

**WILLOWMOOR FLOODPLAIN RESTORATION PROJECT
STAKEHOLDER ADVISORY COMMITTEE**



King County



Meeting Reports

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WILLOWMOOR FLOODPLAIN RESTORATION PROJECT

STAKEHOLDER ADVISORY COMMITTEE



King County



Meeting #1: August 14, 2013

--Meeting Report--

SAC Members Present:

Mike Arntzen, OneRedmond
 Paul Bucich, City of Bellevue
 Paul Fendt, At-Large
 Jeff Fletcher (for Jim Mackey), At-Large
 Jonathan Frodge, Save Lake Sammamish
 Christa Heller, Washington Department of Fish & Wildlife
 Michael Hobbs, Friends of Marymoor Park
 Heather Khan, Washington State Department of Ecology
 Charles Ifft, U.S. Army Corps of Engineers
 Peter Marshall, Eastside Audubon
 Dwight Martin, Sammamish Home Owners
 Nancy Meyers, At-Large
 Martin Nizlek, Washington Sensible Shorelines Association
 Gilbert Pauley, At-Large
 Jennie Proby (for Anne Corley), Sammamish Rowing Association
 John Spangler, City of Redmond
 Joe Thumma, JB Instant Lawn
 Jim Trockle, Serve Our Dog Areas
 Bill Way, At-Large
 Susan Wilkins, At-Large
 Jason Wilkinson, WRIA 8 Salmon Recovery Council

Project Team Staff and Consultants

Roger Dane, City of Redmond
 Craig Garric, King County (Project Manager)
 Kate Akyuz, King County (Ecologist)
 Margaret Norton-Arnold, Committee Facilitator
 Fala Frazier, Committee Administrator

Observers:

Nora Robinson, Park Manager, Marymoor
 Scott Scheffield, Sensible Shorelines Association
 Christine Jensen, staff for King County Councilmember Lambert
 Dave Garland, Washington State Dept of Ecology
 Reed Brockway, Sammamish Home Owners
 Brian Ward, City of Bellevue

Introductions

This was the first meeting of the Willowmoor Stakeholder Advisory Committee, which will meet seven times between 2013-2014 to provide recommendations to King County regarding the Willowmoor Floodplain Restoration Project. The meeting began with introductions from all committee members, who also described

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their interest in serving on the committee. The committee is made up of diverse interests and perspectives, including property owners, natural resource specialists, environmentalists, recreational enthusiasts and supporters of Marymoor Park.

Introduction to the Project

Craig Garric and Kate Akyuz serve as the project managers for King County. They introduced themselves and talked about the overall effort. The Willowmoor project has three primary goals:

1. Ensure the Transition Zone's (TZ) capability to provide necessary lake level control, flow conveyance and downstream flood control.
2. Enhance habitat conditions in the river channel, associated tributaries and adjacent wetlands for ESA-listed Chinook, steelhead, and other species.
3. Reduce costs, complexity, and ecological impacts of channel maintenance.

The stakeholder committee has been formed to assist with the first phase of the project, which includes data collection and a technical analysis, the identification of design criteria, the development of design alternatives, and the selection of a "preferred alternative" that will then be moved forward for final design and permitting.

Kate described the ongoing maintenance occurring in the area right now, which includes sediment removal and hydroseeding on approximately one acre of riverbank. The goal for sediment removal is to improve conditions for flood control on the lake. As mitigation for the sediment removal, King County is also removing an invasive aquatic weed, Brazilian elodea. This is in a pilot phase right now, but the hope is that continued grant funding can be acquired to control this weed. Kate noted: *If we do see positive hydraulic and water quality effects from the weed removal, it will give us the motivation to go after grants from a flood control and water quality perspective. If we don't see these effects it will be difficult to get grant money.*

Craig noted that the development of alternatives will be an iterative process, and will begin even as the technical analysis is also underway. The technical analysis will provide insights on possible design criteria, these will lead to potential alternatives, and those alternatives will be evaluated back against the technical analysis and criteria.

The design alternatives will be developed in a manner that meets the project goals and also adheres to permitting and other constraints. Each alternative will include a comprehensive description, information on the level of work necessary to implement the alternative, cost estimates, conceptual level design drawings, scaled plan views, cross sections and channel sections.

Examples of design criteria could include a desired flow rate in the river, e.g. 15 cubic feet per second (cfs), and water temperature, which should not exceed 19 C between the weir and Bear Creek. Design constraints include existing architectural structures and the parkway.

Craig further reiterated that King County has not yet identified any design alternatives. Past data and alternatives (2003) will be reviewed, but the County is starting fresh with new data, criteria, and potential alternatives. The Stakeholder Advisory Committee will be involved in all of the work associated with this phase of the project.

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Members asked questions and provided comments:

Q: What is the geographic extent of the project, and does it meet the legal constraints of Flood Control District funds?

A: The entire Sammamish River from Lake Sammamish to Lake Washington is a flood control facility, including the Transition Zone (TZ). As local sponsor for construction of this project, the County accepted responsibility for the operations and maintenance of this facility through legal agreement with the U.S. Army Corps of Engineers (USACE). The Willowmoor project study area extends from the section of the Sammamish River from the Lake outlet downstream to the lower end of the TZ, as well as County Parks property southwest of the river. The Transition Zone itself serves as the hydraulic control for the river; it controls how much of the river flows into the lake. Although the USACE built the project originally, it is the County's job to make certain that the weir and the TZ are maintained in such a way to provide flood control protection. While the geographic area of the TZ is relatively small, the project obviously has impacts that extend far beyond that area. This project does fall within the bounds of Flood Control District funding.

Q: The original agreement was written in 1963, and doesn't that specify "adequate" levels of flood control? Is that a term/definition we will discuss as a committee?

A: The original USACE General Design Memo and corresponding Operations and Maintenance Memo both state TZ design criteria of 1,500-cfs capacity without exceeding lake elevation of 29.0. The County has agreed to maintain the facility according to existing maintenance manual standards modified by agreements made with the USACE in the 1990's. Those standards were written in 1964, before all of the salmon, water quality, and other issues we are wrestling with today. So a great deal has changed since that time. Changes to those standards, modifications to the weir, or changes in the width of the channel will require Congressional authorization. It usually takes about one year to get that level of approval.

Q: Is the weir currently being operated in accordance with the maintenance manual? And is that a public document?

A: The manual is a public document, but in the 1990's and early 2000's interim maintenance agreements were written between the USACE and the County. Those interim agreements are not in the maintenance manual, and are meant to be in effect only until this new Willowmoor project is constructed.

Q: Are the interim standards being adhered to?

A: King County is currently maintaining the Transition Zone by mowing more frequently than required in the interim agreements in response to concerns about increasing lake levels. We are evaluating and monitoring all of our maintenance practices. We have already seen improvements in lake levels with the additional mowing now taking place, for example.

Q: Is there good documentation on existing water levels, the maintenance costs per year, levels of overall compliance, and the productivity of fish regardless of whether or not we are in compliance with the standards?

A: We have several flow and temperature gauges in the lake, the Transition Zone and downstream and regularly measure the stage/discharge relationship between the lake and the river. Maintenance costs are accounted for in our County financial software and could be summarized if needed.

High water temperatures are problematic for fish as they can cause migration avoidance behavior or even pre-spawn mortality. The river is Total Maximum Daily Load (TMDL) listed, and regularly exceeds temperature levels and has too low of dissolved oxygen levels that are ideal for fish. We have seen migrating fish killed because the river is too hot. This area is a high priority project for the Watershed Resource Inventory Area (WRIA) 8, and fits into the ESA recovery plan for Chinook. It is important for fish migrating upstream and for the juveniles migrating out to the ocean.

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Q: But in spite of the fish kills, if, in the end, we still have high numbers of fish – is that okay?

A: That is one of the questions we are trying to answer during this first phase of data collection.

Comment: It will be interesting to see the database at the end of this process. I hope it shows that the costs of maintenance will go down and flooding will be better controlled. If not, this effort is just lip service and will demonstrate that the weir and Transition Zone should be maintained just as they should have been all along.

Comment: There are two types of Chinook in this area; hatchery fish and native fish. The returns of hatchery fish from Issaquah Creek are exceeding current goals. The native run is a different story. However, the fish are getting comingled; hatchery fish become “native” fish after several years. Fish aren’t going to spawn in this area no matter what we do; this is an area of movement and migration for them, not spawning habitat.

Comment: The WRIA 8 is concerned about the recovery of native fish stocks, so even if hatchery fish are doing fine, the WRIA 8 plan, which King County, Redmond and Bellevue have all signed, motivates us to improve conditions for wild fish.

Charter and Schedule

Margaret reviewed the Committee Charter and schedule of meetings with the group. Members determined that any questions posed between meetings would be submitted to Margaret, who will work with Craig and Kate to get answers; this set of questions-and-answers will then be distributed to all members.

A project website has been set up, and the County will establish a Sharepoint site for committee members. All relevant documents will be posted on the site. Margaret will also be in frequent touch with committee members via email.

In addition to the Stakeholder Advisory Committee, four public meetings will be scheduled for the Willowmoor project.

Desired Outcomes

Members described their “desired outcomes” for the Willowmoor project – that is, what they’d like to make sure the project is able to accomplish once it is built.

- Lakefront property owners noted the importance of protecting their docks, boats, and yards from flooding. One member noted that she had installed an extensive area of native vegetation and fish-friendly habitat along the lake, and does not want to see this ruined because of high water levels.
- A project that maximizes our approach to properly functioning conditions as defined in the WRIA 8 Chinook recovery plan that all jurisdictions in the area have signed off on. Chinook recovery does not have to be mutually exclusive with flood control. The way in which we rank and prioritize the design criteria will be important.
- What do we mean by flood control on the lake? We have been fortunate to not have 50-100 year storms in the past several years, but what is the level to which we should be designing this facility?
- Are we designing for salmon recovery or for Chinook recovery? There is a distinction between native and hatchery fish, and we need to understand that difference.
- Environmental damage usually seems to happen at the extremes. How can we quantify that? We need to define those limits.
- It would be great to see this area navigable for boats again. We also need to protect existing structures and uses, for example, the rowing club facilities.

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- Reestablish habitat equilibrium; establish a baseline against which to measure. For example, the osprey are disturbed right now by the work going on. Current maintenance is destroying bird habitat in the willows. We should do what we can to enhance the natural habitat for birds, beavers, and other mammals.
- There is a 7-foot drop in water elevation that is currently being wasted. We should determine how to squeeze every possible drop out of that area to create fish habitat. Cold water is important; vegetation can help to maintain those cooler temperatures.
- The goal for park users is to maintain this area as a pretty and peaceful place. It would be good if bulldozers weren't there every year mucking it up. It would be good to stop cutting down trees and mowing for flood control. Let the vegetation grow naturally, but maintain necessary water flow.
- We need to look carefully at the hydrology of the water coming into the lake. We can't just blame Transition Zone maintenance for river flow. It is more complex than that; there are impacts of paving, development. We need to look at the entire system more holistically.
- The Transition Zone needs to be maintained to at least the level it was designed to when it was first built.
- This is a quiet, underutilized corner of the park. I'd love to see it opened up more for people, but also kept in a naturalistic state. It should serve as habitat for mammals, and improvements should be made in the areas where the side streams come into the Sammamish River. I'd love to see beaver ponds and meadows, more trees, improved bird habitat. And, I'd like to do all of this with a look to the future, and an opportunity to maintain lake levels at 29 feet.
- When people walk up and down the river, the ugliest part is the Transition Zone. Otherwise it is a beautiful walk. Environmental enhancements and aesthetic improvements are very important.
- The system has sustained hydraulic damage in this area. Natural systems are fairly intolerant of built systems, and putting a completely natural system in place would have limited success. The transition zone exists because we don't want variability in water elevations. The ideal system would be reasonably functional, tolerant of variability, aesthetically pleasing, and helpful to the migration of fish. But we shouldn't spend a lot of effort to design this as a natural system, which would have limited success and would be very difficult and costly to maintain.
- From the City of Bellevue's perspective, we want cost effectiveness. We have heard from lakeshore property owners, and have also signed WRIA 8. We are striving for something in the middle; this cannot be a completely natural system.
- We need to build more aquatic complexity into the system, including large wood to provide pools and enhancement of the small tributaries for juveniles.
- A complex habitat will slow velocity down and that's a problem. But, it's probably a nice goal to look at to see what can be done.
- The City of Redmond wants to make sure that downtown Redmond does not get flooded. The final preferred alternative has to be one that can be permitted. Also, we want to be able to call this stretch of the river a "river" and not a "slough."

