Attachment B: PSC Questions and Staff Responses

The PSC provided a list of questions to staff in December 2012. Staff separated the key topic areas, environment, social and economic, into three reports. This report includes only the environmental, ownership and tribal questions and responses.

The questions are answered first with a short 1-2 sentence answer, followed by a multi-paragraph summary of the issues and lastly a list of technical documents where additional detail is available. Please feel free to contact Mindy Brooks, 503-823-7831 or mindy.brooks@portlandoregon.gov, or Rachael Hoy, 503-823-9715 or rachael.hoy@portlandoregon.gov, if you have more questions or would like additional clarification.

Location of Mitigation

1. Describe the rationale behind on site mitigation vs. off site. Timing relationship to NRDA? Is it appropriate to reserve mitigation opportunities on WHI for NRDA mitigation for the Portland Harbor, or is the first priority for on-island mitigation of terminal development impacts?

A. Rationale behind on site mitigation vs. off site: The City's long-standing mitigation policy is to prioritize on-site, in-kind mitigation actions. This policy is shared by multiple regulatory agencies.

Ecological functions vary with location. Prioritizing on-site mitigation is an established best practice in natural resource mitigation because on-site mitigation has the greatest chance of replacing impacted ecological functions. This approach is reflected in other agency mitigation methodologies via lower on-site ratios and higher off-site ratios. Prioritizing on-site mitigation actions is used in the City's approach to WHI and was generally endorsed by the WHI Advisory Committee.

WHI provides a singularly unique geographic location in at the confluence of two major northwest rivers, and many unique habitat functions are derived from this location. Lost functions tied directly to location cannot be easily replaced off-site.

B. Location of Mitigation: WHI is currently a high functioning island habitat in the Columbia River at its confluence with the Willamette River. Currently, the island is in relatively good ecological condition. The proposed terminal development will not only impacted the natural resources within the footprint but will also limit the remaining island's capacity to provide enough ecological lift to accommodate necessary mitigation. Although the City's policy prioritizes on-site mitigation, because the remaining land base on WHI cannot accommodate 100% of the mitigation necessary to fully replace lost functions, off-site mitigation will be needed.

Staff has analyzed the mitigation needs for each impacted habitat type on WHI and the capacity of the remaining habitats (post-development) to benefit from mitigation actions. Staff determined that:

- shallow water and wetland mitigation is feasible on-site; because of the extent of remaining shallow water and wetland habitats;
- forest mitigation can be accomplished through a combination of on-site and off-site actions; and
- grassland mitigation must occur off-site because there is limited opportunity to establish additional grassland habitat on WHI without removing other valuable habitats.

The exact mitigation actions (type, size and location) for impacts to shallow water and wetlands will be determined through future review processes. Off-site wetland and shallow water habitat mitigation may occur if it is determined, through future review processes, to be necessary or preferable.

C. NRDA: The City's priority is that mitigation for the proposed marine development occurs on-site to the maximum extent practicable. This should not preclude potential NRDA mitigation on WHI as well.

The City's understanding of NRDA is that the priority habitat for mitigation related to Superfund damages is shallow water because it is a critical habitat for juvenile salmonids. The extent of shallow water habitat on the island fluctuates through seasons and tide cycles. The upper extent of shallow water habitat is defined as the ordinary high water mark (OHWM); where water typically reaches during high flows. On WHI, the OHWM extends up the shore. During periods of high flow areas of forest, wetland and/or grassland may be temporarily inundated by the Columbia River. In other words, there are parts of WHI that function both as forest habitat and shallow water habitat depending on the season/tide (see Map 1).

Generally, the areas on WHI that are frequently inundated for long periods of time during the winter and spring do not overlap with forested habitats. The trees that populate WHI forests, primarily cottonwood and ash, can survive temporary inundation but not long-term inundation. Therefore, the most important areas for shallow water habitat on WHI are the wetlands and grassy areas located below OHWM.

Map 1: WHI Existing Natural Resource Features

Forest habitat below the OHWM contains some invasive vegetation in the understory. Enhancement of this resource would include the removal of invasive vegetation and establishing native cover. These actions would also benefit shallow water habitat and wetlands because of the relationship between the habitat types – trees provide structure, food, shade and other functions to adjacent wetland and aquatic habitats.

The question is not about prioritizing forests over shallow water, it is about how to credit the mitigation actions taken below the OHWM. Here are two options that illustrate the point (see Map 2):

> *Option 1:* To mitigate for the marine terminal development impacts to forest, *all* remaining forests on WHI would be preserved and enhanced; including forested areas located below the OHWM. These actions would be credited towards mitigation for development on WHI and would not be available to count towards NRDA. However, enhancing forested areas below the OHWM would not preclude options for future additional hydrologic improvements that may increase shallow water habitat or improve wetland conditions; provided those improvements don't adversely impact the forests. These hydrologic improvements could generate credit for NRDA purposes.
>
> If we choose Option 1, all mitigation to replace forest functions lost to marine terminal development can be accomplished with a combination of actions on WHI and Government Island. No third site would be needed for forest mitigation.

Option 2: To mitigate for the marine terminal development impacts to forest, only those remaining forests on WHI that are located *above* the OHWM would be preserved and enhanced and credited towards WHI development. This would leave forest habitat enhancement actions below the OHWM available to credit towards NRDA. As stated above, forest enhancements below OHWM would benefit shallow water habitat function and could provide some NRDA credit. As with Option 1, future additional hydrologic improvements could still be made.

If we choose Option 2, there would not be enough forest mitigation opportunities on WHI and Government Island to fully replace the forest functions lost to marine terminal development. Therefore a third site, off WHI, would be needed.

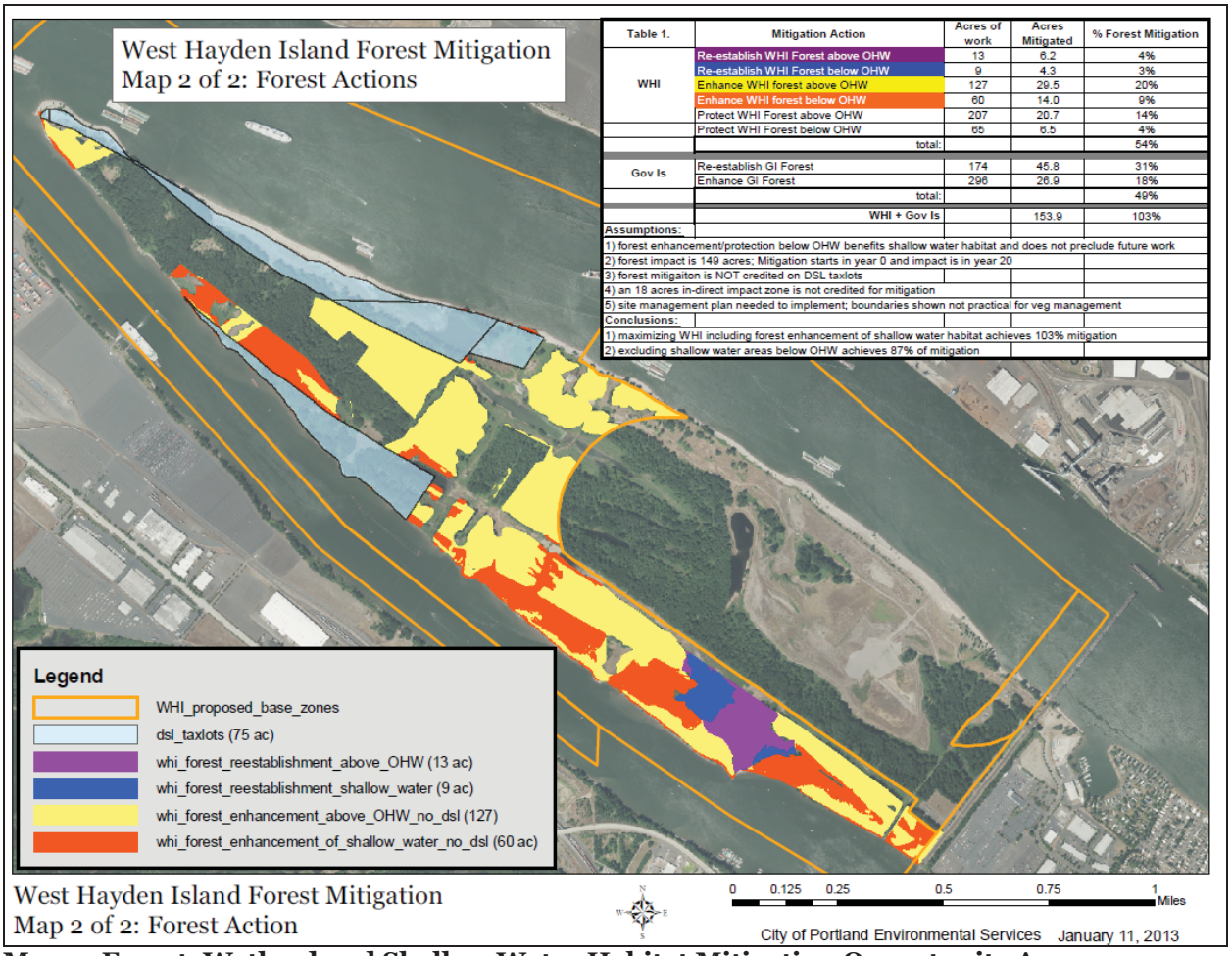


Table 1.	Mitigation Action	Acres of work	Acres Mitigated	% Forest Mitigation
WHI	Re-establish WHI Forest above OHW	13	6.2	4%
	Re-establish WHI Forest below OHW	9	4.3	3%
	Enhance WHI forest above OHW	127	29.5	20%
	Enhance WHI forest below OHW	60	14.0	9%
	Protect WHI Forest above OHW	207	20.7	14%
	Protect WHI Forest below OHW	65	6.5	4%
	total:			54%
Gov Is	Re-establish GI Forest	174	45.8	31%
	Enhance GI Forest	296	26.9	18%
	total:			49%
	WHI + Gov Is		153.9	103%
Assumptions:				
1) forest enhancement/protection below OHW benefits shallow water habitat and does not preclude future work				
2) forest impact is 149 acres; Mitigation starts in year 0 and impact is in year 20				
3) forest mitigaiton is NOT credited on DSL taxlots				
4) an 18 acres in-direct impact zone is not credited for mitigation				
5) site management plan needed to implement; boundaries shown not practical for veg management				
Conclusions:				
1) maximizing WHI including forest enhancement of shallow water habitat achieves 103% mitigation				
2) excluding shallow water areas below OHW achieves 87% of mitigation				

Map 2: Forest, Wetland and Shallow Water Habitat Mitigation Opportunity Areas

The ability for the Port to credit actions on WHI toward NRDA is a decision that is in the hands of the Portland Harbor Trustees' Council, not the City. WHI is outside the Portland Harbor Study Area but within the Broader Focus Area. A recent letter from the Trustees helps explain this process (Attachment E).

