WILLOWMOOR FLOODPLAIN RESTORATION PROJECT
STAKEHOLDER ADVISORY COMMITTEE

King County

KING COUNTY FLOOD CONTROL DISTRICT

Meeting #4: February 12, 2014
--Meeting Report--

SAC Members
Mike Arntzen, OneRedmond
Reid Brockway, Sammamish Home Owners
Paul Bucich, City of Bellevue
Anne Corley, Sammamish Rowing Association
Paul Fendt, Member At-Large
Jonathan Frodge, Save Lake Sammamish
Dave Garland, Washington Department of Ecology
Michael Hobbs, Friends of Marymoor Park
Greg Helland, Friends of Marymoor Park
Christa Heller, Washington Department of Fish & Wildlife
Jim Mackey, Member At-Large
Dwight Martin, Sammamish Home Owners
Peter Marshall, Eastside Audubon
Nancy Meyers, Member At-Large
Martin Nizlek, Washington Sensible Shorelines Association
Gilbert Pauley, Member At-Large
Tyler Quick, U.S. Army Corps of Engineers, Operations & Maintenance
Jon Spangler, City of Redmond
Joe Thumma, JB Instant Lawn
Jim Trockel, Serve Our Dog Areas
Brian Ward, City of Bellevue
Bill Way, Member At-Large
Susan Wilkins, Member At-Large
Jason Wilkinson, WRIA 8 Salmon Recovery Council

Project Team Staff and Consultants
Kate Akyuz, King County
Kyle Comanor, King County Flood Control District
Roger Dane, City of Redmond
John Engel, King County
Craig Garric, King County
Anne Lipe, King County Parks
Patty Dillon, NHC Consultants
Margaret Norton-Arnold, Committee Facilitator
Spencer Easton, Committee Administrator

Observers
Rory Crispin
Christine Jensen
Scott Sheffield

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Introduction
Margaret welcomed members and reiterated upcoming meeting dates: March 26, April 23, June 11, and September 3; with September 3 being the final meeting of the group. The purpose of tonight's meeting was to focus on the Hydraulics and Hydrology (H&H) design objectives. In addition, the meeting included an overview of possible project alternatives. Margaret noted that the OneHub website is up and running for members; anyone having any difficulties accessing the site should contact Margaret.

Final Report for Phase I – Hydrologic Characterization
Patty Dillon, NHC, presented an overview of the final Phase I Hydrologic Characterization report, along with information about the upcoming hydrologic and hydraulic modeling and project design analyses that NHC and the County will perform. Patty's presentation has been posted to the OneHub website. Members asked questions and made comments; Kyle Comanor, King County's hydraulic modeler for the Willowmoor project, also joined in on the discussion.

Q: Do you have long-term data on downstream river levels?
A: There's a long-term record downstream of Bear Creek, but not between the lake and Bear Creek. Monitoring data in that area go back to 2005. Stage measurements at the weir have a longer record.

Q: The report seems to state that you didn't find a change of input into the Lake between 1964-1998. You did not find increased input from Issaquah Creek, either from development or climate change?
A: Statistically speaking, there were no significant increasing trends from Issaquah Creek. There was a statistically significant decreasing trend in late summer low flows, and a corresponding trend in minimum lake levels that stopped when the weir modifications were made. There were indications of possible increases in Bear Creek storm volumes, over a much shorter record, but they weren't statistically significant.

Q: In December 2010, there was an overflow of all the streams into Lake Sammamish. It flooded us and pushed in a lot of sediment, all caused by development and rains. You can't say that what we experienced wasn't caused by development. I can give you photos and video where you can see my shoreline being washed away. Maybe you didn't collect enough data.
A: There are definitely streams that have experienced development impacts and will have seen higher flows or volumes. Flows from those tributaries have a significant local impact, but are a small percentage of the volume of the lake overall. In terms of Lake Sammamish, the amount of volume coming in from those developing areas is relatively small compared to total inflows to the lake.

Q: The report says 60% of flows are from Issaquah Creek. What about the delivery rate from smaller basin areas?
A: Issaquah Creek's drainage area is 60% of the Lake's contributing basin area. In general, there are pretty good correlations between drainage area and flows; however,the percentage of the water flowing into the lake could be higher or lower. Flows from smaller creeks do go up and down more quickly.