Public Comment

One individual commented during this time: We should consider today's technology in tackling this issue. For example, if we know that the lake is at 22.5 feet, and the forecasts are predicting a severe storm, we should use the available technology to lower the lake ahead of time in order to accommodate more rainfall. It's important that we monitor water quality and the fish carefully, so we understand the best way to spend money. We need to thoroughly understand what has and hasn't worked.

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Next Meeting

King County's hydrologic consultant team will attend the next stakeholder advisory committee meeting to provide information on the analysis and technical results emerging. Project design criteria will also be discussed among the committee; Kate and Craig will send out some examples of these prior to the next meeting to spark good ideas and discussion among members.

The next meeting will be on Wednesday, September 25, from 4:00-7:00 p.m. We will try to hold all meetings at the Redmond Schoolhouse Community Center.

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King County



Meeting #2: September 25, 2013

--Meeting Report--

SAC Members Present:

Paul Bucich, City of Bellevue
 Anne Corley, Sammamish Rowing Association
 Paul Fendt, Member At-Large
 Dave Garland (for Heather Khan), Washington Department of Ecology
 Greg Helland (for Michael Hobbs), Friends of Marymoor Park
 Charles Ifft, U.S. Army Corps of Engineers
 Jim Mackey, Member At-Large
 Peter Marshall, Eastside Audubon
 Dwight K. Martin, Sammamish Home Owners
 Nancy Meyers, Member At-Large
 Martin Nizlek, Washington Sensible Shorelines Association
 Gilbert Pauley, Member At-Large
 Jon Spangler, City of Redmond
 Joe Thumma, JB Instant Lawn
 Jim Trockel, Serve Our Dog Areas
 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
 Roger Dane, City of Redmond
 John Engel, King County
 Craig Garric, King County

Todd Bennett, NHC Consultants
 Patty Dillon, NHC Consultants

Margaret Norton-Arnold, Committee Facilitator
 Fala Frazier, Committee Administrator

Observers

Rory Crispin
 Jeff McMorris
 Scott Scheffield

Meeting Overview and Announcements

Margaret welcomed everyone and explained that the primary focus of the meeting was on the hydrology and hydraulics (H&H) associated with the Transition Zone and its interaction with both Lake Sammamish and the Sammamish River.

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The October 23 SAC meeting has been moved to November 13. John Engel introduced himself; he is King County's Supervising Engineer for the Cedar/Sammamish Watersheds, and has oversight responsibility for the Willowmoor project. Kate Akyuz is working on a Frequently-Asked-Questions sheet for the project, which will be finalized and distributed to members in the next several weeks.

Member Reports

A number of SAC members had participated in a kayak and/or walking tour of the project area. Jim Mackey led the kayak tour and provided a summary video and report of that expedition. Michael Hobbs led the walking tour; those who had participated in that event expressed their thanks to Michael and were enthusiastic about the learning that had occurred.

Update: Maintenance in the Transition Zone

Kate provided members with an update on recent Transition Zone maintenance and historic maintenance costs. In addition to mowing and trimming, in 2013 sediment removal, as well as a pilot project on hand removal of the elodea, were completed. Maintenance costs have increased in recent years due to the need for more intensive permitting, monitoring, and mitigation efforts. King County is currently monitoring flow, water surface elevations, and water quality to evaluate maintenance effects. The pilot elodea removal project was costly and the County may use machine-removal methods in the future depending on overall environmental and economic effectiveness. Kate's presentation will be posted to the project website.

One committee member suggested that it would be helpful to see the various maintenance costs broken out by type: mowing vs. sediment removal vs. elodea removal, for example. A table with a detailed cost breakdown will be provided either in the FAQs or paper copy at the next meeting. In response to another question, Kate said that the County has not pursued sediment removal in the lower half of the Transition Zone because modeling had indicated that 80% of the benefits of sediment removal would be realized by concentrating this effort in the upper half of the Transition Zone. Following the sediment removal action a beaver dam was created half-way down the transition zone. King County anticipates that winter flows might naturally remove the dam and will be monitoring this situation.

Kate also emphasized that one of the primary goals of the Willowmoor project is to reduce maintenance costs for flood benefits to a more sustainable level over the long term.

Presentation and Discussion: Hydrology and Hydraulics

Patty Dillon and Todd Bennett from Northwest Hydraulic Consultants (NHC) provided members with introductory presentations on hydrologic and hydraulic concepts related to the Willowmoor project, followed by a presentation and discussion of methods, findings and recommendations from a Phase 1 Hydrologic Study. The report is currently being finalized by NHC and will be made available to members once the final report has been reviewed and approved by the County and the Flood Control District. The NHC presentation will be posted to the project website.

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In comparing current hydrologic conditions to those used to design the original project in the early 1960's, NHC reported the following results based on current flow records (1966 – 2013):

- 10-year annual flood = 2,100 cfs
- 40-year spring flood = 1,960 cfs
- 1,500 cfs equates to approximately a 3-year event

Despite the increase in the 10-year flood, the Sammamish River channel continues to meet the downstream flood control objectives established when the weir was first constructed in 1964.

NHC explored several factors that could be contributing to this increase in flow magnitudes, including climate change, development in the contributing watershed, and statistical sample size. To date, however, it appears that these changes are most likely attributable to the effects of implementing the river scale flood control project in 1964, which included significant deepening of the river channel, and construction of the Transition Zone and weir.

NHC also examined trends in lake levels since the implementation of the Corps project. They presented work completed previously by King County that showed significant increases in days with lake levels between 27 and 28.5 feet (NGVD 29 datum) since project construction. Using hydrographs of lake level and streamflow data, NHC discussed possible relationships between high lake levels and other hydrologic and hydraulic factors, including Issaquah Creek inflows and peak Bear Creek flows causing backwater effects on the weir.

NHC also noted that in 1998 the Transition Zone weir was modified, primarily to improve fish passage. A narrow low-flow notch was constructed at the midpoint of the weir, and the remaining crest of the weir was raised and leveled. Lake level data suggest that summer water levels have gone up since the 1998 weir modifications. However, additional analysis is needed to determine whether the increasing trends King County found in days with lake levels exceeding 27-28 feet (NGVD datum) are truly a long-term trend or a shift related to the modified weir.

NHC wrapped up their presentation by discussing next steps in hydrologic and hydraulic analysis for the Willowmoor project, including a recognition of the need to balance lake level control for both summer minimums and winter/spring highs with ensuring downstream flood control. This, in turn, drives the need to establish appropriate hydrologic and hydraulic design criteria, such as design flows and potential future changes in hydrology, to inform the development and selection of design alternatives.

Members asked questions and engaged in discussion:

Q: Could the uptick we are seeing be a function of more precipitation? And might this be representative of a “new normal?”

A: Weather variability could be part of it, but we can't tease that out today or for our upcoming report. We do know that the last 10-15 years have been wetter than the 10-15 years before that. We might see some specific trends as we continue to look more closely at the past decade.

Q: It looks like there have been increasing incidents in the lake levels reaching 27.5 feet, but no significant increases in lake levels up to 28.5-29?

A: Yes. We're not seeing very many extreme high water events. Lake levels currently exceed 29 feet at approximately a five-year recurrence rate.

Q: I'd like to understand the changes made to the weir in 1998 and the conditions that were in place before that. A lot of that seems to have been done for fish benefit. It would be good to get a copy of those original

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documents. The summer levels in the lake seem to be holding; we saw very little drop in the lake level this year even with our low levels of precipitation. What would it mean to maintain summer lake levels?

A: We haven't established our design objectives for the project yet, but we could consider that as a possibility.

Q: How sensitive are the hydrographs to development in the basin? It looks like a lot of development over time hasn't translated into major changes in the hydrograph. Does that mean that development doesn't have many effects, or that the model is insensitive to those changes?

A: We haven't done the analysis yet to fully determine the effects of development. We have to calibrate the hydrologic models a little bit more to do that. For now though, it looks like the primary drivers for increases in lake levels/flows have to do with the timing and amount of the water coming in from Issaquah Creek and the other tributaries, in combination with the design and maintenance of the weir and Transition Zone. The volume of water from impervious surfaces might be having an effect, but we haven't quantified that yet.

Comment: Lake Sammamish residents are concerned about potential changes in the ordinary high water mark. Even a lake level increase of one foot can mean a shift of the water line onto our properties. I appreciate the data you are presenting here, and the very scientific approach you are taking to this. Thank you.

Next Steps: NHC will use the data and analysis results generated to-date to continue their analysis, creating as accurate a picture as possible of the existing conditions in both the lake and the river. The goal is to understand what is happening now and forecast what may happen in the future, in order to create design objectives for the Willowmoor project that can best address those conditions. Committee members can expect to hear more about this as we get deeper into the design objectives and project alternatives.

Public Comment

The numbers you are using for Bear Creek come from the 1962 Corps of Engineers design memo. In between that time and 1965, they changed the geometry of the Transition Zone, which went from 1200 to 1500 cfs. Bear Creek increased from 300-690 cfs.

Q: When was the last time anyone surveyed to verify that channel dimensions are correct? Would a blockage in front of the weir (i.e. cat tails) affect flows going into the Transition Zone?

A: We last surveyed Lake Washington to Lake Sammamish in 2009. And yes, vegetation upstream of the weir will affect the hydraulics of the lake system.

Q: When the notch was put into the weir in 1998, how much did that change flow levels? Did it diminish flow capabilities?

A: The weir was raised in the middle, not on the sides, and was designed to ensure adequate flow levels to help control flooding.

Project Design Objectives

Craig described some draft examples of design objectives that had been developed for committee discussion. In addition to the broader project goals, the design objectives are meant to measure and evaluate the potential performance of each of the project alternatives. These design objectives should be as "concrete" as possible; tangible measures that will enable both the County and the committee to compare and contrast among the various alternatives. Craig also explained that the design objectives need to be established with respect to reasonable project boundaries, as the project cannot be expected to address problems outside its purview. As an example, he suggested that while excessive sedimentation from tributaries and high fecal coliform levels may be problematic in the upper Sammamish River and Transition Zone, resolving these issues is well outside the scope of the project.

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Margaret gave committee members a homework assignment to review the examples and add their own thoughts for what they would like to see measured and evaluated through the design objectives. These will continue to be refined over time, and will be modified as the County and the committee learn more about both the hydrology and hydraulics and the existing environmental conditions in the Willowmoor project area.

Next Meeting

The next meeting of the Willowmoor Stakeholder Advisory Committee is scheduled for Wednesday, November 13 from 4:00-7:00 p.m. The County's consultant team will attend that meeting to present and discuss information about the existing water quality and fish habitat conditions in the Transition Zone. In addition, the committee will continue to work on the design objectives.

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Meeting #3: November 13, 2013

--Meeting Report--

SAC Members Present:

Paul Fendt, Member At-Large
 Hanna Floss (for Anne Corley), Sammamish Rowing Association
 Jonathan Frodge, Save Lake Sammamish
 Michael Hobbs, Friends of Marymoor Park
 Greg Helland, Friends of Marymoor Park
 Christa Heller, Washington Department of Fish & Wildlife
 Heather Kahn, Washington Department of Ecology
 Jim Mackey, Member At-Large
 Dwight K. Martin, Sammamish Home Owners
 Peter Marshall, Eastside Audubon
 Nancy Meyers, Member At-Large
 Martin Nizlek, Washington Sensible Shorelines Association
 Gilbert Pauley, Member At-Large
 Jon Spangler, City of Redmond
 Joe Thumma, JB Instant Lawn
 Brian Ward (for Paul Bucich), 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
 Craig Garric, King County
 Merri Martz, TetraTech
 John Bethel, King County
 Hans Berge, King County
 Gino Lucchetti, King County
 Kyle Comanor, King County
 Anne Lipe, King County

Margaret Norton-Arnold, Committee Facilitator
 Fala Frazier, Committee Administrator

Observers

Rory Crispin, Citizen – Lake shore property owner
 Steve Bleifuhs, King County
 Christine Jensen, King County
 Dave Garland, Washington Department of Ecology (Back-up Representative)
 Scott Sheffield, Washington Sensible Shorelines Association (Back-up Representative)

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Introduction

The purpose of this meeting was to discuss existing habitat and water quality conditions in the Willowmoor project area and to gather committee comments on the draft design objectives related to potential habitat improvements associated with the project.