References:

Hayden Island Natural Resources Inventory, February 2012, pages 88-97
http://www.portlandoregon.gov/bps/article/407699

WHI Concept Plan Final Report, WorleyParsons, April 26, 2012
http://www.portlandoregon.gov/bps/article/388538
WHI Mitigation Subcommittee, Meeting #2 Notes, January 17, 2012
http://www.portlandoregon.gov/bps/article/384359
WHI Mitigation Subcommittee, Meeting #3 Notes, February 29, 2012
http://www.portlandoregon.gov/bps/article/390088
City of Portland WHI Forest Mitigation Framework, March 22, 2012
http://www.portlandoregon.gov/bps/article/425734

2. Hass the exact location and acreages of forested, shallow water, wetland and grassland habitats been agreed to by all parties, including state and federal agencies?

Answer: No. It is not necessary to gain approval from all parties prior to adoption of the Plan District and signing the IGA.

Shallow water and wetlands: The current draft proposal has the shallow water impacts and mitigation being evaluated through a future City land use review and in coordination with state/federal permitting. The current draft proposal has wetland impacts and mitigation being determined through future state/federal permitting only (no local land use review). The draft IGA established minimum wetland mitigation acres and specifies a monitoring period sufficiently long to ensure that mitigation is successful.

There is general agreement by Port and City staff that priority location for shallow water and wetland mitigation is on-site in the vicinity of Benson Pond and the North Wetland. The IGA and code do not require on-site mitigation; therefore, if necessary, mitigation could go off-site. This would be determined through future processes.

Forests: While there is agreement between the City and Port that forest mitigation should be included in the IGA, there is significant disagreement regarding the acres of mitigation needed. If impact mitigation on WHI occurs on DSL lands or below the OHWM, then approval from DSL will be required. Such approvals have not yet been requested. Any forest mitigation on Government Island would need to be approved by the Federal Aviation Administration (FAA) and Metro; these approvals have not yet been requested. Approval from DSL, FAA and Metro can be obtained after the IGA is signed. It will likely take a while to develop the exact mitigation plans and get agency approvals.

Staff recommends that the City's Forest Mitigation Framework (see Attachment F) be included as an exhibit to the IGA, to facilitate an adoptive management approach. In the event that approvals are not granted by DSL, FAA and/or Metro (or if the Port and the NRDA Trustees agree to credit actions on WHI for NRDA), the Framework would be used to determine the necessary mitigation actions to still achieve 110% (net gain) for forest functions. These alternative forest mitigation actions should occur at one to two large sites within the agreed-to geography. Within that adaptive approach, on-site mitigation should be a priority.

Grasslands: The IGA proposes that impacts to grassland habitat be mitigated by providing a grant toward western meadowlark habitat conservation. The Port has not agreed to this because they feel that protecting the remaining 500 acres of WHI counts as mitigation for impacts within the 300 acre development footprint. Further, the Dredge Deposit

Management Area, which is the area supporting grassland-associated species that will be removed by development, is an approved use and the Port feels that mitigation for this habitat-creating existing land use, which they created, should not be required.

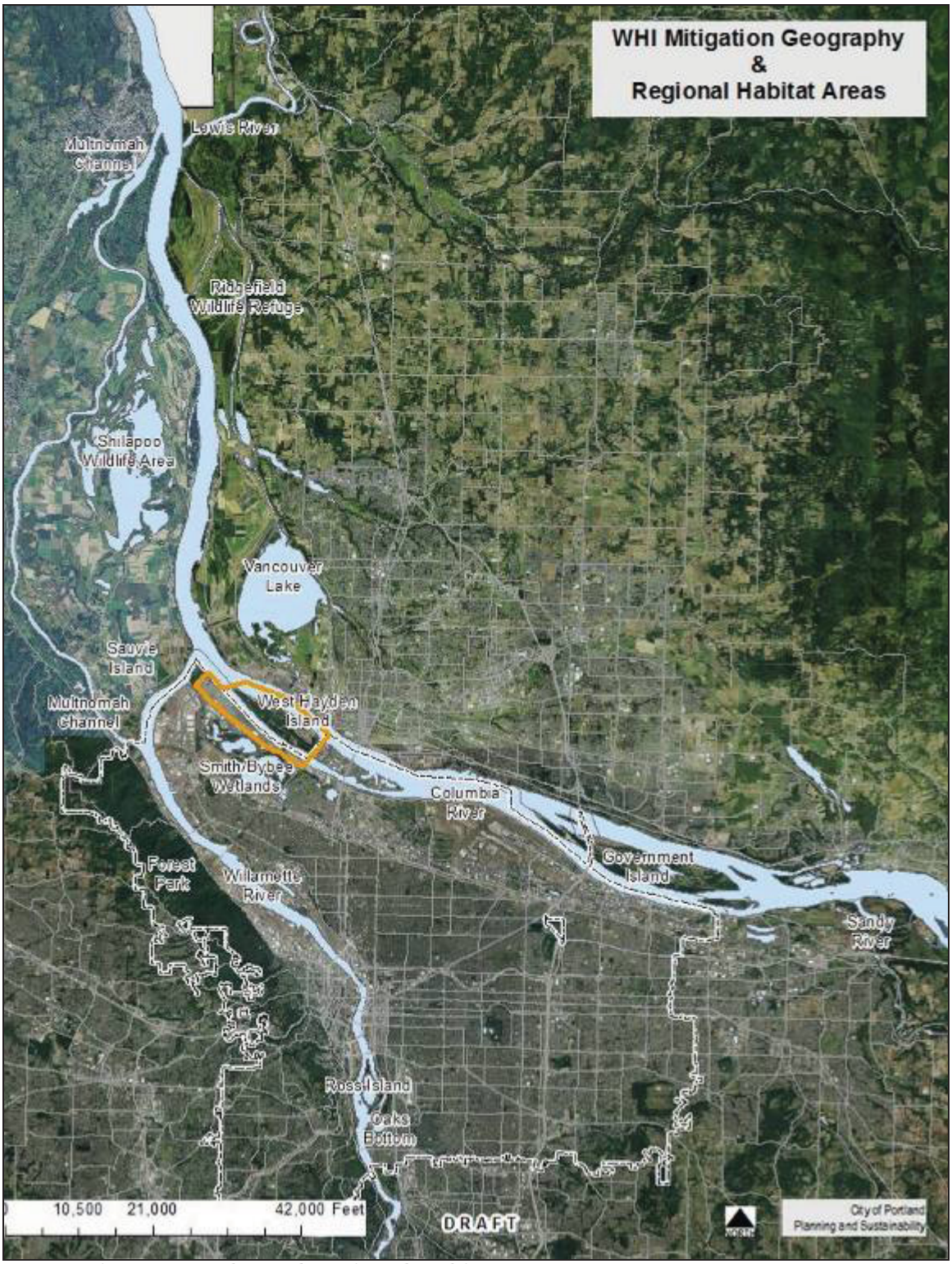
3. Piecemeal nature of mitigation. Too many small bits?

Answer: No. The plan consolidates mitigation at two locations: on WHI, roughly 175 acres of mitigation actions including forests, shallow water and wetlands; and Government Island, roughly 470 acres of forest mitigation actions. Another site is needed to accommodate grassland mitigation and potentially needed to fully mitigate for forest impacts (see answers #1 and #2 regarding crediting forest mitigation below OHWM and gaining necessary approvals).

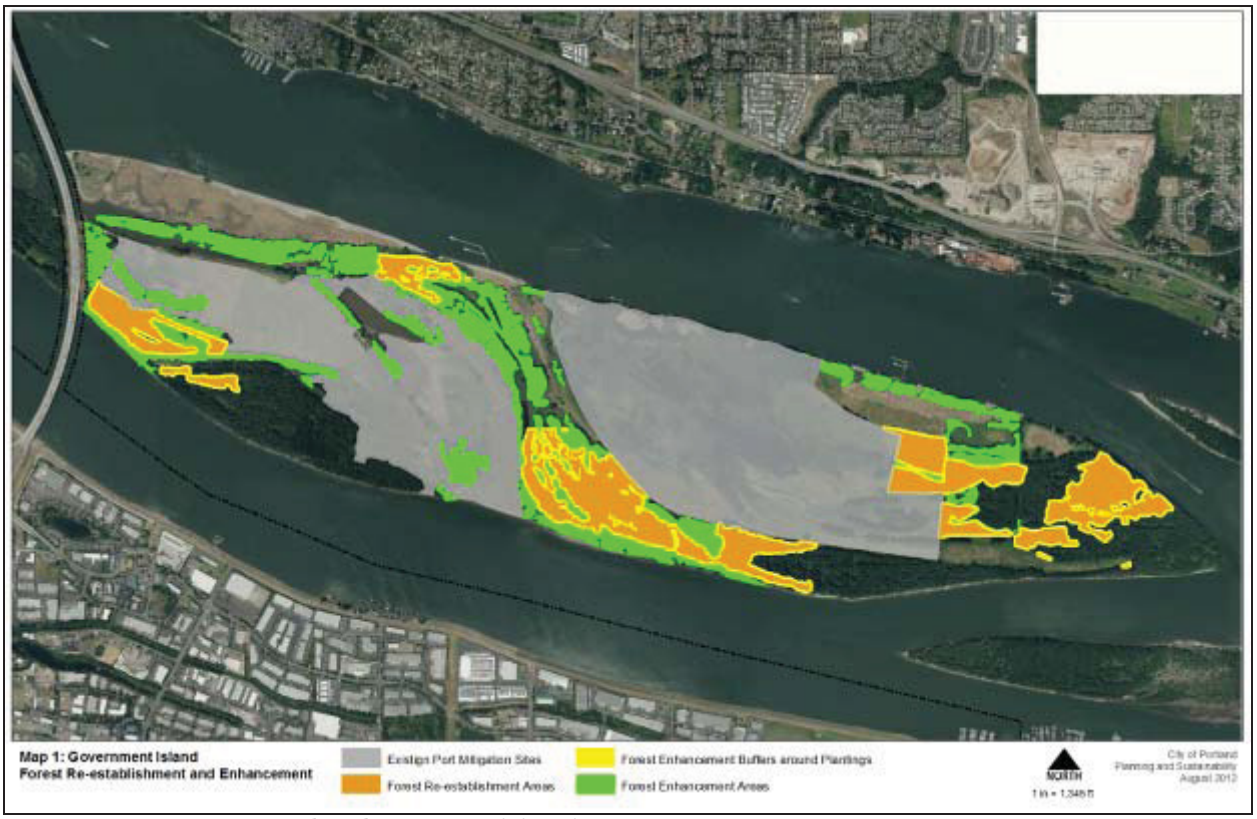
WHI currently functions as part of a large, integrated mosaic of island habitats (see Map 1). Because the remaining (post development) areas of WHI do not have the capacity to provide sufficient mitigation, additional compensation must be made off-site.

Staff has attempted to consolidate mitigation on WHI to the extent practicable, and at one to two other large island locations in close proximity to WHI. Assuming that shallow water and wetland mitigation can be fully addressed on WHI, only forest and grassland mitigation may need to go off-site. Map 3 shows WHI in context of other regional habitat areas.

Government Island has been proposed and accepted by both the Port and the City as an appropriate off-site mitigation location. It is large enough to create an opportunity for a mosaic of habitats (both in terms of size and potential ecological lift). If WHI is used to its fullest capacity and Government Island to its fullest (see Map 4), then there is sufficient area combined to fully mitigate for forest impacts and to have a net benefit for that habitat type. However, if portions of the remaining WHI forest are not credited toward WHI development (see question #1), then a third site will be necessary.



