Transportation
Desiree Tullos, OR State University	Janine Castro, US Fish and Wildlife Service
Peter Jensen, Landowner	Michael Mattick, OR Water Resources Dept
Theresa Buckley, Landowner	Telly Wirth, Landowner
George Pugh, Landowner	

Meeting began at 9 am with introductions.

Denise provided an overview of the August meeting and a few additions/corrections to the August meeting summary. View the final summary at: www.calapooia.org She also reminded the group that the Council has a page on their website dedicated to this project and all documents, minutes, etc are available to download from there. Also, if there is any other project information folks would like to see up on that page, please contact Denise.

Denise reminded the group that we are working toward identifying a conceptual alternative that everyone can support to move forward to the next design phase and that there will be ample opportunity to weigh in on the specifics at future meetings.

Presentation: Scott Wright, P.E., River Design Group

Scott's presentation had 4 main topics:
- Project Review
- Hydrology for Calapooia
- Flow Division at Bifurcation
- Hydraulic Modeling

Scott provided an overview of the typical project's stages and progression. It includes:
Planning: perform studies and develop alternatives, obtain agency/landowner input
Final Design: final plans for construction, permitting
Project Implementation: funding and construction

Scott's entire PP slideshow is available on the Councils's webpage: www.calapooia.org

He explained that the project is still in the "Planning" phase. There is going to be more opportunity for input on and refinement of the design as the project moves into the final design and permitting phase.

He provided a brief overview of the project area and current photos of the dam and bifurcation as well as aerial photos/maps of the project area to remind/reorient everyone to the project site.

Scot provided an overview of the LiDAR data and how they are used for creating the hydraulic model. LiDAR coverage is available for the entire project area and was flown in September 2008 during low flow conditions. This is positive because LiDAR cannot capture surface elevations below water. In order to characterize channel bed conditions, bathymetric surveys must be done. RDG has collected an extensive network of data points on the ground and dozens of stream cross-sections in the project area to give a more complete picture of the topographic surface for the modeling and to evaluate flood inundation.

He had several slides that illustrate the resonance of the LiDAR and provide a detailed view of the varied topography that is especially dynamic in the vicinity of the Skiles property in project Reach 1 – where old channel meanders are visible in multiple locations across the floodplain. This is in stark contrast with the Sodom channel that shows up as a strictly linear feature without connectivity to the adjacent floodplain and no side channels or historic channels.

Another topographic feature of note is the Walton Slough that empties into the Mill Race just downstream of the Spillway Dam. This slough contributes a significant amount of water to the Mill Race during winter months as it drains a fairly substantial area. The LiDAR provides a great graphic of this channel and the surrounding topography that is lined with side channels.

The LiDAR data were used to develop cross-sections that span the project area. When viewing these, you can see the elevation of the Sodom channel is several feet lower than the Calapooia. The Calapooia is perched above the surrounding floodplain. When high flows top the Calapooia's banks, there is no place for water to re-enter the channel. Water either enters small side channels and sloughs or remains on the floodplain until it evaporates or percolates into the ground. Another feature that is clearly visible from the cross-sections is how many small channels are in the Calapooia vicinity and that the Sodom is a single-thread. The effectively wetted area for the Calapooia is much, much greater than for the Sodom. It is counter-intuitive since the Sodom channel itself holds so much more of the River's flows during winter, but when taking in the context of the floodplain, the Calapooia and all of the small channels actually conveys a larger proportion of the flows.