Q: Most of the modeling is pretty close between simulated and observed results, but the Bear Creek flows are an order of magnitude different in all cases. Why is that simulation so far off?
A: The Bear Creek results were puzzling, and, as a result, we recommended that the calibration for Bear Creek tuned up, and we have started that work. It looks like some of the volume shortfalls were due to missing rainfall data.

Q: What about the contributions from Phantom Lake or the creek near 51st Street? It seems there would be significant water coming from those sources; development near the old Bellevue airport caused an increase over and above what we used to have in Lake Sammamish.

A: We could use our models to estimate that, but we don't have records for those sources. The development occurring now under current (more rigorous) stormwater regulations is probably having less of an impact than development between 1960 and 1990. That said, most development will increase the volume of runoff. Over the long term, development has had an impact. Whether it's had an impact over the last 10 years or so when we've experienced high lake levels is a question.

Q: It's important to those of us who live on the lake to determine an appropriate goal for lake elevations, because this determines our property lines, and also regulations such as setbacks and allowable dock heights. I'm wondering about the percentage of error (confidence rates) in the modeling results. When we start speaking about changing the height of the lake 1/10 of a foot, there's an error rate around that you need to acknowledge. It could be plus or minus 1 foot. Looking historically, no more than 100 days a year over 27 feet seems to be a logical threshold for project design. Another issue is whether we use the 1200 cfs or 1500 cfs number. The language in the agreement the County signed clearly says 1500 cfs. If you under-design the project and we end up with lake flooding, then we've wasted our time.
A: To address the uncertainty question, we calibrate the models to get confidence that they're able to capture the key processes we're interested in. We will typically present the range of accuracy for peak flows, event volumes, and annual volumes. We can then compare different scenarios. Because both of these scenarios have the same uncertainty, we can still see the difference between them.

Q: Although 60% of the watershed that feeds Lake Sammamish comes from Issaquah Creek, we know there has been substantial development in the portions of the basin not drained by Issaquah Creek. Doesn't this question the presumption of limited influence from development?
A: The presumption is that the areas that have experienced significant recent development in the last 10-20 years are relatively small compared to what's draining to the lake as a whole. You're right that more of the development has occurred outside the Issaquah Creek drainage area, though there has been some significant development there as well.

Q: The only data set of value is the Issaquah Creek data set, which is a problem. Is there an overall flow value?
A: Yes, there are analyses that could be done to evaluate flows more holistically. However, inflow into the lake isn't something that this project will address.

Q: Inflow can't be controlled but it also can't be ignored. At the end of the day, output has to meet the input. It doesn't matter what is designed in the Transition Zone if the channel downstream can't manage the flow. It seems valid to ensure we understand the input to the lake.
A: The approach we're recommending is going to account for input. We're proposing using a hydrologic model that looks at land use, the condition of the basin now, uncertainties down the line, and estimates of future changes. But if we want to isolate the impacts of development, more detailed modeling would be necessary to look at land use at different points in time.

John Engel, King County, noted that the modeling is looking at existing conditions in a complex system. *Our desire moving forward is to look at a longer period of record, use the modeling tools to look at lake conditions, and evaluate project alternatives to see what changes they would produce. By the time we're done we'll have a comprehensive set of data to look at the issues.*

Q: If the drainage from Issaquah Creek is 1000 cfs, does that mean the total inflow to the lake adds up to 1666 cfs? And does that mean, in turn, that the 1500 cfs outflow is not high enough?
A: The 10-year flow from Lake Sammamish downstream of Bear Creek is 2100 cfs. We haven't yet used the data to determine what the contribution from the rest of the basin is. The 1000 cfs number from Issaquah Creek isn't the ten-year flow, and ten-year flows don't necessarily add up. 1000 cfs inflow doesn't necessarily mean 1000 cfs outflow.

Comment: The seven highest lake levels shown in the table include those from 1975, 1996 and 1997, which were very large storm events. The rest of the high lake level years come after the weir modification. This shows that very small changes can have an effect on lake levels, especially in extreme lake events.