Map 3: Site Geography and Regional Habitat Areas



Map 4: Government Island Forest Mitigation Areas

Below are options listed in hierarchical order based on how likely mitigation will be successful at replacing impacted functions related to location.

Option 1: Three Mitigation Sites – Shallow water and wetland mitigation occur on WHI. Forest mitigation occurs on WHI, including lands below the OHWM, and on Government Island. A third site is needed only for grassland mitigation.

Option 2: Three Mitigation Sites – Like Option 1, shallow water and wetland mitigation occur on WHI. However, forest mitigation on WHI is reserved to only areas located above the OHWM. When combined with mitigation on Government Island there is still a gap and a third site is needed for forest mitigation. To achieve more ecologic function, forest and grassland mitigation should be done at the same site to take advantage of the synergy between habitat types.

Option 3: Four Mitigation Sites – This is the same as Option 2, except that remaining forest mitigation and the grassland mitigation occur at two different sites.

Note – The City's Forest Mitigation Framework allows for off-site locations to be assessed for mitigation (see Attachment F). The mitigation ratios get larger the further the actions move from the impacts to reflect that mitigation for functions related to location cannot be replicated at off-site locations.

4. Does the "net gain" in ecological function depend on off-island mitigation work?

Answer: Yes. See answers to #1, #2 and #3.

WHI is functioning today as a single, large, integrated mosaic of island habitats. There are opportunities to remove invasive plants, plant native understory, increase flooding, create shallow water and enhance existing wetlands. However, relying solely on mitigation actions on WHI would result in a net loss of habitat acres, features and functions. Off-site mitigation actions are necessary to fully compensate for impacts to WHI's features and functions.

5. Describe the unique ecosystem's value of size and contiguity of WHI habitat?

Answer: The geographic location of WHI at the confluence of the Columbia and Willamette Rivers is unique (see Map 3). WHI is the third largest natural area in urbanized Portland next to Forest Park and Smith/Bybee Wetlands. It is a fully functioning mosaic of habitat features and is designated a Special Habitat Area by the City, consistent with Metro's designation of the island as a Habitat of Concern. There are 19 at-risk wildlife species that use a combination of habitats at WHI. The shallow water habitat is federally Critical Habitat for 13 ESA-listed populations of salmon and trout, and the shallow and deep water habitats are federally designated Critical Habitat for one species of eulachon.

Prior to the 1900's, the confluence of the Columbia and many of its tributaries, including the Willamette River, were characterized by multiple braided channels and islands that changed with seasonal flooding. The most significant human-made changes to the island began in the late 19th century: a railroad was constructed across the river and island; dredging of the Oregon Slough began; placement of dredge material on the island; several pile dikes and spur dikes were installed on the south and north shores; and homesteading established freely-grazing livestock. Consequently, WHI is vastly changed from is historic conditions.

Even with all these alterations, and in some cases because of the alterations, today WHI is a single, large, functioning ecosystem made up of forests, woodlands, grasslands, wetlands and shallow water areas; all located in the Columbia River floodplain. These habitats work together, creating a synergistic effect where the whole is greater than the sum of its parts. Five key aspects of WHI are:

1. **Size/Scale** – There are over 800 acres of functioning habitat on WHI, plus in-water-water habitats. It is the third largest island in the lower Columbia River estuary; Sauvie Island and Government Island are the largest. Many fish and wildlife species prefer or are dependent on these large habitats with interior areas that are not as impacted by surrounding noise, light, vibration, etc.

2. **Complexity** – The diverse habitats – shallow water, wetlands, forest, grassland, floodplain - have a synergistic relationship. Many species require different habitats during different parts of their life cycle. For example, red legged frogs live in the forest most of their lives, but breed, hatch, and rear in the interior wetlands. A wetland isolated from forest habitat, even if it is in good condition, doesn't provide red-legged frog habitat.

3. **Location** – The lower Columbia River is the *only* migration route to and from the ocean for 14 ESA-listed fish species. WHI is uniquely located at the confluence of the Columbia and Willamette Rivers and is also used by Willamette River fish species. WHI is also part of the Pacific Flyway for migratory birds. Being located in the middle of an urban area further enhances its value, providing a habitat oasis for species migrating through compromised urban areas.

4. **Rarity** – Intact floodplain habitats are increasingly rare in the lower Columbia and around the world. Floodplain forests, shallow water, grasslands and wetlands are all rare habitats that are in decline. Large, functioning resources such as WHI are very limited in the landscape. Some floodplain forest stands on WHI are in excess of 100 years old; these stands are considered "reference condition" by experienced ecologists for this.

5. **Health** – Like the rest of the Lower Columbia River, WHI hydrology is altered from historic condition by upstream dams and active management of river flows, and it is home to some invasive vegetation. Both of these factors are ubiquitous in the Lower Columbia River ecosystem. Given these caveats, within the context of the Lower Columbia River ecosystem, WHI is in good ecological health.

Other agencies have recognized the ecological significance of WHI:

a. Metro designated it as a Class 1 Riparian/Wildlife Habitat
b. Metro identified it as a Habitat of Concern
c. NOAA designated the shallow water as Critical Habitat for 13 fish species, in addition to the deep water as Critical Habitat for Pacific eulachon
d. Oregon Department of Fish and Wildlife identified it as a Conservation Opportunity Area
e. Oregon Department of Fish and Wildlife further designated the island's forests as Category 2 habitat: "essential and limited."

Below is a description of the existing condition of the primary habitat types on WHI:

Shallow water

The **170 acres** of shallow water located all around WHI provide habitat for Columbia River and Willamette River salmon, trout, and other key aquatic species. This is some of the only intact, contiguous shallow water habitat left in the metropolitan area. Thirteen ESA-listed salmon and trout use this habitat. Juvenile Willamette River salmon have been observed using shoreline habitat around Hayden and Sauvie Islands (confirmed through genetic analysis). ESA-listed fish migrate both downstream and upstream along the island's shoreline as they seek habitat elements that provide opportunities to feed, breed, rest, recharge, and find refuge from predators. Some juvenile salmon species may spend weeks or months in this area before making their last move out to the ocean.

In addition to fish, birds and mammals also rely on shallow water habitats. Western grebes and river otters are examples of the many other species found around WHI. Species such as bald eagles forage in shallow water and nest in trees on the island highlighting the important relationship between the two habitats.

Wetlands

To date, there are **48 acres of wetlands** mapped on WHI (note – no recent or formal wetland delineations have been performed). The wetlands vary in size from approximately 300 square feet to 15+ acres and their sizes change throughout the season. Some wetlands are inundated by the Columbia River during high flows and flood events. The wetlands that have a surface connection to the river provide flood attenuation, complex critical habitat for fish, including many species of ESA-listed salmon and trout, and foraging habitat for waterfowl, wading birds, and diving birds.

At least three of the interior wetlands (typically no surface connection to the river; only during very high flow events) provide habitat for *at-risk* red-legged frogs. These frogs breed in the interior wetlands and then move to the adjacent floodplain forests to continue their life cycle. Red-legged frogs generally will not breed in shoreline wetlands due to variable flows and water volumes.

Some wetlands are impacted by invasive plants, including reed canary grass, which can decrease functionality. These wetlands would benefit from enhancement actions such as invasive plant removal and native plant re-establishment.

Forests

WHI and the south banks of the Oregon Slough contain one of the largest remnant stands of historically abundant cottonwood-ash floodplain forests in the Lower Columbia River Basin, **548 acres** in total. WHI represents 4% of the remaining cottonwood-ash forest habitat between the Bonneville Dam and the Pacific Ocean.

Six attributes combine to make WHI forests highly unique and significant: size, location, old age, habitat rarity, health, and complexity. The cottonwood/ash forests found on WHI are rare, essential and limited in the Lower Columbia River (OR Department of Fish and Wildlife: Category 2 habitat). A patch this old and this large provides valuable ecological services including increased interior habitat area.

The canopy on WHI is almost completely native trees. There are impacts from invasive species including Armenian blackberry; however, invasive plants are found primarily along the roads, trails and power line corridors. The interiors of forest are dominated by multiple layers of native vegetation in various age classes, including young trees, deep leaf litter, and standing snags/downed wood.

The integrity of the floodplain forest is not only represented by its diverse native vegetation, but also reflected by the presence of 13 at-risk wildlife species that are known to live here (birds, bats, and an amphibian).

The riverine cottonwood-ash floodplain forest type found on WHI has been identified as a conservation priority by the following entities:

- PSU Oregon Biodiversity Information Center: High Priority Plant Association/Ecological Element
- Partners in Flight: Priority Habitat
- Oregon Department of Fish and Wildlife: Strategy Habitat and Keystone Habitat

Grasslands and sparsely vegetated areas
There are **230 acres** of grassy and sparsely vegetated areas on WHI.

Historically, open habitats with low structure vegetation were present in the Columbia River and were maintained by natural events like flooding. These wet prairies and early successional habitats were part of a much larger grassland ecosystem. Flooding regimes and development have dramatically altered the river and the habitats supported by flood events. Across the Pacific Northwest the extent of natural grasslands has decreased by 98%; only 2% of the historic coverage remains. The wildlife species that rely on these habitat types have also greatly declined.

The Dredge Deposit Management Area (DDMA), which is actively used for placement of dredge materials, offers an expansive, wide-open area with low structure vegetation and patches of bare sand. The placement and management of dredge materials here restricts trees and shrubs from growing; however, cottonwood saplings are found in the DDMA. The DDMA provides habitat that is preferred by many grassland-associated species. The *at-risk* Western meadowlark is routinely observed in the DDMA, and American kestrels and Northern harriers have also been seen using the habitat.

Floodplain
Nearly all of WHI is within the 100-year floodplain, as mapped by FEMA.

The most obvious function of the floodplain is to hold and convey water during flood events. This reduces flood velocities and peaks, which in turn reduces the impact of floods to areas both up and down stream from the site. The floodplain provides a number of other important natural resource functions that are based on the exchange of groundwater and surface water between the active channel and the floodplain:

1. Flooding in undeveloped areas cycles nutrients (food web) – picking up nutrients on land and bringing them to the river and depositing nutrients from the river on to land.
2. Floodplains improve water quality by trapping, filtering and cycling toxics and pollutants.
3. Natural floodplains provide erosion control though wave attenuation, sediment capture, and sediment release (balancing "sediment budgets").
4. Flooding in woodlands introduces large wood and slash litter to the river – this structure and these nutrients are critical to aquatic species health.
5. Floodplains allow for groundwater recharge and discharge, thereby attenuating floods and allowing for the storage and eventual release of cold, clear groundwater to the river during dry periods.
6. Channel migration is a natural function of rivers and streams and is aided by flooding that carves out areas in the floodplain and deposits sediment in others.
7. Floods help maintain habitats – floods deposit seeds and nutrients from other areas of the watershed.
8. Active floodplains create microclimates by regulating humidity, air temperature, and water temperature.
9. Adaptation – current climate change models show that flooding the Columbia River could increase in frequency and/or volume due to warmer, wetter winters – existing, undeveloped floodplains will help society respond to those changes.