The other component needed to build a hydraulic model is gaging data, or flows. For the

Calapooia, historic gaging records are available for 2 locations: Holley and at the Queen Avenue bridge in Albany. Both gages have been out of operation for nearly 2 decades. However, their historic records span 55 years and 40 years respectively. These gages captured some significant flood events (1950's experienced several high water years and the 1964 floods). They were not operating during the most recent high water event in 1996. Because we do not have a gage at the bifurcation, estimates of flow at this location (where flows would enter the model) are made by examining the watershed area. Inter-fluve did the math in their 2004 study of the area. A 2-year event (often used in talking about rivers as it is a common enough occurrence it is thought to be responsible for most of the channel forming processes that occur in a river) for the Calapooia at the bifurcation is approximately 7,000 cfs. A 10-year event at the bifurcation has an estimated flow of 13,207 cfs. The 2-year flood event is one that has a 50% chance of occurring **each year**, it does not occur once every 2 years. There could be 3 years with a 2-year flood in a row, then a period of several years without experiencing one. The 2-year event is one that will occur 50 times in a span of 100 years. How these events are spread thru that time is at the vagaries of the weather.

For this model, the 2, 5, and 10 year flows were examined. Once you begin to model flood events that exceed the 10-year, it is fruitless because the entire area is underwater. To operate the model, flow had to be divided between the Sodom and Calapooia channels. A flow distribution curve was developed that splits the water in the system. A greater percentage of the flows in the Sodom channel during low flow events and during high flow events, the Calapooia channel and effective floodplain has more of the flows. The curves cross at the 2-year return interval.

Lastly, the model must be calibrated. Even though the required data have been collected and entered into the modeling software, we cannot assume that the model is an accurate representation of the system. The quality of the input data will dictate the quality of the results. The accuracy of a hydraulic model depends on how well it has been calibrated.

Calibration is the process of comparing the model results to field observations and, if necessary, adjusting the input data until the modeling results reasonably agree with real-world data. This model was calibrated using data from OSU professor Desiree Tullos's gaging station installed near Brownsville. The attribute being adjusted was the "Manning's n"or roughness co-efficient. This co-efficient puts a number to the energy losses in the system with the water's interaction with the channel bed. The flow used to calibrate the model was 3,500 cfs. Calibration of the model brought the water surface elevation being modeled to within 4 inches of the actual water surface.

Two primary scenarios were modeled:

1. Existing conditions – useful for calibrating roughness characteristics
2. System with dams removed (Sodom, Shear and Spillway) and replace the Sodom with grade control

The modeling demonstrates how water currently finds the path of least resistance and fills the low lying areas adjacent to the Calapooia channel to a depth of greater than 4 inches during a 2 year storm event (7,000 cfs). The Sodom side does not experience this degree of flooding. The differences in the elevations and shape of channels impacts the degree of flooding. For the 10-

year flow event (13,000 cfs) the areas inundated expand to include virtually the entire project area and land between the two channels. The bifurcation and the Sodom just downstream of the bifurcation remain above water, but the remaining project area is flooded to a depth of 1-2 inches all the way to more than 8 inches.

The model shows that removing the dams has a negligible impact on water surface elevation during floods. The amount of water in the system is so great that the dams are simply a blip on the landscape when it comes to storing water or slowing water. The model also shows that impacts to bridges under a dam removal scenario are not an issue. The surrounding landscape has so much capacity to store water and the elevation of the bridges is so much higher than the surrounding landscape that bridge overtopping is not an issue. Removing the dams, installing grade control at Sodom, and regarding the channel where the Shear dam is removed will actually result in a lowering of the water surface elevation.

For future conditions, following dam removal, RDG looked at how to increase flows in the Calapooia. Increasing flows in the Calapooia will provide several functions: improve summer flow conditions, incise the channel through the silted/grown-in channel and re-create a higher functioning river thereby decreasing the degree of flooding and out-of-banks impacts of smaller flow events. Currently, the channel is so perched and encroached that it does not have the capacity to handle even the small storm events and immediately begins accessing its floodplain. By having more water in the channel, the shape of the channel will change and move toward a deeper, wider channel with the ability to convey the small storm events without flooding. Large storms will continue to access the floodplain, that is unavoidable, but the smaller events could be kept within bank.

