

Appendix D
Duwamish Blueprint
November 6, 2014

Meeting Summaries, 2014 Working Group and 2006 Workshops

**Duwamish Blueprint Working Group Meeting Summary
January 28, 2014**

Attendees:

Brian Anderson	Laura Arber	Judy Blanco	George Blomberg
Tess Brandon	Laura Casey	BJ Cummings	Maggie Glowacki
Rebecca Hoff	Elissa Ostergaard	Kathy Minsch	Jon Sloan
Sandra Whiting	Will Singleton		

Meeting Objectives:

- Review the shoreline master programs and other plans;
- Develop an outline for the revised Blueprint by identifying chapters
- Develop a schedule with benchmarks for producing a new draft Blueprint;
- Establish a common understanding of the meaning of participation and agreement;
- Review, change if necessary and agree on working group protocols.

Outcomes & Next Steps:

- The working group members all agreed to the protocols;
- A rough outline for the revised Blueprint was developed with an emphasis on making the document more concise and establishing a logical framework in the introduction;
- The milestone steps for community engagement were identified;
 - Elissa, Kollin and George will work on defining the transition zone;
 - Jon, Sandra and Kathy will develop an initial introduction / logical framework that outlines opportunities and challenges found in the subject area
- A rough schedule was outlined in which the working group highlighted the scope of their work. These major areas are:
 - (Feb) Establish a logical framework though defining opportunities and challenges
 - (Feb) Redefine the transition zone
 - (Mar) Describe restoration project design and tools by function
 - (Mar) Create a geospatial project list
 - (Apr) Engage outside technical assistance for additional topics including: considering climate change; silviculture/riparian areas; community access.
 - (Apr) Develop common principles, techniques for monitoring and maintenance.

Presentations

The information provided in the presentations has been put into aligned categories to assist in comparison between the plans. The presentations themselves are also available online at:

<https://www.dropbox.com/sh/4gv83qncsmonjmv/-ZCASdus3i>

(Note: We only have three of the presentations, please send your presentation in if you would like for it to be included.)

Shoreline Master Programs

	King County	Tukwila	Seattle
Presenter	Laura Casey	Sandra Whiting	Maggie Glowacki
Area	“Sliver on the River” –	Above/upstream of	Downstream/north of

	narrow area of unincorporated KC in South Park; Left Bank RM 3.8-5.1	Turning Basin 3 (generally)	Turning Basin 3, generally
Aquatic Buffer Width	115 feet	200 feet but buffer reduction allowed if bank resloped to 3:1 and heavily replanted with natives; Residential 50 feet; High Intensity 100 feet; Urban Conservancy 100 feet	35 feet for non-water dependent uses; 15 feet for water-dependent uses, with lots of exceptions
Land Use Types	Residential and High Intensity (industrial)	Residential, High Intensity and Urban Conservancy	Urban Industrial
Habitat Restoration criteria	Modification of vegetation, removal of nonnative/invasive plants, shoreline stabilization, installation of LWD, dredging & filling for restoring the natural character & ecological function of the site	Adopted WRIA 9 recovery plan's restoration projects	Incorporates other plans in restoration plan, Table 16; opportunities
Emphasis	Water dependent, water enjoyment, water oriented and water related	Existing uses okay, significant work requires buffer zones, vegetation restrictions	Balance water-dependent uses with no net loss and restoration plan
Web site	http://www.kingcounty.gov/environment/waterandland/shorelines.aspx	SMP: http://www.tukwilawa.gov/dcd/shoreline.html Code: http://records.tukwilawa.gov/WebLink8/1/doc/56618/Electronic.aspx	http://www.seattle.gov/dpd/codesrules/changestocode/shorelineupdate/whatwhy/default.htm

Restoration/Community Plans

	Duwamish Valley Vision	NRDA Restoration Plan	Port of Seattle Lower Duwamish River Habitat Restoration Plan
Presenter	BJ Cummings, Duwamish River Cleanup Coalition	Rebecca Hoff, NOAA	George Blomberg, Port of Seattle
Who Constructs Projects	Not specified	Potentially Responsible Parties	Port of Seattle or other parties with NRDA or Superfund or mitigation needs – triggered by development actions
Target Area	South Park & Georgetown are focus, but mouth to RM 7.2	Lower Duwamish River & saltwater – highest priority, then Elliot Bay, then upper Duwamish	Lower Duwamish – south end of Harbor Island to RM 5.5, just above Turning Basin 3
Project Type/Focus	Intertidal habitat; connect existing greenbelts and daylight urban creeks; improve access to river and parks	along a continuum for function & sustainability, salmon, marine, fish & birds	5 hub sites, 3 pocket sites (string of pearls), 25 corridor sites
Plan Horizon	Not specified	Not defined	Century Agenda – 20 years
Quantitative Targets or Goals	Create intertidal habitat along at least 30% of river	Net gain of habitat function - HEAs	40 acres of restoration; 60% of linear footage along waterway
Monitoring/Success Measurement	Not specified	Monitoring built in – 10 years	Existing sites monitored
Climate Change	Not addressed	Supports a continuum of habitats	Not addressed

Discussion

After the presentations, the group shared their thoughts that came as a result of what they had heard. Some of the major points included:

- Some expressed an interest in focusing on NRDA plan and on restoring industrial areas. Others also said that the Port Plan would be great to delve into and to think through the potential of Port easement as a way to improve large areas.
- It would be useful to create one combined map as a GIS tool. The map could show a number of layers that might end up being the basis for prioritization including: degree of disturbance, potential for restoration, current ownership.
- The presentations drive home the fact that nomenclature, definitions and measurements should be clarified in the revised Blueprint.

- Including a discussion of climate and adaptation of the restoration sites could be important but it might also be difficult given that many of the major actors are just now putting their approaches together. For instance Seattle is just beginning their climate adaptation planning.
- The Blueprint may need to highlight the need for structural based restoration given the highly industrialized and fortified banks along the Duwamish. WRIA 8 has been working on green shorelines. Could tax incentives help to promote improved practices among the industrial properties on the Duwamish?

Outlining the Blueprint and the process

After reviewing the outline of the 2006 draft of the Blueprint, the DBWG discussed simplifying the document so that it would be more concise. They discussed the importance of explaining the special conditions on the Duwamish that necessitate special considerations and challenges. Along with the challenges, there are also some extraordinary opportunities to link restoration sites together and affect significant improvement in habitat conditions.

By simplifying the existing 2006 Blueprint as the template, the update can include the following foci of the working group’s efforts. These work items are also defined by the meeting month in which the working group would seek to cover them:

February	Jon, Sandy, Kathy	Explanation of the Duwamish with special considerations and challenges. This section would seek to establish a logical framework for restoration projects;
February		Utilize a map format to overlay and integrate existing plans;
February	Elissa, George, Kollin Higgins	Develop criteria for delineating the transition zone location;
March		Summarize restoration project design with an emphasis on function, tools and innovative approaches;
March		Utilize a map format to highlight existing and potential projects;
April		Highlight some additional topics, including silviculture for riparian areas, climate change considerations and community access. These efforts might tap outside expertise.
April		Review and update the section on monitoring and maintenance.
May		Project evaluation criteria and project prioritization

Some participants asked about the target audience and how to orient the document and project list towards them. This will be discussed in February.

In addition to drafting the Blueprint revision, the working group will develop a community engagement plan in February to make sure that stakeholders are informed of the effort and have a chance to review the draft before it is finalized. *(See section below)*

In May, the working group will combine the new materials and create a draft document that can be considered in its entirety. Once the draft is acceptable, the draft can be sent out for comment from outside experts and stakeholders.

In June, the working group will consider comments back on the draft and create a final draft that can be referred to the WRIA 9 Forum for review.

Community engagement

After presenting the DRCC Vision to the group BJ Cummings remained to participate in the community engagement discussion. She stressed the importance of engaging South Park and Georgetown their community and neighborhood associations. She suggested that WRIA 9 should speak at the upcoming Georgetown and South Park association meeting to introduce them to the effort and to request the scheduling of a longer presentation of the draft revision for feedback later in the spring. This could be done through a combined meeting. The engagement could use the community vision as the basis for discussing the Blueprint revision.

Engaging the Manufacturing Industrial Council would also be an important way to reach out to an important constituency. The Boeing Company sits on the Council and can assist with getting on the schedule.

WRIA 9 Forum updates in February and May will be a way to keep key elected officials up to date on the progress of the effort.

For engagement of stakeholders in Tukwila, the Green/Duwamish Industrial Alliance is a way to reach businesses. The working group should also try to reach residents in Duwamish and Allentown,

These four components, along with specific outreach to experts for comment on the draft will comprise the engagement plan between now and the August WRIA 9 Forum meeting. A separate document will elucidate the plan.

Protocols and the meaning of agreement

The working group members accepted the protocols as the basis for their engagement in the Blueprint revision. The protocols outline roles, scope, and decision-making. The protocols discuss consensus as the ability of members to see the broader work product as something they are working to create together, that they should examine if they can “live with” aspects of the effort that they might not consider ideal. If they decide that something is not acceptable, it is their responsibility to find a way to meet the needs of the group while also addressing their concerns.

The context of participation was discussed. As a member of the working group, it means that each individual will utilize their own expertise and the perspective of the organization that they work for to contribute to the Blueprint. Engagement and formal indication of who contributed as a consensus DBWG member will not constitute endorsement by the entity that each individual works for. Having the individuals with their affiliations contribute to the Blueprint is significant in that the reader will be able to see that relevant actors contributed to the effort.

**Duwamish Blueprint Working Group DRAFT Meeting Summary
February 25, 2014**

Attendees:

Laura Arber, WDFW; Brian Anderson, Boeing; George Blomberg, Port of Seattle; Kollin Higgins, WRIA 9; Liz Johnston, Forterra; Kathy Minsch, City of Seattle; Elissa Ostergaard, WRIA 9, project manager; Jon Sloan, Port of Seattle; Jeff Stern, King County WTD; Sandra Whiting, City of Tukwila; Will Singleton, Singleton Strategies, facilitator.

Meeting Objectives:

- Discuss and agree on an approach to identify the transition zone and identify next steps;
- Discuss and consolidate outcomes from January meeting (comparative chart of existing plans and outline for revision of Blueprint);
- Review process for sharing draft Blueprint with communities and key stakeholder (the beginnings of a public engagement plan);
- Discuss and agree on an approach for the introduction/logical framework and identify next steps;
- Identify preparatory steps for March meeting.

Outcomes:

- Transition Zone needs to be broadly defined in order to maximize potential diversity and manage for lack of defining data.
- The working group reviewed the draft engagement plan and gave some suggestions for improvement. They also advocated for a one-pager on the process that can be distributed to stakeholders.
- Barriers/challenges were reviewed by the group with a discussion that the challenges should be framed “through the lens” of the scope of the Blueprint.
- The document outline was generally accepted but with the addition of an executive summary, inserting the Transition Zone earlier in the document, and potentially providing technical guidance at the end...a “one stop shop”.

Action Items

Who	Date	Action
All	Mar 4	Send comments to Elissa on the matrix of shoreline master programs and restoration/community plans
Will	Mar 10	Revise engagement plan to include tribes and other comments from the working group
Will	Mar 10	Draft a fact sheet for sharing with interested publics
Sandra, Jon, Kathy	Mar 10	Build on the challenges that were developed before the last meeting by grouping them into categories that are directly relevant to the Blueprint: ie. physical challenges, logistical/financial challenges, collaborative challenges.
Elissa, Kollin, George	Mar 10	Develop a written description for the new approach to delineating the transition zone and distribute it for comment
Elissa	Mar 10	Revise outline to reflect comments by the working group.

All	Mar 10	Provide Will with a revision suggestion for the definition of the Blueprint audience. The current working description was on the flip-side of the February agenda.
George, Elissa, Judy Blanco, Jeff	Mar 18	Develop an approach for the March meeting to describe restoration project design and tools by function. The results of the discussion will be used to develop the approach for the Blueprint document. Jeff was asked to look at the Elliot Bay Duwamish Program
Sandra, Kathy, Elissa	Mar 18	Develop and approach for the March meeting to consider how projects should be shown in the Blueprint document. This can be discussed at the meeting and then the results of the discussion will be used to develop the approach for the Blueprint document.