References:
Hayden Island Natural Resources Inventory, February 2012
http://www.portlandoregon.gov/bps/article/407699

6. Is the forest mitigation ratio appropriate for ash replacement and is it even possible to replace mature ash on Government Island?

Answer: Yes, with caveats (see also Attachment F).

The forest mitigation ratios treat the cottonwood-ash stands on WHI as a single habitat type. The ratios take into account the rarity of this habitat type and advanced age of the impacted floodplain forest stand. The ratios assume it will take 100 years for a mitigation site to provide *all* of the ecological functions that the impact site provides today. For example, it takes many years for the duff layer to build up and create a microclimate like that of the existing forest on WHI.

Oregon ash represents about one-third of the impacted forest stand on WHI, while black cottonwood makes up the remainder. The stands host a variety of age classes, from young saplings to a couple very old individuals. Some of largest Oregon ash trees are at least 120 years with a few approaching 200 years in age. These "old growth" Oregon ash are only found within the development footprint, not elsewhere on WHI.

The forest stands on WHI appear to be gradually transitioning from cottonwood dominated to ash dominated, a succession observed at other sites in the Lower Columbia River. Oregon ash is shade tolerant and slower growing that cottonwood; they also prefer slightly wetter sites than cottonwood.

It is possible to replace mature Oregon ash on Government Island, if the site conditions, including hydrology, are appropriate. Based on a single cursory site visit, city ecologists believe that portions of the proposed planting areas on Government Island will be able to support healthy Oregon ash in the future. No detailed mitigation planting plans have been developed; however, the draft IGA includes performance standards that specify coverage of both cottonwood and ash.

7. Will the proposed mitigation amount to habitat conversion?

Answer: Overall no, but in some areas habitat conversion is proposed.

The largest location proposed for habitat conversion is the historic agricultural field on the south side of WHI. While a grassland, this area has not been documented to support grassland-associated species (likely because of its size, shape and relationship to surrounding forests). The staff believes the desired future condition in this location is to establish bottomland hardwood forest habitat. ODFW agreed in a recent letter.

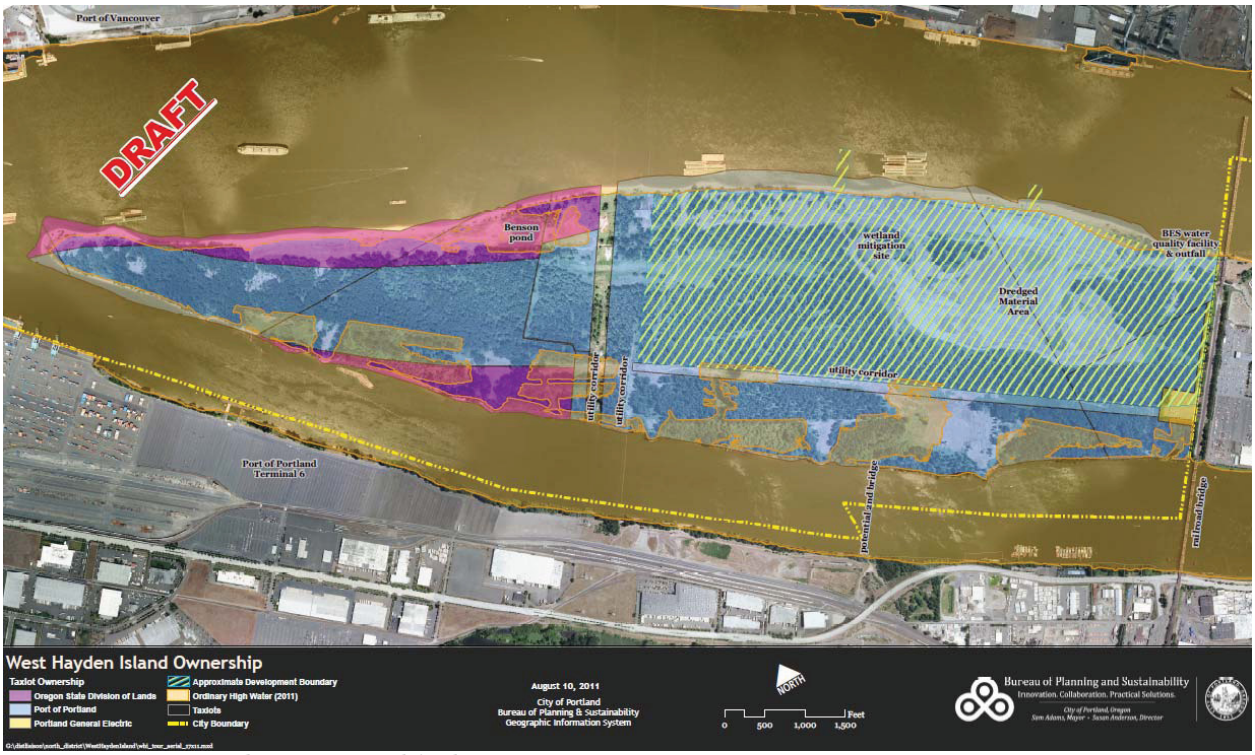
There are also areas of invasive shrub habitat (Himalayan blackberry) and grassy (reed canary grass) on both WHI and Government Island that are proposed to be treated and replanted with native trees and shrubs. The goal is to create more closed canopy forest habitat, reduce edge effects in habitat units, and create larger interior areas.

The proposal does not include any conversion of forest habitat to shallow water or wetlands. Mitigation for impacts to shallow water and wetlands will be determined through future review processes. It is unlikely that habitat conversion from forest to either habitat type would be approved by regulatory agencies. However, there is potential to improve hydrologic conditions without detrimentally impacting existing trees.

Ownership of WHI

8. How many acres does DSL own vs Port ownership? Why hasn't the state (DSL) been involved in the conversation? Have they signed off on the proposed mitigation? The same is true for PGE and Bonneville rights of way. Have those issues already been resolved, as stated in the public testimony?

Answer: Based on the Multnomah County tax lot GIS data, DSL owns 68 acres and PGE owns 6 acres for a substation. PGE also has an easement over 18 acres and BPA has an easement over 14 acres. The Port owns the rest of WHI above ordinary high water. See Map 5 and Attachment G.



Map 5: West Hayden Ownership by Tax Lot

DSL is involved in ongoing conversations regarding WHI. The Port and DSL has been in discussions regarding the 68 acres shown as DSL ownership in the county data. Both agencies agree that DSL's ownership is probably closer to 50 acres. The difference has to do with sediment accretion and erosion over time.

Authorization from DSL would be required for any constraints on or physical impacts to property it owns. This authorization may take the form of an access permit, a lease, an easement, or in certain instances, a purchase agreement. The Port has not entered into a discussion with DSL regarding specific authorization for actions.

DSL also has jurisdiction over submersible and frequently submersed lands; which means that DSL has jurisdiction over some of the lands located below the Ordinary High Water Mark (OHWM).

The current draft proposal recognizes that mitigating impacts to shallow water and wetlands is likely to occur on the north shore or below the ordinary high water mark; either on lands DSL owns or has jurisdiction over. Agreement from DSL would be obtained during permitting at the time of development. City and Port staff believes agreements can be reached.

According to documentation provided by the Port, the easements granted to PGE and the BPA rights-of-way allow the utilities the right to clear and control brush and timber on land covered by the easement and to cut down trees adjacent to the easement that create hazards. The Port explicitly retains the right to use the PGE easement for all purposes that do not unreasonably interfere with the uses and purposes of the easement (i.e., the power transmission lines). In the future, for activities within easement areas, the Port will have to coordinate with PGE and BPA (see question #2).

9. Is there a legal reason the Port cannot mitigate on non-port land? And do or will the Port receive credit for the mitigation?

Answer: No, there are no legal barriers to mitigation on land owned by other entities as long as the mitigation is protected via a deed restriction, conservation easement or some other restrictive measure. Agreements can be reached between the Port and other entities for mitigation on non-Port owned lands. Pending approval by the regulating agencies, the Port would receive credit for those actions. There may be management complexities introduced when additional ownership entities are involved with a project, but these are not legal barriers.

10 Can the Open Space acres be sold to a third party with provisions for the Port to mitigate on the land for the next 100 years?

Answer: Yes. However, generally a third party is unlikely to want to make an agreement considering the significant legal restrictions that would be required in conjunction with the mitigation requirements. Once all mitigation obligations have been fulfilled, other entities may be interested in owning WHI.

References:
West Hayden Island Land Management Options, June 12, 2012
http://www.portlandoregon.gov/bps/article/390089

11. Who will ultimately own and manage the protected open space? Long term Port management and ownership of the 500 acres not acceptable. My overarching concern is the "custody" of the 500 acres that the Port will continue to control…..I am hoping for an unaffiliated group to be the ultimate authority. How do we reconcile this with our desire for on-site mitigation over the next 100 years (which the Port is responsible for)?

Answer: The Port is a public agency and is likely to retain ownership until mitigation obligations related to development on WHI are fulfilled.

The Port is the anticipated owner and manager until its mitigation obligations are completed. Under the current annexation proposal, the Port would have significant long term mitigation obligations covering much of the site, directly related to WHI marine terminal development. Additional mitigation obligations could be related to Superfund damages. Other potential owners are not likely to be interested in taking on management of a site that is primarily being managed for natural resource mitigation actions obligated to the Port. Portland Parks is willing to manage trails and related facilities during the mitigation period, on contract (trails would not be located directly within mitigation areas).

Once the Port has fulfilled their mitigation obligations including monitoring and maintenance, both the Port and the City may agree that other ownership is desirable. The extended time frame of the forest mitigation (100 years) creates uncertainty as to the status of existing land management entities. Therefore, up to this point, the City staff has felt that the long term ownership decision is better left to a future City Council and Port Commission. The Advisory Committee proposed in the current draft IGA will also have a role in determining the future ownership of the Open Space. That said, the most active phase of forest mitigation activities will be complete within 30 years. If the Port's active mitigation obligation ended at 30 years, instead of 100, there may be a way to use the IGA to outline a possible ownership transition at that stage, with the Port retaining a more limited interest in long term forest monitoring.

12. Who will be the third party to the IGA to protect the open space interests?

Answer: We don't know at this stage.

The current IGA states, "The Port's commitment to not seek or support rezoning of the OS zoned area pursuant to Paragraph 4.1.1 will survive the termination of this Agreement and continue in perpetuity. The instrument memorializing this commitment will incorporate a third party organization selected by the City, which will be granted the power to veto future amendments to that agreement."

In addition, the IGA proposes to form an Advisory Committee to comment on development and implementation of an "Open Space Strategy". This Advisory Committee will provide a regular, ongoing forum for discussion of WHI issues including protection of open space interests.

Tribal Interests, Treaties

13. Assertion of the Tribes that treaty rights come into play either with respect to fish issues or with respect to treatment of the island itself.