Scott also provided a summary of the research he did over the past winter by installing scour chains at two spots upstream of the bifurcation. These were installed to provide a window into gravel movement in the system. Last fall, the chains were installed by driving the length of chain into an existing gravel bar perpendicular to the ground surface. Their location was taken with GPS. They were retrieved in September. During high flows, the streambed is scoured and the exposed portion of the scour chain lays over to the depth of scour. As peak flows subside, deposition occurs and the scour chain is buried. The portion of the chain now parallel to the streambed records the dept of scour. The experiment showed that there was 16 inches of scour and ended with an 8-inch bed increase at one bar. This totals 26-inches of deposition at this location, an indicator of an active channel. At the next upstream location, 6-inches of scour followed by a 1-inch bed increase. These values were what we would expect to see in a system this size.

In conclusion, the hydraulic model has not removed any of the alternatives or identified any critical constrictions. For larger peak flow events like the 10-year or 25-year, the dams are minor obstructions in the landscape and are barely detectable.

The group took a break then re-convened to hear the proposed combined solution.

Proposed Combined Alternative

Denise Hoffert-Hay, Project Manager for the Calapooia Watershed Council presented the following:

For the project to utilize currently available funding, the group needs to agree that dam removal is the best alternative. Open Rivers Initiative funding is only available to the project if it includes dam removal. ORI funding will be used to complete the project design and obtain permits. The OWEB grant is only available to the project once final design and permits are complete. Therefore, for the project to move forward with the current available funding, dam removal needs to be part of the alternative. The combined solution outlined here is a concept, not a fully developed design. What we are seeking from the Technical Team/Landowner group is their support in moving forward to the design and permitting phase with this combined solution. There will be continued Technical Team/Landowner meetings and continued opportunity for dialogue and input on the project.

The combined solution was developed by taking into consideration comments and concerns from landowners and agency staff as well as the project's goals. This is the result of these many months of meetings and percolation of ideas. It has been a collaborative process and one with significant input. It is derived from the supported components of the other alternatives. It is an option that is achievable with the available funding and within the current regulatory/permitting framework. It is one that meets the project objectives: improve fish passage, maintain water delivery for landowners, and minimize flood risk.

The proposed alternative includes the following components:

1. Remove Sodom Dam. Maintain channel grade by installing grade control with fish passage at all flows. Develop bifurcation design to minimize maintenance.
2. Remove Shear Dam. Regrade channel and establish fish passage at all flows.
3. Remove Spillway Dam *(optional)*.
4. State Parks to move Thompson's Mills offline and install a pump system to meet water needs for demonstration milling and aesthetics (*optional)*.

The group was supportive of moving this proposed option forward. Concerns that were raised include:

- Will landowners have the option to move surface water rights on the Calapooia channel to groundwater rights? *(This will be reviewed and discussed as the project moves forward and could potentially be included in the project.)*
- Will this option include some maintenance work on the Calapooia channel to remove log jams and debris that is currently choking the Calapooia? *(Yes, some channel maintenance work will be included).*
- Landowners along the Calapooia already have more water than they want. Need to carefully demonstrate that this option will not worsen their flooding. Several locations have major constrictions that cause the Calapooia to move out of bank and impact homes. How will these be addressed?

- If Spillway dam is removed, there is a piece of property that could be left orphaned. A bridge might be needed. *(Linn County potentially has a bridge that could be used for the location).*
- Gravel maintenance at the bifurcation is a long-term issue. Who/how will the bifurcation be maintained? Who is ultimately responsible for managing future issues that arise at the bifurcation? *(The design will develop some approaches for changing the bifurcation to minimize future maintenance.)*

The group will meet on October 14th to discuss the proposed combined alternative and to provide support for moving forward with the next project phase. The meeting will be from 10 am to noon at the Kirk Room, Brownsville Library. Please contact the Council's Project Manager, Denise Hoffert-Hay with any questions or to RSVP.

Submitted for review and comment by Denise Hoffert-Hay.