Draft meeting summary

Identifying the transition zone

Prior to the meeting George Blomberg, Kollin Higgins, and Elissa Ostergaard met and discussed the issues associated with designating the Blueprint transition zone. Kollin Higgins then presented these considerations to the working group. Some of the major points include:

- Despite decades of investigations, there is still not very good data on how the Duwamish behaves; mixing of the salt wedge. Correlation of fish studies with salinity had not been done.
- The two years for which there is good data ended up being abnormal years. Everything discussed needs to be done with caution because of the anomaly.
- The transition zone as defined in the 2005 Habitat Plan was based on information collected in 2000-2001. Newer information suggests that there are juvenile fish of different sizes in different parts of the Duwamish during different times within the migration period for juvenile fish (February-July). Kollin provided new data from King County (unpublished) and Ruggerone 2005 showing these details (fry migrants used lower and middle estuary early in season; parr migrants used upper estuary late in the season). One of the Viable Salmonid Population goals is diversity of life history stages, so all of these areas of the Duwamish are important in order to maintain these various life history strategies.
- There is insufficient data to finely delineate the transition zone.
- The TZ should be defined as where fish are making the transition. This may be defined as the combination of where there is salinity and where there are observed juvenile fish.
- To the degree that the TZ spurs restoration projects, it should seek to maximize diversity of habitat.
- RM 1 – 9 should be defined as the TZ. It could also potentially include up to RM 10, but there is little information on fish use between RM 0-1 and RM 8.5-11.
- It does not make sense to have a “core” designation because of the lack of data.
- A broadly defined TZ will maximize opportunities for habitat restoration.
- The working group may want to include a recommendation in the Blueprint to study the issue further:
 - One action could be to integrate information that already exists, synthesize all the information to indicate what older reports (going back to 1950s) found – Tom Nelson’s 2005 draft unpublished report has a list of these old reports.

- sampling should be done in RM 0-1 and RM 9-11 to provide data and context for where juveniles are found
- Look for ways to fund additional data collection through existing and future restoration projects?
- In the context of the Blueprint, the TZ is the most important place for juvenile salmonids to transition to salt water. 40% of the funding through WRIA 9 would go to creating TZ rearing habitat.

For the Blueprint, the text should cover the following topics related to the TZ: Why is it important? Where should it be? What does it mean in the context of the document? And how is it defined? *George, Kollin and Elissa agreed to draft language describing the TZ and a justification for the new draft of the Blueprint and distribute it to the group prior to the March meeting.*

Public Engagement

As a follow up to the January meeting, Will and Elissa had drafted an engagement plan that was reviewed with the working group. The plan is designed to engage groups at three different levels:

- Stakeholders that are solicited for detailed comments
- Community members who want to provide comments'
- Community members who want to know what the process is

The plan outlines a series of community meetings. It also discusses that the draft will be distributed to a group of expert reviewers who will provide feedback on the draft. With all the comments collected, the working group will determine what to do with the proposed changes. The plan stipulates that a feedback loop should be provided to those who provided substantive comments.

Working group members cautioned that the process would need to maintain its focus in light of multiple inputs from the communities. The group also stated that tribes (the Muckleshoot and Suquamish) should be included explicitly in the plan. The local entity should partner with WRIA 9 in the specific community engagement so that they are completely aware of the history of the area. Finally, the working group asked for a “one pager” that outlines the purpose and precipitating factors that lead to the process.

Discussion of challenges

Prior to the meeting Jon Sloan, Sandra Whiting, and Kathy Minsch developed a list of challenges that are associated with the Duwamish. The conversation raised the focus that is needed to frame challenges in light of the Blueprint and its scope. Some commented that the desire to create “perfect” habitat is getting in the way of opportunities to substantively “improve conditions” along the Duwamish. Coordination and taking advantage of opportunities when they come up was another challenge. A lack of knowledge among the businesses that are going to be required to do restoration is another challenge – that the Blueprint can address. The list was used as the basis for discussion.

The three (Jon, Sandra and Kathy) were asked to reorder and elaborate on their list given the Blueprint outline and the purpose of the document.

**Duwamish Blueprint Working Group DRAFT Meeting Summary
March 25, 2014, King Street Center, Room 3E**

Attendees:

Laura Arber	Brian Anderson	Judy Blanco	George Blomberg
Tess Brandon	Bob Deal	Rebecca Hoff	Liz Johnston
Kathy Minsch	Elissa Ostergaard	Sandra Whiting	Will Singleton

Meeting Outcomes -

- The DBWG adopted the revised outline and agreed to make adjustments to the outline as the drafting process warrants. This outline more closely aligns with the 2006 draft Blueprint.
- The working group agreed that an inclusive approach to delineating the Transition Zone is the appropriate for the Blueprint. RM 10 will be included as part of the TZ (based on the fact that saline water reaches that extent) but further research will be urged to determine if RM 10 inclusion should be continued in the future based on fish use.
- The engagement plan was accepted with some minor changes including one Tukwila community meeting if accompanied with an email about the process to Tukwila’s list of most involved citizens.
- A task group will develop a new approach for a project list and associated map that can be based on reach related criteria, project status and other factors.
- Silviculture will be included as a short section of the Blueprint. Riparian habitat will also be integrated into the project objectives section.
- A lessons learned workshop was proposed for those engaged in restoration projects to help inform a more detailed set of guidance on restoration in the Duwamish.

Action Items

Who	When	What
All	ASAP	Provide comments on the transition zone text. The revision was distributed via email by Elissa on 3/13. The text was also distributed at the meeting. Track changes in Word are preferred.
Tess, Sandra, Elissa, Kathy, Judy, Brian	Week of 3/31 or ASAP	Schedule a meeting to work out details of project list.
Tess, Sandra, Elissa, Kathy, Judy, Brian	April 8	Distribute plan for project list, map and treatment to the working group.
Elissa & Bob	April 8	Develop a guidance language for riparian revegetation and consider where riparian issues/ text should be inserted into the document
Will	March 28	Distribute Bob’s vegetative learnings hand out
George, Judy, Tess and Elissa	April 8	Update the habitat objectives based on the most recent science. Incorporate the Innovative approaches section. Add references and describe sources/reasoning. Distribute to Working Group prior to April meeting for comment.

Transition Zone

New draft language was distributed to the working group, which modified the 2006 draft Blueprint document to be more inclusive. This approach was discussed at the February meeting. The key defining factor of the Transition Zone will be locations where juvenile fish are known to or could transition to saltwater, based on either presence of fish or presence of saline water. The new language eliminates the “core zone” from the 2006 draft.

The group was asked if the 2006 and 2014 meeting summaries should be included as an appendix to the document so that future revisions can draw from the rationale. The group agreed that they should be available. A description of the overall process should be included in the introduction to help provide context for future redrafts.

The group agreed that the TZ should include RM 10 out of a desire to be inclusive of all areas with saline water. A recommendation should be included in the Blueprint for further study of RM 9-11. Little is known about juvenile fish use from RM 9-11 due to lack of data. DBWG members are asked to give comments back on the TZ text in preparation for putting this revised language into the full draft.

Engagement Plan

The DBWG briefly reviewed the Engagement plan. The new draft includes a section on audience, tribes, dates of scheduled meetings, clarifies potential adjustments to the draft as a result of stakeholder input and modifies the number of community meetings.

During discussion, it was suggested that only one community meeting is necessary in Tukwila if an email is sent to the Tukwila list of active citizens informing them about the process in advance of the meeting. It was also suggested that revisions be scheduled around community meetings where possible.

Outline

The DBWG reviewed a revised outline that more closely links to the previous draft. The group accepted the new outline with the understanding that suggested changes would be made and further adjustments may be made as the document continues to be developed. Some suggested changes to the outline were:

- Change the section to “Transition Zone” rather than “Transition Zone Defined”
- Potentially map challenges and constraints (bulkheads, property issues, physical characteristics),
- Also use maps to show where the critical habitat is for restoration
- Add “Stewardship” to Monitoring and Maintenance with the interest of developing a constituency for community-based maintenance of restoration sites
- Move scientific knowledge (IIIb) into TZ explained (II)
- Rather than going into depth on the basic objectives of restoration (like in the ‘06 draft), briefly list the priorities (spawning, rearing and TZ) to help provide context for the reader.
- Reference the conservation hypotheses rather than restating them in the document.

Project lists

A significant portion of the '06 draft is a project list. The group agreed that it needs to be revamped. The '06 version is too long and conflates objectives with actual projects. The DBWG discussed how the revision needs to:

- Be able to be updated easily as developments warrant
- Show opportunities and constraints through a map format. Size, adjacency, and distribution are examples of a potential opportunities that can be shown.
- Show current, accomplished and future projects
- Potentially be able to give summaries of the projects via a user interface instead of a single linear narrative. The summaries may follow the WRIA 9 one-pager format. They should include contact information.

The group discussed having the list be linked to criteria that are delineated by subreach. The group also discussed that each project listed should include which objective-based criteria were being addressed by the project.

The draft may also include a brief narrative on the projects and include photo examples of potential locations and accomplished projects.

A task group comprised of Tess, Sandra, Elissa, George, Judy & Brian will define the criteria, define further by subreach, and give completed, ongoing and future projects. Develop a map that can help communicate this and key factors such as adjacency. They will also work on how the document should deal with old, new projects and future conditions.

Silviculture & Riparian Habitat

Robert Deal of the US Forest Service attended the meeting to help the working group consider the inclusion of guidance on terrestrial vegetation use of silviculture in habitat restoration. The hand out that was the basis of some of the presentation is included at the end of this document.

Some of the aspects of his guidance included:

- Site preparation to provide conditions for quick growth
- Maintenance and monitoring: intense maintenance/irrigation is important at the start
- Starting with densely (4 ft. spacing) planted areas to overcome invasive competition
- Preparedness for nurseries to have the stock of needed local plants– think ahead of time to have seeds starting. You can plant really small trees. Seedlings and small shrubs.
- Species selection is important: red alder is an insect attractor, fixes nitrogen, grows quickly
- Timing makes a difference. Fall planting is best.
 - Engage communities that will help the trees get established. The group talked about how this can be tough in the fall with most people's schedules.

Establishing an area is relatively cheap - \$5-10k per acre. It can be a cost-effective step for restoration given the benefits it can provide. Terrestrial vegetation can provide five times more caloric content to Chinook than aquatic food. The benefits are immediate, cheap and attainable.

The working group members followed up with questions that applied to the Duwamish. These included how to deal with Blackberry in the riprap. Alder can do fairly well with relatively little soil. Some commented that it was important to provide access to the river through the vegetation, or else the area will be trampled by fishermen and others.

For the discussion of vegetation in the Blueprint, the action should be to look at the outline and plug vegetation into section IV and then more detail special to the Duwamish in Section V: Factors to consider into project design and maintenance. Guidance on vegetation may be best developed by subreach as part of the discussion of restoration objectives for each section.

- This conversation led to how it might be very useful to tap knowledge among those who have already done projects on vegetation and other components of restoration. The group should consider convening a workshop to share lessons learned. The results of the workshop could add techniques that work to updates to the Blueprint but could also lead to a separate guidance document for implementers.

As an outcome to the conversation: Elissa and Bob will work together to develop the section and consider how and where to insert riparian issues through the rest of the document. Elissa and Rebecca will discuss convening a workshop of lessons learned.

Restoration Project Design

As a first step in the discussion on providing guidance on restoration project design, Elissa reviewed what was in the 2006 draft. The group agreed that the guidance should be more function-based and less prescriptive. The very specific elevations in the 2006 draft may not be the most effective approach, instead the narrative should discuss about habitat types. For example, what type of habitat encourages what type of function?

- Resting area- mudflats and marsh – productive for insects – what proportion of each? Best to have a diversity across the river?
- Recommend project designers look locally for even small strips of marsh vegetation to find appropriate planting elevations at their site – will vary along the river.

The group agreed that the new text should seek to maximize diversity of habitat types. This is also consistent with the approach that NRDA guidance.

George, Judy and Elissa will continue to work on developing recommendations for habitat objectives, with an emphasis on habitat function.

April 2014 meeting will be cancelled.

Revegetation Key Learnings

From Robert Deal, USDA Forest Service, PNW Research Station, Portland, OR

March 25, 2014

- Conduct adequate site preparation by fully removing invasive species (mechanical removal with chain saw crews and/or herbicide treatment depending on species) within a defensible project boundary (extend projects so they are bordered by a road, trail, water terrace or other). Try to avoid soil disturbance after treatment to minimize re-engaging invasives that may be deeper in the seed bank.
- Use reference / least disturbed sites to inform your plant species selection, stem densities, tree-shrub ratios to build a trans-successional palette (vs one that is early or late seral only). The densities we have typically used are between 2200-2600 stems per acre, with an interplant the following year or two as needed to address any loss.
- Plant in tight meandering rows that are conducive to maintenance (typically ring spray in early spring); mowing is not necessary if you use a cover crop of native low stature grasses.
- Use plant stock that is sourced from the area and grown to a specification that will facilitate the best chance for survival. We use 1-0 bare root stock that are contract grown to a certain shoot height and root length (varies by species). They are easy to fit in the planting bags, which increases planting efficiency, and are most appropriate in terms of the root to shoot ratio.
- The plant handling is also very important - in terms of cooler temp, length of time in cooler, hydrating the roots before planting and ensuring they do not dry out while staging.
- Professional planting crews are by far the most economical and effective in installing the plants properly and in large quantities. Typical seasoned crew members can plant a 1,000 plants a day per person on average.
- Maintenance is key to the success of any planting project - the first two years are most intense, with ring sprays around plants to keep grasses back and invasives under control. It takes approx 5-7 years to get a site to a free to grow state with little to no invasive cover <5%, on average
- We have found irrigation isn't needed; but it may be in east side or much drier conditions. Interplanting is cheaper than installing and maintaining irrigation in most cases.
- Plant tubes and plant fencing are also unnecessary in our experience. Most ends up as trash in the rivers or crush the plant during floods. The plant palette selected can help with beaver damage, the ring sprays help with rodents, and there are so many plants on site, that deer and elk have enough to eat without wiping out the whole lot (intense browse on a few plants, vs moderate browse on a lot of plants).
- Monitoring should focus on the trajectory of riparian condition recovery - not on % survival. Stem density, species diversity, growth, native cover composition, and invasive cover are more representative of what is going on in the riparian area vs a survival count. Plus, it is typically impossible to tell in a few years which were planted vs natural regeneration.
- With all the costs accounted for (project management, plant supplies, contractors) the typical site costs 5-10K per acre to establish. Note that it is often much less costly to implement voluntary revegetation than if you do ecosystem services accounting because of the risk factors, legal, payments to landowners, overall program costs (middle men), extensive monitoring, reporting, verification, etc. And if you don't have the restoration economy or infrastructure build up in an area, it is going to take years to build that capacity and drive competition and pricing to a reasonable level.