Existing Habitat and Water Quality Conditions

Merri Martz, an environmental consultant from TetraTech, provided members with a presentation of existing habitat and water quality conditions in the project study area. The presentation covered fish and wildlife species that use the project area and their habitat requirements. In addition, Merri noted generally degraded habitat conditions within the project area and highlighted poor water quality, particularly high summer water temperatures as a problem for Chinook and other salmon species. Merri then introduced some of the habitat restoration opportunities that could be pursued through the Willowmoor project. A number of King County technical experts were also on hand to answer questions and provide additional information. SAC members were provided with a copy of Merri's presentation. Tetra Tech's PowerPoint presentation will be available on the SAC OneHub website as will a detailed written report documenting the topics covered in the presentation.

Members asked questions and engaged in discussion:

Q: In the project area, what are the total acres that are considered to be wetlands, and what percentage of those are high-value wetlands?

A: Fifty-three acres of wetlands are currently delineated, and are divided into five wetland classes. Three of these are class 2 wetlands and are immediately adjacent to the river. Two others are class 4 and the fifth one is class 5. Most of the wetlands are degraded due to agricultural land use conversion and are currently dominated by invasive plant communities.

Q: What construction constraints are in the area because of wetlands?

A: They are regulated, and buffers are required to protect them; anywhere from 25-150 feet. A very good multi-purpose project at this site could be a win-win; we want to improve the wetlands in order to improve habitat conditions in the area and that can go a long way towards getting permits approved.

Q: Is there an opportunity to reconnect some of the habitat corridors in this area?

A: Yes, we are looking into that, especially between the Transition Zone and the wetland areas. King County has a land use classification system for wildlife corridors which does not include the Transition Zone and we are not currently looking at expanding the project boundaries beyond the project study area. However, the river itself is a type of corridor, particularly for fish and migratory birds, so anything we do to improve connectivity between the river and the lake and the river and adjacent wetlands will benefit the movement of wildlife.

Q: I've heard that, in the past, Kokanee salmon were considered "trash fish" and were killed on purpose. Is this true?

A: Yes, in the past they were killed because it was believed that sockeye and Kokanee were carriers of a virus that harmed commercial fish. Kokanee were killed to protect the Chinook salmon in the river. The Chinook have proven to be resistant to the virus, so this culling is no longer practiced.

Q: I'm surprised to see that you have bacteria listed in some areas; I thought this was one of the areas where King County was meeting the standards for bacterial control.

A: There are a couple of spots along the Sammamish that are listed with high levels of bacteria including the Transition Zone and an area adjacent to agricultural lands downstream. It does not happen every year, and we

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don't know the exact source of the bacteria. The County is working on refining fecal coliform analyses methods to refine our understanding of bacterial sources.

Q: Water temperature is noted as 77 degrees in August. That seems really hot – is that considered normal and properly functioning?

A: That's normal for the surface condition of Lake Sammamish, but it's not properly functioning for salmon. They do well in 50-57 degree water. It takes juvenile Chinook about 3-4 days to migrate through this area, and fortunately the majority of them migrate in March-April when the water temperatures aren't quite that high. Fall-run Chinook do migrate during this critically high temperature period, so overall, yes, the high temperatures in the lake and river are of concern when we are talking about fish, and salmon in particular.

Q: So far you haven't mentioned navigability as being constrained on the river, and that is an important goal we should be trying to achieve.

A: There may be some opportunity to enhance small boat recreation or portage through the project area in the current project scope. A structural improvement such as a locks or major modification of the weir is currently out of scope for the project. That type of adjustment or goal would need to be addressed with the Flood Control District as the project is currently funded only to address the three main project goals.

Q: We need to look at the opportunity to get rid of noxious weeds. They are blocking passage for boats, and they have to be blocking fish, as well, correct?

A: The aquatic weed, Brazilian elodea, we've been concerned about is downstream of the Transition Zone and outside the project study area, so we haven't been as focused on that for habitat. We will have a report on that at our next meeting.

Q: Is a 150-foot width achievable for a buffer?

A: That is the City of Redmond's required buffer for the Sammamish River, so the project design team will strive to meet that performance standard. In some areas, depending on the final channel design, 150 feet may not be feasible, in such cases buffer averaging or mitigation may be necessary to achieve the standard.

Q: You've mentioned a target of 18 pools per mile in order to improve habitat, but is that a goal that is even possible in the Sammamish River? It seems that we should be developing goals that are actually workable.

A: The project area is in a degraded condition and the idea that we will be able to entirely restore natural processes is not realistic. What we've presented today are the NOAA goals for Properly Functioning Conditions and a few others performance standards based on Best Available Science. These performance standards set a high bar and in many cases are unachievable at this site. They do, however, provide a starting point for the conversation among designers in terms of what it would be desirable to achieve. The design team will work within the land use and environmental limitations of this site to develop a project that can meet a realistic set of design criteria with the goal of maximizing improvements to habitat conditions.

Q: I'm concerned about the backwater effects that could occur if there is increased flow from Bear Creek, and also in relation to these proposed habitat improvements. The project design needs to take this into consideration, so we aren't causing a reduction in outflow from the lake.

A: The next phase of work for NHC will be to develop a set of design flows that will include Bear Creek inflows and any potential backwater effect. The design team will develop project alternatives and run those through a hydraulic model at all the proposed design flows. Any problematic issues related to Bear Creek inflow will be identified in the alternatives analysis process.

Q: Will one of our project objectives be to decrease sediment in the project area?

A: There has been some discussion of including an effort to stabilize the dog water access areas as a design objective. Modifying delivery of sediment from drainages in the landscape surrounding the project area is

WILLOWMOOR FLOODPLAIN RESTORATION PROJECT

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beyond the scope of this project. The City of Redmond has several projects on the books to address these issues.

Committee Discussion on Project Design Objectives

The stakeholder advisory committee engaged in discussion related to draft project design objectives. A few sample objectives had been offered by the King County project team at the October 23rd meeting of the group to seed the discussion. Committee members had submitted written comments on these sample ideas, and had suggested their own design objectives and performance criteria. The project team then built on those ideas to create a draft set of design objectives and performance criteria, which were presented and discussed with the group.

There was a question about recreation, specifically in relation to boat navigability along the river. Jim Mackey was concerned that recreation did not appear to be addressed by the three project goals. Kate responded that Mr. Mackey's request, depending on the extent of what he means by "navigability", may be out of scope with the project goals, which were established in the 2006 King County Flood Hazard Management Plan. The project budget was approved by the King County Flood Control District Board of Supervisors with those goals in mind based on the recommendation of the Flood Control District Advisory Board and the Cedar-Sammamish Basin Technical Committee. Please see the following link for an understanding of District governance: <http://www.kingcounty.gov/environment/waterandland/flooding/flood-control-zone-district/governance.aspx>. Modification of the project goals would be a substantial undertaking with an associated budget process. Although there could be some recreational benefits as a result of the project, recreation is currently of lower priority than the established goals of habitat, flood control, and a reduction in maintenance costs. Marymoor Park has a master plan, and recreational goals such as modifications to provide a boat launch within Marymoor Park, may be better pursued through that forum.

In reviewing the draft design objectives, committee members had two comments that applied to many or all of the draft objectives:

- Some of the objectives are really proposed solutions. Another column should be added to the chart to indicate how the potential solutions relate to the objectives.
- Care should be taken to use verbs that are not too definitive, since you cannot guarantee the outcomes. "Pursue," for example, is a better verb than "ensure." "Minimize" or "reduce" should be used in place of "never."

Other Comments from the Committee on the Goals and Objectives included:

Goal 2

Replace "other species" with "fish and wildlife." We are talking about more than fish with this project.

Objective 1

It does not seem achievable to lower the water temperature to 16 degrees C.

Q: Are we trying to improve spawning, rearing, or migration habitat?

A: This is primarily a migration area. This is not a salmon spawning area. First, there is not the substrate, or gravels, that salmon need for spawning. Second, water movement (velocity) through this area is too fast. Factors other than water temperature influence spawning habitat.

Objective 3

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Q: It seems absurd to take a pipe from Lake Sammamish into the Transition Zone in order to get colder water in the area.

A: TetraTech is looking at three-to-four options for cold water sourcing. They are analyzing the cost and benefits of all of these.

Q: Is there something immoral about fish dying? Wouldn't it be beneficial to allow natural selection to produce a later salmon run that would avoid the highest water temperatures? What are we trying to save here?

A: We can't work to solve lake elevation issues without enhancing the environment at the same time. Both of those goals have to be accomplished together.

Objective 4

More shade (willows, for example) could impede the navigability on the river.

Q: Have you done studies related to the benefits of shade?

A: Yes, several studies have been performed on this. Shade reduces additional increases in temperature due to solar radiation, but it does not directly lower water temperatures.

Objective 5

You might want to consider shear stress as a performance criteria.

We need more information on the relationship between meandering and cooler water temperatures. What are the effects of meandering on water temperatures?

Objective 7

You need to use Oregon Ash or oaks for vegetation; willows are complete blocks.

Riparian vegetation needs to come out of the middle of the channel and off to the side.

By definition, this is a transition zone. The bottom and the top of it have different characteristics. You can't apply something at one end and have the effects be the same at the other end.

Objective 14

This is a good one; it's important to keep this.

Objective 15

Other adjectives to add to this are: sustainable, durable, and resilient.

Objective 16

The existing O&M manual for the weir and transition zone already includes a number of specific criteria.

The maintenance has to be sustainable.

This objective should be associated with goal #3.

Care should be taken not to enhance habitat for predators.

Public Comment

- In addition to the mean high temperature, you should include the mean low temperature. Remember that fish migrate at night. The County's website needs to be improved; include the presentations on there and include the time of this committee meeting. The existing O & M manual already includes a lot of criteria; those should also be posted on the website. There's a natural temperature to the lake, and fish have been migrating through there at that temperature. King County maintenance in the Transition Zone seems to have dropped off after twenty years. The Q&A sheet says that it can't be determined which animal is producing fecal coliform, but there are tests to do that. It also states that the Willowmoor project will not address fecal coliform, but I think it should.

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- Thanks to the committee members for their questions and thanks to Hans for the information he provided today. It would be useful to put information such as the Kokanee virus, etc. on the website. As Hans said, this is not the spot we want to use to create spawning habitat. If we don't create spawning habitat it would be good to have the rationale for that clearly explained. It will be important to understand how we are spending money. Are we spending money for habitat that, in the end, won't do that much for fish?

Next Meeting and Next Steps

The King County team will continue to work on the project design objectives and will produce a second, revised document in the near future. A project website is also being established for the committee and will be up and running very soon.

NHC will soon complete its Phase One report and has started on more detailed Phase Two work. When that work is completed, the County will have the information needed to develop draft design objectives for hydraulics and hydrology. Those will be reviewed with the SAC at the next meeting. That meeting has been scheduled for February 12, 2014, but another meeting in later January or later in February will likely be necessary.

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King County



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.

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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.

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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.

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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.

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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.

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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.

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STAKEHOLDER ADVISORY COMMITTEE



King County



Meeting #5: March 26, 2014

--Meeting Report--

SAC Members Present:

Anne Corley, Sammamish Rowing Association
 Roger Dane, City of Redmond
 Paul Fendt, Member At-Large
 Jonathan Frodge, Save Lake Sammamish
 Michael Hobbs, Friends of Marymoor Park
 Christa Heller, Washington Department of Fish & Wildlife
 Heather Kahn, Washington Department of Ecology
 Jim Mackey, Member At-Large
 Dwight K. 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
 Jim Trockel, Serve Our Dog Areas
 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
 Mason Bowles, King County
 Craig Garric, King County
 Kyle Comanor, King County
 John Engel, King County
 Anne Lipe, King County
 Merri Martz, TetraTech
 Patty Dillon, NHC

Margaret Norton-Arnold, Committee Facilitator
 Spencer Easton, Committee Administrator

Observers

Christina Jensen, King County - Council Staff
 Connie Brown
 Scott Sheffield, Washington Sensible Shorelines Association

Introduction

Margaret opened the meeting and explained the agenda. The purpose of the meeting is to discuss design objectives for operations & maintenance and recreation and to introduce conceptual design alternatives.

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Operations/Maintenance Design Objectives

Craig Garric introduced the objectives for Goal #3 and asked the committee for questions and comments.

Objective 1

Comment: One constraint listed here is the Bear Creek channel capacity constriction. I hope that someone will look at Leary Way as a pinch point. It seems like the channel is pinched at that point and it's just below Bear Creek. Rather than designing only to the capacity we have right now at Bear Creek, we should look into the possibility of improvements there in the future. Craig said that when we do the HEC-RAS model for the river, we can look to see how it performs under various scenarios. We can make sure the model accurately reflects the constraint you're talking about.

Comment: Downstream of that point, there's a footbridge and a sewer line. The cover on the sewer line is a bump. That's a limiting factor for hydraulics as well.

