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## **North Reach Science Panel**

**June 18, 2010**

### **Meeting notes**

#### **Participants:**

Expert panel members in attendance: Jimmy Kagen, OSU/PSU/ORNHIC; Brian Lightcap, (ret.) USACE; Randy Moore, OSU; Derek Booth, Stillwater Sciences/UW; Mary Kentula, EPA; Brent Haddaway, ICF/Jones & Stokes; and Bobby Cochran, Willamette Partnership

Invited experts who could not attend (input provided as attachment to this meeting summary): Doug DeHart, (ret.) USFWS/ ODFW; and Stan van de Wetering, Siletz Tribes

City staff: Kaitlin Lovell, Paul Ketcham, Chris Prescott, Ann Beier, Kevin Kilduff, and Patti Howard

Consultant: Darlene Siegel, Tetra Tech

Facilitator: Julie Wilson, EnviroIssues

#### **Meeting purpose:**

The North Reach Science Panel was convened to advise the City of Portland on the accounting system used in the North Reach mitigation bank. The following questions were sent to expert panel members to consider prior to, and discuss at, the meeting:

1. To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified?
2. Did we get the right species? Are we missing a species or habitat?
3. We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?
4. By utilizing an "in kind" approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations ("weightings") that should be added?

#### **Public testimony:**

At the request of the Mayor, the science panel meeting was preceded by a 1-hour opportunity for public comment. Two people spoke during the public comment period. Those comments can be obtained by

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viewing the DVD recording of the meeting. At the end of the meeting there was a 30-minute session when the public could hear a summary of the proceedings and ask questions.

**Meeting summary:**

Kaitlin Lovell introduced the City staff, and provided background and context for the meeting. She also explained that the two fish biologists invited to participate (Dehart and van de Wetering) were unable to attend. The city is revising its Greenway Code and the first location is for the North Reach of the Willamette River. The North Reach is a designated industrial sanctuary, and protective of river dependent industrial uses. A new River Zone has been added, in which any environmental impacts need to be avoided or minimized. If they cannot be avoided or minimized, they need to be mitigated, in the following order: on-site (on same tax lot<sup>1</sup>), or offsite (in “the Pearls”, which are public and private properties with ecological value or potential). On-site is currently preferred, if meaningful, to discourage fragmentation. The Pearls serve a dual purpose as mitigation and restoration sites. Mitigation alone is intended to maintain function. Restoration provides the added lift by requiring any site requesting development, regardless of location, to landscape 15% of their site or pay an in-lieu fee for off-site revegetation.<sup>2</sup> Mitigation must be in-kind for lost functions, to result in no net loss of functions. Paul Ketcham added that more fish use has been identified in the North Reach than previously thought, and that many of the sites within this area are contaminated; the harbor is a Federal Superfund site. Mitigation for past damages is not part of this effort. Kaitlin also indicated that the mitigation “accounting” system should adhere to the following criteria: it should be open (not proprietary), it should be aligned with state and federal government systems (so as to not require double mitigation), and it should incorporate the best available science, with the latter being the driver.

*Questions 1 and 2* To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified? Did we get the right species? Are we missing a species or habitat?:

Derek Booth asked for clarification as to whether the city was proposing two conceptual frameworks; an ecosystem based approach (with the Pearls), and a non-contextual valuation of conditions (e.g., if you remove 2-feet of buffer there, you must replace 4-feet of buffer there). If so this is a conflict. Chris Prescott agreed, indicating that some of this is due to a limitation in the tools used, such as with connectivity. Derek asked why the group was not committed to one framework. Jimmy Kagen suggested that context must be included in the measures to resolve the framework conflict. Even if different tools need to be used, results can be evaluated spatially. There was some discussion about including Pearls outside of the North Reach area, such as Smith and Bybee lakes, which are highly

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<sup>1</sup> Correction by the City 7-26-2010: it is the same ownership, regardless of tax-lot.

<sup>2</sup> Correction by the City 7-26-2010: The restoration/landscaping requirement is up to 1% of project value with a cap of \$200,000 per permit.

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valuable habitats whose enhancement could provide large ecological benefits. Kaitlin responded that other Pearls are identified in other planning efforts, but they will all be integrated into restoration efforts. Smith and Bybee is part of the Columbia Corridor planning area. Bobby responded that planning boundaries don't make sense if the goal is to mitigate for function. Later in the discussion Darlene Segal explained that the intent of this process is to provide fair and equitable scores for development projects so that value is not lost, not necessarily to provide ecological lift in the area. Paul added that the decision to do this and focus on mitigating within the North Reach was done in a citywide context. Other areas of the city – tributaries and stormwater - are being mitigated and restored through other programs and efforts. Derek asked about the regulatory environment. Washington State Department of Ecology wants to see net gains in brownfields, not just to minimize functional loss. Chris responded that the biggest driver is development review, since the bank is to mitigate for loss due to development.

The group discussed whether the proposed HEP-HEA methodology was appropriate for their focus, which is on retaining function. Mary Kentula asked for clarification about how habitat and function are being used in the model. City staff responded that habitat is a surrogate for function, and that habitat is essentially land cover and the features, such as riprap, on them. Mary indicated that if you use a habitat model like HSI, then you are using habitat in a different way, for organisms to measure the ecological value of the habitats on the landscape. Bobby added that Oregon Department of State Lands' definitions are that function is the ability of the site to perform, value is its ability to perform the function within context (usually based upon where it is in the landscape), and function + value is the service. Randy Moore explained that if you are trying to mitigate for yellow warbler habitat by using the HSI, the value is determined by existing habitat information. This may or may not capture the true value of what we are trying to mitigate for.

With regard to whether the proposed model is the best, Jimmy indicated that the Willamette Partnership has a model that could be considered. Bobby indicated that it may be too early to say whether the Partnership's model is the right one, but he recommended looking at a North Carolina Ecosystem Enhancement program model. However, he felt that reaching the program's goals within the spatial constraints and in-kind requirements placed upon them is independent of the methodology. The spatial extent of mitigation should be either the Reach boundaries (of all three reaches) or City of Portland boundaries, which is a policy question. Prioritization of in-kind or out-of-kind should be based on ecological goals with flexibility built in. Also, the sequencing that Kaitlin described in the introduction is different from the federal and state sequencing, which is to avoid, minimize and then perform *off-site* mitigation. With these three things decided, many methodologies will work.

Brian Lightcap asked where costs would be considered. He suggested that the mitigation depends upon the funding package. Brian suggested that the city review the Florida model that was used at Ramsay Lake. With regard to costs of development, an estimate of the economic value of development investment in the North Reach, based upon the last ten years, is \$700M. The first mitigation proposal was to put 1% of development costs into a fund for restoration in designated areas. The result of this proposal reduced environmental funding from economic investment to \$7M. In addition, a big

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uncertainty is that Superfund liabilities have not yet been resolved. Landowners of contaminated sites don't yet know what they will be required to do.

Jimmy indicated that if the goal is to mitigate for specific species, the HEP-HEA model is as good as any other. If the goal is to mitigate for generalized habitat and function, then perhaps it is not the best model. Bobby suggested that the city not use the HEP-HEA model for grasslands and around streams, and that functional assessments might be better for these. Having two methods is acceptable, as long as the score is correct. The important thing is that the results are repeatable and stand up in court. HSI will not provide functions and values, but could improve the process, which does not have to be perfect. Incorporating landscape context into the score will be very helpful. Mary added that a National Research Council report on mitigation found that decisions made on a site by site basis without landscape context were, in part, why some of the projects did not work. They were good projects in the wrong places. Wetlands in a landscape provide the functions and values; few can be attributed to individual sites. She went on to comment about using the HSI. It is difficult to suggest any better method because all have some problems. The limitations of whatever method is used need to be understood.

Kaitlin summarized the group's response that they support the model's focus on functions, but that a weakness may be that the model reduces the functions assessment to the species level. Species is a surrogate for habitat, and habitat is a surrogate for function. She asked how we close the gap? Randy suggested using (for example) yellow warbler as an index for conserving other bird species. This is more direct than using the model to create habitat elsewhere for yellow warbler and other birds. Kaitlin agreed that this would reduce the danger of layering surrogates. Brent added that each of the city's factors is measured subjectively. User error and scoring variability could be magnified at each step, which is only slightly reduced even with group training. He suggested using a range of mitigation requirements rather than a specific DSAY score. The assessment puts a project score within a category. This approach is less accurate but correct more often, and helps address variability of the models. Also, to help explain this approach to stakeholders, the city can respond that scores are presented in ranges because precision of the model cannot be known. Bobby indicated that Washington Department of Ecology thinks it gets better restoration with ranges. Potential manipulation of the final range assignment would not be any worse than potential manipulation of the DSAY score. Mary provided an example of a court case that stood up to review because the final score utilized categories. The Willamette Partnership assumes all score will be +/- 15%. To account for this, landowners are required to purchase 15% more credits. Bobby agreed to help develop the justification for use of ranges for assessments.