Answer: While one or more tribes have expressed concern about the effect that developing a port facility may have on their fishing rights, staff is not aware of any treaty violation related to this project and no specific treaty violation has been asserted

There are a variety of treaties with Pacific Northwest Sovereign Nations/Tribes. Some tribes have treaty rights to fish in the Columbia River. Other tribes have retained rights to hunt and gather, or perform traditional ceremony in traditional locations. The Yakama have reserved rights under the Treaty of 1855 to fish at all usual and accustomed places known at the time of the treaty signing. This includes both on – and off-reservation sites. The Grande Ronde includes descendants of the original people of the Portland area, and they were the tribe that ceded the land that makes up Portland to the United States. Because the Columbia River was such a significant trade corridor, other tribes also have treaty interest in lands along it. In the case of WHI, our primary treaty-related concern is that Port development would impact fisheries in the Columbia River.

Staff's approach to respecting and honoring these treaty rights includes: 1) conducting detailed natural resource evaluations (the HNRI and ESEE), and inviting tribal review of that work; 2) designing the site to be as salmon-friendly as possible – in this case avoiding shallow water impacts (a key habitat for salmon) and fully mitigating forest impacts; 3) staying in close communication with interested tribes at each stage of our work; and 4) coordinating information and actions related to state archeological resource protections.

Fisheries Impacts

The Columbia River is designated *Critical Habitat* for 13 Endangered Species Act (ESA) - listed salmonid populations because it is *the* migration route to and from the ocean. Pacific salmon, especially juveniles, are one of the more sensitive aquatic species to water quality and quantity, and physically diverse and complex habitats. The lower Columbia River is also designated critical habitat for Pacific eulachon. Pacific lamprey, which are not yet listed, also use the Columbia River to migrate between freshwater spawning beds and the ocean.

Shallow water habitat (SWH) is a primary limiting factor for salmon and eulachon species. SWH in the Lower Columbia River estuary[1] provides important functions such as velocity moderation and food production that support aquatic organisms. For juvenile salmonids migrating out of the Columbia River system, shallow water habitat is where they begin to experience tidal action. These fish can have extended rearing (resting and eating) periods in the lower river prior to outmigration. SWH also builds and maintains the aquatic food web for other fish such as lamprey and sturgeon, amphibians, birds and mammals.

West Hayden Island is surrounded on all sides by SWH. The highest quality shallow water habitat on West Hayden Island predominantly occurs on the south shore of the island where forest land is contiguous to the in-water areas and there is evidence of large woody debris accumulation. Maintaining the continuity of shoreline habitats is important, fragmentation of the shoreline area can disrupt migratory behaviors of fish. Chinook

[1] The Columbia River estuary is the lower 145 miles of the river from the Bonneville dam to the Pacific Ocean.

salmon, coho salmon, steelhead trout and Pacific eulachon are highly reliant on shallow water habitats; slower water is especially important during high flows, which can negatively affect small or stressed fish.

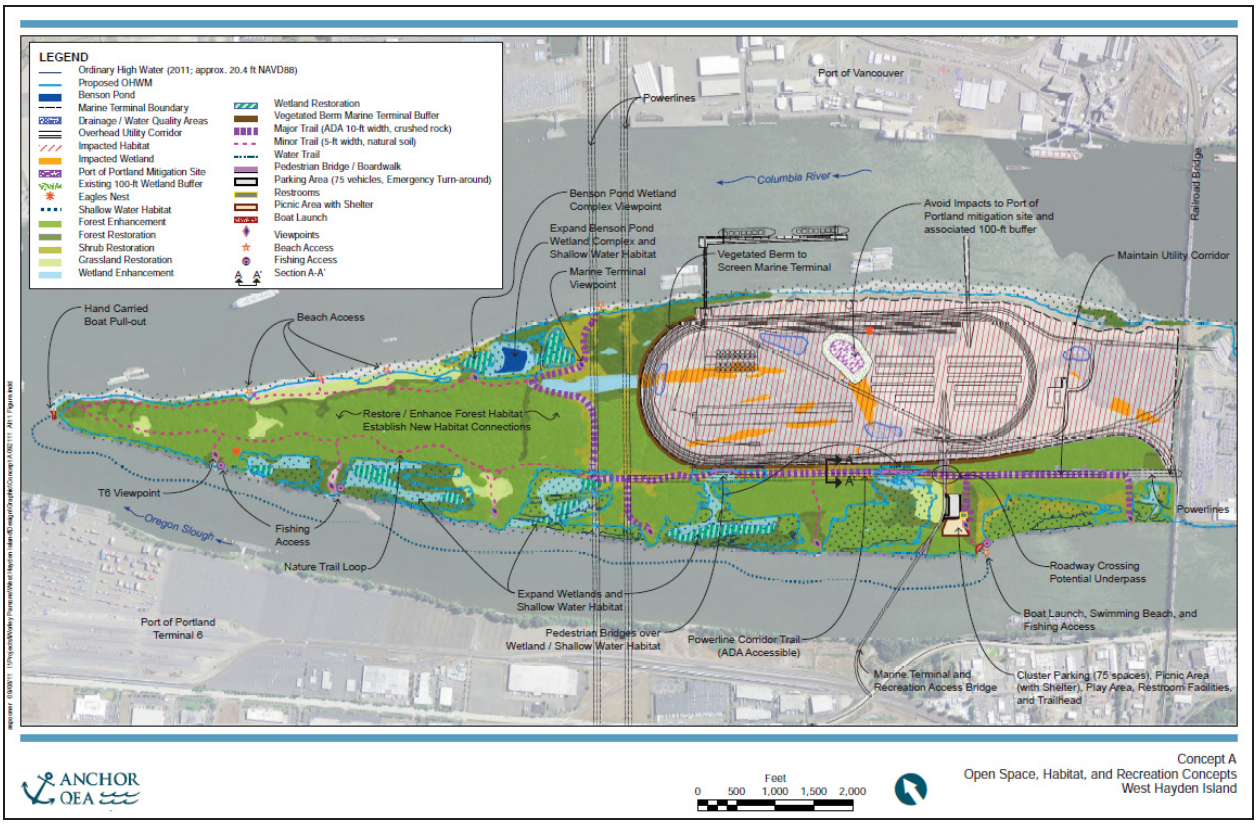
More information about SWH and ESA species can be found in the Environmental Foundation Report (ENTRIX, 2010), the Concept Plan report (Worley Parsons, 2012), and the Hayden island Natural Resources Inventory (BPS, 2012). In particular:

- Hayden Island NRI (aka HNRI), pg 91-97
- Environmental Foundation Study (ENTRIX), pg ES-15 and pg 3
- Concept Plan Final Report (WorleyParsons), pg 14 and memo dated 11-10-11

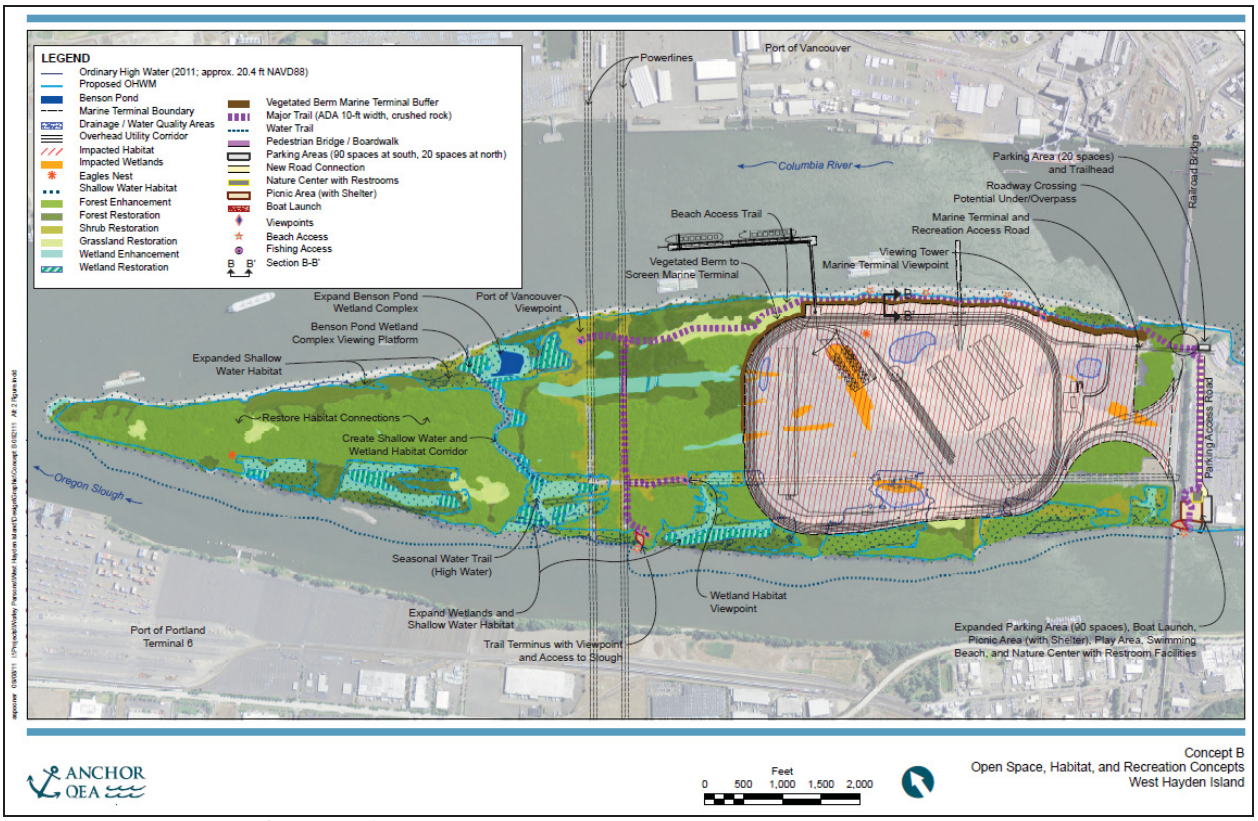
The Concept Plan looked at two basic layouts (see Map 6 and 7):

A Series: Avoided the wetlands and SWH along the south bank of the island by keeping all development north of the PGE easement

B Series: Impacted some of the wetlands and SWH along the south bank, but avoided the large forest patch just west of the DDMA



Map 6: Concept Plan Series A Layout



Map 7: Concept Plan Series B Layout

Both the A and B Series proposed that development be set back 100ft from the Ordinary High Water Mark on the north shore. This was to avoid impacts to shallow water habitat to the maximum extent possible.

The Advisory Committee (AC) preferred the A Series of site layouts for preserving on-site, shallow water habitat for the benefit of salmon. The only direct impacts to shallow water habitat in the *Final Base Concept Plan* are the access ramps to the docks; the docks themselves are to be located out past the lower extent of SWH. In total, there are less than 2 acres of direct impact from the dock infrastructure. The AC also chose the version of the A Series that pushed the rail loop as far east as possible to minimize impacts to the intact cottonwood/ash forest.

14. If this annexation and development were passed by City Council - what is the impact on relationships with Tribes – especially those who have Federal Treaty rights on the Columbia and Willamette?

Answer: Our City Attorney's office continues to research federal tribal treaty rights and their relationship to this potential annexation and development. The passage of Resolution 36941 is one way that the City is moving forward to formalize government-to-government relationships with Tribal Government Partners. The City of Portland is currently working to establish Tribal Government Consultation protocols called for in the resolution. The potential annexation of WHI presents an opportunity to begin to define what theses protocols might look like. As separate sovereign nations we will need to defer to Tribal

Governments individually regarding their expectations for consultation for this project and other important projects in the City.