Objective 2

Comment: This objective should also state that there should be no net loss of lake-adjacent wetlands. That needs to be an evaluation criteria. We would be okay with expansion of wetlands to replace historic losses.

Question: Wouldn't the project have some impact on lake levels? Craig said yes, the project can have impacts on the lake. The water coming into the lake is what we can't control.

Comment: This effort is undertaking a variety of studies that should be a base of information communicated back to jurisdictions telling them how what they're doing influences the lake and the project.

Objectives 3 & 4

Comment: It seems like the objective should discuss the real intent, which is that the facility continues to operate as it was designed over time. One way to do that is to have an O&M manual.

Comment: I've gotten permits from the Corps before. They don't happen quickly. This is a good goal, but it may not be possible to have it done before the project is done.

Comment: If you change this objective from developing a manual to making sure that the project works as intended, does that open us up to changes in the future because it could be deemed that the project didn't operate as it was supposed to? I prefer the goal to be about developing an O&M manual rather than something more vague.

Comment: The bullet about maintenance for habitat features makes me uncomfortable. That should be about fixing something that's broken as opposed to constantly tinkering with the habitat features you put in. You need to allow dynamic change to occur.

Comment: I assume when you say O&M you mean something approved by the Corps. That should be stated here. In the fourth bullet under performance criteria it says you would define operation and adaptive management. If you look back at the O&M manual, there was supposed to be someone walking along the transition zone on a regular basis inspecting it and saying what needs to be done. Some of us have proposed a dynamic approach to managing the lake level. At different lake stages, if flow is not at the requisite level, red lights would go off. There are ways to do that electronically and have an email go out. I'd like to push for something like that to address that fourth bullet. If it's not practical, it would be nice to have an explanation of why it isn't.

Comment: Anything that affects an O&M manual for a Federal project needs to be approved by the Corps. But if you're expanding your project area you have more flexibility. It's a good idea to have an O&M manual to agree on things in advance.

Objectives 5 & 6

Comment: The objectives should specify that the concern is with adverse impacts, not impacts in general.

Comment: You should add as an opportunity that you could advance habitat for the ESA listed species.

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Objective 7

Craig said in the bullet under performance criteria it should also say Goal #2 in addition to Goal #1.

Question: Would this conflict with downstream flooding issues, if you're designing to have more flow? Craig said that would be a constraint. The first bullet for performance criteria should be moved under constraints.

Question: What do you mean by "buffer capacity?" Do you mean a buffer physically on the edge of the stream or a safety factor? Craig said we use the word very generically. It could be a buffer for storage, for flow capacity, etc. It is intended to refer to a safety factor. We should change the term.

Question: Where do you see this in the hierarchy if it conflicts with some of the other objectives? Craig said these objectives would be constrained by other objectives. We can't increase downstream flooding.

Objective 8

No comments.

Recreation Design Objectives

Objective 1

Comment: The concern about the maintenance of rowing access is specifically about the construction period. Once the project is finished it's no longer an issue. Craig said we will add to the objective that it's both during and after construction.

Comment: There's an opportunity to connect the trail network to the site just west of the Sammamish Rowing Club.

Objective 2

No comments.

Objective 3

Comment: One opportunity would be to improve boat access to the east side of Marymoor Park. Why are viewing platforms located on the west site, when the parking is on the east side? Craig said he thinks this issue is better covered under Objective 4, and we can discuss it there.

Objective 4

Craig suggested that, to address the comment above, we should add "and to access the park" (in addition to passage) for small boats.

Comment: Boating is a tremendous untapped resource. There's suppressed demand. The ability to dock on both sides of the river would be good.

Comments: Ski boats currently go down to the weir then turn around. I go down in a pontoon boat that is bigger than what's listed here. Craig said you're talking about going through the weir. This is written to address navigating through the transition zone, but we're also talking now about getting through the weir and up to the park.

Comment: The big picture is to make it safe to boat between the two lakes.

Comment: We would like to see this refer to safer passage for non-powered vessels.

Comment: I would prefer the boat measurements here be maximums, not minimums.

Comment: When they did the original weir project back in 1999, one of the major issues with the transition zone was that activities in the river affect salmon habitat. The county wanted to shut all motorized craft out of the water through the summer season. They wanted to shut dogs out of the river as well. We came up with a compromise, which was fencing to keep dogs out of the channel. The county put up signs saying no motorized craft allowed. The rowing club agreed not to bring boats above their dock because they came too far up. Has anybody addressed those issues? We're dealing with 10,000 offleash area users that quite frankly

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don't think it's fair that we can't go in the river when we see people waterskiing or jet skiing. There are people abusing the privileges. There's a serious concern about the ESA effects.

Comment: The agreement with the rowing club was that they would row boats in and out of the slough until they were into the lake. Craig said maybe we could add to that a constraint that there may need to be seasonal restrictions to boating.

Question: Would there be an EIS on this project that would discuss impacts to fish? Kate said we'd have to go through the SEPA process.

Comment: The signs were added based on comments from the Muckelshoot Tribe.

Comment: The fourth bullet point under constraints is powerboat access. Should that be changed to all boat access that could affect ESA listed species, at least seasonally? You need to look at how anything you're doing to improve navigation might affect salmon. In terms of the boat size constraints listed here, I'm concerned that as you make a bigger hole, bigger boats will try to go through it. That's a safety concern.

Comment: There may need to be another objective listed to provide appropriate signage, whether advisory, warning, or closure. The sign could list the size of boats and seasonal restrictions.

Comment: While there's no legal way to close the waterway, one option could be to close that part of the park so that anyone there would be under a trespassing ordinance.

Craig said we could list an objective to "provide appropriate public outreach," which could include signage explaining restriction to boat access.

Question: Is there an enforcement agency?

Comment: The sheriff is on the lake. The proportion of police to citizens on the lake is probably the highest in the county. Lake users are probably the most policed set of citizens in the county.

Comment: The signage should be as simple as possible, because people aren't going to read a long sign.

Comment: We would like to see that human-powered boats are allowed and motor powered boats are not allowed to go past the weir.

Comment: There's also the issue of habitat improvements and navigation. You would have to consider navigation through the habitat feature as well as through the weir.

Question: Why is weight listed as a performance criteria? I don't know the weight of my boat when loaded up and I don't have a scale. Craig said we included that because of the possibility to have a boat crane with one of the conceptual alternatives.

Comment: Would these criteria be applicable across the board? That alternative would have its own weight issue, but the others shouldn't be constrained by that weight criteria. Craig agreed and said we'll strike that one. We'll deal with that as a specific design issue for this alternative.

Miscellaneous Design Objectives

Craig said the miscellaneous design objectives are fairly straightforward and asked committee members to look at them on their own time and provide feedback via email. Paul Fendt said one constraint for the funding objectives is that grant funding can have strings attached. Craig said that is listed as a constraint for Objective #1.

Introduction to Draft Project Alternatives

Craig Garric, Kate Akyuz, and Mason Bowles presented the draft conceptual design alternatives and took questions and comments from the committee.

Alternative 1: Maintenance Alternative

Question: What are the maintenance permits that would be difficult to renew without construction? Kate said the permits are for vegetation maintenance.

Comment: Is this a bogus alternative, because you won't be able to get the permits? Kate said it's not bogus, we would just have to do more mitigation. It's often possible to get permits, just difficult.

Comment: Could you do habitat improvements with this? Kate said yes.

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Comment: If you move forward with a different alternative, you would have to consider No Action, so this alternative would help conceptualize that.

Alternative 2: 2003 Preferred Alternative

Question: One design in the Chinook Recovery Plan was a project at this site. Would that be included as part of this alternative? Mason said the County is looking at that possibility.

Question: How deep would the proposed new channel be? Mason said you could dig very deep new pools. You don't have to worry about it filling in because there's no sediment coming out of the lake.

Question: Could the whole channel be 20 feet deep, for example? Mason said we haven't gotten that detailed yet.

Question: Even if you make the channel deeper it may not improve the temperature much because you're slowing down the water. For this design, what measures can we put in place to make sure the vegetation doesn't take over the new meander channel? It looks like vegetation would still be a problem.

Question: What are the cultural resource issues? Kate said there's a high potential to find resources. For any project we do, we will need to do shovel probes and have an Inadvertent Discovery Plan.

Comment: You would have to know exactly where the old bank was. You have to assume you'll run into a lot of cultural resources.

Comment: To the extent any alternatives can mitigate sediment issues, that would be beneficial.

Question: I'm intrigued about using groundwater to introduce cold water to the river. Could that be used for any alternative? Craig said yes.

Alternative 3

Question: In Patterson Creek (an example of a similar project), is that habitat being used by Cutthroat? Aren't they the #1 predators having an impact on juvenile predation? Mason said Cutthroat are using that habitat. They are predators, but they aren't having more impact than elevated water temperatures.

Question: How would you keep it cool during the salmon run time? Mason said it wouldn't have flow through the summer, the water would be in isolated pools. When the fall freshets come, you would have flow going through this area and Tosh Creek.

Question: Would it dry up? Mason said no, there would be pools. There would be streams through in the winter.

Question: Would the transition zone maintain the same level of temperature it has now? Kate said there would be the same improvements to water temperature as in the 2003 preferred alternative.

Comment: We're not specifically talking about temperature tonight. There could be benefits to temperature from these designs. The larger scale improvements for temperature could be mixed with any alternative.

Question: Is the transition zone where the water becomes too hot? Mason said no, it's already hot from the lake surface before it enters the transition zone.

Question: You're now creating a new flow path for water coming out of the lake. How would this affect lake levels? How did you account for that in the calculations in the total flow going out through the river? Mason said that would be in the next level of design. This is just the concept design.

Comment: This alternative would affect the overall water levels and the ability to go over the sill in a boat at different times of the year. Mason said those are all things to analyze at the next level.

Question: It looks like the river isn't actually connected to the channels. Is there a barrier? Would the fish be stranded? Mason said there would be surface flows in the winter but not in the summer. Fish would be stranded in the pools, and that is how natural ecosystems work.

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Alternative 4

Question: Would the replaced weir be a fixed structure or something with dynamic control? Craig said that's an option we'd have to look at.

Comment: This design looks like the best design for trapping solar energy. If you're going to do this you'd have to look at the difficulty of shading the water. You would have to incorporate a heat budget and heat model. Craig said we'd have to maintain some minimum flow in the flood channel. There are certainly temperature issues with this alternative.

Question: How tall would the structure be? Would you have to get a dam permit and regulate this as a dam? Craig said the elevation change along the transition zone is 6 feet. It would be less than 6 feet tall, but there would be plenty of acre-feet of behind it, so it may be necessary to get a dam permit.

Question: Would the elevation in the transition zone be much higher than now? And does it flood now? Craig said the elevation would be much higher, and it doesn't flood now.

Question: Wouldn't the connector channel be bleeding hot dead water into the other channel during the summer? You probably wouldn't want to have a connector.

Comment: A global constraint to consider is the fact that you have thousands of dogs on the east bank. You have to make sure that dogs stay managed in the offleash dog area and don't impact wildlife. Alternative 4 would encourage people to bring dogs into areas that they currently don't go into. Dogs have to be managed.

Comment: If you have 6 feet of water and it's nice and warm, dogs won't be the only ones swimming there.

Craig said the next step is to analyze the conceptual alternatives and figure out dimensions and scaling. We will probably end up with three alternatives to do hydrologic modeling with.

Public Comment

- My first comment is on cost. I understand the budget problems and issues. But I don't want funding to only be considered a constraint. If you look at how many houses have been built over the last 30 or 40 years and the revenues being taxed to us, we need to solve it right and do it in a long-term fashion. My second comment is about the damage to docks. For people who don't live on the lake, the initial response is that things break, it's tough, and you can go ahead and pay for repairs. A lot of the people have lived there for a long time and when there is high water and it's consistently up, the damage does happen more often. It's not as simple as it used to be where you could just fix it. If I were to do what my dad did on his dock, I would be fined. It's hard to go through the permitting process and fix something like a broken fence in your own back yard. The high water is our property line, and when that changes, it changes our setbacks. That's one of the reasons you will hear some of us talk about that issue.
- I saw some interesting ideas presented tonight and that's good. But I wanted to go backwards a little bit and talk about what I consider to be a violation of the public trust. Going back to the general design memorandum, there was a requirement to maintain the project. One requirement was that the project needs to allow passage of fish and also boats. These are by definition navigable waters. In the 60s you could water-ski between the rivers. The King County Council agreed to these maintenance requirements. But if we look at what's happened, over the past 20 years it hasn't been kept that way. These are wonderful concepts, but what happens in 20 years when the plants don't grow the way you think they will or something else goes wrong? In the meantime you haven't been maintaining the project. It's been a violation of the public trust. We need to trust you will live up to agreements King County agreed to. Will future changes be lived up to?