The group discussed whether the proposed indicators were representative of the habitats. Jimmy responded that they appeared to be representative for all habitats except for uplands. There are too many indicators for the uplands, and dividing upland habitats as the city has done may not be useful.

Current species of concern are addressed in the NRI, which gives these habitats the highest value, and would be represented as a function and value to include in the assessment to replace. The NRI and the

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HSI are not one-to-one. One could attribute a higher value than the other. Bobby suggested that the city could pre-calculate the mitigation value for the North Reach, since it is not a large area. This would increase predictability for business. Jimmy recommended that only major upland types be identified, and that shallow water habitat be distinguished from deeper water. The group moved towards the thinking that a functional assessment (using the NRI as a basis) and a species assessment (i.e., the HEP-HEA model) combination might be preferable. Brian suggested that the city prepare an example assessment comparing how the NRI would score a site, and then perform an assessment of what actually exists using the model and then compare the evaluations for variability. Kaitlin indicated that the city has done this for one site and can send the results to the group. Brian suggested that they also do this for one site “not on the radar”. Kaitlin and Paul will identify a site.

Derek noted that coho habitat has been reduced to two factor types, which is very limited compared to current scientific understanding of actual needs. He suggested that the city either select a number of species or keystone species. Otherwise, habitat for one threatened fish species could conflict with that of another fish species. Bobby asked if the city had reviewed the Willamette Partnership’s salmon metric, which is based upon coho. It is a functional assessment; it does not address context. Bonneville Environmental Foundation is currently testing it for validity and repeatability. Derek thought that there are too many habitats to capture them all in the model. The more that the city tries to refine and perfect the model runs counter to current understanding. He suggested simplifying the model rather than try to make it more complicated, since there is no justifiable approach. Derek referred to mitigation ratios as a way to simplify the approach. Brian agreed, suggesting that this would make transparency easier, because flaws are known and can be admitted.

Mary asked about the city’s plans to evaluate whether the model is working. There was a recent violation on the Missouri River, and the court questioned whether anyone had evaluated the models to see if they worked. Experts invited by the court to review the model found serious flaws. The evaluation should be built in, and adaptive management should be included. She also stated that other groups have collected so much data and then wondered what to do with it all, so it is important to have a plan for the use of the information collected. Kaitlin responded that they are requiring monitoring in the bank. She agreed that they should add something, perhaps build in stops to evaluate whether objective and progress are being met. Derek added that monitoring and outcomes need to be included from the start to be able to manage adaptively.

*Question 3* We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?:

Kaitlin asked the group for feedback on the use of “gray literature” (which is not published in a peer-reviewed journal but may be otherwise peer reviewed). The group generally agreed that using gray literature was acceptable, as long as they do not ignore peer reviewed literature. Gray literature is often peer reviewed. Mary indicated that she had a list of documents that she could provide, including one that compares various methods.

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*Question 4* By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?:

Kaitlin questioned how to build context and rarity into the accounting. Jimmy recommended prioritizing the whole area to show which places matter most in the context of the entire region and weighting those. There are many existing tools for prioritizing, such as one by the Nature Conservancy. Grassland has context variables that determine the values. Bobby added that, for riparian, start with ORWAP and build from there. Mary asked whether the city was using reference sites. Randy indicated that what is between patches and patch shape can be more important than patch size (e.g., linear versus globular). Brian added that succession to forest should be factored in. Rivers control succession by flooding, but uplands are more difficult.

Kaitlin asked how to build in uncertainties, such as river rise. Bobby recommended maintaining a programmatic reserve of credits using an uncertainty factor, and preventing such responses as riprapping to protect riparian areas. Mary reminded that projects need to allow systems to move as waters rise, such as *Spartina* marshes, which have to move up as sea levels rise. Brian recommended getting good stewardship agreements from landowners for the foreseeable next 20 years.

## **Introduction to the North Reach Mitigation Bank Science Panel: Jimmy Kagen**

The City of Portland is revising its environmental regulation along the Willamette River. Known as the River Plan, it is a comprehensive, multi-objective plan for land along the Willamette River that strives to balance jobs, natural resources, access to the river and livable communities. The first application of the River Plan is in the North Reach of the Willamette River, which extends from the Freemont Bridge to confluence with the Columbia River. The North Reach Plan creates a new “river zone” that serves to protect and conserve natural resources while allowing certain types of industrial development. (Code language 33.475.400 et seq. and 33.865 et. seq.). The river zone applies to both the river itself as well as key upland areas. These natural resources have been inventoried in the Natural Resources Inventory, and given a broad ranking of High, Medium or Low (Volume 3A). The river zone applies to those areas that received a medium or a high ranking. In addition, the new code language requires development to protect the identified “functions and values” of the natural resources.

One way to protect the identified functions and values is through mitigation. The code allows two types of mitigation: onsite and offsite. The offsite mitigation allows for the purchase of credits from a City certified mitigation bank.

The North Reach Mitigation Bank Science Panel is being convened to advise the City on the accounting of the functions and values of the natural resources for use in the mitigation bank. The City is proposing to use a hybrid model that combines a Habitat Evaluation Procedure (HEP) with a Habitat Equivalency Assessment (HEA). The City is proposing to use Habitat Suitability Indices to populate the HEP. While the City is not required to use these methodologies, we are specifically targeting habitat accounting that is: 1) open and transparent; 2) represents the best available science - is well tested on multiple habitat types and suitable for the Willamette River; 3) publicly available (non-proprietary); 4) allows for “in kind” tracking (ex: in water impacts are not mitigated by upland restoration); 5) is widely accepted by multiple state and federal agencies (to minimize doubling mitigation requirements); and 6) allows mitigation to stay in the North Reach service area.

With that background, we are asking this esteemed panel to inform the city on the following questions:

- 1) To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?**

I feel that the HSI quantification makes very good sense, as does the general approach. As was pointed out in the discussions, there should be some way to weight HSI or the final results to allow for ecological context to be included in the weighting, to prevent extensive mitigation from occurring in small and potentially isolated patches which will be able to provide only a limited amount of ecological benefits. The method has identified larger sites already, and adjacency to these sites or other restoration areas can

be included. Historically, HEP alone has often been extremely subjective, but using it with HEA helps considerably.

**2) Did we get the right species? Are we missing a species or habitat?**

You did an excellent job of identifying the right species, for all of the habitats except for “upland”. However, in my view, it is impossible to identify a species or species for “upland”, because this does not really represent a habitat, but a broad category of habitats represent many, very different vegetation, landcover and habitat types, ranging from conifer forests, hardwood-conifer forests, oak savannas, grasslands, and upland shrublands, all of which would have been found in small amounts in the project area. I believe that the initial natural resources assessment provides better opportunities to identify meaningful habitats and species within the areas defined by “upland in the plan.

I would like to put in a personal request for the consistent use of habitat definitions. Currently, habitats can be named and defined by anyone. For example, in the Final Siltronic Grassland report, URS defined 4 grassland “habitats”, which were, 1) Herbaceous cultivated, 2) Herbaceous natural/semi-natural, 3) Shrubland cultivated and 4) Shrubland natural/semi-natural. When habitats are named in an ad-hoc fashion, there is no way to establish meaningful priorities as to their local, state, regional or national significance. Nor is there a meaningful way to establish standard measures of quality or importance. A number of organizations are working to develop standard habitat names and definitions. Short of this, using any kind of published names or classes is strongly recommended.

**3) We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?**

Aside from the salmon work, which has been fairly well discussed, and for which I have no expertise, we didn’t discuss this much at the workshop. I do not believe there are any well articulated HSI’s, aside from the Prairie model which has been recently updated by the Willamette Partnership (which may be able to be used for oak savanna) and the ORWAP model you’ve already identified. This is ongoing work to attempt to develop a HSI for older conifer forests, but I don’t believe it will be developed in a timely enough way for you to be able to use it in this process. I have no guidance as to what to do in situations where you lack an HSI.