Duwamish Blueprint Working Group – DRAFT Meeting Notes

May 27, 2014

Attendees: Elissa Ostergaard WRIA 9 (Facilitator), Brian Anderson Boeing, Elizabeth Johnston Forterra, George Blomberg Port of Seattle, Laura Arber WDFW, Kathy Minsch Seattle, Sandra Whiting Tukwila, Jeff Stern King County Wastewater Treatment Division.

Project List and Project Map

Subcommittee approach used to generate updated project list and map:

- 2005 WRIA 9 Salmon Habitat Plan lists projects by river miles – ones that are stretched over multiple river miles and more general were converted to habitat goals – now calling these habitat targets – to meet by 2025.
- For tracking purposes, need to keep reach breaks the same as 2005 plan.
- Put projects into tables, one table for each reach; targets for the reach all summarized in a table at the beginning.

Working group input on maps:

- Call the RM spans “reaches” rather than “project areas” (latter is a particular project). Include reach names on each reach map, and reach breaks.
- Show completed projects and how the math works out between the original/25-year targets and what’s been accomplished. Short statement before each table – what has been accomplished; refer to Status & Trends report & put in link.
- Describe better the “necessary future conditions” and how relates to short-term, more achievable targets for short term. Put targets on maps.
- Project descriptions in the tables need to be shorter – Kathy will work on making them more concise by this Friday. Also want longer narrative descriptions of projects for project sponsors/grant reviewers to use for grant writing. Then send out to the rest of the group for editing.
- Schedule a conceptual design charrette with technical experts to flesh out new project ideas.
- Clarify page 2 – habitat plan long-term goals vs. how much habitat this blueprint is getting us as % of long-term goal. Also say what land is currently available.

Community Outreach

- Went to Georgetown Community Council meeting in May, going to South Park Neighborhood Assoc meeting on 6/10. Ideally – to Forum in November so need to have public meeting for community public meeting in Tukwila by mid-September.
- Public engagement plan has more details, but need to change dates.
- Coordinate with Sandra to publicize public meeting in September via knotweed workshop mailing going out to property owners for June 17 meetings. Set date & location.

Schedule/Tasks for Completing Blueprint

- Restoration project design guidelines – subcommittee developed draft, Elissa will send to group for review

- Climate change & sea level rise – write paragraph describing work/decisions done and include in design guidelines (gentle slopes in riparian zone)
- Rearrange blueprint document to fit outline approved in March – Elissa will do after more pieces are completed
- List of opportunities & constraints – Kathy will send – sets stage for how we got to this point – informs kinds of projects we will be able to do
- TZ description – see if I got enough feedback and if not, send around again
- SMP – use table instead of specifying buffer widths for riparian targets
- Additional maps – besides 5 project maps – existing plans, best places for restoration, parcels that could be combined to maximize effectiveness
- Never been ground truthing on shoreline armoring along river similar to what Kollin did for nearshore (measure change over time in shoreline armoring and document which was permitted vs. unpermitted) – would WRIA be interested in that? – There is a map of shoreline armoring in status & trends report, and Jeff says King County (Shawn O’Neill) GIS has layers of shoreline infrastructure, overwater structures, and shallow water habitat for RM 0.5-5.9
- Stewardship – Elliot Bay Restoration Panel trying to set up long-term stewardship program before they disband - working with Trustees – not only NRDA projects – Jeff pushing so not limited use to only NRDA projects – but creates accounting issues because NRDA \$ needs to be kept separate for federal accounting purposes. Could do restricted accounts/2 pools of funding. Model for long-term stewardship. Identifying dollar amount that goes in as part of construction cost for long-term stewardship. Meeting at least one time before this Blueprint goes final. This group definitely interested in making that connection. Endowment vs. annuity – looking at different models.
 - T117 – doing that as an endowment structure – difficult to fund otherwise.

Proposed Schedule:

- Forum approval November 2014 –
- Have Will help with facilitating public meeting in Sept and Forum meeting in Nov. Can only afford him 1-2 more times.
- Meet 2-3 times before final draft in Sept for public comment, then finalize, and one more DB Working Group meeting before Management Committee in Oct & Forum in November for approval.
- Elissa will develop schedule/draft agendas for next meetings.

DRAFT Meeting Notes - Duwamish Blueprint Working Group

9:30 a.m. – 12:00 p.m. Tuesday, June 24, 2014

Location: King Street Center, 201 S. Jackson Street, Seattle, King Room, 6th Floor

Attendees:

Sandra Whiting, Tukwila; Kathy Minsch, Seattle; Laura Arber, WDFW; Elissa Ostergaard, WRIA 9; George Blomberg, Port of Seattle

Meeting Objectives:

- Update the revised project list and project maps
- Review and update the “challenges and opportunities” section
- Plan for conceptual design charrette for new projects

Comments on flyer for 9/23 public meeting – to Elissa by Thursday, 8/7

Project list – update on project list and maps

- Shortened project descriptions, clarified language on necessary future conditions and habitat targets
- Mapped new projects, new index map
- Compilation of existing habitat conditions

Map and Project List Review

The group went over the draft project list tables and poster maps, with the following suggestions:

- Use river miles in project numbers (e.g., Duw-5.2) and add LB or RB if duplicates.
- 3 types of projects – completed (lime green), in progress (orange), potential (turquoise and dashed)
- Add projects from list to maps and correlate names, change status to above
- All completed projects – put in one table at end and list reach, include how much of what types of habitat created, remove – rows by reach with projects listed underneath
- Kathy will ask about the status of Seattle street end projects & parks and provide
- Use DUW-RM for new projects. Add LB or RB if duplicates. Use tenths of miles.
- South Park bridge – opening today – completed some bank plantings – LB – King County Roads – check.
- Delete 2 reaches not in TZ – send to WRIA 9.
- Not including dredging/capping unless results in habitat improvements in shallow water/mudflat/marsh.
- Define intertidal/shallow water/mudflat/marsh/emergent/riparian. Subtidal is below lowest tide. George will send.
- *Elissa will make changes to maps and list and bring revisions to entire group one more time for review.*

Laura referenced a study by Jim Johansen, Coastal Geological Services – properties with bulkheads in recent storms had water on property for much longer than properties without.

Review and update “Challenges and Opportunities” section

- DNR – mitigation – requiring improvements – they own the water area below the OHM above RM 5.5
- Multiple permits and agencies, Superfund approval, cultural resources
- CERCLA/NRDA conflicts – competing interests? *Kathy will research.*
- Made a number of edits to hard copy – *Kathy will start by editing electronically and sending to the group by Monday 6/30.*

Conceptual Design Charette - brainstorm session

- The purpose would be to generate concepts for specific areas and come up with other unique ideas that we can try out in different reaches. With the right mix of people, including experts with sampling experience in the Duwamish, we would get different views from different perspectives.
- Definitely include Jason Toft, Jeff Cordell – Elissa talked to them recently and they expressed interest in participating.
- *Don't do now – put a recommendation in the Blueprint that we do this in the future.*

Project Evaluation & Ranking

- Discussed whether to rank and evaluate projects as part of the Blueprint. Likely not helpful in the Duwamish – need to be prepared to move when opportunities arise (parcels are for sale), not be held to a specific order or list. From a fish perspective – any habitat is better than what we have. Restoration/rehabilitation/enhancement will be decades in the making. Laura emphasized that we should say fish need habitat everywhere, and even small pockets of habitat are really important.

Next Meetings

- Elissa gathered schedule information for July, August, September from participants and *will send out meeting invites based on that and the recent Doodle poll.* The public meeting and agency review of the draft Blueprint document is scheduled for mid-September. *Elissa will see if Will Singleton is available to help at that point and with wrapping up the process prior to stakeholder and then Forum approval in November.*

DRAFT MEETING NOTES - Duwamish Blueprint Working Group

9:30 a.m. – 12:00 p.m. Tuesday, July 29, 2014

Location: King Street Center, 201 S. Jackson Street, Seattle, King Room, 6th Floor

Attendees:

Brian Anderson, The Boeing Company; Laura Arber, WDFW; George Blomberg, Port of Seattle; Liz Johnston, Forterra; Kathy Minsch, City of Seattle; Elissa Ostergaard, WRIA 9; Jeff Stern, King County WTD

Action items in italics

Meeting Objectives:

- Plan revisions to Blueprint document based on our latest outline
- Determine final changes to the revised project list and project maps
- Determine criteria and locations for maps of best places and parcels that could be combined

Schedule for finalizing Blueprint document

Need a defined public comment period for all agencies, stakeholders and the public – have them review during the same period. Timing – final draft by 2 weeks before 9/23 public meeting, 4 week public comment, then 2 weeks to make revisions, give back to working group for one week to verify, then finalize for Forum approval.

Schedule:

- Next Working Group meeting – Tuesday, Aug. 26
- *Another Working Group meeting before Sept 9?*
- Final Draft – Sept 9 – post on Web page
- Public comment – Sept 9-Oct 7
- Public meeting – Sept 23 – Tukwila Community Center
- Comments due – Oct 7
- Revisions & draft back to working group – Oct 21
- Final comments due – Oct 28 (meeting?)
- Ready for Forum decision whether to approve – Nov 14

Project list & maps– update & review

- Color coding is good
- Bigger legends on 11x17 maps, 11x17 folded for report
- Project labels difficult to see on Lower Duwamish reach map
- Where is City Light South? Where is description? RM 5.1 – where Kenco Marine is – split into 2 projects, City Light South is north portion. Was mitigation for joint facility.
- KC properties – Council said they can be sold but there are long-term leases on lots of them. Leave as potential.
- *ADD South Fork Hamm Creek fish passage – culvert removal*
- *Make changes and do one more pass by the working group – by email/ftp*
- WSDOT parcel under 1st Ave S bridge – added – KC has sewer line/CSO outfall easement going through it. Little habitat value unless pipe moved. Links up with Port area for potential T115 east bank and existing 509 restoration.
- Why is T115 called east bank when on the west bank of the river? East bank of the terminal?

- Need Port's help to fill in some descriptions. *George will work on this.*
- *Elissa will submit these changes to GIS and add projects to the list. After receiving updates from Seattle and Port of Seattle, list and maps will be sent to working group for review (or at Aug 26 meeting).*

Outline review –changes to particular sections and authors

- Purpose and Scope – condense, reference conservation hypotheses and policy MS1 (don't reiterate). Add section about working group. Page 9 habitat goal – condense and put in purpose section.
- Significant Initiatives Affecting Salmon Recovery
 - UWFP – funding available for small projects, DRCC got 2 grants through it. Also an opportunity for federal agencies to coordinate: ACOE & dredging with EPA, EPA with NRDA trustees to maximize habitat opportunities at cleanup areas.
 - Annexation of the South Park “sliver by the river” – Jeff had heard that this was still being considered, Kathy will find out.
 - City and county have to do source control implementation plans for Superfund, drafts won't be ready until after this doc. Talks about regulations but what more going to do for source control. Only Seattle & county.
Direct drainages coming to restoration sites are of concern for water quality – promote partnerships to treat. Include LID and trees
 - Other entity maps and plans – include links, not maps. Maps get too busy.
 - Challenges & opportunities – table format works. Also:
Put fishing access near cultural resources and ask Glen how they should be referenced. On SEPA documents, treaty tribal fishing rights are considered cultural.
- Project Design & Approach
 - Continue working on this section with George, Judy, and others; incorporate info from earlier meetings.
 - # acres of habitat creation – increase from 30 to 40 since didn't meet 1st 10-year goal of 30.
 - Diagram of habitat types with definitions – George can provide one from Port plan. We can copy them.
 - Community access & functionality – acknowledge that there will be access whether we plan for it or not. Seattle's street ends all have community access to river.
- Implementation Strategy
 - Useful to put in green stormwater infrastructure somewhere else other than in challenges/opportunities – encourage policies to do GSI and plant trees, coordinate.
 - Innovative approaches/techniques – experimental restoration techniques as well as having sites with potential dictate ownership instead of the other way around. E.g., WSDOT owns parcel next to SR509, not vegetated, geese mow it down, not motivated to do exclusion, mouth never fully restored. Opportunity for someone else to work on WSDOT property. Institutional barriers. Existing owners may not have desire but may not mind if someone else does.
 - Project list – include as appendix. (20 pages!)
 - Strategy new will be focused on entire Duwamish, not just upper (as in 2006 Blueprint). Other initiatives (e.g., NRDA, SMP) not only salmon-focused. Opportunities – plans need

to be coordinated to maximize value. NRDA not targeting salmon specifically, just damaged resources. During design, there are things that can be done to improve project design for salmon. This can inform those other efforts.