15. How does the city propose to close the gap between tribal testimony and the proposed annexation and development of WHI? Has there been staff outreach post hearings and are there plans for addressing tribal concerns?

Answer: Since the PSC hearings staff has continued to communicate with tribal representatives, working with the City's Government Relations Office. We have also worked with the City Attorney's Office to consider questions related to treaty interests. Some of that research is ongoing, and our answers may evolve as we learn more.

Regarding tribal and indigenous outreach, there have been several distinct efforts, at different levels.

- In July 2012City Council passed Resolution 36941, which aimed to establish more formal consultation agreements between the City and Tribal Government partners. This resolution is particularly focused on higher level (City Council and Tribal leadership level) dialog and relationship building. Although the WHI project pre-dates this resolution, there has been communication at this level – for example WHI project staff has participated in talks between then Mayor Adams and Grand Ronde leadership, where the project was discussed. Staff is working with Council staff to provide a more detailed a briefing on this Resolution during the 29th work session.
- Many of the Tribes have natural resource offices and technical staff. BPS staff has continued to work with those staff to collect technical input on the natural resource reports and proposed mitigation framework. Tribal Government staff has offered technical feedback over the course of this project, and will be in attendance on the 29th. Staff recommends the Commission invite their comments. Specifically, we have also been informed that Yakama Nation Fisheries (YNF) management has authorized continued involvement and oversight of the WHI annexation issue. Grande Ronde has also indicated that they would like to continue staff to staff periodic meetings and updates on the project.
- Staff has contacted the Columbia River Inter-Tribal Fish Commission (CRITFC) to determine how CRITFC would like to be involved in the project moving forward. BPS has been informed that CRITFC will continue to monitor this project and would like to receive regular updates.
- Staff also understands that there is a large indigenous or Native American population in Portland, who may or may not be affiliated with recognized tribes. BPS maintains a relationship with the Native American Youth Family Center (NAYA), as a component of our larger outreach work on all planning issues. Project staff have discussed WHI with NAYA staff on several occasions, and NAYA has been involved with BPS staff education and training on Native American concerns.

Given the level of tribal government interest, staff recommends consideration of more specific coordination mechanisms in the proposed IGA, to ensure ongoing consultation as the project progresses, after annexation.

16 Can the IGA contain a mechanism that provides tribal feedback (design, mitigation, continued communication through development and management)?

Answer: Yes, BPS recommends consideration of more specific coordination mechanisms in the proposed IGA, to ensure ongoing consultation as the project progresses, after annexation. Some of the areas of the agreement we are looking at include the open space strategy, natural resources coordination and ongoing WHI advisory committee.

17. Describe the tribes role in process – how did we involve them?

Answer: In early 2010 (prior to the City Council's resolution) staff worked with the City's Government Relations Office to discuss sovereign nation involvement in the WHI project and to determine the list of sovereign nations in the area that may have an interest in the WHI planning process. We contacted the following tribal representatives by e-mail in the spring of 2010 and again in the fall of 2010 to discuss involvement in the WHI project:

Erin Madden, Nez Perce Tribe
Mike Karnosh, Grand Ronde Ceded Lands Coordinator
Tom Downey, Siletz Tribes
Brian Cunninghame, Warm Springs Tribes
Matt Johnson, Umatilla Tribes
Rose Longoria, Yakama Nation

We provided background on the project and asked how they would like to participate. This included:

- Periodic check-ins via phone or email;
- Quarterly meetings to discuss the project;
- Identifying experts to participate in technical review of reports; or
- Discussions with the project advisory committee.

Grande Ronde, Warm Springs, Nez Perce and Yakama requested periodic phone check ins and updates by e-mail. BPS has provided quarterly check ins or at key project milestones to provide updates. Since Council's resolution in July 2010 we have also had additional involvement by Grande Ronde and Yakama as part of a technical review team to review our Hayden Island Natural Resources Inventory and ESEE Analysis. In March 2011, BPS staff and management participated in a meeting with Grande Ronde staff in Grande Ronde to discuss more details on the WHI and River Plan projects.

Grande Ronde, Nez Perce and Yakama requested notification of technical work sessions to review consultant and staff reports. Staff provided e-mail updates on a quarterly basis, or as key studies were completed, with notification of technical works sessions of interest. Over the past year and half Yakama has become more involved in attending WHI Advisory Committee meetings. Grande Ronde has requested phone check ins and staff to staff meetings to receive updates on the concept plan, land management options report and natural resources mitigation.

Floodplain Functions

18. How can the Port and City achieve net gain in ecological function while ignoring 300 acres of floodplain fill?

Answer: Unless out-of-kind mitigation is considered, it is not possible to achieve a net gain in ecologic function without mitigating for fill within the floodplain.

The current draft proposal will not result in an overall net increase in ecosystem functions, for every function impacts. The individual habitat types – shallow water, wetlands, forest and grasslands – are addressed and there will be a net increase in forest functions as a result of the proposed mitigation. However, floodplain functions are not fully addressed. While some impacted flood functions would be compensated for, including ensuring no harm to ESA-listed species and no significant increased risk of flooding in the surrounding area, other functions could be lost. See Table 1.

Table 1: Summary of WHI Mitigation

Habitat	Where it's Addressed	Full Mitigation
shallow water habitat	Plan District – future local review	Yes – 100%*
wetlands	IGA – state/federal permits	Yes – 100%**
forests	IGA – local	Net Increase – 110%
grasslands	IGA – grant	Yes – 100%
floodplain	existing code and IGA	Loss - <100%

*Assumes that future local, state and federal determination of mitigation actions will fully compensate for the impacts. Local land use approval criteria require full compensation for significant detrimental impacts.

**Assumes that future state and federal permitting process will address all wetlands and impacted wetland functions. Some stakeholders and technical experts disagree that state and federal authorities will address all functions. City has proposed to not have a formal review in the future.

19. Has Planning and Sustainability and BES sorted out concerns that the city might face significant liability if it allows filling of the floodplain without mitigation? Relationship to FEMA lawsuit?

Answer: Staff has addressed this in the IGA by requiring that the Port obtain federal ESA authorization prior to requesting FEMA mapping modifications.

There are three regulatory systems in Portland to address floodplain impacts and to protect these functions. First, the federal FEMA flood insurance program requires cities to regulate fill in the floodway. Second, through Title 3, Metro requires cities to implement balanced cut and fill in most situations (WHI is one such exception), and finally, the City has often used its Goal 5 authority to adopt environmental overlays to protect forests and other habitats in the floodplain.

The City implements the normal FEMA requirements through Title 24, which requires an engineering evaluation at the time of development (at the time of the fill) for any fill placed in the floodway. This includes a "no net rise" requirement, requiring that fill placed in the

floodway does not cause any increase in 100-year flood elevations. Habitable buildings must also have finished floor elevations at least 1 foot above the flood elevation. The City is not proposing to waive or change these standard FEMA requirements as they apply to WHI.

Metro's Title 3 requirement is also implemented through the City's Title 24. In most areas of the city any fill placed in the floodplain below the 100-year flood elevation must be balanced by an equivalent cut, creating a compensatory floodable volume. This is in addition to the "no-net rise" rule described above. There are a number of exempt properties, including the South Waterfront District, and several Port properties, including WHI. These exemptions were provided by Metro because development of these sites are important elements of the regional growth management strategy and important to the City's economic development strategy. Ports are, by their nature, inherently located with fill or other structures in the floodplain. While on balance the region practices balanced cut and fill, there was an economic concern that a strict application to all sites may present a significant barrier to our ability to remain a Port city. The WHI concept plan does include some removal of existing fill associated with anticipated wetland and shallow water mitigation actions, but there will not be a 1:1 ratio of cut to fill.

Through its application of State Land Use Goal 5, the City also has the authority to regulate removal of forests and wetlands and other natural resources located in the floodplain. This is done via the Environmental Overlay regulations (for example, along Johnson Creek), or via the Greenway regulations (along the Willamette). In the case of the WHI open space, the City has proposed standards that are substantially similar to the environmental overlay, as an element of the proposed Plan District. For purposes of State Goal 5, staff are recommending that marine terminal development be allowed within a 300 acre area on WHI. In that development footprint, staff proposing an agreement with the Port to carry out compensatory forest mitigation.

Recently in Washington and Oregon, lawsuits were filed making it necessary for FEMA to consult with NOAA on any changes to the mapped 100-year floodplain. The requirement is to ensure no harm to ESA-listed species (salmon, steelhead and eulachon). This recognizes the important relationship between the river's floodplain and its in-water aquatic habitat. The City's current draft IGA proposal includes provisions that address ESA-listed species:

1. No fill can be placed outside the dredge area until CWA 404 permits are obtained; and
2. The Port will get ESA authorization prior to requesting any FEMA map modifications.

20. Describe the technical basis for a balance cut and fill requirements?

Answer: From a hydraulics perspective, the purpose of balanced cut and fill is to maintain the capacity of the floodplain to store floodwater, addressing cumulative impacts that may otherwise occur. The floodplain provides a valuable function by storing floodwaters, especially in flat areas. When fill or buildings are placed in the floodplain, some of the flood storage area is lost and the flood water that would have been stored there must be conveyed or stored elsewhere. Flood elevations may increase because there is less room

for the floodwater. Think of a bath tub. It can hold a certain amount of water. But if it is filled with sand and you turn on the faucet, the tub will quickly overflow.

FEMA flood insurance regulations attempt to limit the potential increase in flood elevations by identifying the floodway portion of the floodplain. The floodway is the river channel and that portion of the floodplain that must remain open and unobstructed to allow passage of flood water without significantly increasing flood elevations. The floodway boundary is mapped by FEMA and established by computer analysis. There is an analysis that evaluates the effects of filling the floodplain beginning at the outer edges and incrementally moving inward toward the floodway. This squeezes the floodwater toward the channel and causes the flood elevation to rise. At the point where the flood rise reaches one foot, the floodway boundaries are drawn. Most development is prohibited within the floodway. The program is voluntary, in theory, but communities that choose not to enforce these standards would face very steep hikes in their flood insurance rates, for property inside the floodplain.

Theoretically, the FEMA floodway standard should limit the increase in flood elevation to one foot as future development and fill obstructs the portion of floodplain outside the floodway. This one foot of "allowed" increase in flood elevation is a compromise standard intended to allow some development in the floodplain and yet still limit the potential increase in flood elevation.

The FEMA flood insurance floodway standard however does not fully address the need to maintain flood storage over the long term. Fills and development reduce the natural storage of floodwater and increase the magnitude and rate of runoff, which can increase the peak flow rate downstream. The more fill that is placed in the floodplain, over time, the more likely it is that the one foot of flood increase built into the FEMA floodway standard will eventually be realized. The balanced cut and fill requirement is a more protective standard than the historical approach taken by the FEMA flood insurance program.

Preserving flood storage is most important in smaller watersheds where the portion of the floodplain outside the floodway stores and/or conveys a more significant proportion of the flood flows. In other words, fill in a small watershed will have a more pronounced affect on flood elevations than fill in a large watershed.