**4) By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?**

At the meeting, many of us were clear that the “in kind” and “in place” approach had significant limitations, particularly in relation to making developers replace not very

important habitats in areas where they might not have historically occurred, and are likely not going to provide viable ecosystem benefits over time. However, we all agreed that two of the factors listed above, proximity to other habitats and patch size, are important. Also important is place, but this mostly is important as it allows for protected areas to provide connectivity to adjacent natural habitats, and larger and more viable natural habitats.

I don't believe that habitat diversity is even remotely important, since the overall size of all of these habitats is exceptionally small. I do think that it is important for habitat rarity or importance factors to be addressed, and would like a consistent approach for defining these to be used. The idea of using priority habitats in the Oregon Conservation Strategy makes good sense, as would using ecological systems with priority plant associations as defined by NatureServe.

## **5) Others?**

At the meeting, the idea of providing a "place" importance factor was brought up in a general way, and I, like other members of the panel, believe this is possible and useful, especially when addressing mitigation that can't occur in place. However, perhaps this has been addressed in the plan with the designation of your priority areas. However, the use of locational priorities to measure conservation benefits is an idea whose time is near, if it hasn't already come yet. The Willamette Partnership and others are working on making this work for wetlands and other restoration needs, but at this point, perhaps the exact methodology is not suitable.

*Response to Questions: Mary Kentula*

**1) To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?**

I am not an expert in habitat evaluation. I do know that HEP and HSI have been used for a number of years and are generally accepted. Since habitat provision is key to the objective of this effort, these methods seem appropriate. Because habitat is also being used as a surrogate for restoration success and ecosystem quality, I think it is important to evaluate how well this approach is working with independent measures. I recommend that you consider an assessment of overall ecological condition as the check. Condition is easier to measure than all the various ecological functions. It is related to system function because both condition and functional assessments are ways to assess ecological integrity. An ecosystem in good ecological condition should perform the functions one would expect for a system of that type in that location. (See the discussion in Fennessy et al. (2007).)

The State of Ohio won a major court decision a few years ago when their use of a rapid assessment method in permitting decisions was challenged. They use the Ohio Rapid Assessment Method (ORAM), which assesses condition, to determine the regulatory category of a wetland being considered for a permit action. Because of their extensive testing, Ohio EPA was able to demonstrate to the court that decisions based on ORAM were legitimate. ORAM assesses wetland condition. See the two figures below from Mack et al. (2000) showing some of their data and how it is used to set categories for regulatory responses. Also, note the “gray” areas in the second figure. ORAM scores falling in these ranges require more information to make a decision as to which regulatory category pertains to the case.

LITERATURE CITED

Fennessy, M. S., A. D. Jacobs, et al. (2007). "An evaluation of rapid methods for assessing the ecological condition of wetlands." *Wetlands* **27**(3): 543-560.

Mack, J. J., M. Micacchion, et al. (2000). Vegetation Indices of Biotic Integrity (VIBI) for Wetlands and Calibration of the Ohio Rapid Assessment Method for Wetlands v. 5.0. Columbus, OH, Wetland Ecology Unit, Division of Surface Water, Ohio Environmental Protection Agency: 79.

For publications and information on ORAM see  
<http://www.epa.state.oh.us/dsw/wetlands/WetlandEcologySection.aspx#ORAM>.

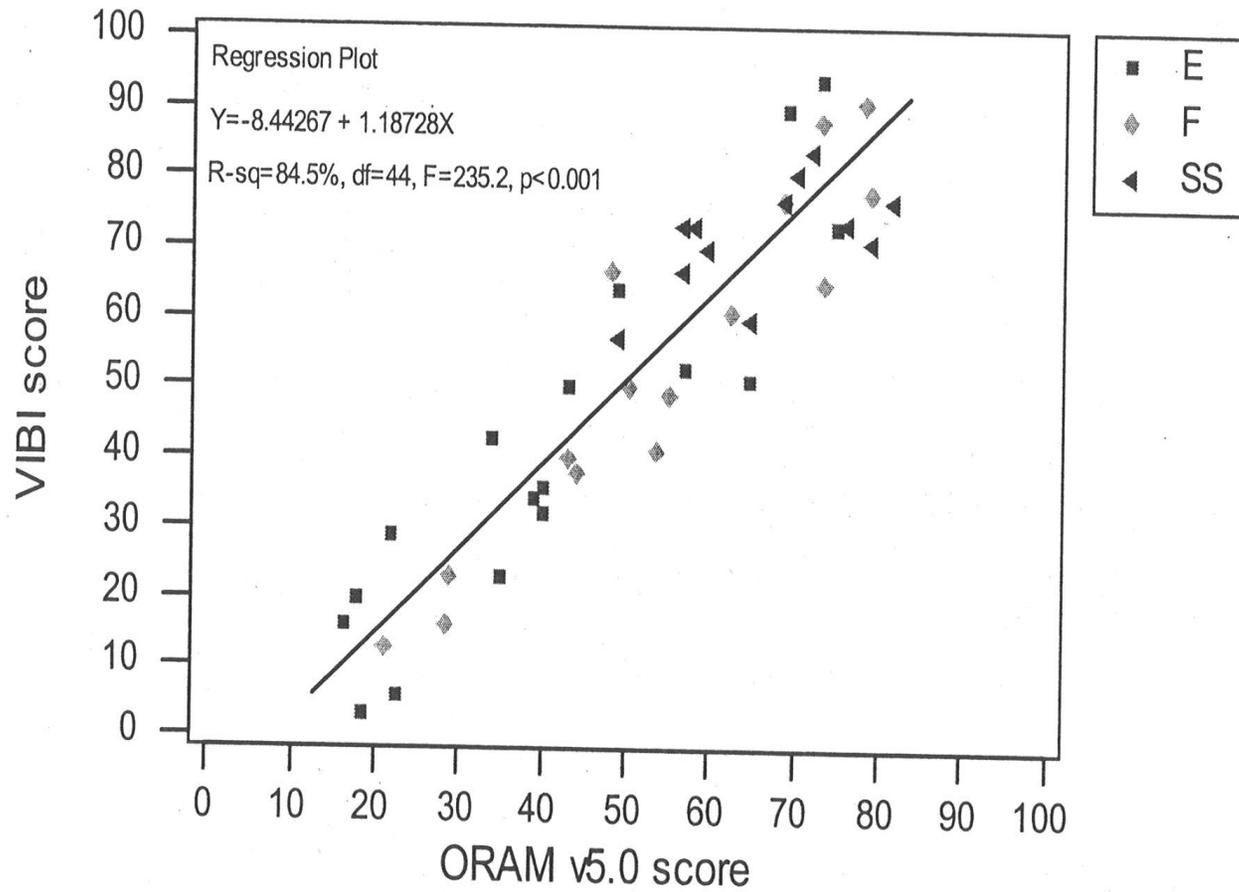


Figure from Mack et al. (2000) showing the relationship between ORAM version 5.0 and a Vegetation Index of Biological Integrity (VIBI) for emergent (E), forested (F) and shrub-scrub (SS) wetlands.