- Continue to collaborate – identify the salmon nexus. And WRIA can help them get funding.
- In this urban area, there are issues with safety and homeless using open space; can be seen as parks/access vs. habitat. But stewards will take care of properties if there is access, and stewardship/access builds awareness and support for more habitat.
- E.g., Elliott Bay restoration – trail at top of bank, bike path, can't see water from path. Broken views are nice. Private properties will have no access but public agencies do have to provide access. Urban area – how you build it dictates how/whether people use it.
- This document, and particularly, implementation strategy, will be from the perspective of WRIA 9 - role, scope and limitations. WRIA 9 can play a role in advocating for habitat as an entity with no liability, helpful in encouraging collaboration.
- How to have funding to purchase – Forterra – sometimes people want to give money – revolving fund for available for when those opportunities come up. Could be a foundation that puts money towards that use. Holding company – nonprofit that holds money for group and develop system for how money is spent and how it gets returned. Forterra or other could purchase property on city's behalf and then pay them back/buy back from nonprofit – dedicated restricted funding. LEED projects sometimes donate money for mitigation or other – greenhouse gas compensation with a board that decides when/how money gets spent. Crowd-sourcing as a funding idea?
- The project list can be used to attract funding, and makes a case for how much funding is actually needed. WRIA funding sources could include many state and federal grant programs, King FCD funds. Important for people to understand that this will guide opportunity areas, and make projects eligible and for multiple grant programs via the statewide effort to recover Chinook salmon.
- Mitigation – how much to encourage or allow? Discussed keeping all projects open for mitigation funding - because we are never going to be able to afford all the habitat restoration that we could use. Helps get the habitat improvement more quickly. Some see that mitigation is not necessarily no net loss because what is being lost is often of lower habitat function.
- Stewardship, Monitoring & Maintenance (didn't discuss)
- Policy Issues – consider whether we need this section. Existing section discusses a shoreline exemption, which has been done, and it may be good here or under implementation to include funding.

New Maps - Identify locations/criteria for best places, parcels that could be combined to maximize effectiveness

Discussion/decisions: No map of best places – need criteria and that becomes problematic.

- Map of opportunities to combine parcels – hate to cancel out other opportunities – have a paragraph about these issues.
- This blueprint is a 10-year plan based on current land use. Will change with time, so no point in identifying all the best opportunities, because they will change. Need small and

big projects, need them spread over the area, and we want the plan to be at least somewhat proactive. Any ownership change or development is an opportunity. Especially in a stretch where there is very little habitat.

- *Okay to have a map of parcels that could be combined – get ideas from the group.*

Next Steps

- *Elissa will make changes to the 2006 Blueprint document, using guidance from this and other meetings, and email in small sections to the working group for review. See schedule above – final draft due by September 9.*
- *George will provide information as above – project list edits, diagram and definitions of habitat types. Elissa will work with George and Port GIS person for map information.*
- *Elissa and Liz will talk more about the funding section.*
- *Elissa, George, Judy, and anyone else inclined will work more on the project design and approach section.*

DRAFT Meeting notes – Duwamish Blueprint Working Group
August 26, 2014, King Street Center, King Room

Attendees: Ryan Larson, City of Tukwila; Rebecca Hoff, NOAA; Liz Johnston, Forterra; Kathy Minsch, Seattle Public Utilities; George Blomberg, Port of Seattle; Laura Arber, Washington Department of Fish and Wildlife; Elissa Ostergaard, WRIA 9.

Schedule and Outcomes

- Document review period – Sept. 9-Oct. 7, public meeting Sept. 23, Tukwila Community Center, 6:30-7:30 pm. Flyers are available for distribution, just ask Elissa.
- ***For this draft being sent out on Sept 9, deadline for map revisions is August 29, deadline for document revisions to Elissa is Friday, Sept 5.*** George promised to send his portions by COB 8/28.
- Working group participants – this review period will be a chance get feedback from others at your agency.
- Level of approvals were discussed, which can be difficult with large agencies. This document will be a product of salmon habitat plan, which calls for it, and with Forum approval, it becomes one of the actions/strategies of the plan. We will list working group members at the front and state that each person contributed from their own experience. This is simplest for federal participants. The tone of the document is not binding - projects are considered opportunity areas. It is intended as a reference for project sponsors to identify priority projects and obtain funding and take advantage of partnership opportunities that come along.
- Public review – planning on announcing it via email to the WRIA 9 lists when document goes live. Elissa will send the outgoing message to the working group for review prior to sending.
- Working group meeting to discuss comments & policy issues for Forum – scheduled for Oct 9
- Revisions & draft back to working group for final review – by Oct 21? Or earlier.
- Final comments due to Elissa – Oct 28
- Finalize document with maps, etc. – Nov 6
- Forum decision whether to approve – Nov 13
- Elissa is available to work with working group members to brief Forum representatives prior to the 11/13 meeting.

Blueprint Review

Policy Issues

- Funding with Liz – Forterra is a private non-profit, can hold money in restricted accounts for specific areas or foundations or private individuals who want to donate – can use that money for opportunities that arise. They could use to purchase private property to hold until WRIA/project sponsor gets the funding. Need to be in plan? Interaction with KC in-lieu fee program – another source of funds for mitigation. Could be a potential source for funding some projects. Not clear from where the money would come. It needs a source, similar to Conservation Futures Tax.
- Industrial vs. ecological – Seattle is intent on keeping industrial land use. Duwamish has 80% of Seattle's industrial lands. Move from policy to challenges and opportunities.

- Deleted the policy issues section – moved bullets to other locations. Talk about whether the section is needed, or whether there are issues for a memo to the Forum to be delivered with the Blueprint it at next meeting, possible Oct 9.

Purpose & Scope - George has some comments – More than just acquiring land – want to influence private and public development to include elements that could benefit salmon recovery – changed wording.

- Could say industrial zone represents 80% of Seattle, \$40 B worth of cargo/year, \$250,000 payroll. Added language to better describe past impacts to the river and the importance of the area to the economy. Want to keep it brief, the information can be found in other places.

Project Design & Approach – General features to use at a site – intent is to not be too prescriptive. Approach is very opportunistic.

- Don't single out slips for restoration, especially since not certain that off-channel habitats are important in Lower Duwamish.
- Research – we agree on ideal habitat characteristics– where we wonder is how important are they and how much does it impact the use? Future research topics, if funds are available - look at fish use of less than ideal features once projects are built - gradients, substrates, etc.
- Building a low water channel so fish aren't pushed out during low tides is good, but how do you design so that it doesn't strand? Natural mudflats develop channels over time. Subtidal channel would be great – only one is WSDOT under the 1st Ave S bridge, a neglected site that could be improved substantially.
- Some bullets are universal truths, some are detailed – move detailed ones to appendix.
- Judy Blanco (Forterra) is planning to send me knotweed proposal language by the end of the week.

Project list - Adding street ends from Seattle – some are parks properties. Also got changes from Margee Duncan on SCL properties. Send FTP site link to everyone. Everyone needs to send changes to Elissa this week because the GIS person is out next week.

Significant initiatives

- Delete reference to the potential annexation of “sliver by the river” – doesn't affect much.
- Elissa will call Glen at Muckleshoot Indian Tribe to see if they have anything to add.
- NRDA – Implementation strategy of the NRDA Trustees - Focus is on the lower Duwamish, but they are open to partnerships – WRIA can leverage funds and encourage participation, as well as move projects on public lands forward. Not the need to have the WRIA avoid restoration in Lower Duwamish any longer, although projects there can be complex, with contamination, etc.
- Added Forterra's Cascade Agenda.

Many document details were changed using Track Changes with the document displayed on screen, and are incorporated into the most recent draft emailed to the Working Group.

Climate Change & Duwamish Salmon Habitat Planning Draft Summary - March 13, 2013

Attendees

George Blomberg – Port of Seattle	Paul Fleming – Seattle Public Utilities
Margaret Glowacki – City of Seattle	Kollin Higgins – WRIA 9
Rebecca Hoff – NOAA/NRSA	Kirk Lakey – WA DFW
Ryan Larson – City of Tukwila	Kathy Minsch – City of Seattle
Elissa Ostergaard – WRIA 9	James Rufo Hill – Seattle Public Utilities
Jon Sloan – Port of Seattle	Jason Toft – UW, School of Fisheries
Lara Whitely Binder – UW Climate Impacts Group	Will Singleton – Singleton Strategies

Meeting Objectives:

- Review projections for sea level rise, Green River stream flows, and temperature change;
- Consider potential climate change impacts on Duwamish salmonid habitat restoration and planning;
- Consider how climate change adaptation strategies might be considered for an update to the Duwamish Conservation Blueprint;
- Outline next steps for integrating climate change into Duwamish habitat restoration guidance, planning and implementation.

Outcomes and Next Steps:

- Up to fifty years is a reasonable timeframe for restoration planning. Beyond fifty years the variability is too great including other factors than climate change.
- Suggestions were made for the Blueprint. These include:
 - Reorient the “Habitat Objectives” section to emphasize function; plan for diverse habitats across the subwatershed and habitat resilience
 - Describe the data sources that seem to be illustrative
- Develop a separate section for the Blueprint that includes policy recommendations that come from considering climate change factors.
- Look at the interaction of the location of the transition zone to flow from upstream, dam releases, salt wedge location and variability, salinity and tidal influence.
- Find out if King County Wastewater (John Phillips) might have put together a climate change model with a mapping tool that could be helpful information.
- Consider the impacts of seasonal variability for the target salmon population.
- Consider sediment transport models – are there any above the turning basin?

Background:

WRIA 9 is seeking to improve and update its 2006 draft Duwamish Zone Blueprint. The document provides guidance for salmon habitat restoration including priority zones and optimal depths for habitat. Climate change factors were not included in the original draft and WRIA 9 is seeking advice on whether it should be included in the update. This meeting brought together field-based experts to consider how climate information might be relevant and helpful to their habitat planning and restoration efforts.

Review of climate change information:

Lara Whitely Binder of UW Climate Impacts Group reviewed general information that could be relevant to habitat restoration planning in the Duwamish. Slides with the summary of her discussion can be found at this link: <https://www.dropbox.com/s/re332rm6trio8t7/Whitely%20Binder%20Presentation.pdf>.

An NRCS West Coast-wide study on sea level rise (SLR) included a focus on the Seattle area and took into account multiple factors including wind “pile up”, glacial rebound, plate tectonics, increased temperature related water volume and other factors. contribute to “wind pile up” at certain locations. The study also includes assumptions on greenhouse gas (GHG) emissions. Following are some key points of her presentation:

- SLR is noted with mean predictions and a potential range. The range of potential levels will expand as we extend predictions to out years and the range of possibilities increase. Picking the “right number” can depend on the cost of the decision and the consequences of being wrong.
- High impact damaging storm surges will drive response to SLR long before inundation. SLR dramatically increases the risk of events previously considered to be “100 year” storms.
- Freshwater ecology will change as the annual timeframe for snow accumulation decreases, the calendar of run off changes and overall precipitation changes. Warming temperatures will likely mean that the watershed will move from a snow dominant to a rain dominant basin.
- Water temperature will change as predicted lower stream flows decrease.
- Sediment transport will be a factor. Some areas could accrete to allow for habitat to be maintained.
- Overall habitat for salmon could change as Changes in ocean chemistry impact marine environment.

City of Seattle mapped new shoreline inundation and storm surge information as a way of informing its infrastructure planning. Many questions are similar for habitat restoration:

- How long should the investment last?
- How can a portfolio of investments be considered that might mitigate risk?
- How can specific sites be linked to provide a variability of habitat – thereby allowing for greater robustness to climate variability?

Approaches to resilience

The Port is planning on 1.5 feet of SLR over time with a fifty year expected lifespan for infrastructure. Their habitat restoration is for a longer timeframe. The Port has included varying slopes at its T-117 sites to include vegetated 2/1 slopes. The lower part has a 3.5/1 slope to allow for marsh to adapt. Armoring is placed between the different sections.

- The group raised the question of how to account for shifts in the transition zone and seasonal shifts as well.
- An assessment of vulnerability could help narrow down the types of decisions that need to be considered with the new information on climate risk. Some decisions may not need to be rethought.
- Dredging practices in the river (particularly at the turning basin) was discussed. How would dredging affect sediment accumulation. The Port plans on accumulation of between 2 – 3 inches / year which could help offset SLR.

- Expect to need to get bigger sites either through combining sites or acquiring more for better resilience.
- Look at more engineered solutions (such as modifying the releases at the dam to minimize disruptions caused by changes in the precipitation cycle).
- Consider modifying the guidance on water depth guidance and RM transition zone. Instead of specific depths, a focus on function may prove more robust over time.