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Informal Discussions on Alternatives

The meeting adjourned to informal discussions on the conceptual alternatives. Committee members were invited to provide comments directly to King County staff members or to submit written comments on post-it notes. Written comments are included below for each conceptual project alternative.

Existing Conditions

- Need topo – old & now!
- +2' on weir. Infiltration & pools etc. in old T'Z.

Alternative 1

- Cut the center channel 20' deep to provide cool water area for salmon and less need to mow/maintain the channel
- Re cut the weir to improve boat transit and allow seasonal flow control adjustment
- Two alternatives you haven't considered (or at least haven't shown to us). 1) Simply widen all elements of the transition zone. 2) Build new high flow channel.
- Add a swimming pool for kids and a swimming pool for salmon. Only on the 10 days per year when the river temp is too hot. Use a heat pump to heat the kid pool and cool the fish pool. Charge admission to pay for the green electricity to transfer heat.
- Add fish ladder with cooled water to chill the fish as they pass through. Add cool water low in deep channel to stratify the depth by temp.
- +: cheaper; no risk of archeological finds. -: regular budget versus capital cost; no habitat improvement. (Dwight Martin)

Alternative 2

- Hyporheic flow + high Q byp.
- Make this look like/act like Cavanah Ponds on Cedar River
- Estimated cost?
- 20' deep channel please. For: cold water stratification; improved flow; reduced maintenance; improved navigability.

Alternative 3

- Very interesting. Great to take advantage of the underutilized land on west side. Expand opportunities for wildlife and bird viewing. Hard to manage public access to all those small pools?
- No way for boats to pass through with less water.
- Wetland mitigation bank to get some funds for project.
- Yes! Hyporheic interflow. Lower temp.
- Cuts, cuts, cuts will eat the salmon.
- +: still pools; cool water; great habitat. -: artifacts; lots of dirt; need to see topo (pre '64 project, existing, ONLY dig out spoils); cost. (Dwight Martin)
- Insects/smelly swamp. Will affect park usability.
- Estimated cost?
- Build a swamp and the bugs will come.
- Do not trust that gravel will stay – maintenance issues.

Alternative 4

- Can boats transit flow structure?
- Small groundwater pumping for pockets of cool water. Refuge.

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- Love the boater access to Marymoor Park. Thank you!
- Like opportunity for more trail access west side. Concerned about enlarged impoundment behind relocated weir. Will attract more (power?) boat traffic, conflict with dogs and maybe habitat.
- Solar powered fish killer.
- Portage only
- Deep channel to reduce maintenance and improve flow, cooler stratified water for salmon, and improve navigation.
- Estimated cost?
- Make this a swamp cooler. Designed hyporheic.

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King County



Meeting #6: June 11, 2014 --Meeting Report--

SAC Members Present:

Anne Corley, Sammamish Rowing Association
 Roger Dane, City of Redmond
 Paul Fendt, Member At-Large
 Jonathan Frodge, Save Lake Sammamish
 Michael Hobbs, Friends of Marymoor Park
 Christa Heller, Washington Department of Fish & Wildlife
 Heather Kahn, Washington Department of Ecology
 Jim Mackey, Member At-Large
 Dwight K. Martin, Sammamish Home Owners
 Peter Marshall, Eastside Audubon
 Martin Nizlek, Washington Sensible Shorelines Association
 Gilbert Pauley, Member At-Large
 Tyler Quick, U.S. Army Corps of Engineers, Operations & Maintenance
 Joe Thumma, JB Instant Lawn
 Jon Spangler, City of Redmond
 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
 Hans Berge, King County
 John Engel, King County
 Curtis DeGasperi, King County
 Craig Garric, King County
 Anne Lipe, King County Parks

Mark Hopkinson, TetraTech
 Merri Martz, TetraTech

Margaret Norton-Arnold, Committee Facilitator
 Spencer Easton, Committee Administrator

Observers

Reid Brockway
 Dave Garland, Washington Department of Ecology
 Christina Jensen, King County - Council Staff
 Scott Sheffield, Washington Sensible Shorelines Association

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Introduction

This was an informational meeting focused on two aspects of the Willowmoor project: recent studies regarding the species and populations of fish in the Sammamish Lake and River, and a Cold-Water Supplementation Report focused on options for bringing more cold water into the Transition Zone and the downstream Sammamish River to create improved fish habitat.

Updates: Ongoing Project Work; Maintenance Update

Craig Garric provided an update on the work underway, noting that the project alternatives will be presented for committee discussion and review at their September 3 meeting. Craig said the project alternatives will be refined based on committee feedback from the March 2014 meeting, in addition to committee postings and ideas on line.

Kate Akyuz provided an update on the maintenance underway in the Transition Zone, highlighting that the mowing and other activities appear to have measurably lowered the weir rating curve to a level that now meets or exceeds the original Corps design criteria. A chart showing the lowering of the weir rating curve following these activities was presented to the SAC. Consequently, the current maintenance program appears to be working well.

Key Findings To-Date on Juvenile Fish Presence in the Transition Zone

Hans Berge, King County presented the preliminary results of ongoing fish surveys in Lake Sammamish and the Transition Zone. Hans' presentation is available on the committee's OneHub website. Committee members offered their questions and comments:

Q: How long have Rock Bass been in the system?

A: I'm not sure – this is the first time we've seen them in the Sammamish River. We've found them previously in Thornton Creek and other tributaries of Lake Washington.

Q: When do the hatchery fish get released?

A: That occurs in March. The numbers earlier in the year are measurements of naturally-occurring fish in the system.

Q: Are the fish using the reed canary grass channels?

A: No, that does not seem to be their preferred spot. Even the areas under water that are essentially bare ground had more fish at least for the time period covered here. Also, the fish like to stay closer to the banks rather than out in the middle of the channel. It's easier to hide from predators where there is more vegetation.

Q: As we move into June and July, will the concentration of fish now in Lake Sammamish shift to the river systems?

A: Yes; even as of last night (June 10), there were only a few fish left in the lake.

Q: Did you see any Kokanee salmon during the surveys?

A: No, Kokanee spend most of their time in lakes. We have seen Kokanee spawning in the transition zone, but I would not expect to see them in the river.

Q: Is there any fish activity around the willows?

A: We think there are fish there, but the river is moving too quickly in that area for us to do snorkel surveys.

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Q: The presentation hasn't included anything related to cooling. Is that separate issue?

A: Juvenile fish like the warmer temperatures; adults like cooler water. The needs for adults and juveniles are different, so we have to be sure we aren't designing the project for one over the other.

Kate noted that the information being presented by Hans would be useful in designing the project alternatives. For example, the fish seem to prefer shallow slope banks, so perhaps some terraces as part of the design would assist in creating viable fish habitat.

Cold Water Supplementation Report: Presentation and Discussion

Merri Martz from TetraTech presented a preliminary report related to cold-water supplementation for the project area. Because the water temperatures get so warm during the summer months, it may be necessary to draw in colder water to help maintain suitable temperatures for fish. TetraTech has performed a very preliminary analysis of six possible concepts in this regard. This list will now be narrowed to the most viable two or three concepts, and further analysis will be conducted on those. Merri's presentation, as well as the Cold-Water Supplementation Report, is posted on the committee's OneHub website.

Members asked questions and provided comments:

Q: Are we trying to cool the entire stream or provide cool resting points?

A: That's part of what we are trying to determine with the analysis. We started with the assumption that we would create four pools of cooling water in the transition zone, but some of the concepts wouldn't work that way. For example, if we can only get 1 cfs (cubic foot per second) of water, there is very little benefit in distributing that to four pools. We might want to concentrate that cooler water in just one location.

Q: How do you know if this will actually benefit the fish population?

A: We don't know that yet. Studies suggest that fish seek out cooler temperatures; we've seen that in the Sammamish, and have looked at similar data from the Yakima River. It's going to be tricky to monitor these options for effectiveness. It's not just about fish mortality, it's about the overall health of the system. If we do implement a cold-water system, we will need to monitor and prove its effectiveness.

Q: How have these concepts worked, or not worked, in other river systems?

A: This type of an engineered solution is a very new idea, so there isn't a lot of information available about other systems. Again, we will do a significant amount of additional analysis before any of these alternatives would be selected or eventually built.

Q: Have you looked at the historic meanders of the channel? It seems those would have the potential to move a lot more cold groundwater through the transition zone.

A: Yes, we are measuring that now. So far we've seen that groundwater ranges from being right at the surface level to being 7-10 feet below the ground. The old meanders probably have coarser material in them that would transfer water faster.

Q: One of your concepts has the intake pulling water out of the river itself, not the lake. What effect will this have on river flows?

A: This intake is above the weir. It would pull out about 5 cfs that would not pass over the weir, but would be returned to the river shortly below the weir. The normal flow here is between 20-100 cfs; so we would not be affecting the flow level. Additionally, this part of the channel is effectively an extension of the lake, with very low velocity and no effective water level difference compared to the lake.

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Q: Have you considered the drinking water system? You could do a heat exchange with that system and use those pipes as your cooling source.

A: That's an interesting idea; not one we have looked at.

Q: Is the thermocline at the same level everywhere through the lake? I dive in Lake Sammamish multiple times in July and August, and I hit a thermocline at 20-30 feet; it doesn't seem that you'd have to go to 50 feet.

A: The County has a number of gauges monitoring the lake at different surfaces. At about 10 meters you're starting to get pretty cold water, but the temperature can go up a bit during the day. At 15 meters, it stays colder. The north end of the lake is shallower, so from the Transition Zone we'd need to make the intake tunnel longer to get to the colder water.

Q: We're trying to cool the Transition Zone because that is the hottest area, but what happens when the fish go into Lake Sammamish? Isn't that also pretty shallow and hot?

A: The surface of the lake is warm, but the adult fish can swim lower to cooler water in the lake. That's not possible in the Transition Zone. There are opportunities to look at cooling around Bear Creek and at all of the tributary inputs. The County is doing this analysis work based on the 2002 Corridor Action Plan core recommendation of an engineered solution that has effects at the river scale. Whether we implement that through the Willowmoor project or not is an open question. We are considering whether there is something we might consider doing in tandem with this project, since we'll be digging in the dirt here, to explore a river scale cool water solution.

Q: What about digging a bunch of deep holes? Could that gain the same kind of low-stress way for the fish to go through the river? You could compare the cost of digging 15-20 deep holes between the weir and Bear Creek to the cost of pumping water.

A: The Transition Zone is a lot steeper than the rest of the river. Residence time and groundwater seep may have an impact or not. Pools in the deeper Transition Zone may not have a lot of benefit.

Q: What about water rights?

A: That's another item we need to review; we know we would need a water right to pump from the lake or to pump from deep groundwater.

Q: The river gets cooler as it moves downstream? Why is that?

A: The river does cool as it flows downstream from the extreme high temperatures in the Transition Zone, but temperatures are still above water quality standards. According to the data, rivers temperature is at a peak in the daytime when it leaves the lake. That temperature goes down a bit where each tributary discharges colder water into the river (Bear Creek, Little Bear Creek, North Creek, Swamp Creek). Groundwater seepage into the river all along its course contributes to cooling as well. The lowest part of the river gets cooled by backwater from Lake Washington.

Comments:

- The difficult challenge is going to be determining the marginal cost for the fish you are saving. We have these project alternatives that will add more fish habitat to the system, and if you add this as the last element you spend an additional \$2-7 million for X number of additional fish. I hope the County can make that estimate. Otherwise, saying we're going to spend \$2-7 million to drop the thermal stress index is not going to compute.
- You talked about a pumping system doing 1 cfs for one alternative and 5 cfs for another, but you didn't talk about building 5 pumping systems. The scales change and you have to equalize the cfs.

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Another thing to think about is the mass balance of the temperature. There's a difference between taking hot water and making it cooler as opposed to taking cool water and adding it to the system. There should be a way to think of that from an energy perspective or a sustainability perspective.