One way to put the impact of flood storage into context is to compare the lost storage volume with the flood discharge. For example, Johnson Creek has a peak discharge of about 2,780 cubic feet per second (cfs) and a flood duration of about 24 hours. The Columbia River has a peak discharge of about 560,000 cfs and a flood duration of about 3 days or more. A floodplain fill of 1,300,000 cubic yards would theoretically prolong flooding on Johnson Creek by about 3.5 hours; a significant impact for a flood that typically lasts 24 hours. Whereas the same volume of floodplain fill would prolong flooding on the Columbia River by about 1 minute; a much less significant impact for a flood that typically lasts three days or more.

21. The loss of ecological functions associated with the Columbia River floodplain must be accounted for and some form of mitigation included in the IGA. Are there are methods short of balanced cut and fill that would help mitigate for loss of floodplain function?

Answer: Yes, impacts to flood functions can be mitigated by actions other than cut and fill. For example, breaking through a levee and allowing the river to inundate areas that were historically flooded. However, unless an equal amount of volume for flooding is created to compensate for the fill then full mitigation will not be achieved.

One option is to move or break through a levee to increase flood inundation and frequency. Breaking through a levee is relatively inexpensive; while moving a levee would be more expense maybe not as much as a wholesale cut. Sauvie Island has many levees that could be considered for these actions.

Another option is to replace culverts or weirs that prevent or drastically reduce surface water connections between the Columbia River and wetlands within the floodplain. For example, the culvert located under the access road on WHI that connects Benson Pond wetlands to the North Wetland complex could be removed.. This would allow for flood waters to more frequently reach North Wetland and provide more fish access to the wetland.

22. Can we provide some more scientific evidence to counteract fears that the fill will increase flooding up or down stream?

Answer: The City implements the typical FEMA flood insurance program requirements through Title 24, which requires an engineering evaluation at the time of development (at the time of the fill). This includes a "no net rise" requirement, requiring that fill does not cause more than an one-inch rise in flood elevation, and prohibiting fill in locations where there is typically active flowing water (the FEMA floodway). Habitable buildings must also have finished floor elevations at least 1 foot above the existing flood elevation. The regulations are in place to protect property against flooding. Existing regulations would prohibit building permit from being issued for development that violated this standard.

23. What are the potential mitigation costs for balanced cut and fill?

Answer: Staff does not have an answer to this question at this time. It would take significant additional research to determine the costs associated with balancing 1.3M cubic yards of fill – including where the cuts could take place. Staffs have generally estimated the cost of balanced cut and fill on WHI to be in the tens of millions of dollars.

Climate Change

24. With Climate Change, is the island likely to flood more frequently in the future? How does this impact terminal development or floodplain management?

Answer: We cannot answer this question definitively at this time.

The City of Portland and Multnomah County are undertaking work to better understand how climate change will affect us locally; however, decision-making in the face of

uncertainties in climate change projections, especially in regional downscaling of global climate change models, remains a challenge. Climate projections work well for some variables and poorly for others. For example, currently available model projections for the Pacific Northwest have a higher degree of certainty related to expected changes in precipitation patterns and temperature increases, but are inconclusive about total annual precipitation, extreme weather events or river surface elevations.

It is fairly certain that the Portland region will experience:

- Increased temperatures overall, including higher average, maximum and minimum temperatures in the summer and winter months (projected 0.5 ºF increase per decade).
- Changes in precipitation patterns, with more precipitation falling in mid-winter and less precipitation in the summer.
    - More precipitation falling as rain rather than as snow in lower elevation watersheds.
- Continued influence of ocean-driven weather patterns (e.g., La Nina/El Nino and the Pacific Decadal Oscillation) and swings between hot/dry and cold/wet

Source: Oregon Climate Change Research Institute, 2010

In addition, the Portland region may also experience:

- Changes in total annual precipitation amounts (seasonal increases or decreases).
- A change in the frequency, magnitude or duration of extreme weather events (intense rainfall, wind storms, ice and snow).

Changes in precipitation patterns could cause additional river flooding; changes in flood frequency, duration or extent. Because the Columbia River flow is actively managed by humans, an additional element of uncertainty is what river management policies may be in the future. The river flow is governed by a complex set of agreements and international treaties.

Sea level rise is not currently expected to directly cause additional flooding on WHI before 2100; though longer term impacts may be possible. The most recent estimates from the University of Washington and the National Research Council anticipate changes of 50-140cm (1.6-4.6 feet) on the West Coast of the US by 2100. Sea level rises in the vicinity of the Columbia River are expected to be on the lower end of that range because our coast is rising geologically. Impacts from sea level changes vary based on local geography and geology. In some areas of the Pacific Northwest coastal uplift is causing land to rise faster than sea levels, in other areas where the land is subsiding, sea levels may rise faster. Estimates may become more accurate over time as we better understand the rate of glacial melting in Greenland and Antarctica.

Non-developed areas that provide multiple natural resource functions, such as WHI, can play an important role in adapting to climate change in the region. Flood storage provided by active floodplains may become even more important to accommodate potential changes in flows and flood regimes. Maintaining diverse and functioning habitats and corridors will be critical for resident and migratory wildlife that may be required to adapt their behaviors and life cycles to changes in air and water temperature, weather patterns, habitat ranges, and food sources. All of these functions associated with the floodplain on WHI would be significantly impacted by terminal development.

When the marine terminal is designed there may be more understanding of climate change trends, and there may be additional requirements to prepare for increased frequency or greater volume of flood events. This could add to the cost of developing the terminal.

25. Impact or connections of this project to the Climate Change Action Plan?

Answer: This project relates directly to two key components of the Climate Action Plan (2009):

1) Improving the efficiency of freight movement within and through the region; and
2) Maximizing the benefits of natural systems, particularly tree canopy, to mitigate against climate change impacts.

The Portland/Multnomah Climate Action Plan (CAP) establishes the goal of reducing local carbon emissions by 80% by 2050, with an interim goal of 40% by 2030. To this end, the CAP establishes a series of "2030 Objectives," milestones the City and County seek to achieve in order to meet the overall carbon reduction goals.

Several 2030 Objectives in the CAP relate to WHI. Two Objectives that relate most directly are:

1) Urban Form and Mobility, Objective 7: Improve the efficiency of freight movement within and through the Portland metropolitan area.
2) Urban Forestry and Natural Systems, Objective 13: Expand the urban forest canopy to cover one-third of Portland, and at least 50 percent of total stream and river length in the city meet urban water temperature goals as an indicator of watershed health.

The draft WHI proposal would take advantage of efficiencies in freight movement (see question #26 for more description). The draft proposal also requires full mitigation of impacted forest habitat and proposed a net increase in forest functions. Both of these aspects support the CAP.

In addition, several 2030 Objectives could be helped or hindered, depending on how the project is implemented (e.g., design and performance of facilities, employee commute modes, and use of alternative transportation fuels):

3) Buildings and Energy, Objective 2: Achieve zero net greenhouse gas emissions in all new buildings and homes.
4) Buildings and Energy, Objective 4: Ensure that new buildings and major remodels can adapt to the changing climate.
5) Urban Form and Mobility, Objective 6: Reduce per capital daily vehicle-miles traveled (VMT) by 30 percent from 2008 levels.
6) Urban Form and Mobility, Objective 9: Reduce the lifecycle green-house gas emissions of transportation fuels by 20 percent.
7) Climate Change Preparation, Objective 17: Adapt successfully to a changing climate.

26. What are the climate benefits of rail and water transportation? How does locating the rail/marine terminals in the lower Columbia impact greenhouse gas emissions?

Answer: Locating a marine/rail terminal in the lower Columbia could reduce regional greenhouse gas emissions in the long run.

Development of additional marine terminal capacity in the lower Columbia is generally expected to reduce GHG emissions relative to alternative locations due to the combination of access to the deep water navigation channel and the BNSF main rail line.

Freight movement on an ocean-going ship is significantly less carbon-intensive than other freight modes. Figure 8 shows estimated CO2 emissions from transporting freight by several transportation modes; other research suggests a range of emissions for transporting freight, as follows:

- ocean-going ship: less than 10 g/ton-mile
- inland waterways barge: 15-20 g/ton-mile
- rail: 20-30 g/ton-mile
- truck: 65-135 g/ton-mile
- air: 100-1000 g/ton-mile

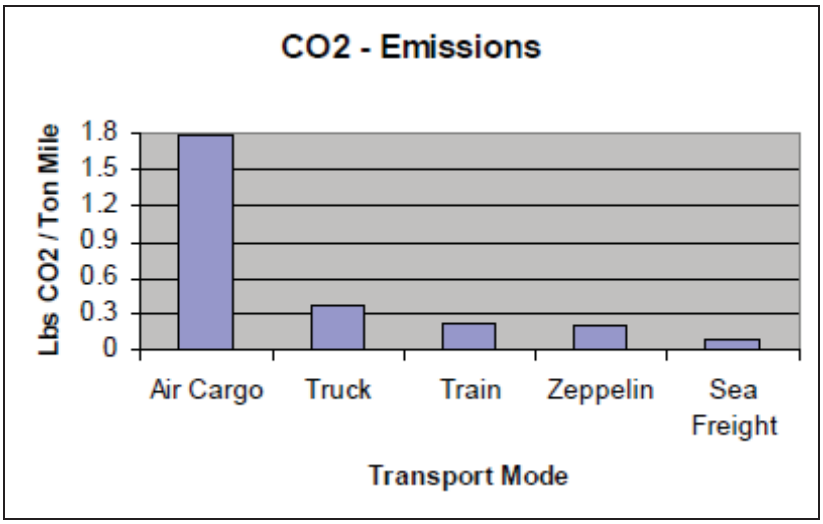


Figure 8: CO2 Emissions by Transport Mode (Flugzeuge. 1999)

In general, carbon emissions decline as transportation infrastructure brings ocean-going ships further inland and connects those ships with barge or rail. Right now, the Columbia River Shipping channel depth permits large ocean-going ships to reach Portland/ Vancouver. If market demand emerges as projected, and the Port of Portland does not develop WHI, some demand may be met by expanding other downstream Ports - Longview, Kelso, St. Helens, Astoria. This is already happening (for example, the new grain terminal in Longview). Failure to develop sufficient marine terminal capacity in Portland/Vancouver will encourage more of those facilities to develop farther downstream, shifting freight to a more carbon intensive mode. This is a significant impact, as the emissions from the various modes differ widely.

Additional downstream port development would likely require development of additional truck and rail infrastructure along the Lower Columbia. Existing roads and rail infrastructure on the Oregon side of the river are particularly ill-equipped to handle growth. Portland/Vancouver is the only location in the Lower Columbia with access to the deep shipping channel, the interstate highway system, and two competing transcontinental

railroads. Building new infrastructure elsewhere in the Lower Columbia would have its own environmental impacts. In general, maximizing existing infrastructure will minimize GHG emissions because building large scale infrastructure is a fairly carbon intensive activity. This is part of our effort to plan for a compact urban growth boundary, building up rather than out.