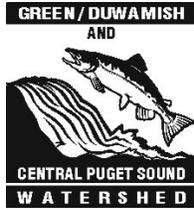
Timeframe

The group agreed that one hundred years is too difficult to plan for because of climate variability but also other factors. Fifty years seems to be a better timeframe in which it is still possible to plan for the range of conditions.

Monitoring

Helpful information (such as sediment levels and photos of vegetation) would not be difficult to collect if there was a common set of metrics that could be used. It would be helpful to look at how monitoring is set up and see whether it is giving the information that is needed. Current monitoring tends to be very site specific when metrics should be linked.

- Choose reference sites to check the numbers given in the Blueprint. Spot checking is needed for areas where marsh vegetation exists. +10 - +14 might be the optimal range.



Summary

Duwamish Transition Zone Habitat Workshop #1

Water Resource Inventory Area 9

February 23, 2006

Workshop Purposes:

- **Immediate Task:** Identify either parcel-specific and/or generic rehabilitation/substitution projects (e.g., X acres of new shallow water habitat) and programs in the Duwamish transition zone that could begin in the next three years (2007 – 2009) and should be proposed to the WRIA 9 Steering Committee and Shared Strategy in March.
- **Longer-term Task:** Decide scope of transition zone “blueprint.” Begin developing blueprint by addressing most important and/or most urgent issues.

Workshop Participants:

Julie Hall, City of Seattle – Seattle Public Utilities
Judith Noble, City of Seattle – Seattle Public Utilities
Jackie Reid, City of Seattle – Seattle Public Utilities
Ryan Larson, City of Tukwila
Noel Gilbrough, U.S. Army Corps of Engineers
Curtis Tanner, U.S. Fish & Wildlife Service
Ginger Phalen, U.S. Fish & Wildlife Service
John Kern, NOAA Fisheries Restoration Center Northwest
Shandra O’Haleck, NOAA Fisheries
Glenn St. Amant, Muckleshoot Indian Tribe
Eric Warner, Muckleshoot Indian Tribe
Kirk Lakey, Washington Department of Fish and Wildlife
John Phillips, King County - Wastewater Treatment Division
Jeff Stern, King County - Wastewater Treatment Division
Ann Kenny, Port of Seattle
Charlie Keller, The Boeing Company
Robin Clark, People For Puget Sound
James Rasmussen, Duwamish Tribe/Green-Duwamish Watershed Alliance
Jon Houghton, Pentec Environmental
Paul Schlenger, Anchor Environmental
Jim Shannon, Taylor Associates
Don Weitkamp, Parametrix
Margee Duncan, Puget Sound Shared Strategy
Gordon Thomson, WRIA 9 Salmon Habitat Recovery Team
Linda Hanson, WRIA 9 Salmon Habitat Recovery Team
Dennis Clark, WRIA 9 Salmon Habitat Recovery Team

Workshop Overview:

The workshop relied heavily on brainstorming to begin discussions on each topic, thereby generating a wide range of ideas from all participants. The participants then worked to group and name similar ideas. The results are summarized below.

Some ideas have been rewritten for clarity (participants were limited to jotting ideas down on half sheets of paper).

There is some duplication of ideas. Some ideas may be contradictory or incompatible. Future work will attempt to clarify/resolve these matters.

Scope of Duwamish Transition Zone Blueprint

Content: What should be in the blueprint? How specific should it be?

- **Strategy** of Blueprint
 - Overall strategy
 - Vision for Duwamish habitat recovery
 - Purpose of blueprint
 - To explain the whole
 - Stewardship goals and guidelines
 - Public involvement strategy
 - Outreach to landowners

- **Habitat** Desired
 - Habitat
 - Identify specific project types needed
 - Identify important habitat types
 - Riparian enhancements
 - Habitat parameters
 - Fish and wildlife use of area
 - Fish and wildlife species that use the area
 - Restoration design
 - Public access to habitat

- **Criteria** for Project Selection
 - Acreage of transition zone expansion
 - Targeted project scales (e.g., X projects at Y acres per project)
 - Criteria for selection of potential projects
 - Criteria for value of sites
 - Prioritized activities
 - How/if activities address causes of degradation rather than symptoms
 - Sustainability of projects
 - Focus on limiting factors within the transition zone
 - Guidance supporting immediate action

- Differentiate between projects upstream of the Lower Duwamish Superfund area and those within the Superfund site
- Source control

- **Projects**
 - Identify potential project locations
 - Priority enhancement areas (parcels)
 - Identify specific properties for rehabilitation
 - Boeing shoreline (shoreline areas of all Boeing properties)
 - Alternative enhancement options based on land uses (e.g., purchase, easement)
 - Projects and programmatic actions
 - Bank cutbacks
 - Enlarge Hamm Creek

- **Funding**
 - Funding strategies and responsibilities
 - Funding sources (who, when)
 - Funding for restoration on private land
 - To get money
 - Funding options
 - Superfund vs. non-Superfund

- **Monitoring and Adaptive Management** (this topic also will be developed through the creation of a WRIA-wide monitoring and adaptive management)
 - Detailed adaptive management plan
 - How to monitor effectiveness (baseline monitoring, needs)
 - Acknowledge and identify uncertainty

- **“Nuts & Bolts”**
 - History of the area
 - Summary of science
 - All info: contacts, ideas, people
 - Matrix displaying potential projects and their ranking
 - Schedule
 - Potential implementers
 - Review of transition zone boundaries, values, and ecological uses
 - Discussion of public utilities that could impact transition zone habitat
 - Plan for clean dredged material

- **Level of Specificity**
 - Be site-specific only if ready to act
 - Blueprint as working document – stays as draft

Audience: Who do we think is going to use the blueprint? What does that mean for content specificity?

- **Federal, Tribal, State Agencies**
 - Natural Resource Trustees
 - Permit applicants (through NWP, 404, Section 7)
 - Regulatory agencies will use
 - NOAA approval
 - Funding agencies
 - Funding sources
 - Federal, tribal, state government grantors

- **Local Governments**
 - WRIA use
 - WRIA 9 Forum, Steering Committee, Technical Committee
 - Local jurisdictions
 - Local agencies
 - Local and regional planners and project proponents

- **Elected Officials**
 - Electeds
 - Legislators and their staff
 - Puget Sound Partnership

- **Landowners**
 - Private landowners
 - Landowners, developers, businesses

- **Those Needing Mitigation Opportunities**
 - Potentially Responsible Parties/project sponsors needing mitigation credit
 - Potential funders of mitigation

- **Broad Community**
 - Affected communities
 - Parent-teacher associations
 - Stakeholders
 - Everyone!

Question about how specificity is shaped by audiences was not explicitly answered by participants.

Scientific/Technical Issues

Habitat Features: Determine key design features of transition zone habitat projects. What shallow-water habitat elevations are ideal? How much separation from the main channel is desirable/acceptable? Are some locations more valuable than others?

- **Strategy/Approach**
 - Functioning ecosystem over targeted habitat
 - Take advantage of any opportunity
 - Do projects wherever possible
 - Diversity = good
 - One size does not fit all
 - Not a static problem
 - Recognize that criteria for Chinook habitat aren't the same as criteria for Natural Resources Damages Assessments credit
 - See draft research report in March from Seattle (also see pending Juvenile Salmonid Survival Study report)

- **Design Objectives**
 - Create hypotheses and use adaptive management to answer these questions of design
 - Create juvenile salmonid habitat
 - Diverse riparian vegetation
 - Err on over-excavating sites
 - Science seems to suggest Chinook are less likely to use off channel habitats than other salmonids?
 - Structure to improve retention
 - Bank softening
 - Look for opportunity to include range of ecosystem components

- **Habitat Types**
 - High flow refuge (higher elevations)
 - Low energy rearing areas through widening flats and side channels
 - Key features: clean, brackish water
 - Key features: habitat at each elevation -- riparian, marsh, mudflats, channels
 - Off channel living space
 - Marsh in off-channels
 - At freshwater inputs in saltier zones
 - Creeks (freshwater)

- **Habitat Elevations**
 - Intertidal
 - Intertidal elevations

- Shallow subtidal
- Elevations -4 feet to +14 feet
- Need habitat (shallow intertidal) that stays inundated

- **Miscellaneous**
 - Connectivity of upland to intertidal
 - Food availability
 - Hydrology (upland and intertidal)
 - Pollution sources controlled
 - Transition zone boundary definition
 - Legal/treaty constraints

- **General observations**
 - Differences of opinion about the science should be resolved by being clear about conservation hypotheses and testing them
 - Don't assume that there is one "right" answer about type of habitat since habitat needs vary over time (and likely along the length of the estuary)
 - Goals/criteria for estuarine ecosystem projects may vary depending on sponsor (e.g., WRIA salmon recovery, Green/Duwamish Ecosystem Restoration Project, Natural Resources Damages Assessment restoration)

Habitat Size: Determine habitat value of habitat projects of different sizes. How much does scale matter (e.g., what is the qualitative difference between one ten-acre site versus two five-acre sites versus ten one-acre sites)?

- **Scale**
 - Get as much as you can at one acre and 10 acre sizes
 - Bigger is probably better (hypothesis that needs testing)
 - Big projects (more stable)
 - Size → big and long
 - Minimum size 1-acre; variable size okay
 - One 10-acre site better than ten 1-acre sites
 - Distribution of good habitat over continuum more important than size
 - Scale is dependent on problem and need
 - Large and small scale projects for different sponsors
 - Capacity = shoreline length or area?

“Practical” Issues

How can transition zone restoration work for salmon habitat recovery be coordinated with Superfund cleanup and Natural Resource Damage Assessment-funded restoration in the portion of the transition zone that overlaps with the Lower Duwamish Superfund area?

- **Informal Consultation**
 - Informal coordination process for project evaluations
 - Educate each other about purpose, responsibilities, data, etc.
 - Focus WRIA work upstream of the Superfund site
 - Talk to Natural Resource Trustees to rationalize WRIA criteria with NRDA criteria

- **Formal Involvement**
 - Oversight board
 - Establish policy-level coordination committee with technical work group support
 - Initiate and maintain dialogue with Natural Resource Trustees to work toward crediting early restoration actions
 - Take an active stakeholder role in reviewing Superfund actions, perhaps as part of the Duwamish River Cleanup Coalition
 - NOAA Fisheries should provide guidance regarding project valuation: “what’s it worth to me?”
 - Duwamish cleanup levels!
 - Superfund coordination: source control
 - Source control
 - NRDA coordination: develop project designs for Natural Resource Trustees to evaluate

- **Synergy/Leveraging**
 - Look at feasibility of expanding the project site (per criteria)
 - Augment (money, size, scope) Superfund/NRDA mitigation projects to increase habitat gain

- **Funding**
 - Set aside some percentage of money from both sources (WRIA and Superfund/NRDA) for joint work
 - Investigate feasibility of shared funding
 - Superfund damages → project funding

- **Miscellaneous**
 - Agree projects meet WRIA transition zone goals
 - Equal effort to habitat restoration and cleanup
 - Use ecosystem approach
 - Timing (work windows)
 - Duwamish cleanup/restoration is also occurring under the Resource Conservation and Recovery Act, not just Superfund

When and how should property-owners be approached regarding acquisition for projects?

- **Strategy**
 - Take long term view – all land becomes available
 - Public land policy – habitat first
 - Approached by real estate specialists
 - Ask real estate specialists about good approaches
 - Advance Shoreline Management Act jurisdiction issue (WRIA 9 Salmon Habitat Plan Policy IN2 on page 3-17) to Puget Sound Partnership
 - WRIA input to Shoreline Management Plan updates
 - Involve land trusts to hold property
 - Fight “gold rush” phenomenon that pushes up value of desired properties
 - Identify incentives for landowner involvement

- **Early Landowner Involvement**
 - During initial site identification (general advertisement)
 - Proactive approach to landowners

- **Site-Specific Landowner Involvement**
 - Early in process is likely better
 - Early and often
 - Early with information; often with updates/negotiation
 - Involve as soon as possible – area thought of/identified as valuable
 - Assess willingness
 - Involve property owners in planning process

- **“How” or Tool Box**
 - Obtain right of first refusal
 - Credits
 - Benefits for restoration easements
 - Identify different types of acquisitions – conservation easements, parcel purchase
 - Conservation easements before acquisition
 - Condemnation – will we or won’t we?

What strategies for maintenance dredging at Turning Basin #3 could produce more shallow water habitat? (Salmon Habitat Plan Program D-4)

- **(No groupings)**
 - Define the science
 - Where’s the data? What does it say?
 - Analyze environmental impacts, including those on adult migrants that hold in the Turning Basin pool
 - Changes to salt wedge dynamics

- Shallow water area not always good habitat
- Impact on juvenile versus adult Chinook habitat
- Will sediment be deposited in straight, narrow section of the channel downstream from Turning Basin #3?
- Turning Basin is important fishing site for Muckleshoot Tribe – impact on treaty rights
- Who sponsors feasibility study/EIS/bill to change federally-authorized shipping channel?
- Additional disposal costs (?)
- Focus on beneficial reuse of dredge material (while other potential strategies are developed)
- Effective use of clean dredged material
- Pull back uplands

General conclusion of participants was that this proposal could not be carried out in the 2007-2009 timeframe.