- The concept of digging deep holes has already been brought up and is a good one. It's important to look at the analysis of temperature throughout the entire system. If we cool down the transition zone, the fish still have to go through the Ship Canal, Lake Washington, and the river. Why would we spend several million to only address one end of the problem? As far as pumping out of Lake Sammamish, there are a lot of issues associated with that. You're taking the water out at the exact time and location where the fish have been constrained oxygen wise. You'll have to screen it, which will increase costs. There will also be a phosphorous issue.
- There's a long-term water quality monitoring site that could be added to background data. It's probably not still in place, but it does have 15 years' worth of data.
- This is an excellent start and it's very interesting what you've been able to put together. I have to complement you, and also Hans for the survey information.
- Representatives from the regulatory agencies on the committee also weighed in. From Christa Heller: *the County has been doing a good job of getting its ducks in a row – these are conceivable options and we just have to see where they go.* And Dave Garland from the Department of Ecology noted that his agency is considering a temperature TMDL on the Sammamish further down the system and that the Department is very interested in using shade to keep the system cool: *It would be a real boon to start the system cool here and try to keep it cool downstream as well.*

Next Steps on Cold Water Supplementation

Kate reiterated that significant additional analysis will take place before any decisions are made regarding the possibility of cold water supplementation. She noted that the Army Corps of Engineers is also considering cold water supplementation at the Locks; the ideal situation would be to undertake such a cold water program at both the Locks and upstream. Kate further noted that King County's biologists are reviewing the cold water study, and have raised a number of questions that will be passed on to Merri for further evaluation. Phosphorous data will be reviewed, and there will be a siting study on the alternatives as well.

Kate further noted that a project such as this could not get grant funding if it does not demonstrate clear benefits to fish. *We won't write a grant based on this conceptual level of analysis. We need to explore fish health, how to measure it, and how we propose to benefit fish.*

Craig and Kate are currently developing the scope of work for the TetraTech consulting team on both cold water supplementation and the project alternatives. Committee members are asked to share any additional comments or questions over the next week or so. The design alternatives and technical studies will begin to be integrated together, so by the September committee meeting the group will begin to see how the draft project alternatives address the various design criteria.

Design Alternative

Bill Way had developed a design alternative aimed at getting cold water from hyporheic interactions using ripple systems that would have subterranean cooling. He noted that boats could move through it and it will be a self-sustaining alternative. It would prevent vegetation and brush to accumulate in the flow channel, and involves a ripple sequence where the pools could be used for rearing. Backwater systems would be held open

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because they're too wet for trees and shrubs. It would be a semi-natural systems approach that's self-correcting. Bill will meet with Craig and Kate to discuss his ideas.

Public Comment

On the topic of how many fish will we benefit, the first couple of alternatives seemed to have minimal benefit. Is there a threshold you need to get over for it to make sense to do in the first place? If the first two concepts only benefit two fish, even if they're the cheapest, it makes no sense. Maybe you should explore the benefit per fish per dollar. Yes, doing something is better than nothing, but it's foolish to do it if there's no measurable benefit.

Next Meeting

The next meeting of the Willomoor Stakeholder Advisory Committee will be on Wednesday, September 3, again at 4:00.

WILLOWMOOR FLOODPLAIN RESTORATION PROJECT

STAKEHOLDER ADVISORY COMMITTEE



King County



Meeting #7: September 3, 2014

--Meeting Report--

SAC Members Present:

Paul Bucich, City of Bellevue
 Roger Dane, City of Redmond
 Paul Fendt, Member At-Large
 Jonathan Frodge, Save Lake Sammamish
 Greg Helland, Friends of Marymoor Park
 Michael Hobbs, Friends of Marymoor Park
 Charles Ifft, US Army Corps of Engineers
 Jeanne Justice, City of Redmond
 Heather Khan, Washington Department of Ecology
 Jim Mackey, Member At-Large
 Dwight K. Martin, Sammamish Home Owners
 Peter Marshall, Eastside Audubon
 Gilbert Pauley, Member At-Large
 Scott Sheffield, Washington Sensible Shorelines Association
 Joe Thumma, JB Instant Lawn
 Jim Trockel, Serve Our Dog Areas
 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
 Craig Garric, King County
 Anne Lipe, King County
 Merri Martz, TetraTech
 Patty Dillon, NHC

Margaret Norton-Arnold, Committee Facilitator
 Casey Rogers, Committee Administrator

Observers

Dave Garland, Washington Department of Ecology
 Joan Nolan, Washington Department of Ecology
 Ralph Svrjcek, Washington Department of Ecology
 April Sanders, King County
 Curtis DeGasperi, King County

Introduction

The purpose of this meeting was to discuss four potential alternatives for the Willowmoor Floodplain Restoration project, as well as possible options for cold water supplementation in the project area. Jeanne

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Justice was introduced as the new committee representative for the City of Redmond, as Jon Spangler has accepted a new position with the City.

Updates: Ongoing Project Work; Maintenance

Craig Garric provided updates on the project schedule and process, noting that an RFP will be issued to select a consultant team for the final design of the Willowmoor Floodplain Restoration project. This selection should be completed by early 2015. The Stakeholder Advisory Committee will meet at least one more time this year to review refined alternatives before the next public meeting, and will likely meet for the last time in February-March 2015. Meeting dates will be determined as soon as possible.

Kate Akyuz updated members on maintenance in the Transition Zone; the beaver dam is gone and was likely washed away by high water flows. The one very large shrub in the low flow channel just below the weir has been removed and the willow trees have been trimmed. The project is currently meeting its design objectives.

Discussion of Potential Project Alternatives

Kate and Craig were joined by Kyle Comanor, Patty Dillon, and Merri Martz in a presentation and review of four draft project alternatives. Kate and Craig began this segment of the agenda with an overview of the degree to which the analysis to-date has provided information on the project design objectives and criteria. They noted in particular that these early stages of analyses and design focused on certain hydraulic and habitat objectives that are fundamental to project success. Remaining design objectives will be addressed as the alternatives are narrowed and refined.

SAC members first heard of these alternatives at their March 2014 meeting. Refined alternative plan-view drawings were provided in advance of this meeting through the OneHub site, and the meeting presentation was also posted to OneHub shortly following the meeting, along with updated versions of the drawings. The project team reminded SAC members that these are still very early drawings and are primarily focused on possible channel configurations. Specific channel widths, water depths, weir configurations, vegetation plans and other design elements are currently under development and analysis.

In addition to the descriptions of each alternative, the project team shared preliminary hydraulic modeling results with the committee. A first round of modeling was conducted to determine any “fatal flaws”; that is, any alternatives that will fundamentally not meet downstream flood control or upstream lake level criteria. This first round of modeling indicates that all of the proposed alternatives would satisfactorily maintain Sammamish River downstream flooding levels during 10 and 100-year flood events. In addition, the preliminary results indicate that, when compared to observed conditions, each of the four alternatives would significantly reduce the number of days lake levels exceed 27, 28 and 29 ft NGVD respectively.

Alternative 1: Maintenance (No Action)

This alternative keeps the existing conditions in place. Annual maintenance -- primarily willow trimming, mowing and occasional sediment removal -- will be needed to maintain these conditions and ensure that the weir and Transition Zone is functioning to design standards. These maintenance activities will require ongoing permitting. Aquatic habitat mitigation may also be required by the Washington State Department of Fish and Wildlife. While there will be no upfront costs to maintain the existing project, the estimated life cycle cost is approximately \$900,000.

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Alternative 2: Single Meander

This alternative is similar to the historical look of the river at the Transition Zone, with a meander replacing the existing straight channel, plus pool-and-riffle sequences to provide enhanced fish habitat. The existing straight channel would be at least partially retained to provide additional flood conveyance capacity during high flows.

Members had questions about the width and water depth of the proposed channel. Patty responded that it could be as wide as 50-60 feet and as deep as 3 feet in the summer, but that those specific details will require additional analysis and design. She noted that, as long as the same flow objectives are maintained, the channel could be shaped in a number of different ways.

Alternative 3: Hyporheic Channels

Under this alternative, several small channels and pools would be excavated off of the main channel. These would provide additional flood mitigation capacity during high flows, as well as provide fish habitat. A berm with small pipes or other structure types would be built to help control the water going into these side channels. Additionally, gravels placed in the channel bottoms would allow inter-gravel or “hyporheic” flow that would provide some cooling of the shallow, warm lake water.

In response to questions, Kyle said that the berm is placed further upstream from the existing weir in order to maximize the length of the side channels and to provide more opportunity for water cooling. The berm could potentially be closer to the weir, if additional analysis indicated that would still provide sufficient length to meet water cooling criteria. The berm would be overtopped with water during high flows and would function as a standard weir.

One member wondered if the intention of this alternative was to directly connect the river with groundwater. Kyle responded that connecting to groundwater was not really the intent of this alternative. During low river flows, water flowing from the river into the gravel-filled channels would remain below the gravel surface and would not be visible. A couple of members likened this to having “French drains,” and commented that a significant degree of maintenance would be likely with this alternative.

Another comment referenced a 2003 Department of Ecology report (posted to OneHub) that indicated groundwater or hyporheic flow was the only strategy that would be successful in lowering the temperature of the river. More than one groundwater or hyporheic channel would need to be developed in order to make this effective.

Another member wondered about the likelihood of Native American artifacts being uncovered as the smaller channels are excavated; project team members noted that this issue will likely emerge under any of the alternatives other than the maintenance alternative.

Alternative 4: Split Channels

This alternative strives to separate the competing needs of flood protection and improved habitat currently being provided by a single channel. Under this alternative, a single secondary channel would be developed to provide a more dedicated habitat channel, while the main channel would be maintained to provide flood conveyance. This alternative includes a new weir to control flow into the habitat channel, and a tie-in to Tosh Creek could provide some cooling benefit. Pools and riffles would likely be elements incorporated into the habitat channel for improved habitat and cooling benefits.

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In response to a question, Kyle responded that the proposed side channel is 2500 feet long because that approximate length is likely to work the best for both flow maintenance and habitat creation. Kyle also stated that the proposed channel inlet was intentionally located upstream of the dog park river access sites.

Additional Cold Water Supplementation Concepts

Merri Martz presented information on two additional cold water supplementation concepts that were suggested by SAC members at their June meeting. These included:

1. A suggestion from Bill Way that includes both a Transition Zone reconfiguration and water cooling, and that includes meanders, pool-riffle sequences and backwater channels. Similar to project Alternative 3, the channel bottom would be lined with a layer of gravels to provide cooling via hyporheic flow. Analysis indicated that less than 1-cfs of water would flow hyporheically during warmer, low flow periods. Initial estimates indicated an implementation cost of ~\$5.6M and life cycle cost of ~\$117K net present value. However, it should be noted that unlike other cold water concepts, these costs are for both the Transition Zone reconfiguration and water cooling features.
2. A suggestion from Michael Hobbs to modify the previously presented hypolimnetic withdrawal concept so that it would draw warm surface water and cool it through heat exchange in the much colder water in the hypolimnion. This concept could provide up to 20-cfs of cooled water. Initial estimates indicated an implementation cost of ~\$7.4M and life cycle cost of ~\$197K net present value. However, in contrast to the hyporheic cooling concept, this concept does not simultaneously include Transition Zone reconfiguration costs.

In response to a question, Merri said that dissolved oxygen levels have not yet been evaluated, but they will be as the alternatives continue to be narrowed and refined. The hypolimnetic solutions proposals included an aerator to manage dissolved oxygen issues.

Round Robin

Members participated in a “round-robin” process, during which each SAC member was asked to comment on the alternatives and provide suggestions for presenting project information to the public.

Gilbert Pauley: I don't like Alternative 3 with the “French Drains;” I have experience with those and they are a nightmare. I tend to favor Alternative 2, which restores the old meander and natural flavor of the stream. It also appears to be most cost effective. We do need to evaluate the benefits/impacts to fish.

Jeanne Justice: I am supportive of Alternative 2, but I have some concerns regarding flood control and the way in which water would be released. I'd like to have more conversations about that. *For the public:* The public meeting(s) should be held in various locations in order to ensure that the maximum number of people can attend.

Paul Bucich: We should eliminate Alternative 1 because it does not address habitat issues. Alternative 3 will be expensive and difficult to maintain over the long-term. It seems that the water going in and out of that system will be a maintenance nightmare. The idea of using pipes underwater concerns me; over the years I've seen a lot of those types of systems get plugged up. Alternative 2 is attractive, because it seems the simplest option, most straightforward and easy to build. I wonder if the water would heat up when it slows down, however. I like Alternative 4 because of the habitat it would provide. *For the public:* Provide planning-level cost estimates. Reconsider the graphic representation of your comparison matrix; the current version is confusing and it needs to be as easy to understand as possible.

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Michael Hobbs/Greg Helland: The most important goals for this project are to reduce high lake levels and protect the boardwalk in Marymoor Park. Habitat should be prioritized in all of the alternatives. It's difficult to make a decision on which alternative we would prefer without knowing the plan for vegetation. In Alternative 4, for example, would the existing Transition Zone area be mowed flat? How will any new vegetation provide for birding habitat? Maintenance will be required for all of the alternatives. *For the public:* people will want to know what it is going to look like. More than one meeting should be held at different venues.