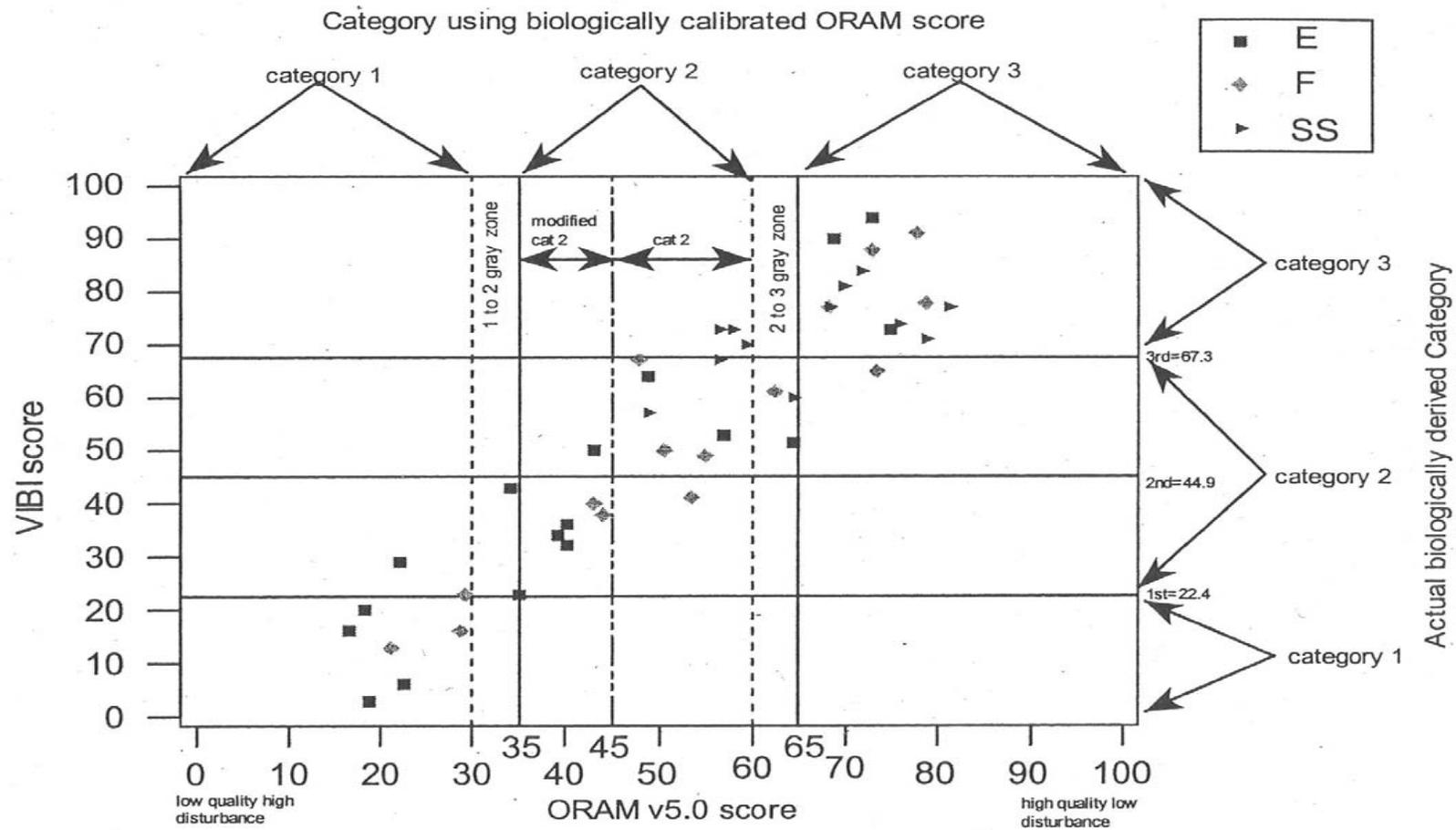


Figure from Mack et al. (2000) showing how the relationship between ORAM and VIBI scores from the preceding figure were used to define regulatory categories and account for uncertainties by using “gray areas.”

Below is a list of papers from the work on monitoring and assessment aquatic systems produced by scientists from the branch at EPA's Corvallis lab to which I belong and their collaborators.

On reference site selection:

Hawkins, C. P., J. R. Olson, et al. (2010). "The reference condition: predicting benchmarks for ecological and water-quality assessments." JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **29**(1): 312-343.

Herlihy, A. T., S. G. Paulsen, et al. (2008). "Striving for consistency in a national assessment: the challenges of applying a reference-condition approach at a continental scale." J. N. Am. Benthol. Soc. **27**(4): 860-877.

Stoddard, J. L., D. P. Larsen, et al. (2006). "Setting expectations for the ecological condition of streams: the concept of reference condition." Ecological Applications **16**(4): 1267-1276.

Whittier, T. R., J. L. Stoddard, et al. (2007). "Selecting reference sites for stream biological assessments: best professional judgment or objective criteria." JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **26**(2): 349-360.

On screening metrics and creating indices:

Jacobs, A. D., M. E. Kentula, et al. (2010). "Developing an index of wetland condition from ecological data: An example using HGM functional variables from the Nanticoke watershed, USA." Ecological Indicators **10**(3): 703-712.

Sifneos, J., A. T. Herlihy, et al. (in press). "Calibration of the Delaware Wetland Rapid Assessment Protocol to a more comprehensive measure of wetland condition." Wetlands.

Stoddard, J. L., A. T. Herlihy, et al. (2008). "A process for creating multimetric indices for large-scale aquatic surveys." JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY **27**(4): 878-891.

Whittier, T. R., R. M. Hughes, et al. (2007). "A structured approach for developing indices of biotic integrity: three examples from western USA streams and rivers." Transactions of the American Fisheries Society **136**: 718-735.

On determining the weights for the metrics composing an index:

Jacobs, A. D., M. E. Kentula, et al. (2010). "Developing an index of wetland condition from ecological data: An example using HGM functional variables from the Nanticoke watershed, USA." Ecological Indicators **10**(3): 703-712.

Sifneos, J., A. T. Herlihy, et al. (in press). "Calibration of the Delaware Wetland Rapid Assessment Protocol to a more comprehensive measure of wetland condition." Wetlands.

On evaluating assessment methods with independent data:

Jacobs, A. D., M. E. Kentula, et al. (2010). "Developing an index of wetland condition from ecological data: An example using HGM functional variables from the Nanticoke watershed, USA." Ecological Indicators **10**(3): 703-712.

Sifneos, J., A. T. Herlihy, et al. (in press). "Calibration of the Delaware Wetland Rapid Assessment Protocol to a more comprehensive measure of wetland condition." Wetlands.

Wardrop, D. H., M. E. Kentula, et al. (2007). "Assessment of wetland condition: an example from the Upper Juniata Watershed in Pennsylvania, USA." Wetlands **27**: 416-430.

**2) Did we get the right species? Are we missing a species or habitat?**

The choice of species makes sense to me, however, species as indicators of habitat quality is not my expertise.

**3) We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?**

I don't have any suggestions. This is not my expertise.

**4) By utilizing an "in kind" approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations ("weightings") that should be added?**

I think that it is important to preserve the landscape profile, *sensu* Bedford (1996), as applied in Gwin et al. (1999). I know that this work is wetland centric, but the concept and importance of preserving the hydrogeomorphic character of an area applies to Portland's effort. When I began studying wetland mitigation in the Portland area, I was told by those involved that ponds were being created as mitigation projects for primarily two reasons. First, they were a type of wetland that was possible to create, given the current state of the craft. Second, permanent open water was rare, so these actions were increasing a rare resource. As we came to find out, as reported in Kentula et al. (2004), the biota typical to the region had adapted to the paucity of permanent open water in the region and the increases in that habitat reported in Gwin et al. (1999) favored

alien species. The example given in Kentula et al. was the bullfrog, which at the time, required permanent open water to reproduce and mature while the native amphibians complete their lifecycle in one year so that permanent water is not required. (Note that there are reports that the bullfrog is adapting to the Pacific Northwest and some populations do not need two years to mature.) Magee et al. (1999) and Magee and Kentula (2005) report on the effect on plant communities.

Restoration and creation practices should be consistent with the hydrogeomorphologic character of the landscape. This will increase the probability of success because projects will be appropriate to the setting. This point was echoed in the National Research Council's (2001) first technical recommendation on wetland mitigation. This approach also recognizes that while some wetland functions (e.g., habitat) may be defined at the scale of individual wetlands, most functions and values (e.g., biodiversity and maintenance of populations, water-quality improvement, flow moderation) depend on the type, abundance, and distribution of wetlands across a watershed or landscape (Detenbeck et al. 1999 and references cited therein).

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- Detenbeck, N. E., S. M. Galatowitsch, et al. (1999). "Evaluating perturbations and developing restoration strategies for inland wetlands in the Great Lakes Basin." Wetlands **19**(4): 789-820.
- Gwin, S. E., M. E. Kentula, et al. (1999). "Evaluating the effects of wetland regulation through hydrogeomorphic classification and landscape profiles." Wetlands **19**(3): 477-489.
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## **North Reach Willamette Mitigation Bank Review – Brent Haddaway**

***1. To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?***

Pro's: Rapid (relatively low cost), simple assessments to make. Performing this work will not require a high degree of expertise.

Cons: The method is simple, yet prescribes precise mitigation requirements, which means it is often incorrect in the mitigation requirements it prescribes. Sites are assessed into broad habitat categories that are subjective to varying degrees. These habitat assessments are tied to numeric scores, which are then entered into a mathematical model to generate mitigation requirements. At each level modeling, the subjectivity in the initial assessments are multiplied to further decrease accuracy. The resulting decisions and mitigation commitments are therefore based on multiple layers of assumptions, and should not be relied upon to provide precise mitigation requirements.

I know of no other suitable habitat assessment methodology that would be better suited for the City's needs. I therefore support the use of the HEP- HEA, but recommend the lack of precision be addressed in the generation of mitigation requirements. BES could either "lump" HEP-HEA scores into groups to calibrate the results in recognition of the imprecise results. Another option would be to factor in a mitigation ratio, such as 2:1 area replacement, to assure no net loss of habitat has been achieved.