Recommended Transition Zone Projects/Programs 2007-2009*

Based on preceding discussions, identify either parcel-specific and/or generic rehabilitation/ substitution projects (e.g., X acres of new shallow water habitat) and programs in the Duwamish transition zone that could begin in the next three years (2007 – 2009) and should be proposed to the WRIA 9 Steering Committee and Shared Strategy in March.

- **Specific Projects** (upstream to downstream, including some outside the transition zone as currently defined)
 - Tukwila River Bend Park (Grandmother’s Hill) (Salmon Habitat Plan Project Duw-6)
 - Acquire Carosino property at right bank, RM 7
 - Riverton Creek side channel (Salmon Habitat Plan Project Duw-8)
 - Expand Cecil Moses restoration site
 - North Wind’s Weir/Site 1 (underway) (Salmon Habitat Plan Project Duw-10)
 - Bank restoration and setback at RM 6.6-5.5 (left bank) (Salmon Habitat Plan Project Duw-9)
 - Boeing parking lot on left bank upstream of Turning Basin
 - Boeing parking lot (on left bank upstream of Turning Basin)

* Due to a request from Puget Sound Shared Strategy to submit three-year “watershed implementation priority lists” (CIP) by the end of March 2006 and the desire to obtain input from the WRIA 9 Steering Committee at its March 9 meeting, this set of “placeholder” projects and programs for 2007-2009 was discussed for the Duwamish transition zone (as currently defined). In 2007, the “watershed implementation priority list” will be updated to reflect the projects and programs identified in the Duwamish transition zone blueprint later this year.

- Replace oxbow surface parking lot (Boeing parking lot on left bank upstream of Turning Basin)
- City Light North (Hamm Creek)
- Increase Hamm Creek site
- Hamm Creek expansion
- Rhone-Poulenc (Container Properties LLC) clean up site
- Slip 4 clean up site
- Puget Creek
- Kellogg Island (Salmon Habitat Plan Project Duw-13)

- **General Projects**
 - Focus on projects above the Turning Basin (above the Superfund site)
 - King County property
 - Desimone Trust property
 - Boeing shoreline
 - Deepen areas currently above +6 feet elevation to -2 feet
 - Plant every foot of shoreline
 - Shoreline revegetation for transition zone
 - Look at habitats separated from the river by roads – reconnect through culverts/roads
 - Projects at street ends?
 - Soft armoring in transition zone
 - Remove unused pilings
 - Remove relic vessels (Salmon Habitat Plan Policy DU5)
 - Blueprint activities discussed today

- **Programs**
 - Monitor existing rehabilitation sites
 - Monitoring and adaptive management for existing and future sites
 - Establish framework for evaluating effectiveness (model?)
 - Education and outreach plan for property owners (real estate specialists)
 - Source control coordination (local, state); private runoff point source
 - Green building strategy for the basin

Next Steps

- WRIA 9 staff will develop a proposal for Recommended Transition Zone Projects/Programs 2007-2009 (placeholders until blueprint is completed). These draft ideas will be circulated for workshop participant review and comment February 27-28. The draft recommendations will be forwarded to the WRIA 9 Steering Committee on March 2 for discussion at its March 9 meeting. The Steering Committee will submit its recommendations for the entire WRIA to Shared Strategy by the end of the month.
- Most participants indicated their willingness to participate in a second workshop to further advance the discussion begun on February 23.
- Dates considered for the second workshop are March 29 or March 30, either day 9 a.m. – Noon, King Street Center, Seattle.

- Possible topics the second workshop include:
 - Discuss the science behind the determination of transition zone boundaries, including the vertical and horizontal extent of the transition zone (primary purpose is to confirm/adjust boundaries of transition zone for Habitat Plan implementation; secondary purpose is to identify differences of opinion that should be tested through adaptive management)
 - Review conclusions of latest relevant studies (if available)
 - Review a suggested scope of the blueprint
 - Further develop a range of “habitat features” (see pages 5-6)
 - Develop the “strategy” (see page 8) for when and how property owners should be approached regarding acquisition or other involvement (with participation by real estate specialists)



Summary

Duwamish Transition Zone Habitat Workshop #2

Water Resource Inventory Area 9

April 20, 2006

Workshop Purposes:

- Task #1: Define the Duwamish transition zone for purposes of project site prioritization and adaptive management.
- Task #2: Further develop and agree on the range of habitat features (process/structure/function) brainstormed at the February 23 workshop.

Workshop Participants:

Mayor Joan McGilton, City of Burien
Mayor Steven Mullet, City of Tukwila
Julie Hall, City of Seattle – Seattle Public Utilities
Tom Nelson, King County – Water and Land Resources Division
John Phillips, King County - Wastewater Treatment Division
Jeff Stern, King County - Wastewater Treatment Division
Fred Goetz, U.S. Army Corps of Engineers
Noel Gilbrough, U.S. Army Corps of Engineers
Bernie Hargrave, U.S. Army Corps of Engineers
Shandra O’Haleck, NOAA Fisheries
Glenn St. Amant, Muckleshoot Indian Tribe
Eric Warner, Muckleshoot Indian Tribe
Kirk Lakey, Washington Department of Fish and Wildlife
Ann Kenny, Port of Seattle
Charlie Keller, The Boeing Company
Cyrilla Cook, People For Puget Sound
Jon Houghton, Pentec Environmental
Greg Ruggione, Natural Resource Consultants
Jim Shannon, Taylor Associates
Don Weitkamp, Parametrix
Gordon Thomson, WRIA 9 Salmon Habitat Recovery Team
Dennis Clark, WRIA 9 Salmon Habitat Recovery Team

Duwamish Transition Zone Definition

- A. What are the estuarine ecological processes/structures/functions that provide transition zone habitat for anadromous salmonids? How do juvenile Chinook and bull trout appear to be using these habitats?**

Presentations on the following studies occurred (note that the following are rough summaries – please contact the authors and/or view the studies to learn more):

Juvenile Chinook Migration, Growth and Habitat Use in the Lower Green River, Duwamish River and Nearshore Elliott Bay 2001-2003

Tom Nelson, King County

Selected key points:

- Study occurred in 2001-2003.
- Highest concentrations of juvenile Chinook salmonids were found in the Turning Basin area.
- Fish concentrations were lower at Kellogg Island than at Turning Basin.
- The salt wedge rarely moves upstream of North Wind's Weir during winter/spring outmigration.
- Transition physical attributes:
 - Fresh initially meets salt water and produces a salinity gradient
 - Low velocities
 - Shallow water and mudflats
- Transition zone ecological attributes:
 - Area for juvenile salmon to physiologically prepare for salt water
 - Fewer fish predators
 - Less energy expenditure
 - Food production
- Likely transition zone located between river miles (RM) 6.5 to 4.6*

In addition to highlights from his own work, Tom also presented a two-dimensional model showing salinity differences in the water column across the lower Duwamish (from North Wind's Weir at RM 6.4 to about RM 1.0). This model was summarized in a video clip covering a 12-day period in the spring; the salt wedge moved back and forth, driven by the spring tides. During a standard flow of 1,200 cubic feet per second (Auburn gage), the 10 part per thousand halocline rarely began upstream of North Wind's Weir and often moved down to the dredged area at the Turning Basin. This model was created by the King County Wastewater Treatment Division.

Duwamish Fish Distribution and Habitat Productivity Study 2004-2005

Greg Ruggerone, Natural Resource Consultants

Selected key points:

- Study occurred in winter 2005, which was an abnormally low-flow year.
- Highest concentrations of juvenile Chinook salmonids were found at C-flats (Rhone-Poulenc, RM 4.7), about half a mile downstream from the head of the Turning Basin.
- Codiga at RM 8.6 also saw relatively high concentrations.
- The lowest fish concentrations were at Kellogg Island.

* River mile 0 is at the southwest corner of Harbor Island in this study. Note that there are differing mileage markers used in studies of the Duwamish.

- Growth of fish in the estuary was correlated with growth in fresh water. In other words, fish that grew faster in freshwater entered the estuary at a larger size and were able to grow more quickly.
- Among habitat types, eddies and low velocity saw higher concentrations than non-eddy areas and high velocity habitats, respectively. Bank armoring, bank type, and substrate had relatively little effect on fish concentrations.
- Mudflat slope mattered, with the highest concentrations of fish found over mudflats with slopes of between 1.5 and 4 degrees.
- Purse seining results through February suggested the fish concentrate in the shallow water areas close to the shoreline rather than the center of the channel.

Greg also provided summary results from **Fish Assemblages and Patterns of Chinook Salmon Abundance, Diet, and Growth at Restored Sites in the Duwamish River**, a study by Jeffery Cordell, Jason Toft, Michael Cooksey, and Ayesha Gray.

Selected key points:

- Site was a less important factor than time in structuring fish assemblages: peak species compositions of juvenile salmonids and other fishes changed through time.
- In several cases, non-salmonids were very abundant when juvenile salmon were present, and may compete with the salmon.
- Although there were no statistically significant differences in overall fish densities among the sites, at two locations, Turning Basin and Hamm Creek, taxa richness was higher at the restored sites.
- Of three paired comparisons, juvenile Chinook were statistically more abundant in the restored site only at the Turning Basin site.
- Turning Basin has an unobstructed opening to the main channel of the Duwamish estuary, making access easier. This could account for higher fish concentrations.
- Salmon densities were greater in the Turning Basin area than in other parts of the estuary.
- Juvenile Chinook salmon fed on a variety of benthic invertebrates, terrestrial insects, and emergent marsh insects, similar to results from previous studies.
- Juvenile Chinook had consistently higher instantaneous ration of food at both the restored and reference Turning Basin sites compared with the other two study sites.
- Higher ration translated into higher modeled growth rates at the Turning Basin compared to other locations.
- Bioenergetics models did not verify the hypothesis that restored sites provide juvenile Chinook salmon with enhanced growth potential

Muckleshoot Tribe Juvenile Studies in the Mid-1990s

Eric Warner, Muckleshoot Indian Tribe

Selected key points:

- Study occurred in 1994-1995.
- Factors dictating distribution of juvenile fish:
 - Toe of the salt wedge (5 parts per thousand halocline used as criterion)
 - Habitat
 - Food (which was not studied)

- Concentrations of juvenile salmonids – Chinook and chum:
 - Highest concentrations over shallowly-sloped mudflats
 - Most fish were caught at Kellogg Island and at Turning Basin but fish could be found at any mudflat between Trimaran (just below North Wind's Weir) and Kellogg Island
 - Codiga (pre-restoration) had consistently low catches; other sites had variable catches
- Differences in fish size, distribution, and timing between sites:
 - No longitudinal increase in size among fish caught at downstream sites
 - Lower catches were seen at lower tides at Trimaran and Codiga (Codiga restoration project had not yet occurred)
 - Other marine species were found at Codiga depending on tides and flow (during July and August)
- Salt wedge is dynamic:
 - Salinity varies over the season and longitudinally
 - Depth of the 5 parts per thousand (ppt) halocline is lower (deeper) at low tide and higher (more shallow) at high tide
 - Toe of salt wedge (5 ppt) can occur almost anywhere in the river
 - Fish riding the salt wedge can move 10 km upstream and downstream in hours
 - Only a few meters vertically separates the salinity range
- Conclusions about habitat:
 - Preferred salmonid habitat appears to be mudflats
 - A mudflat above Turning Basin that is not flushed at low tide would likely be heavily used by juvenile salmonids

Paper copies of the following information were provided to supplement the presentations:

- Elliott Bay/Duwamish Restoration Panel Monitoring Report (draft)
- Bull trout use in the Lower Green- Duwamish Rivers (Jeff Chan, USFWS, 4/11/06)
- Memo on Lower Duwamish Waterway Habitat Preferences (Marla Steinhoff, NOAA, 3/6/06)

These documents were not discussed and no one made reference to them.

Other comments made during discussion:

- Fish can find the salinity gradient they need in some cases by moving up and down in the water column.
- Acreage size of restored habitat may obscure habitat value of potential restoration projects. A relatively small project could have greater value than its size would suggest if it contributes to improving a length of shoreline.

Points of disagreement/inadequate information/questions raised:

- What salinity do juvenile Chinook prefer?
- To what extent is fish presence a function of habitat quality/quantity as opposed to salinity?

- What was the depth/area of the Turning Basin in the 1960s? Historical photos from that time (available through the Corps) could help answer the question.
- Could the density of fish in some areas be due to the greater carrying capacity created by restored habitat?

B. What are the merits of defining the transition zone based on:

- **Fish presence,**
- **Salinity, and/or**
- **Habitat features?**

What are the upstream and downstream boundaries of the transition zone? What is the vertical aspect of the transition zone and its boundaries (if salinity is used)? What are the critical caveats in terms of seasonal and annual variation?