Q: How would King County advise lake property owners on where we go from here to resolve the 1200 vs. 1500 cfs issue? The difference would raise the lake one foot in a week.
A: King County isn't trying to pick the lower number; we're trying to get the facts right. The documentation in the US Army Corps report for the cfs figure is not good documentation. More recent reports reference 1200 cfs. We may request an official determination about that from the Corps, but when we finish with this project analysis we will have a much better understanding; we certainly recognize the lake level as being an extremely important issue. Our analysis will provide answers to that.

Q: What knobs do you turn to calibrate and adjust the model?
A: There are a lot of options; for example, soil infiltration rates, soil depth or storage, land use, groundwater recession rates that control low flows. We've been working mainly with the knobs that control how much water can infiltrate into the soil and how fast.

Q: Have you changed the degree of impervious surface?
A: It's possible, but we haven't done that yet because our current estimates for impervious area don't appear to be an issue.

Q: Does an unsteady model allow you to model dynamic management, such as lowering the lake in the fall in anticipation of upcoming rain, and raising it again in the summer?
A: Yes.

Q: We know development has a significant impact on loading of nutrients in the lake. King County has models and data sets for this, including for streams that don't have gauges. There's a lot of data available. Could you combine hydraulic modeling with a projected nutrient budget model to see whether changes to the lake will have an impact on the relative nutrient concentrations?
A: We can discuss it, but that's currently outside the scope of this project.

Q: The proposed model only looks at 13 years (2001-2013). Don't you have to go back in time and look at a broader scope to see what type of impact development has had and relate it to this model? You might be running the risk of under-designing the project.
A: The model looks at current conditions, including the increased flows caused by development to this point. The idea was to use a data set that would include some recent storm events that folks around the table are familiar with so we could understand how a differently designed Transition Zone would handle the flows compared to the TZ we have today. In terms of future development, that is one of the aspects we need to look at. It's possible to go back into the hydrologic model and change the land use or increase the amount of impervious area. Another consideration is that current stormwater regulations are different from those in the past, and we will want to account for those more stringent regulations going forward. That can be done in the hydrologic model, and it would give us a sense of future inflows. For comparing alternatives we can go back and run 60 years of input to look at a wider range of storms.

Q: You came to the conclusion that the lake level has increased. What are the drivers of this "new normal"?
A: The new normal for low to moderate lake elevations is linked to the weir modification.

Q: In addition to the weir, you should consider the maintenance of the Transition Zone. In the time period being analyzed, the TZ has not been appropriately maintained. One project alternative to consider should be the base design, with a ten-foot buffer with vegetation.

A: The weir is the apparent cause in the shift of the lower lake levels. Vegetation has varied over time. All of these things work together to determine how much water goes over the weir. It would be simple to put the old weir configuration into the hydraulic model and see if there's a difference.

Q: Why did you pick the 2001-2013 timeframe and how will it affect the results?
A: That timeframe captures a wide range of flow conditions over a relatively short number of years. It's a recent period where we have good data for calibration and where we have a lot of events, including events where you have anecdotal data that can help us calibrate the model. It also includes several of the highest lake level events identified in the report.

Q: In the alternatives screening flowchart, what does the No Action Alternative box represent?
A: That means the existing baseline condition, including the more robust maintenance King County is currently doing. It will account for willow trimming and mowing.

Draft H&H Design Objectives

Craig Garric introduced the draft objectives for Goal #1 relating to hydrology and hydraulics. The group discussed the draft objectives and made recommendations for changes.

Q: For Goal #1 -- Have you defined the term "necessary"?
A: No, it seems more productive to focus on the objectives and performance criteria rather than worrying about all of the specific wording at this point.

Draft Objective 1

- Would the same criteria apply to lake flooding levels? If not, how will lake flooding be addressed? Is it taking a lower priority?
- These objectives say to "meet" regulatory, existing standards, but there isn't any language about "improving" the situation. Don't we want to make things better?
- One of the opportunities for this objective could be to create off-channel flood storage in the Sammamish River.
- Is the capacity of the channel now equal to or greater than the design capacity? It seems like Patty's report addressed this. The ten-year annual flow, which is more or less the 40-year spring flow, is contained in the channel. However, in much of the channel there may be some capacity above that.
- The performance criteria could reference FEMA profiles rather than maps.