***2. Did we get the right species? Are we missing a species or habitat?***

I'm not familiar enough with the sites to comment, although the relationship habitat, species, and functions are somewhat cluttered. I would suggest identifying specific habitat types to be protected and mitigated, and clearly justify the selection process. The selection should likely be based on historic habitat losses, the types of wildlife that use the habitats, and the suitability of the reach to support specific habitat types. The habitat models should generate scores in the fewest number of steps and include the fewest number of calculations. The current model considers the habitat needs of multiple species that are compiled to generate a single habitat score. As stated above, each assessment step adopts a possible user error or subjectivity and multiplication of scores magnifies the potential discrepancies between users.

***3. We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?***

Same comments as above, and the HSIs are all weighted equally in the model, which seems skewed. An HSI could have a fairly high score, but still lack a critical habitat component (ie: 4 parameters score maximum, the 5<sup>th</sup> scores minimum, the average is still high).

***4. By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?***

I would defer to others on what other factors should be included in the habitat models. I think it is logical to include any attribute that contributes to habitat quality in a meaningful way such as size or connectivity.

Derek Booth's responses to "the 4 questions" (July 12, 2010)

**1. To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified?**

I do not have much prior experience with this style of approach, but I recognize that it has the advantage for a local municipality that it is well-established and transparent. There may be a "better" approach, but you cannot be faulted for using the same approach that everyone else also has. It is not optimal—it reflects an approach to species conservation over three decades old, where the metric of value is "habitat area" independent of contextual needs, spatial relationships, or species interactions. It is thus prone to easy complaints about specific metrics for specific species (e.g., the use of just two factor types for coho, as noted during the panel discussion). Most challenging for the city, however, is the implicit conflict between a spatially explicit and ecosystem-based approach, as articulated in other policy documents and the identification of "pearls," and this fixed-ratio, habitat-area framework. My suspicion is that either framework would provide net environmental benefits: but the former without the latter will be difficult to implement, and the latter without the former will fall far short of ever achieving its overarching goals. Pragmatism would suggest that the City has made a prudent decision to embrace the HEP/HEA approach but would be misguided to believe that it has "achieved" its stated policy goals as a result. This is just the first step...

**2. Did we get the right species? Are we missing a species or habitat?**

As a non-biologist, it would be presumptuous for me to tell you what species, or habitats for specific species, are missing. I can note, however, that "habitat area" alone will never capture all of the life-history needs of key species, and that a simple arithmetic combination of factors, no matter how numerous for any given species, is unlikely to "add up" to a coherent plan for conservation or recovery. See my answer to #1 above—the approach is a defensible, credible first step but cannot be expected to yield successful outcomes in isolation. As for the list or number of species, my comments during the meeting were to consider *fewer*, not more, but to develop a more nuanced characterization of their habitat needs. The guiding ecological principle should be that healthy landscapes provide the ecological processes that yield both functional habitat and the species they support. Just "building habitat" without such a landscape context will not achieve sustainable results.

**3. We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?**

This question lies outside my areas of expertise. I will encourage you, however, that as you are striving to do a good job with this characterization don't get lost in the weeds. Any critical shortcomings with this approach will not be in choosing an "incorrect" boundary between suitability index values but in the inappropriate application of the overall approach to a real landscape.

**4. By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?**

I don't believe that an algebraic adjustment of the index will address the concern you raise here (which is entirely consistent with my responses to the previous questions). Because the panel was not asked to review the process by which (for example) your key areas (a.k.a. 'pearls') were identified, it's not immediately obvious how the results of an HEP/HEA analysis might be incorporated into that landscape-scale evaluation. I do think, however, that trying to integrate those two approaches and scales of landscape/habitat analysis will prove more successful in the long run than keeping them entirely independent. I believe this is already recognized by the City, but the panel wasn't given enough information to yet offer any useful suggestions as to how that might occur.

**Questions Posed to North Reach Advisory Panel**  
**Preliminary Responses by D. DeHart**

**1. To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?**

*I believe that the methodology you have selected is sound and well supported by the scientific literature. The real issues are parameter values and weighting factors used in your application.*

**2. Did we get the right species? Are we missing a species or habitat?**

*Addressing aquatic species only, I believe there is a weakness. Certainly the emphasis on salmonids and a few associated species is understandable. These are the species formally identified as “at risk” and the ones where the most information is available. On the other hand, there are probably few, if any, native aquatic species in the North Reach area that are presently healthy and abundant. I think there is value in identifying several non-salmonid native species that are likely indicators of aquatic condition and which occur in healthy lower Columbia Basin habitats (i.e. long nose dace, reticulate sculpin, brook lamprey, native crayfish, freshwater mussels, etc).*

**3. We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?**

*Some native species which were likely historically abundant in the North Reach area do not have complete or well documented HIS information. It will be necessary to utilize representative species where information is most readily available, but I would suggest you use an expert panel process to identify preliminary values for some species as needed.*

**4. By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?**

*Certainly proximity and diversity are important factors for aquatic habitats. As you note, a weighting to recognize such critical attributes would be appropriate. In reference to native aquatic species, you clearly understand the serious adverse factor posed by introduced warmwater predatory fish species in the North Reach area. Availability of cover and habitat*

*types which provide protection from predation of this kind are factors which could be considered in such weightings.*

## **5. Others?**

*I believe some additional thought as to objectives for aquatic habitat restoration is appropriate. As I mentioned above, the emphasis on salmonids is understandable but may be misleading. I believe the near-term goal should be the restoration of aquatic habitats likely to support limited assemblages of native aquatic species. This is an achievable goal and one whose success can be readily measured. It is also an ecologically sound approach to restoring the water quality and habitat structure ultimately necessary for reestablishing a broader array of species/habitats for identified species at risk including salmonids.*

## **Introduction to the North Reach Mitigation Bank Science Panel:**

With that background, we are asking this esteemed panel to inform the city on the following questions:

**1) To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?**

I placed a call with Yvonne Vallet to see if she could get a copy of the Ramsey Lake assessment that was based on Florida's USACE method. I know that Smith Bybee Lake is reserved for the Columbia reach, but it's important to note there is no connection to the Columbia and the lakes are isolated from that river by the industrial sanctuary. As far as the use HEP is concerned, It's often associated with larger habitat matters, and as such it was used (modified) by PGE and the USACE when PGE had plans for developing West Hayden Is. And, now that I think of it, West Hayden Island is a better fit for Columbia River mitigation. At the time of their proposal, I had PGE do a aquatic habitat evaluation of Oregon Sl. since it was relatively shallow and likely had a high concentration of benthic infauna (which it did, based on actually sampling). Unlike the Willamette, extensive reaches of Oregon Sl. have not been dredged in a long time.

**2) Did we get the right species? Are we missing a species or habitat?**

I know we used yellow warbler for the PGE HEP, but they also nest way away from the rivers. Maybe northern oriel, willow fly catcher, or yellow throat would be better. Does USFWS have those models available?

**3) We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?**

**4) By utilizing an "in kind" approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations ("weightings") that should be added?**

Is the factor of delay in achieving the target habitat currently factored in ? I also think that the width of the upland buffer is a factor. The upland buffer really isn't so hard to imagine. On the east side of the river used to be highly flood prone, the forest habitat type examples are adjacent to Oregon Sl. on West Hayden Is. and further on down in Multnomah Channel. On the West side, ignoring that Guild's Lake was been gone 100 years, there is less ash for more cedar, white and Douglas fir. I'd mention maple, too, except successful maple planting will quickly out complete other planted species. Alder is also more prevalent and beaver don't like the taste of the wood and cambium.

## 5) Others?

Material provided will include:

- Volume 1A of the North Reach Plan - weblink
- Pertinent sections of the Code (see citations above) – photocopies/e-copies
- Volume 3A (Natural Resources Inventory) – for reference – web link
- Draft Accounting documentation – e copies
- NRDA Trustees Executive Summary from their Science Panel – e copies

## **Introduction to the North Reach Mitigation Bank Science Panel: Stan Van DeWetering**

The City of Portland is revising its environmental regulation along the Willamette River. Known as the River Plan, it is a comprehensive, multi-objective plan for land along the Willamette River that strives to balance jobs, natural resources, access to the river and livable communities. The first application of the River Plan is in the North Reach of the Willamette River, which extends from the Fremont Bridge to confluence with the Columbia River. The North Reach Plan creates a new “river zone” that serves to protect and conserve natural resources while allowing certain types of industrial development. (Code language 33.475.400 et seq. and 33.865 et. seq.). The river zone applies to both the river itself as well as key upland areas. These natural resources have been inventoried in the Natural Resources Inventory, and given a broad ranking of High, Medium or Low (Volume 3A). The river zone applies to those areas that received a medium or a high ranking. In addition, the new code language requires development to protect the identified “functions and values” of the natural resources.