Comments from individual participants during discussion (not necessarily consensus):

- What criteria other than fish presence should be used to define the transition zone?
- The Green/Duwamish is a highly modified system. What can we learn from other modified systems? Salmonids *can* survive abrupt transitions to salt water.
- Transition zone is more gradual in a natural system than in the modified Duwamish.
- One factor may be that young fish are flushed through the Lower Green and Upper Duwamish and have few places to rear/take shelter. This may shape use of transition zone.
- If habitat in the Lower Green is improved, this could change conservation hypotheses regarding the transition zone. We should integrate the biology/ecology of the upper system with that of the transition zone.
- Catches at Codiga (post-restoration) match those at C-Flats (Rhone-Poulenc), suggesting fish will use in equal numbers that lower-salinity habitat. There are more restoration opportunities above Turning Basin than below. Providing more habitat farther upstream also would tend to increase the size of fish reaching the transition zone.
- Why are fish found where they are? Is it because of salinity or because the habitat is there? If we build additional habitat elsewhere, will they use that, too?
- What is significance of presence of fish for defining the transition zone? (The presence of fish is clearly valuable in terms of adaptive management.)
- Is lack of good habitat above the Turning Basin shaping fish use of the Turning Basin?
- What's happening to fry migrants in the transition zone? We shouldn't assume that fingerlings are the only users of the transition zone.
- Mix of hatchery/wild-origin fish varies over time.
- Rather than looking at salinity of the water column, could salinity in the sediments be significant in terms of transition zone habitat?
- The transition zone should be defined as extending from the upper range of tidal influence (RM 15) to Kellogg Island.
- We need a wider focus [than the transition zone as defined in the WRIA 9 Salmon Habitat Plan].

- Defining the transition zone more widely is a lower risk approach.
- Defining the transition zone more widely also means there will be more opportunities (properties to work on).
- Transition zone habitat *does* matter.
- Transition zone could be defined using multiple parameters:
 - Physical characteristics
 - Elevation
 - Salinity: fresh, brackish, marine
 - Vegetation types
 - Biological needs of juvenile salmonids

Define the transition zone now using these parameters to serve as a baseline; then measure changes in 10 years.

- One challenge with using fish presence as a criterion is that there is no one type of habitat common to all segments of the Duwamish that can be used to compare fish presence (ie, we can't control for habitat type).
- If dredging is reduced/moved downstream, this could cause the habitat in the Turning Basin to transform into that found at Trimaran. This would tend to push fish downstream.
- Relatively low use of restored habitat by salmonids (seen in 2003 study by Greg Ruggerone) is due to relatively high elevation, which means the mudflats are dry for part of the tidal cycle. Restoration projects should be lower in elevation.
- When prioritizing restoration projects, projects in the transition zone should have a higher rating factor. However, projects outside of this area may receive a higher overall rating due to the amount of habitat they could create. Five acres outside the transition zone could be worth more than a smaller area within the transition zone.
- Build restoration sites as large as possible; include channel to accommodate fish during very low tides.

Are there reaches in the Duwamish where we are more confident that additional transition zone habitat would benefit juvenile salmonid productivity?

In an effort to summarize the range of perspectives, participants were asked to individually draw on handout maps where they would consider putting a transition zone habitat restoration project if given substantial funds. The results were compiled on a large map, with responses from the scientists in one color and those of the informed lay people in another to see if there were differences in interpretation.

There were relatively few people who focused on shorter (e.g., two miles or less) lengths of the river. Most people, both scientists and non-scientists, indicated they would consider the transition zone to be longer, typically from RM 8 (or farther upstream) to RM 3.

Range of Habitat Features

This task was to further develop and agree on the range of habitat features (process/structure/function) brainstormed at the February 23 workshop.

For an ideal site – located wherever in the Duwamish you think it will do the most good for transition habitat – how would you answer the following questions?

- 1) Proportion of mudflat – emergent marsh – upland (adding to 100, for example 60 – 20 – 20)?**
- 2) Angle of slope and upper/lower elevations?**
- 3) Minimum size (acres)?**

Type of Respondent	Proportion of mudflat-emergent marsh-upland?	Angle of slope and upper/lower elevations?	Minimum size (acres)?	Additional comments
Scientist	(50-75) – (25-45) - <5	< 5% Lower elevation -4 feet	2 acres	
Scientist	85 – 5 – 10	8:1 to 12:1 +6 to -2 feet	1-2 acres	
Scientist	(30-70) – (20-40) – (10-20) average: 55 – 30 – 15	20:1 or flatter +9 to -2 feet	Site specific	Steep transition from flats to marsh; [included sketch for habitat in off-channel slip]
Non-scientist (?)	(50-85) – (10-25) – (0-25) average: 75 – 15 – 10	10% overall; terracing critical to site design	2 acres Lineal stretches on Duwamish important and [are] less than 2 acres Function also important regardless of size	Precluding small funding amounts
Non-scientist	50 – 50 – 0	5%		
Non-scientist	75 – 15 - 10	2 – 5% assuming large area to work with but steeper slope leads to “deep” channel	Strive to maximize area for fish. Cecil Moses Park may provide some prey for	

		where fish can hold during low tide 	fish but few fish like to utilize it due to high (+7 feet) sill.	
Non-scientist	Maximize mudflats	tide flat slopes 20:1; side slopes 6:1; upper slopes 3:1 +20 to -2 feet	2.2 acres [like] North Winds Weir site	Include recreational trail and hand-carry boat launch
Non-scientist	50 – 25 – 25	Terraced bank with 10 degree overall slope 	1 acre minimum; bigger the better	Located between Trimaran and Turning Basin
Non-scientist	75 – 25	Nearly flat except near a needed low-flow channel; +9 foot to -2 foot, then a channel at -4 foot 	Large, probably at least 2 acres; prefer 2 – 20 acre sites so all attributes can form including marsh, tide channel; look at small tide channel near Turning Basin for design ideas	Located in transition zone as currently defined
Non-scientist	Dream project is pothole barely off-channel, shallowly sloped mudflats with slow water existing at the lowest tide (-4 feet); size of Tukwila Pond only more of them and all the way down to the Trimaran site			

Next Steps

- Most participants indicated their interest in having the next workshop at the Tukwila Community Center.
- Possible topics the third workshop include:
 - Further refinement of the definition of the transition zone for project site prioritization and adaptive management 2006-2015
 - Further refinement of habitat features of restoration projects
 - Develop the “strategy” for when and how property owners should be approached regarding acquisition or other involvement (with participation by real estate specialists)



Summary

Duwamish Transition Zone Habitat Workshop #3

Water Resource Inventory Area 9

May 22, 2006

Workshop Purposes:

- Task #1: Identify approximate locations for future restoration projects that provide transition zone habitat.
- Task #2: Further develop the desired habitat features (process/structure/function) at three specific locations.
- Task #3: Develop the “strategy” for when and how property owners should be approached regarding acquisition or other involvement in habitat improvements.

Workshop Participants:

Mayor Joan McGilton, City of Burien
Ryan Larson, City of Tukwila
Tom Nelson, King County – Water and Land Resources Division
John Kern, NOAA Fisheries
Glenn St. Amant, Muckleshoot Indian Tribe
James Rasmussen, Duwamish Tribe and Green/Duwamish Watershed Alliance
Ann Kenny, Port of Seattle
Charlie Keller, The Boeing Company
Robin Clark, People For Puget Sound
Jason Toft, University of Washington
Erik Steffens, Cascade Land Conservancy
Gordon Thomson, WRIA 9 Salmon Habitat Recovery Team
Linda Hanson, WRIA 9 Salmon Habitat Recovery Team
Dennis Clark, WRIA 9 Salmon Habitat Recovery Team

Transition Habitat Project Siting and Transition Zone Definition

This discussion helped define the transition zone for the purposes of project siting and prioritization.

Discussions and presentations at the previous workshops (February 23 and April 20, 2006) had identified:

- Facts about juvenile Chinook use of the transition zone
- Some differences of interpretation of those facts
- Some differences of opinion about where future transition habitat projects would most benefit salmonids

In an effort to define the transition zone, as called for in Program D-3 of the WRIA 9 Salmon Habitat Plan, participants carried out an exercise (see attached). The exercise asked participants to locate six projects to improve transition zone habitat for juvenile Chinook salmon and the overall estuarine ecology of the Duwamish:

- Two 5-acre projects of new or significantly improved shallow water habitat
- Three 2-acre projects of new or significantly improved shallow water habitat
- One 1-mile bank layback/riparian vegetation restoration

Respondents located these projects on a graphic that showed river miles using a scale intended to avoid identification of specific parcels. This exercise was focused on where projects *ideally* would go given current habitat conditions in the Duwamish, ignoring for the moment the significant physical and economic constraints on future projects.

Prior to the exercise, there was discussion about the transition zone, how to define it, and the interpretation of study results.

Thirteen persons completed the exercise. Results were aggregated. Responses from ecologists/fishery biologists were identified to help determine if there were differences between that group and the group of informed lay participants.

(Subsequent to the meeting, the exercise was distributed to ecologists/fishery biologists not present to obtain their input. This was done because only three of the participants in the workshop – Tom Nelson, John Kern, and Jason Toft -- had professional qualifications directly related to salmonid biology/ecology. Responses were received from Julie Hall, Kirk Lakey, Shandra O’Haleck, Ginger Phelan, Greg Ruggerone, Paul Schlenger, Jim Shannon, and Don Weitkamp, all of whom had participated in previous workshops and thus were familiar with the workshop task as well as current scientific information on this area.)

The results of the exercise – including results from the eight fishery biologists/ecologists who provided input after the meeting – are presented below:

Figure 1

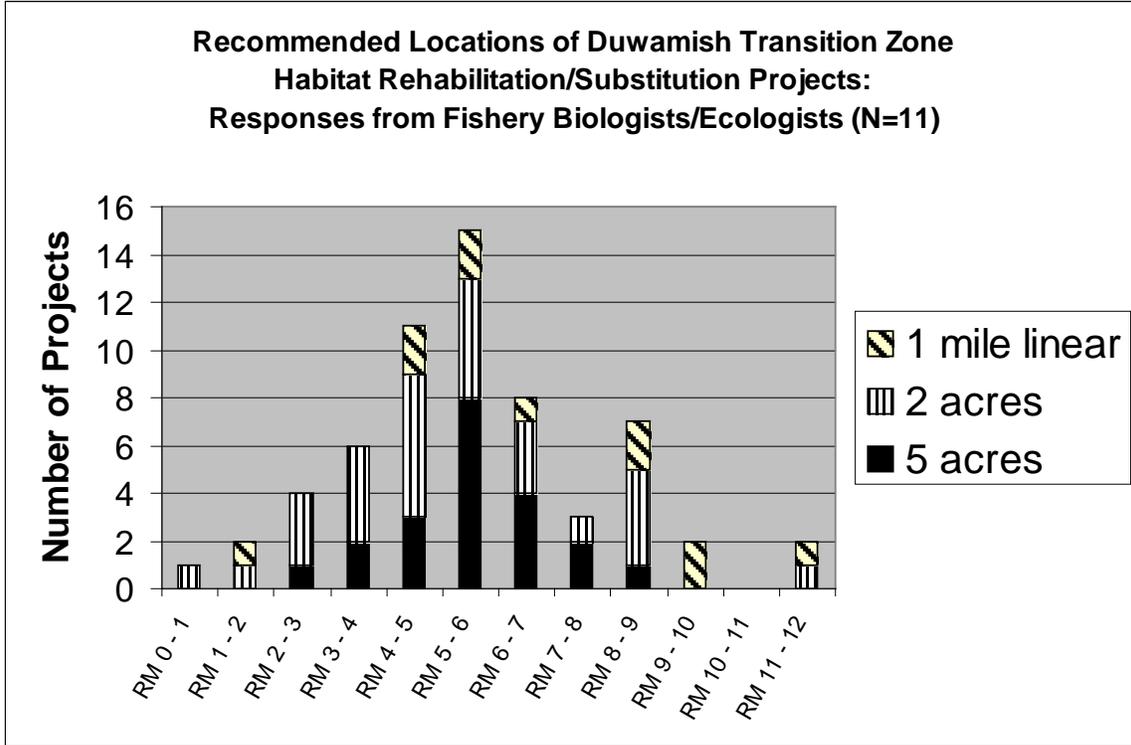


Figure 2

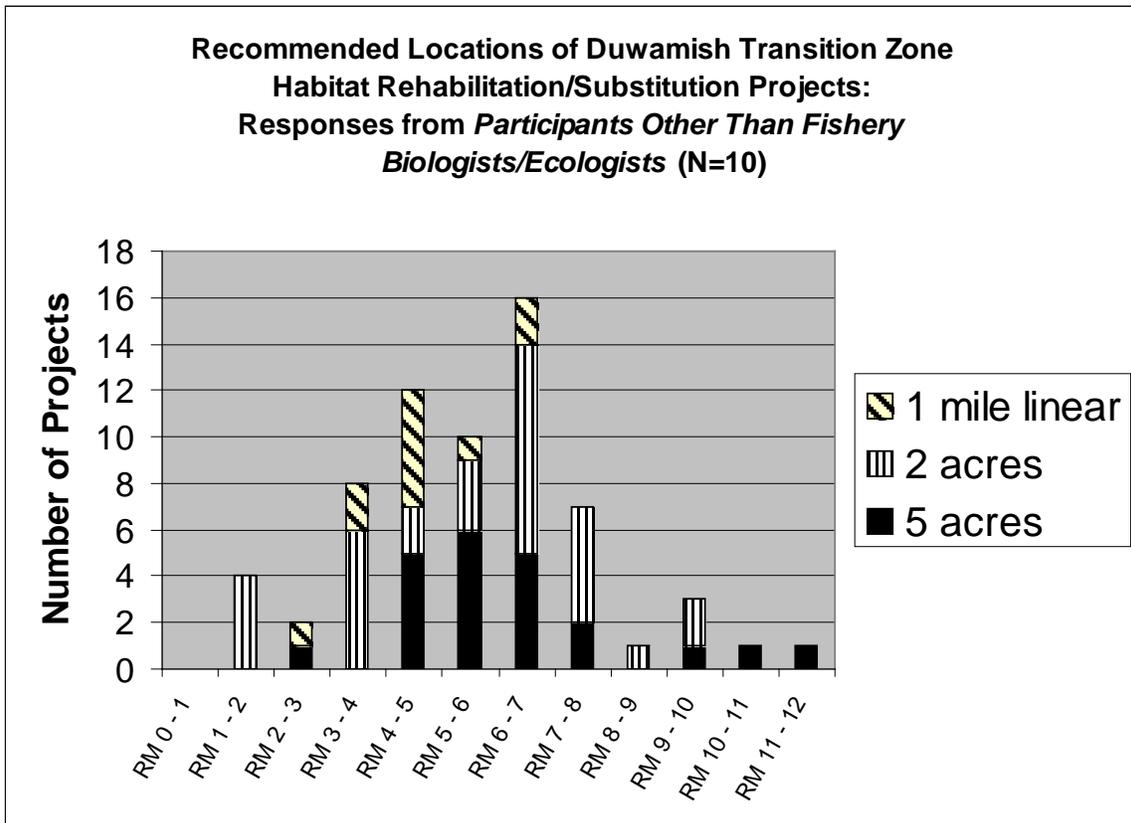
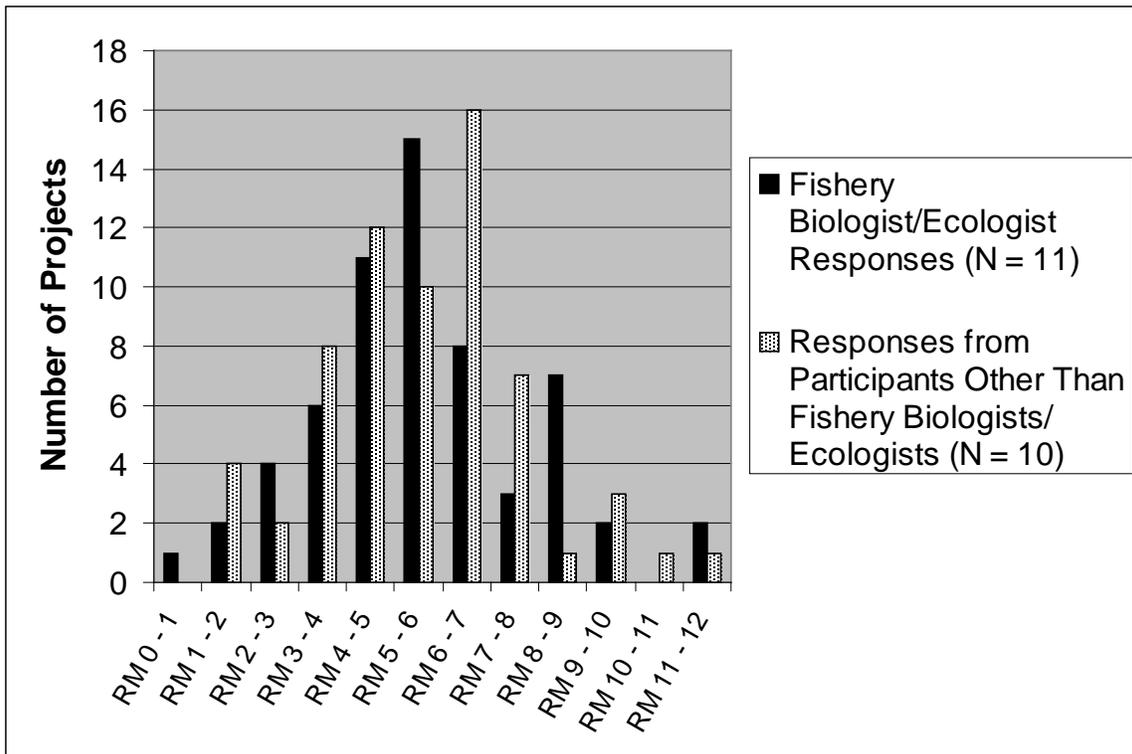


Figure 3



Note that several projects could not be recorded due to lack of specificity by respondents and that several respondents did not place all six projects.

Comments from individual participants during discussion (not necessarily consensus):

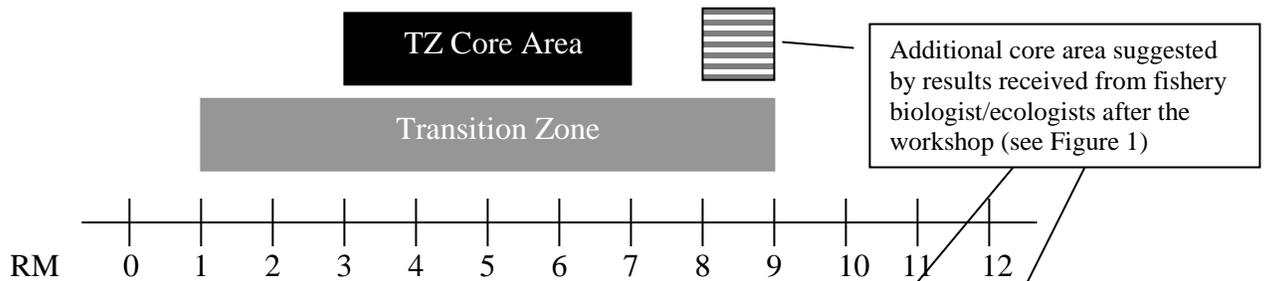
- Transition zone should be viewed as an area of emphasis.
- We shouldn't "put all of our eggs in one basket" by defining a small transition zone.
- Is there a hazard in clustering projects in a small area?
- Think about connectivity between restoration projects/suitable habitat. Especially pay attention to habitats downstream from the Turning Basin.
- Build restoration sites as large as possible; include channel to accommodate fish during very low tides.
- Transition zone habitat can be viewed as a biological feature defined by physiological factors such as salinity.
- There is a difference between where salmonids *can* osmoregulate and where they *prefer* to osmoregulate.
- The transition zone is RM 4.5 to 6.5 but good projects exist outside that area.
- In addition to shallow-water habitat projects, we need improvements to the shoreline. What are the "little" things we can do in addition to the bigger restoration projects?
- The Turning Basin functions well and is no longer "broken" – will we create greater value by locating future restoration projects elsewhere?
- Calculate the density of restored sites to determine where to locate future projects.

Based on the exercise results, a central segment of the Duwamish was favored for future habitat projects. This more important area was identified as being between River Mile (RM) 3 and 7. The RM 1-3 and RM 7-9 areas were viewed as relatively less important but still worthwhile in assisting juvenile salmonids in transitioning from fresh to salt water. (Note that responses from fishery biologist/ecologists received after the workshop resulted in a relatively high ranking for the segment RM 8-9, which may suggest the value in making further adjustments to the graphics below. It also is possible that part of the attention given to RM 8-9 is due to the opportunity to improve the Codiga off-channel restoration project and/or the high use by fish of the restored site.)

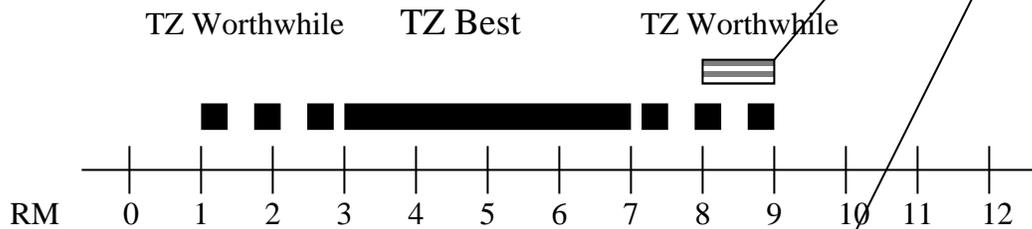
Based on the preceding discussion and the aggregated results of the project location exercise, people were asked whether they agreed with the idea of a two-tiered approach for defining the transition zone, with a core area and then areas upstream and downstream that were relatively less important although still worthwhile in terms of supporting transitioning of juvenile salmonids. Participants were not opposed to this approach and some favored it.

Several ways of portraying a two-tiered approach were identified.

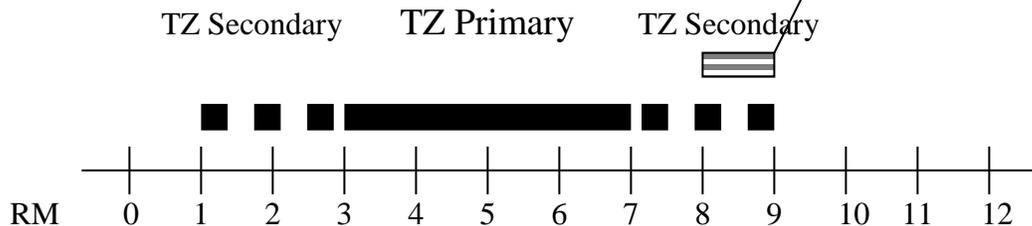
Option A:



Option B:



Option C:



Desired Habitat Features

Due to lack of time and the greater level of agreement on this topic that was reached at the second workshop on April 20, this topic was not discussed at the workshop on May 22.

Property Owner/Public Involvement

This topic was to develop the “strategy” for when and how property owners should be approached regarding acquisition or other involvement in habitat improvements. It was to build on brainstorming from the February workshop.

Erik Steffens from the Cascade Land Conservancy was invited to the workshop to offer his suggestions, which included:

- Focus first on explaining the goal or purpose of working in the community (e.g., restoring a healthy river for people and fish) rather than immediately talking about the purchase of land.
- Try to locate a leader from the local community. If he or she supports (or at least understands) the project, he or she can help explain it to others.
- Work with property owners to explore options short of fee-simple purchase, such as conservation easements. Easements are flexible and benefit the landowner with both the up-front purchase and on-going tax savings. Easements can be purchased for land that will later be rehabilitated.
- To allow time to assemble funding for purchase, it is possible to purchase an option to buy (typically 10% of the value of the land for defined period).
- Understand that some property owners will never be interested in working with you. Negotiating with 10-15% of the owners in a given area can be considered successful.

Cascade Land Conservancy has some connections in the Duwamish and will share them with WRIA staff.

Additional comments were provided in advance by King County real estate staff and conveyed to the group in writing:

- Need to address the impacts of shifting the 200 foot shoreline zone as a result of changing the ordinary high water mark (Salmon Habitat Plan Policy IN2: *Support a shorelines exemption for properties affected by salmon habitat restoration projects that would relocate the location of the ordinary high water mark.*).
- Parcel assessed value in assessor’s information usually understates market value.
- Purchasing land that is leased requires paying relocation costs – which can be substantial – for tenant businesses that have to move.
- Purchase process involves evaluating the property for contamination. Contamination that is found must be cleaned up by the property owner, whether the sale goes through or not.

- King County does not have the ability to purchase an option to buy, making the need to figure out funding in advance particularly important. (Cascade Land Conservancy *does* have the ability to buy options.)
- A community meeting with the property owners will help ensure consistent messaging and promote sense of openness.

Discussion among the group raised the following points:

- Recognize that the overlap of the Duwamish transition zone with the Lower Duwamish Superfund area complicates property-owner outreach.
- Contamination is likely to be an issue with properties in this area.
- There is some ambiguity in the minds of some adjacent upland property owners about where their property line ends and that of the Port of Seattle begins (the Port owns the five miles of the shipping channel, which at times includes shorelines and slivers of uplands).
- The Port will be releasing the AIG Duwamish study, which will have its own associated public outreach effort, probably through one-on-one meetings with property-owners.

It was agreed that rather than moving right away toward hosting a public meeting, WRIA 9 staff would talk with a smaller group involving Port of Seattle, Tukwila, Seattle, and ECOSS staff to determine how to do public outreach.

Next Steps

- Possible topics for a future workshop include:
 - Property-owner outreach
 - Criteria for property/parcel evaluation
 - Coordination with NRDA/Superfund and differentiation between projects within Superfund project area and those upstream
 - Fitting the Duwamish transition zone into monitoring and adaptive management