Draft Objective 2

- It would help to have greater clarification of the flows downstream.
- The statistical analysis by the Army Corps in the 1960s gave us flow rates. Could the analysis we're using now give us much higher flow rates? If we use the 1964 rates, we're pretty much already there. But for the 10-year flood, it's a different flow rate. Which are we going to use?
- This objective should say we will meet the "1964 COE design *intent*" instead of "criteria."
- Why don't we have the management of flows from Bear Creek listed as an objective?
- Is 1200 the right number to be using as a measurement here?
- We should change "no out of bank flooding" to just say "no increase in flooding."
- It would be good to have specific numbers in the objectives and performance criteria.

Draft Objective 3

- This objective seems impossible to meet if we are going to try to get more water out of the lake and maintain the lake to an overall lower level.
- There are constraints during low flows and high flows. Do we have the potential to get more water out of the lake and into the river during regular winter flows?
- Will the modeling be able to look at dynamic management?
- We should build in some flexibility here – instead of saying that we won't increase frequency and duration of river levels exceeding XX stage(s) up through the 10-year return interval, we should say that we won't increase *between* the 2- and 10-year return interval.
- We should be looking at mitigation on other parts of the river, such as levee setbacks or off-channel storage. There's more water than before to move through the system. Something's going to have to change for this to all work out.

Draft Objective 4

- Does the order of these objectives indicate a prioritization of them? (no).
- There is a legal requirement related to management of flooding/flows downstream. Does the same requirement apply upstream as well?

Draft Objective 5

- High lake levels are discussed here. Is there also an objective for low lake levels? Perhaps we could say something about not increasing the frequency of low lake levels?

Other Ideas and Comments

- An additional objective could be to evaluate proactive management as a dynamic lake level management tool.
- Another objective could be to maintain or shift the lake level so it is at or near 27 feet (historic water levels from 1965-2008) and only exceeds that 100 days out of the year.
- The objectives should not be tied to the Ordinary High Water Mark. This is a measurement that is contentious, and not yet been finally determined. We should put "XX feet" into the criteria instead, and talk about duration times rather than trying to pin down the actual number.
- An additional objective should be developed that addresses duration of flows. Inundation periods increased by 2 to 3 weeks can change habitats. There needs to be an objective stating we will cause minimal changes in duration.

The comments received during the discussion will be considered by King County; with the County team revising the draft objectives and sending them out once more for committee review.

Public Comment

- The 100-year floodplain elevation is 32.5 feet. The Flood Risk Management number is 33 because it's rounded up. The 1962 general design memorandum from the U.S. Army Corps should be posted on the OneHub site, along with the 1965 operations and maintenance manual. King County agreed to abide by the maintenance laid out in this document, but has not abided by it. The physical size of the channel was listed as 32 feet in the 1962 document and this increased to 42 feet in the final 1965 report. The 1962 document lists flows of 1200 cfs through the Transition Zone and 300 cfs in Bear Creek. The 1965 document lists 1500 cfs and 690 cfs. That's a big decrease for the Transition Zone and a big increase for Bear Creek. Little Bear Creek went from 262 cfs to 300 cfs. North Creek went from 200 cfs to 590 cfs. All the dimensions of the main channels also increased substantially.

The 1962 document was not the design document; the 1965 document was the final and was signed by the Corps with the responsibilities of King County listed.

Project Alternatives

Kate Akyuz and Craig Garric presented photographs and diagrams of several channel configuration and habitat enhancement projects as examples of the type of work that could be used for Willowmoor project alternatives. These types of ideas will be discussed further at the March 26 SAC meeting.

Next Meeting and Next Steps

The King County team will review committee comments on the draft hydrology and hydraulics design objectives, and will send a revised version of those objectives out for continued committee comment prior to the next meeting. The advisory committee will meet next on Wednesday, March 26, 4:00-7:00 p.m. at the Redmond Schoolhouse.