One way to protect the identified functions and values is through mitigation. The code allows two types of mitigation: onsite and offsite. The offsite mitigation allows for the purchase of credits from a City certified mitigation bank.

The North Reach Mitigation Bank Science Panel is being convened to advise the City on the accounting of the functions and values of the natural resources for use in the mitigation bank. The City is proposing to use a hybrid model that combines a Habitat Evaluation Procedure (HEP) with a Habitat Equivalency Assessment (HEA). The City is proposing to use Habitat Suitability Indices to populate the HEP. While the City is not required to use these methodologies, we are specifically targeting habitat accounting that is: 1) open and transparent; 2) represents the best available science - is well tested on multiple habitat types and suitable for the Willamette River; 3) publicly available (non-proprietary); 4) allows for “in kind” tracking (ex: in water impacts are not mitigated by upland restoration); 5) is widely accepted by multiple state and federal agencies (to minimize doubling mitigation requirements); and 6) allows mitigation to stay in the North Reach service area.

With that background, we are asking this esteemed panel to inform the city on the following questions:

**1) To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?**

I have limited experience in using any of the three proposed methods but I generally agree with the rating process that is shown in the June 3 Habitat Valuation System doc. A few comments regarding the aquatic fish species – because we don’t have habitat suitability indexes for Pacific lamprey I suggest we follow those outlined for chinook salmon. Based on my experience with juvenile lamprey habitat preferences, the chinook indices are most applicable. I would also like to comment on how those indices fit or are typically nested into non-disturbed habitats. When

examining the chinook work cited in the Valuation doc we must realize that shoreline shallow areas adjacent to deeper waters can occur at a significantly greater rate when the reach as a whole contains greater complexity. That is to say, when hard structures (wood and rock) are present to form scour and fill then we see more bars and islands and thus more preferred shoreline habitats. In turn when we are considering both the chinook and the lamprey and our suggested preference for shallower waters with fine substrates or rather limited rip rap hard structures, we should think about the following. In many instances we may be required to approach habitat restoration and mitigation through the use of substrates and structures that currently correlate to low index scores within our habitat matrix. If we wish to consider all our options when restoring shallow water sandy substrates for chinook and lamprey we should consider building new islands, bars and peninsulas with these substrates. These approaches may allow us to significantly increase our mitigation ability by creating complex flow patterns followed by complex depths and substrates resulting in our desired chinook/lamprey habitat. I believe this could increase our opportunity to create the miles of habitat we need whereas if we only examine those sites that currently meet the depth and substrate composition we are targeting, our potential will be significantly less. Thinking through our options to work with the sediment that needs to be removed from the main channel via dredging and for shipping lane purposes, we could in turn direct those sediments toward island and bar building. To close this thought, in addition to creating these habitats away from future development we might also want to consider how we can adapt those areas that currently have hard structure in place and or those that might need it in the future for development, to increase our opportunity to create the desired fish mitigation and restoration options. Tiering existing hard banks by creating multiple levels of hard rock to support fine sediments at shallow depths could be considered as an approach to modify existing low value shore line habitats. If the approaches turned out to be of value then we might be able to adjust our options for onsite mitigation within the immediate zone of proposed or existing development. Land owners could bank mitigation credits by modifying existing bank habitats and or pulling back existing banks edges and thus losing some acreage to new habitats.

## **2) Did we get the right species? Are we missing a species or habitat?**

I do not feel completely qualified to comment here but it appears to me that the species listed in the review docs cover a broad enough range of habitats that the plan should cover additional species not mentioned by way of your focus on retaining and restoring historic habitats in general. I feel strongly that as long as the approach includes a focus toward overall complexity each time a mitigation or restoration occurs, that individual as well as multiple species will benefit.

## **3) We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?**

I have one general comment regarding coho salmon and steelhead trout. When considering restoring habitat we should be reminded of the significant differences we might observe in water quality conditions and exotic species in the lower river within mainstem backwater and wetland vs thalweg habitats. An example is the following - If an offsite mitigation is suggested for a

lowland tributary development that contains coho salmon and that mitigation is directed at mainstem habitats, we need to realize there will likely be a loss in value when transferred from one to another. This will be especially true on a seasonal scale. The example project would be pitched as enhancing mainstem off channel habitat to benefit age zero coho winter and summer rearing. Two issues would likely arise. First, the mainstem wetland might be used by age zero coho during the winter months at a very low rate due to broader distribution patterns. Second, the summer habitat could be by default too warm or have too low of DO to allow for adequate coho summer rearing. Exotic species could in turn benefit from the warm slow water habitat created through the mitigation. I would therefore suggest the coho and steelhead mitigation work keep a focus within the tributary zones where the permit is issued rather than move offsite using the theory that there will be specific benefits to the tributary fish. Where water quality and exotic species are not problems these issues would be of less concern.

**4) By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?**

Habitat mitigations that are targeted for specific species should provide a temporal rate of access that is similar to the period of presence of the species. For example if targeting spring chinook smolts within a mainstem off channel wetland project we need to ensure that project is maintained over time to allow access to those habitats based on mean flows during the observed period of chinook presence. My experience leads me to believe that when working in an environment such as below the falls that so many of the natural processes have been manipulated by humans that we must build our restorations with the ability to maintain them over time. In this instance maintenance could include activities such as adding woody structures at regular intervals, dredging soils that fall out in slow water areas designed for overwinter habitat, keeping inflow and out flow areas open from aquatic weed growth and or sediment accumulations, etc. As maintenance requirements increase weighting toward mitigation value would need to be adjusted.

**5) Others?**

We understand that habitat loss has played a large role in the reduction in numbers of many of our species in our North West river systems. I believe that in the future the quality of our water within our surviving habitats will prove to play an even more significant role in the final fight for survival of these same species. I think there would be value in considering how to improve and redirect runoff capture basins within industrial complexes. If outdated facilities exist then updating could count toward partial mitigation. If new facilities exist then expansion of treatment beyond conservative standards could count toward partial mitigation. If we worked toward capture basins that provided clean water and on site seasonal refuge to a range of species, that could be viewed as providing a higher value of mitigation when compared to certain offsite options. This might be particularly appropriate at sites that have been occupied for several

decades, where flood plain relief was the optimal historic use, where larger tributary systems don't occur and where continued industrial occupation is expected.

Piped systems – do we have any opportunities to remove these systems and bring them to the surface and still move water to the river? This sort of activity could provide reduced runoff time and create small wetland areas that might add additional habitat when summed across the complete North Reach. Mitigation credits could again be banked by completing this sort of work.

Increasing flood area at regular intervals on both banks – removing old fill to create minimum flood area wetland like channel basins could improve storm event stress for juvenile fishes. These areas could be associated with hard surface clean water runoff that have been engineered for mitigation as well. Providing small pockets of low velocity clean water feeding into the main stem channel during storm events could reduce stress and increase survival. These areas should not be thought of as constant rearing sites but rather storm related refugia wetland channels.

Material provided will include:

- Volume 1A of the North Reach Plan - weblink
- Pertinent sections of the Code (see citations above) – photocopies/e-copies
- Volume 3A (Natural Resources Inventory) – for reference – web link
- Draft Accounting documentation – e copies
- NRDA Trustees Executive Summary from their Science Panel – e copies



INCREASING THE PACE, EXPANDING THE SCOPE, AND IMPROVING  
THE EFFECTIVENESS OF CONSERVATION

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July 12, 2010

City of Portland  
Bureau of Environmental Services  
1120 SW 5th Ave., Room 1000  
Portland, OR 97204-3713

Re: City of Portland Comments on the North Reach Mitigation Strategy

Dear Kaitlin:

Thank you for the opportunity to participate on the technical review panel and provide some comments. You all have done an enormous amount of work in a pretty tightly constrained space. You should feel pretty proud of that. The comments below include both some general comments and specific comments tied to the questions you asked.