Dwight Martin: Alternative 1 is the bottom line starting point for what needs to be achieved. I think there are some benefits to trying to stay within the channel, but widening of the channel should be considered to allow for additional vegetation. For Alternative 2, I like the look of that one, but I don't see any way to get away from maintenance, and I think maintenance will be an issue for any of these alternatives. I'd like more information about that. I love the idea of Alternative 3, getting some kind of a natural cooling mechanism, but that seems like way too complicated of a way to get that cooling, and maybe that natural cooling won't happen. Would shorter side channels be a more reasonable approach? With Alternative 4 I am concerned about the length and depth of the side channel, but I do love the idea that it can be shaded, would hope that could be an area where habitat remains. I wonder about the archeological finds possible in the area, and if we do have the split channel, the existing Transition Zone can't just be mowed flat. For the cold water supplementation; the idea of big pipes out into the water – I can't believe we are even discussing that. Politically I think it's a non-starter. *For the public:* The County needs to show the costs for the project, as well as the potential water levels for the people who live around the lake.

Paul Fendt: I don't see a lot of difference between the four alternatives. All the flood control elements of those alternatives will require ongoing maintenance. In Alternatives 1 and 2 where flood control and habitat are in the same place; neither of them will be achieved well. For Alternative 4, we need a lot more detail on what it will actually look like, I don't think it will be as nice as we all imagine. My preference would be to make something like Alternative 3 work; meaning that there is a channel that cools water in some way. I prefer a passive system for water cooling. In general, we need more cost/benefit information and design details that reflect what the alternatives will look like. *For the public:* Make it crystal clear what each alternative does and does not do, and illustrate the costs in some way.

Bill Way: I think the existing maintenance channel, if it could be manipulated and improved to include pools and riffles, is the best option related to cost. The proportional gain for the other alternatives is just not there. Other than that, Alternative 2 has the best character in terms of being self-sustaining. Vegetation will be the major issue; the biggest misconception in projects like these is that what you plant will always grow. It will require grading and a lot of planning to get the right vegetation in the right places. Alternative 2 would be best for long-term maintenance. Alternative 3 is not self-maintaining and would require too much energy input. I worry that the secondary channel in Alternative 4 would get filled in with vegetation. Even if you plant the right things, reed canary grass and other invasive plant species will come in. For water temperature, the riffle sequencing is how you get evaporation, which leads to a drop in water temperature. The large pipe alternative to achieve cooling does not sound realistic; it seems like a potential boondoggle that will impact other species.

Charles Ifft: I'm not opposed to any of the alternatives; the Corps is focused on the flood functions of our authorized projects. All of these alternatives have variables that may make the project fail. In general, as projects get more complex it becomes more challenging to demonstrate that they will be better than what currently exists. My preferred option is Alternative 1, given that the hurdles and chances for success with the others are so immense. It seems the cheapest, most straightforward and most likely to gain Corps approval. We need scientific proof that any of the other alternatives will improve habitat function. *For the public:* The County needs to work on messaging: what's in it for the public and why should taxpayers fund this project?

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Susan Wilkins: The primary objective for this project has been to "ensure the Transition Zone's capability to provide necessary lake level control, flow conveyance and downstream flood control." The Preliminary Alternative Analysis table indicates that all four of the proposed alternatives would maintain flood levels below the 10- and 100-year projected profiling for downstream Sammamish River flooding. The analysis also indicates that each of the four alternatives would significantly reduce the number of days lake levels would exceed 27, 28 and 29 NGVD respectively. It was not clear to me how many days per year that the lake levels would still be higher than acceptable to lakefront property owners whose docks and landscaping are being frequently damaged by high water.

If downstream flood control and lake level control were the only objectives, then Alternative 1 would be acceptable. However, the straight/wide/flat channel that already exists in its north-south orientation creates excessively hot water with low-oxygen conditions that are unacceptable to fish. If it were still 1962, this wouldn't matter, but in 2014, we must have channel habitat/orientation that provides for safe fish passage between the Transition Zone and Lake Sammamish. The proposed cold-water supplementation, especially the deep lake withdrawal proposal, might remedy these conditions; however, it is extremely expensive and may not work long-term.

I favor Alternative 4 with its enhanced side channel for low-flow stream conditions. The side channel is nearly twice as long as the single meander proposed in Alternative 2. Instead of directing fish into the wide, shallow, sun-exposed channel that currently exists, Alternative 4 would create a small-stream side channel habitat that would be easier to shade and contour while maintaining the wide, straight channel for flood conveyance. The existing straight channel could be modified to accommodate additional flood conveyance thus ensuring that lake level flooding would be minimized to only the most extreme storm events. (Note that regular mowing and clearing of this main channel would still need to be performed so it will still be a continuing maintenance cost.)

Planting hemlock and cedar should be considered because these trees seem to inhibit the growth of grasses and invasive plants by providing significant shade and by creating acidic soil conditions that encourage the growth of ferns and mosses. Planting trees is a long-term strategy that would take at least 15 years before the trees were big enough to produce results.

Peter Marshall: Anything that helps fish also helps birds, so Audubon will be in favor of habitat improvements. I don't know which alternative is best, but Alternative 3 looks good as far as keeping the natural habitat. The piping for cold water sounds extravagant, but may be good for fish. *For the public:* The committee needs to look at this again before a public meeting is scheduled. We don't have enough answers yet. For example, we haven't discussed power boat access in enough detail as a group.

Heather Kahn: I prefer Alternatives 2 and 4, and Alternative 3 might be viable with some modification. I like Alternative 2 because the natural historical formation is restored. Ecology does not favor the hypolimnetic withdrawal supplementation due to the expense and the amount of infrastructure. I suggest the County look closely at dissolved oxygen levels and biological oxygen demand (BOD) when considering this option. Hypolimnetic supplementation did not work well for Lake Ballinger due to low dissolved oxygen levels and high BOD, so researching Lake Ballinger as a case study on lessons learned may be beneficial. As with temperature, Ecology would be most interested in seeing dissolved oxygen levels that are not lethal for fish and secondarily, achieving the 9.5 mg/L standard for core summer salmonid habitat if possible. If this is not possible, we would need to be able to explain the conditions that prevent us from reaching the water quality standard for dissolved oxygen. For all of the alternatives, the County should explain and report on the channel gradients. *For the public:* Keep it simple. The meetings should be held in different locations. Walk the public through goals and objectives, and how project alternatives do or don't meet them.

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Jason Wilkinson: Thanks to the project team for all of their work on this. We have to acknowledge that it's a highly modified system, but we have a great opportunity here to help restore the migratory patterns of ESA-listed salmon. We need to put this project into the perspective of the large basin restoration efforts that have taken place upstream and consider the value that the Willowmoor project will contribute at this level. In the Issaquah area, for example, lots of work has taken place to restore salmon habitat, and this project could be really great in connecting to that previous work. We need to take advantage of the opportunity to improve overall habitat conditions. I like both alternatives 2 and 4, but I have some concerns about the possibility of water stagnation above the main channel weir in alternative 4. *For the public:* The depictions of the alternatives/evaluation need to be as clear as possible.

Jonathan Frodge: I'd like the Flood District to stick with their original plan to control for flooding and restore habitat. Alternative 1 is a typical 1960s Army Corps project that did not take any habitat into account. The Sammamish is very effective at capturing solar energy. Large trees are not going to provide that much of a benefit toward cooler water temperatures. I generally support Alternatives 2, 3, and 4. Meanders will help with cooling in combination with tall trees, and the hyporheic cooling should be included as part of the meanders. The hyporheic function exists in this river, and that should be designed into the alternatives – digging pools down in the river, for example, seems to be a cost-effective way to achieve cooling. The big pipe/pump system is the height of hubris. It sends the wrong message that somehow we can flip a switch to save salmon. It's important to consider if/how flood control could be achieved using the natural wetlands and other processes that were once in place here. We need to begin replacing and increasing fringe wetlands, and focusing on natural riverine processes.

Jim Trockel: I like Alternative 2 because it looks nice. From my perspective we represent the largest user group of Marymoor Park and I have a huge concern any time we're taking water out of the main channel (Alternatives 3 and 4), because that river gets very low flow this time of year. We tend to forget that Marymoor is the largest park in the King County Parks System, so the recreational and aesthetic aspects of this project are also important. Overall, the costs vs. benefits for the alternatives don't seem to pan out. *For the public:* It's premature to present this to the public. Wait until there are more specifics, including cost. Have a final plan in place and let people know that's what you will be building.

Jim Mackey: There is a major flaw in these alternatives because none of them propose any changes to the weir. In my mind that is unacceptable; a fifth alternative needs to be proposed that involves a redesign of the weir and greater public access to the river and lake from Marymoor Park. Alternative 1 looks like it would be the simplest and cheapest. It's not clear that Alternative 2 would be a significant improvement over Alternative 1. It's not clear to me that Alternative 3 is even feasible. I like the separation of uses in Alternative 4. We will face public ridicule if we present the hypolimnetic withdrawal option. We need more detail on channel geometry, plantings, public access, weir modifications and costs. *For the public:* Provide information on the channel geometry, proposed plantings, and public access.

Scott Sheffield: The cold water pipeline does not seem feasible. I wonder if the Corps of Engineers will approve of any of these ideas. Have the County and the Corps met to discuss these options? I also wonder about actual fish benefits. If we spend these millions of dollars on any of these alternatives, how many fish will we actually save? The original project was designed for flood control and to maintain certain levels on the lake. We need to make sure that those design objectives continue to be met. Also, has the County installed these types of projects elsewhere? How effective have those projects been? I like Alternative 2 if it includes a meandering of the dog park trail in order to provide more limited views of the maintained Transition Zone. Please post the USACE Section 408 Circular on the OneHub website. *For the public:* Describe how the project will be funded. Do a dry run, perhaps with this committee, to make sure the presentations are simple and effective.

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King County



Meeting #8: December 10, 2014

--Meeting Report--

SAC Members Present:

Mike Arntzen, OneRedmond
 Paul Bucich, City of Bellevue
 Roger Dane, City of Redmond
 Paul Fendt, Member At-Large
 Jonathan Frodge, Save Lake Sammamish
 Dave Garland, Washington Department of Ecology
 Christa Heller, Washington Department of Fish & Wildlife
 Greg Helland, Save Our Dog Areas
 Michael Hobbs, Friends of Marymoor Park
 Charles Ifft, US Army Corps of Engineers
 Jeanne Justice, City of Redmond
 Heather Kahn, Washington Department of Ecology
 Jim Mackey, Member At-Large
 Dwight K. Martin, Sammamish Home Owners
 Peter Marshall, Eastside Audubon
 Martin Nizlek, WA Sensible Shorelines Association
 Gilbert Pauley, Member At-Large
 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
 John Engel, King County
 Craig Garric, King County
 Daniel Lantz, King County
 Anne Lipe, King County
 Gino Lucchetti, King County
 Merri Martz, TetraTech
 Patty Dillon, NHC
 Erik Rowland, NHC
 Margaret Norton-Arnold, Committee Facilitator
 Spencer Easton, Committee Administrator

Observers

Angie Peace
 Scott Sheffield

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Schedule and Process Update

Margaret Norton-Arnold welcomed members to the meeting, noting that this was the next-to-last meeting of the Stakeholder Advisory Committee. The final meeting of the group will take place in February or March of 2015. Craig Garric described activities over the next several months, during which the Willowmoor project will move to a greater level of scrutiny from a broader audience. A public meeting will be held in early 2015, and a presentation to a variety of public agencies through the U.S. Army Corps' pre-application meeting process will also take place. Consultation will occur with the Muckleshoot Tribe.

Based on these discussions and continued analysis, King County will select a "preferred alternative" for the project that will be presented to the Flood District's Board of Supervisors (composed of the members of the King County Council). After the Board's approval, the District will move forward into final design, permitting, funding, and construction of the Willowmoor project. There will be ample opportunity to engage in the process moving forward, including additional public meetings and a formal SEPA/NEPA process.

The project will also be subjected to a U.S. Army Corps of Engineers "408 process" that will include a rigorous analysis of all of the project's assumptions and design elements. This analysis could take approximately two years.

Updated Design Alternatives

The project team presented the three project alternatives that remain under consideration:

- Alternative 1 – No Action/Maintenance
- Alternative 4 – Split Channels with Pumped Groundwater
- Alternative 5 – Benches and Coves with Heat Exchange System

The presentation included a description of changes in channel geometry for each alternative, planting plans, habitat benefits and estimated costs. Although the cold water supplementation options can be interchanged with channel reconfiguration alternatives 4 and 5, they were combined in this way to achieve maximum cooling and habitat benefits. Presentation materials from the meeting were posted to the committee's OneHub site.