Overall, you heard a lot from the review panel that the most important thing is to tie the overall mitigation framework AND the functional assessments to the priorities identified in a conservation strategy. The River Plan has a lot of these outlined, and you seem to have done a good job identifying the restoration and conservation priorities within the North Reach in terms of the mapped pearls. I would strongly urge the City to consider three alterations to the overall mitigation framework to tie the program more effectively to conservation priorities.

1. Expand the service area for mitigation to cover the entire City. If this is not feasible, then expand the service area to cover all the areas that will include a similar zoning overlay in the foreseeable future. Staff mentioned upcoming plans for the Columbia and Central/South Willamette reaches. Staff made the point that the North reach sites are the most difficult to fund with existing restoration programs. This is may be a valid reason for constraining the service area, but you would need to include a couple of paragraphs in whatever document is most appropriate describing that.
2. Don't tie yourself so closely to in-kind requirements for mitigation at the project-by-project scale. Staff has done a wonderful job articulating priority restoration sites. Let those be your guide. You can track "no net loss" of functions at the programmatic scale across habitat types. You could even track this across different funding programs.
3. Similarly, I would strongly suggest you reconsider your mitigation hierarchy. I support avoidance and minimization as the first two steps, but I would suggest you consider offsite mitigation before onsite for two reasons. First, you have clearly mapped priorities that you want to steer investment toward. Second, you are setting yourself up for a tugging match with other

mitigation programs (e.g. Clean Water Act 404), which favors off-site mitigation within the 4<sup>th</sup> Field HUC. You don't want the City pushing a permittee to one site and the Corps to another. If nothing else, I would get documentation from the other agencies supporting the City's decisions on mitigation hierarchy, service areas, and in-kind rules to make sure there is consistent implementation across programs.

#### SPECIFIC COMMENTS

1) To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?

HEP/HSI and HEA are two different beasts. The advantage of both is the overall frameworks have been used by federal agencies and tested in court. It's important to note that these are just frameworks. The HEP/HSI methodology being proposed here is new in a lot of ways. The most advanced application of HEP in the region is the modified version Bonneville Power uses for its fish and wildlife program. This has been well-tested, but has its difficulties too.

HEA provides for consideration of temporal losses, and its use may make it easier to coordinate impacts with NRD requirements. However, HEA does not prescribe how functions are calculated. On its face, there is nothing wrong with HEP so long as the right indicator species are used. However, HEP will never provide an estimate of the functions gained or lost at a site. This point was made at the meeting. It can be a good proxy for habitat condition, but may not capture other functions of interest (eg water quality).

It's also important to note that you are proposing to use HEP for only the riverine, upland, and riparian habitats. You are using a functional assessment for wetlands and a modified functional assessment for grasslands. These methods are getting at really different things. I think the panel's advice to move all methods toward functional assessments is sound. The indicators you have so far are a good start, but there are some other sources to explore.

25 agencies and groups that participated in the Counting on the Environment process have approved four functional assessment methods for pilot use in the Willamette. You are already using the ORWAP assessment, and there are pieces of the prairie metric being used for the grasslands assessment. The salmon stream metric is also available. It is a functional assessment that captures information on 7 functions and provides a score of 0 to 1 as a % of optimal functioning habitat. Both the salmon metric and prairie metric are undergoing sensitivity, repeatability, and variation testing this summer with results by September 2010. I would encourage the City to run the salmon/prairie metrics side-by-side with their proposed HEP/HIS methods on at least two sites to compare results.

In general, any metric you choose should be:

- Valid. This means it is sensitive enough to capture changes from pre to post restoration on an annual or other regular time period. You need to be able to differentiate between sites too. A metric needs to be repeatable. Finally, it needs to accurately capture the dynamic functions that drive ecosystem health.
- Practical. A metric needs to be accessible. For the Willamette Partnership, this means that a trained watershed council or soil and water conservation district professional can apply the method on a site in less than a day after just 2-7 days of training. Methods need to be rapid, visual assessments for most applications.

An ideal metric would:

- Confirm that you are in a particular habitat type
- Roll the contextual value, condition, and management of a site into a score
- Look at the multiple functions and values provided
- Consider historic impacts and future site potential
- Be connected to environmental goals. Ultimately you want your metric to help you drive behavior and investment toward the things your plan wants to achieve.

2) Did we get the right species? Are we missing a species or habitat? We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated?

Based on my comments above, the panel commented that a species-based approach will not connect you to your goal of ensuring no net loss of functions and values. In this sense, I would focus on asking if you are capturing the appropriate indicators of function. The indicators you have now are a start, but you also heard from the panel that the indicators you have now are incomplete for many habitat types. The beauty of what you have now is that calculation is simple with so few indicators. The challenge is that this may inhibit the sensitivity of the metrics and your ability to really get at the functions lost and gained.

3) Are there species/habitats that do not have HSIs? What process should we use in those situations?

See response to Question 2. In terms of process, the City needs to think about adaptive management of both the program and the metrics. I think there is already language saying the City will revisit the program at regular intervals. I would encourage Staff to develop an adaptive management strategy that includes testing on the metrics, a process for updating metrics, and a predictable way that those changes move into City ordinances. For the Willamette Partnership, metric construction includes: Goal setting—Metric construction—Expert review—Field testing & modification—Adaptation over time.

4) By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?

I would look directly at the “Values” sections in ORWAP and the Prairie Calculator. These should get you decent ideas of indicators for values. The City could make an enormous contribution by articulating value indicators and metric for the riverine systems.

For the riverine system, you will want to look at fish passage barriers and constraints.

Ideally, you could use the exact same metrics for other reaches and parts of the City.

Sincerely,



Bobby Cochran  
Willamette Partnership, Executive Director

## MEETING SUMMARY PER QUESTION

Prepared by EnviroIssues  
July 23, 2010



***1. To the extent known, or within your particular area of expertise, what are the pros and cons of using a combination of HEP and HEA and the HSI quantification? Are there other methodologies we should consider that meet or exceed the criteria identified above?***

In general, panel members supported use of HEP/HSI and HEA. It is a well established, transparent, relatively low cost and accessible tool that is widely used; however, panel members observed that it also reflects an approach to species conservation that is somewhat dated in that “habitat area” is the metric (independent of contextual needs, spatial relationships, or species interactions). It was also noted that HEP/HSI and HEA have been used by federal agencies for some time, and tested in court, but they are really frameworks to which different approaches could be applied. The City’s combined approach is new in many ways. While the methods themselves are supported by the scientific literature, panel members noted that the “real issues” relate to the parameter values that capture ecological functions (versus habitats or species), weighting factors selected for use, and monitoring to ensure outcomes validate expectations.

Limitations to these frameworks noted by individual panel members included:

- The outcome of use of the methods are specific mitigation requirements, which may not meet the City’s purposes. The reason the mitigation requirements may not be correct is that sites are assessed into broad habitat categories that are subjective to varying degrees. These assessments are tied to numeric scores, which are then entered into a mathematical model to identify mitigation requirements. At each level of modeling, subjectivity is multiplied and accuracy decreases. Resulting decisions and mitigation commitments are based on multiple layers of assumptions and likely should not be relied upon exclusively to identify mitigation requirements.
- While HEA provides for consideration of temporal losses, and its use may allow for easier coordination with NRDA requirements, it does not prescribe how functions are calculated.
- These frameworks do not consider an “ecosystem-based approach”, and if not adjusted for this consideration, could fall short of achieving overarching goals. HSI itself, or the final result, should be weighted in some manner to allow for consideration of ecological context, prevent excessive mitigation from occurring in small and potentially isolated patches which will be able to provide for only a limited amount of ecological benefit, and allow for consideration of proximity of larger sites to each other and to other restoration areas.
- HEP is fine as long as the correct indicator species are used; however, it will not provide an estimate of the functions gained or lost at a site. It can serve as a good proxy for habitat condition, but it may not capture other functions of interest at a site (e.g. water quality). Using HEP alone has often been subjective, but using it with HEA helps considerably.

The City had originally proposed to use HEP only for the riverine, upland, and riparian habitats, to use a functional assessment for wetlands, and to use a modified functional assessment for grasslands. One of the panel members pointed out that these methods are getting at really different things, and advised moving toward use of functional assessments for all habitat types. This panel member noted that the 25 agencies and groups that have participated in the “Counting on the Environment” process have

approved four functional assessment methods for pilot use on the Willamette. One of these methods (ORWAP) is already being used by the City, and there are pieces of the prairie metric proposed by the City for use in the grasslands assessment. A salmon metric is also available, and both it and the prairie metric are undergoing sensitivity, repeatability, and variation testing this summer. The panel member suggested that the City run the salmon/prairie metrics side-by-side with the City's proposed HEP/HSI methods on a couple of sites and compare results.

Another panel member also recommended that the City evaluate their approach outcome against an assessment of overall ecological condition as a check on whether provision of habitat is indeed an appropriate surrogate for restoration success and ecosystem quality. This panel member noted that condition (e.g. water quality) is easier to measure than all the various ecological functions (wetland filtration and hydrology), and that it is related to system function because both condition and functional assessments are ways to assess ecological integrity (an ecosystem in good ecological condition should perform the functions one would expect for a system of that type in that location).

Panel members agreed that the indicators selected by the City were a good start, but that there were other sources that needed to be explored to add to the list.

Panel members suggested that some basic criteria should be used by the City in selecting metrics. Metrics should be valid, i.e., sensitive enough to capture changes from pre- to post-restoration on an annual or other regular time period, and to differentiate between sites. Metric validity also means it is repeatable, and it needs to accurately capture the dynamic functions that drive ecosystem health. Metrics also need to be practical. In being practical, it is accessible (i.e. able to be applied by a professional who receives 2-7 days of training). Practical also implies that for most applications, methods entail a rapid visual assessment. At its best, a metric should:

- Confirm that you are in a particular habitat type;
- Roll the contextual value, condition, and management of a site into a score;
- Consider the multiple functions and values provided'
- Consider historic impacts and future site potential; and
- Be connected to environmental goals, to help drive behavior and investment toward these goals.

**2. *Did we get the right species? Are we missing a species or habitat?***

The panel does not think that use of a species-based approach will allow the City to achieve its goal of ensuring no net loss of functions and values. Rather than focusing on species and habitat, panel members encouraged the City to focus on ensuring that they are capturing the appropriate indicators of ecosystem function. It was noted that accounting only for “habitat area” will not capture all of the life history needs of key species, and that a simple arithmetic combination of factors is unlikely to define a coherent plan for conservation or recovery (simply building habitat without consideration of the larger landscape context will not be enough). In general, panel members did not seem to be as focused on the need for a large number of species to be included, but rather, that they be indicative of good ecosystem function.

Panel members noted that the City had made a good start, but the indicators are incomplete for many habitat types. Fewer species means a less complex calculation, but it also means loss of sensitivity of the metrics and the ability to really identify functions lost and gained. Identification of species for upland habitats was noted as particularly difficult because of the broad range of potential habitat types; this could be supported by the initial natural resources assessment. Suggested potential species to consider for upland habitat included yellow warbler, northern oriel, willow fly catcher and yellow throat. It was noted that with respect to aquatic species, there are probably few, if any, native aquatic species in the North Reach area of the Willamette that are presently healthy and abundant; it was recommended that the City identify several non-salmonid species that are likely indicators of aquatic condition and which occur in healthy lower Columbia River basin habitats (e.g., long nose dace, reticulate sculpin, brook lamprey, native crayfish, freshwater mussel).



***3. We are proposing to use peer reviewed HSIs to establish values for the HEP model. Are there some that need to be updated? Are there species/habitats that do not have HSIs? What process should we use in those situations?***

The Panel noted that there is already language in the City documents stating that the program would be revisited at regular intervals, and recommended that the City develop an adaptive management strategy for updating HSI values. This strategy should include testing of the metrics, a process for updating metrics, and a predictable way that changes are reflected in City ordinances. An example of such a process for metric construction and review, as used by the Willamette Partnership, includes the following steps:

- Goal setting
- Metric construction
- Expert review
- Field testing and modification
- Adaptation over time

Outside of the Prairie model (recently updated by the Willamette Partnership), and the ORWAP model, few well-articulated HSI's exist. Some native species that were likely historically abundant do not have complete or well-documented HSIs. It was noted that an HSI for older conifer forests is in development, but not yet ready for use. Panel members pointed out that it will likely be necessary to use representative species, for which information is available. It was suggested that an expert panel process be used to identify preliminary HIS values for species as needed.

One panel member pointed out the potential for a problem in that the HSIs are all equally weighted in the model. For example, a HSI could have a fairly high score, but the score could be based on a few high scoring values and a single minimal score, with that minimal score representing a critical habitat component. Further, it was noted that a potential shortcoming could be associated not so much with the HIS's themselves as with their application landscape-wide. Additionally, one of the panel members noted that application of mitigation work in response to modeling results for in-stream habitats may in fact cause other potential issues (such as inadvertent creation of favorable conditions for exotic species) that were not intended; this panel member encouraged full examination of the potential for creation of these issues before taking on mitigation that may be recommended by model results.



***4. By utilizing an “in kind” approach, rarity of different habitat types should be addressed. However other factors, such as proximity to other habitats, patch size, or diversity of contiguous habitats are all important ecological concepts that are not captured in this approach. Are there certain additional considerations (“weightings”) that should be added?***

Panel members agreed that proximity to other habitats and patch size are important. They also identified several specific factors that should be considered:

- “Place” was identified as an important factor, because it can allow to protected areas to provide connectivity to adjacent natural habitats, and larger and more viable natural habitats.
- For aquatic habitats, proximity and diversity (availability of cover and habitat types which provide protection from predation). Diversity was noted by at least one panel member as not being important, because the overall size of these habitats is likely to be small. This individual suggested that “habitat rarity” was a better factor than diversity.
- The amount of time it takes to achieve a target habitat and the width of the upland buffer.
- The likelihood that the results of a given mitigation effort will allow for access to the habitat at the time it is needed, and the amount of maintenance that would be required to allow access to occur at the right time (e.g. spring chinook smolts and mainstem off channel wetland mitigation)
- For the riverine system, fish passage barriers and constraints.

Other potential sources of factors to be considered, as suggested by panel members included the “Values” sections in ORWAP and the Prairie Calculator. It was noted that the City could make a significant contribution by articulating value indicators and metrics for the riverine system. Other suggestions included using priority habitats in the Oregon Conservation Strategy, and ecological systems with priority plant associations as defined by Nature Serve.

Panel members also noted that the weighting approach was not likely to address the need to incorporate the results of a HEP/HEA analysis into a landscape-scale evaluation. They again stressed the importance of this broader evaluation, and their hope that the City could integrate the two approaches and analysis scale. One panel member noted a specific example of where restoration practices were not consistent with the hydrogeomorphologic character of the landscape. The case cited had to do with creation of ponds as a mitigation project in the region, to create a type of wetland and to create permanent open water, which was rare. In this case, native species had adapted to the reduction in permanent open water in the region over time, and did not as much benefit from more open water available as had exotic species such as the bullfrog. This example illustrates that restoration practices need to be consistent with the hydrogeomorphologic character of the landscape. While some wetland functions, such as habitat, can be defined at the scale of individual wetlands, most functions and values (e.g., biodiversity, maintenance of populations, improvement in water quality, flow moderation) depend on the type, abundance, and distribution of wetlands across a watershed or landscape. Evaluating individual projects within the landscape context will increase the probability of success because projects will be appropriate to the setting.



**5. *What other things does the City need to consider?***

Several suggestions were made by panel members relative to this question;

- Some additional thought on objectives for aquatic habitat restoration is likely needed. Although the current emphasis on salmonids is understandable, it might also be misleading. A readily measured and readily achievable short-term goal might be to restore aquatic habitat to support a limited assemblage of native aquatic species.
- Panel members thought that some manner of weighting for “place” could be useful, especially for cases where mitigation could not happen at the place where the impact was occurring. It was noted that there is increasing effort to use “locational priorities” as a means of assessing conservation benefits (e.g. Willamette Partnership and others work in wetlands). This issue may at least in part be addressed by the City’s identification of “the pearls”, but should be assessed to determine if more needs to be done in this area.
- One panel member suggested that the mitigation potential associated with upgrading outdated stormwater runoff capture basins within industrial complexes, or with expanding existing new systems, should be looked at. These facilities, if constructed correctly, can contribute to clean water and provide onsite seasonal refuge to a range of species. These facilities could be especially important on sites where flood plain relief was the optimal historic use, where larger tributary systems don’t occur, and where continued occupation by industry is anticipated. It was also suggested that the potential to bring piped stormwater systems to the surface be evaluated; if determined to be beneficial, such work could also count toward mitigation credits. Finally, this panel member also suggested that the potential to remove old fill along the river bank in areas where runoff from clean surfaces was also determined to provide clean water to the river. This potential mitigation work could provide small pockets of low velocity clean water feeding into the main stem channel during storm events, providing storm-related refugia, which could reduce stress and increase survival of salmonids.