In discussing costs, the project team highlighted the potential to acquire funding from various mitigation and grant resources; funds that have been established specifically to assist in habitat restoration. The County has initiated discussions with a variety of potential funding partners in this regard, and is optimistic that mitigation and/or grant dollars will be made available to help support construction costs.

Committee Feedback and Discussion on the Alternatives

Committee members asked questions and provided their feedback on the three proposed alternatives under consideration.

Q: It doesn't look like boats would be able to get through the weir under alternative 4. (Jim Mackey)

A: The depth we've presented is based on the lowest of low flows; those flows are likely to be higher during most of July-September. Refinement of the weir design is still being conducted to optimize performance with respect to hydrologic/hydraulic, habitat and navigational project objectives. Further refinement and optimization of the weir design will continue into the final design of this project. Finding the optimal balance will be an iterative and collaborative process, and we will certainly take your input into account.

Q: It doesn't look like the estimated maintenance costs include money for sediment removal; that seems like a major concern. (Marty Nizlek)

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A: King County has only had to remove sediment once since 1968, so sediment removal is included as a one-time effort in the 50-year life cycle cost of the maintenance alternative. In the two other alternatives reed canary grass will be treated and native plant communities installed to decrease the buildup of organic material in the Transition Zone – the primary source of “sediment” buildup in the TZ. Also, the willows in the Transition Zone will be removed under both of the alternatives. This will have significant benefits for water conveyance throughout the channel.

Q: Is the cold water supplementation a requirement? Also, it looks like the construction staging approach could create an opportunity to add cobbles and pipes to provide hyporheic benefits. (Dwight Martin)

A: There is currently a Washington Department of Ecology Total Maximum Daily Load (TMDL) process underway in the Sammamish River for temperature, as the river consistently exceeds the state water quality standard for temperature. That study could determine that the high water temperature in the river needs to be addressed. Also, cold water supplementation was listed as one of the highest priorities in the 2002 Sammamish River Corridor Action Plan. There is probably no river in Puget Sound more potentially productive than the Sammamish. If we can encourage juveniles to rear in the Sammamish River, it will be a major step forward. This is an opportunity to systematically affect river temperatures all the way down to Lake Washington. There are very few other sites around Puget Sound where that is a possibility. Regarding your suggestion for the construction staging approach, that is a really good idea; we’ll take a further look at it.

Q: Does the system have the ability to produce enough fish to take advantage of these habitat improvements? (Marty Nizlek)

A: Salmon managers always report that if we provide quality habitat, they will fill it with fish. If we can fix the temperature issues, we will be restoring critical habitat processes. Also, the Washington Department of Fish and Wildlife recently removed a dam upstream of the hatchery; this opens up 11 miles of fish habitat that was only partially accessible before. So we will be tying into a much larger Sammamish Basin scale restoration process through this project.

Paul Bucich needed to leave the meeting early and noted that at this point his preference was for Alternative 4, and also commented: “Could the modified weir shown in Alternatives 4 and 5 also work with Alternative 1? On Alternative 5, the heat exchanger should be located on the other side of the river so it’s easier to get to the pipe system to maintain or replace it. That would also move the pipes to an already disturbed area and out of the restoration area. Will you be able to ensure that the pipes won’t sink or float with the groundwater? 10 cfs will require a large pump station and an access road. On Alternative 4, the well point should be closer to the discharge point. Access to the well point and weir will also require a road.”

Q: What is the gradient of the side channel, and how does that compare to the other restoration project examples you’ve shown us? The proposed side channel gradient (approximately 0.2%) will be much lower than the example projects, plus there will be significant backwater from the downstream river channel extended well upstream into the proposed side channel. (Paul Fendt)

A: Those examples are probably different from what we would need at this site; those determinations will be made through the final design work. The intent of the example projects was to demonstrate success in creating side channel habitat.

Q: Will you need a water right for the cold water supplementation? (Paul Fendt)

A: No, we don’t believe we are likely to need a water right, but will explore that with our in-house experts and WA Department of Ecology.

Q: Could you do Alternative 4 without the cold water supplementation? (Paul Fendt)

A: Yes, potentially. Tosh Creek will add cold water as well as a lot of gravel, so even without supplementation there will be some cold water benefits.

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Paul Fendt commented that his preference at this point is for Alternative 5, and also asked why a diversion channel will be necessary during construction. He noted that Redmond's downstream restoration project was constructed without a diversion. "With the bench vegetation, what are the durations of flows at each bench? You would be flooding the side channel for quite a ways up the channel and it will affect plant selection."

Bill Way said Alternative 5 does not seem viable, noting that he believes the channel will plug up with vegetation. Both sides of the river would end up with a bunch of natural seed generation, both native and non-native, which would cause a permanent maintenance headache for King County. Bill liked some aspects of Alternative 4, but still had several concerns, including the side channel becoming plugged with vegetation. "Alternative 4 is pretty good, as the slopes are just about right for salmonids to pass through. It has maintenance problems in that you have to maintain two weirs instead of one. The County will run into archeological issues in Alternative 4. Finally, Bill expressed his disappointment that Alternative 2 had been removed from consideration. I think Alternative 2, the single meander channel, got short shrift. It maintains the throat of the channel, and would provide different fish and wildlife habitats from Alternatives 4 and 5. There are very few opportunities in the northwest where you have a trapezoidal ditch that drops 8 feet, so it seems like there's a huge opportunity here to do something creative. So far I haven't seen that creativity. I don't understand why you are only proposing a little side channel."

Kate Akyuz responded, noting that there are lots of questions about vegetation maintenance, "No matter what alternative gets selected, this site is full of noxious weeds. Maintenance is included in the O&M costs. We've included costs for two years of pre-project noxious weed control and for ten years after the project is built. The Flood Control District and other project sponsors would be responsible for vegetation maintenance of the project to establish native plants, but ultimately King County Parks will be responsible for managing noxious weeds above the river banks at the site. The main channel is exactly the same for both Alternatives 4 and 5. The County team included a number of creative suggestions from staff and the SAC, including one from Bill Way to incorporate riffles and benches; there has been a great deal of creative work put into these alternatives. If you have additional suggestions we are open to hearing them."

Q: Do the alternatives include a commitment to maintain, trim, and mow grass? And, would it be possible to create a river profile where it only drops a foot and a half in the first 1000 feet? This would allow the weir to run slower, so we could have a deeper notch in it. Deeper water could exist if we just slow down the flow. (Mike Arntzen)

A: The idea is to shift the vegetation community from reed canary grass to emergent native plants, so we don't have to mow or scrape so much in the future. It might not be possible to build the system as you are suggesting. We can put in additional logs to slow the water down, but that would have an adverse effect on boats and public safety. A second weir would also add to project costs. We also don't want to slow down the water too much, as that will decrease conveyance flood flows. Another consideration is lake level balance; we can't drop the lake too low in summer.

The group discussed potential modifications to the weir, with Jim Mackey suggesting that, if the weir is intended to be modified, now is the time to add some flexibility in order to better control flows. A "control knob" could be installed into the weir that would enable the County to modify lake levels when needed (prior to a large storm, for example), effectively lowering the lake in order to accommodate anticipated rainfall from a major storm event.

The County team responded that a "seasonal control knob" would increase operational complexity, which is in opposition to one of the design objectives. However, the team will design the project in a manner that allows for adaptive management in the future. One idea is to make a larger notch in the weir, and add in a steel plate that could be removed if needed to change the size of the notch in the future. Those ideas will be further explored as the County moves into final design. Marty Nizlek noted that he appreciated the direction the discussion was taking regarding future flexibility of the weir.

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Michael Hobbs wondered about how Alternative 4 could be made compatible with beavers. The design team responded that an adaptive management plan would need to be developed with WDFW. Michael also noted the importance of dealing with the bottom hundred feet of Tosh Creek, since the City of Redmond had not completed that area when they carried out Tosh Creek restoration.

Q: Aren't the archeological issues the same for both alternatives 4 and 5? (Greg Helland)

A: Alternative 5 includes excavation mostly within the spoils from the dredging of the river. We wanted to present one alternative that actually went out into the floodplain, and of those we felt Alternative 4 was the most ideal. Alternative 5 reduces the risk of archeological issues, but provides close to the same benefits as Alternative 2.

Q: Why are multiple diversion channels necessary during construction? (Greg Helland)

A: They are required because we will be working in the river, not just on the banks. Actual construction details would be determined during final project design. For this level of analysis, we wanted to look at worst case scenarios; so we are being particularly cautious and recommending multiple diversion channels. Modifications to the main channel include excavation and placement of streambed gravels below water. This in-water work is expected to create turbidity and may require isolation. For Alternative 4, construction of the side channel wouldn't itself require a diversion channel, and the side channel could then be used as a diversion channel during reconfiguration of the main channel. However, for Alternative 5, a temporary diversion channel(s) may be necessary while construction is underway in the main channel.

Christa Heller noted that major fish and wildlife issues have been identified in this area, and that opportunities to address those should be pursued wherever possible. "As you move forward with these alternatives and are looking at fish passage and fish screening, we have a fish passage shop in Yakima that can be of assistance. For beaver issues, a similar habitat channel like this has been created in North Creek and they've figured out a way to live with the beavers. An adaptive management plan for beavers would be required."

Q: For Alternatives 4 and 5, willows will be removed. How will the removal of those willows affect water temperatures; how will you replace the shading that they currently provide? (Christa Heller)

A: Kate Akyuz noted that the County will plant cottonwood and other tall-growing trees, creating a wider riparian buffer, and that shading models will be conducted to make sure the trees selected are tall enough to shade the river. Cottonwood trees in the Cedar watershed can grow 7-10 feet per year.

Q: Will the large woody debris placed on the benches in the transition zone be tied down? (Marty Nizlek)

A: Yes.

Jonathan Frodge noted that the issue on the lake is that we've lost riparian wetlands. "If we lower lake levels in the summer, we would impact those wetlands. Also, kayaks can get through now with a depth of 6 inches. I like the idea of reducing archeological impacts, but the County should revisit the idea that Alternative 5 would avoid archeological impacts. The suggestion of doing more hyporheic heat exchange in the main channel (from Dwight Martin) has merit. Alternative 4 seems to present an opportunity to create additional habitat if we step outside of just looking at fish and look more broadly at the creation of additional wetland habitat. Alternative 4 doesn't necessarily preclude Alternative 2 (single meander)."

Jeanne Justice recommended that the County look at the cold water benefits that could be achieved just from Tosh Creek. Moving the well point down to the rowing club to make access easier could be beneficial. "The City of Redmond remains concerned about any changes in water levels during the summer or winter. We also support finishing the work on Tosh Creek."

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Jason Wilkinson reiterated that from a salmon recovery perspective, large scale projects like this can really make a difference. “There aren’t a lot of places on the Sammamish where you have this type of opportunity. We have a chance here to significantly improve habitat for Chinook salmon and other fish species as well as wildlife. Some of you probably have sticker shock with the costs, but this project is not out of line with the types of costs we see around the Puget Sound region, especially in highly urbanized areas. It takes a lot of money to do big projects effectively and well. And, as mentioned previously, there are mitigation dollars that could be brought to bear here. WRIA 8 puts together funding strategies for these types of projects, including mitigation dollars and grants. A lot of folks would support this project financially if it provides significant habitat improvements.”

Q: Eastside Audubon and Friends of Marymoor Park remain very concerned about the potential habitat effects of boating. We have no problem with kayaks and canoes, but we do not want to increase access for motorized boats. (Peter Marshall; Michael Hobbs)

A: The design guidelines we are working with include an 8-foot width for a canoe, and a 2-foot depth for a standup paddleboard. Motor boats cannot get through at that depth.

Public Comment

We don’t need to have boat passage through the weir 24/7. It’s like snow skiing, I can’t snow ski right now. There can be a seasonal aspect. Lake Sammamish lake levels aren’t natural. We are dealing with a modified environment. For funding, if there are mitigation dollars to offset the cost, I would like to see estimates of that. Relating to flexibility in how the weir is managed, this opportunity occurs once every 50 years. Since you will be modifying the weir, do it now. If you don’t include that level of flexibility, there will likely be some friction from the lakeside property owners. (Scott Sheffield)

Next Steps and Adjourn

The SAC will be fully informed about, and invited to attend, the public meeting, which will likely be scheduled in February 2015. The final Stakeholder Advisory Committee meeting will likely be scheduled in February or March 2015.