Meeting marine terminal growth demand elsewhere in the Lower Columbia will also potentially increase emissions from car and small trucks in the region, because the majority of the port workers and firms that provide logistical support for marine terminal operations are based in Portland. An existing cluster of businesses located in Portland has been developed around the Port. In other words, allowing the future demand to drift to downstream ports will spread out this industry, and could put more service trucks and longshore cars on I-5 and/or Highway 30.

Shallow Water and Wetlands

27. In the AC report that suggests [BPS] proposed expanding environmental zoning restrictions for shallow water and wetlands in the IH zone. Please explain the differences in approach between wetlands and shallow water.

Answer: The current proposal is recommending application of local environmental regulations to shallow water habitat. Wetland impacts would be addressed in the IGA; and through state/federal permitting, but no local land use review.

Shallow Water Habitat: Mitigation associated with impacts to shallow water habitat would be addressed in the Plan District zoning code through a local land use review. The IGA contains general language regarding City/Port coordination.

Impacts to shallow water habitat are not fully understood at this time. In the concept plan for development, the number and location of docks and access ramps are only theoretical. It is unclear if two docks would be built at one time or if one would be built before the other. In the future, dock materials, construction techniques, etc. may have changed from what is standard today. Further, while the Hayden Island Natural Resources Inventory generally describes the shallow water habitat and species use, much more detail will be needed to fully understand the direct and indirect impacts to functions and species. It will be necessary, at the time of design, to evaluate the specific impacts and determine appropriate mitigation.

In addition to local review, there will be state and federal permitting required at the time of development. Determining local mitigation now as part of the IGA could result in incompatibility with mitigation required in the future by state and federal permitting agencies.

For these reasons, the City is proposing to apply environmental regulations through the zoning code to the shallow water habitat. Impacts and mitigation would be evaluated through a land use review, similar to what is done when development impacts environmentally sensitive land in other areas of the city. There is an existing voluntary process through the City, *Streamlining*, that could be used at the time of review to coordinate local, state and federal permitting requirements.

Staff assumes that through local land use review, full mitigation of impacts to shallow water habitat features and functions will occur.

Wetlands: Mitigation associated with impacts to wetland habitat would be addressed through the IGA and would rely entirely on state and federal permitting requirements.

It is assumed that approximately 10 acres of wetlands located within the 300-acre development footprint in IH zone would be filled. Filling of these wetlands will require Clean Water Act 404 permitting and trigger the NEPA process; however, it is unlikely that an EIS would be required for wetland fill. It is unknown if the Port will fill the entire site at one time, thus removing all wetlands, or phase the filling requesting individual 404 permits.

State and federal wetland requirements are fairly robust and well understood. However, state and federal requirements may not result in mitigation that fully compensates for wetland impacts. Therefore, the current draft proposal includes the following additional local requirements:

1. Impacts to *all* wetlands must be mitigated.
    a. Wetlands on WHI have not been formally delineated. Past studies (1987 – 2012) have mapped wetland acres on WHI between 20 and 80 acres; the current inventory mapped 48 acres. Delineation at the time of permitting will determine exactly how many wetland acres are impacted.
    b. Further, the state or federal regulatory agencies could decide not to take jurisdiction over some of the wetlands. The requirement that impacts to *all* wetlands be mitigated is not dependant on state or federal jurisdiction.
2. The City wants to ensure wetland *restoration* occurs; not just enhancement of existing wetlands. Therefore the proposed IGA requires a minimum acres of wetland restoration. Staff recommends reducing the minimum in the IGA to 19 acres of wetland restoration, which is more inline with existing state and federal regulations. However, for reasons stated above, this could either fall short of what is needed or be much more than what is needed depending on the results of delineations.
3. Typically state and federal agencies only require monitoring for 5 years, which has been demonstrated to be too short a timeframe to ensure success. The proposed IGA requires a minimum of 10 years of monitoring and names the City Bureau of Environmental Services to receive monitoring reports.

Even with these requirements, there is not certainty that the state and federal regulatory agencies will review for all features and functions that the City is concerned about. For example, the state and federal agencies only consider impacts to hydrology, soil and plants; not wildlife. Certain existing wetland functions, such as support for breeding red-legged frogs, may not be replaced. In addition, the state and federal agencies do not consider the relationship between the wetland and adjacent habitat. Functions such as a wetland providing water and food to bats roosting in the forest may not be considered. The current draft proposal accepts these risks; but if these functions are not addressed then wetland mitigation will not achieve no net loss.

Another option to the relying on state and federal permitting with additional minimum requirements in the local IGA, would be to evaluate impacts to wetlands and mitigation alternatives through a local land use review. The local review process would be similar to

that for shallow water habitat; requiring that only minimizing impacts and mitigating for unavoidable impacts be considered (not total avoidance).

29. Does salmon habitat mitigation fall under the federal government since they are an endangered species? If so, should we add local review as well?

Answer: Yes, impacts to Critical Habitat for ESA-listed species would require permitting through federal and state regulatory agencies. State and federal agencies focus closely on biological systems, particularly listed species; however, local review is necessary.

The City typically takes a more comprehensive look at impacts, considering impacts to all fish and wildlife species and functions that support those species. While federal and state regulations may nominally cover many of these resources, in practice their reviews only apply to discrete resources, and in limited circumstances.

For example, an applicant may be able to make the case to the state and federal permit applications that a particular dock and bank stabilization design does not affect salmon, or that the impacts can be mitigated by improving salmon habitat somewhere else; even though the bank design eliminates an existing riparian area with significant habitat value. In this case, the City would want to see alternative bank designs that have less impact on the riparian area and that the mitigation plan includes compensation for the lost riparian resources in addition to impacts on salmon. The proposal may impact functions like channel dynamics or microclimate, but the state and federal agencies may not ask for mitigation for those functions. Additionally, federal agencies weigh a project's overall impact to the species in its entire range. The City assesses impacts to local populations of protected species, which reduces cumulative impacts to the larger range of the species, as well as upholds our legal obligation to advocate for species recovery, per the ESA.

The City maintains a list of *at-risk* species that are considered for impacts in land-use reviews, many of which are not protected by state or federal laws. Protection of these important species is preventative and more cost-effective than addressing a new ESA listing in the future.

Ecological Function	State	Federal	City of Portland
fish/wildlife habitat	Focuses on wetlands and waters of the state with stronger focus on designated "essential fish habitat," water quality, and contamination. Must provide for fish passage at all times.	Focuses on listed species and their specific habitat requirements, generally limited to designated "critical habitat." Also looks at dredging in navigable waters and significant contamination issues.	Considers all native fish and wildlife species and their habitat requirements
bank functions	Considers removal and fill in a wetland or water of the state that may be connected to a stream/river bank, and in the context of contamination and clean up.	Addresses bank functions in context of designated critical habitat	Addresses bank functions in relation to a diversity of fish and wildlife species as well as other city goals such as flood protection, access.
riparian vegetation	Considers riparian vegetation only if there are state listed species (birds, mammals) on state lands, or as it relates to contamination containment.	Considers in-water impacts; the relationship between in-water and riparian areas is only considered relative to listed species in non-binding recovery plans.	Considers the relationship of impacts to riparian vegetation and in-water conditions/ how impacts in-water may affect riparian habitat, hydrologic function and wildlife connectivity

From: River Plan/North Reach (April 2010), Volume 1A, page 60

Other

30. Does the mitigation plan achieve the "net ecosystem benefit" objective yet?

Answer: No, not unless out-of-kind mitigation is considered.

The City Council's resolution referenced a number of guiding principles, including the goal of achieving a "net increase in ecosystem function". There are several different habitat types on WHI that provide various and synergistic ecosystem functions: wetlands, shallow water, cottonwood/ash forests, and grasslands/sandy areas of sparse vegetation. Nearly all of these habitat types are also in the floodplain and the whole site is on an island at the confluence of two large river systems. These habitats function individually and have an interdependent relationship.

The current draft proposal includes actions and processes to compensate for development impacts to most, but not all, of the identified features and functions. In the case of forest impacts the proposed mitigation goes beyond replacement, achieves net improvement. The following table summarizes the Mayor's current mitigation proposal.

Table 2: Summary of WHI Mitigation

Habitat Type	Impact	Mitigation	Estimated % of function replaced
shallow water	<2 acres	tbd via future local land use review (zoning) and state and federal permitting	100% *
wetlands	~10 acres	Min 19 acres, tbd via state and federal permit (IGA)	100%**
cottonwood/ash forest (floodplain, island context)	149 acres	More than 600 acres of forest enhancement and planting, on WHI and Government Island, plus $4.1M fund (IGA)	110%
grassland + sandy areas with sparse vegetation	123 acres	$1.5 M fund to benefit Western Meadowlark (IGA)	100%
Floodplain	302 acres	ESA consultation (IGA)	Uncertain

*Assumes that future local, state and federal determination of mitigation actions will fully compensate for the impacts. Local land use approval criteria require full compensation for significant detrimental impacts.

**Assumes that future state and federal permitting process will address all wetlands and impacted wetland functions. Some stakeholders and technical experts disagree that state and federal authorities will address all functions. City has proposed to not have a formal review in the future.

31. Does the City have a response to ODFW's letter RE city mitigation?

Answer: As stated in the ODFW letter (November 27, 2012), they are generally supportive of the City's approach to mitigation and the framework staff developed to determine necessary forest mitigation. Below are areas of disagreement or points that require clarification:

Point #4 from ODFW letter: "ODFW recommends that development related impact assessments and mitigation planning be based on ODFW's Fish and Wildlife Habitats Mitigation Policy."

City Response: ODFW's Mitigation policy ranks habitats at development sites and provides mitigation goals and strategies for each habitat category. To meet the ODFW policy, WHI mitigation would need to achieve "no net loss of habitat quantity and quality" and "a net benefit of quality or quantity" for shallow water, wetlands and bottomland hardwood forest. These three habitat types are ranked by ODFW as Category 2, defined as *essential and limited*. WHI grasslands are a Category 3 habitat which requires a 'no net loss' of habitat quantity or quality, but not a net gain.

While City staff agrees with ODFW's habitat categorizations for WHI habitats, in the current draft proposal only the mitigation for forest impacts meets ODFW's standard for a net benefit of quality or quantity. Shallow water and wetland mitigation would be determined at the time of development and ODFW would be involved with the review. Therefore, it is possible that a net benefit could be achieved for these two habitat types

Point #6 from ODFW letter: "ODFW does not believe it is appropriate to credit for protection of existing habitat. According to ODFW' s Mitigation Policy, true mitigation credit is realized when habitat quality and/or quantity is increased. Therefore, as consistent with our Mitigation Policy, it continues to be our recommendation that protection of the remaining forest on WHI, or any other habitat type within the approximate 500-acre area, should not be counted as compensatory mitigation. As such, the City's mitigation proposal would be short of the *no net loss goal* for floodplain forest."

City Response: City staff acknowledges and agrees that typically habitat protection is not a mitigation strategy which supports no net loss or net gain goals. This is because protection does not increase habitat acreage or functions above the baseline condition at time of development. However, the City feels it is appropriate to credit protection actions on WHI because WHI could be developed for a number of uses under current county zoning (e.g., forestry, farming) or future city zoning.

Staff researched other mitigation programs and found appropriate guidance from the Washington Department of Ecology (WDOE) regarding ways to credit resource protection. WDOE urges caution with this approach and uses a fairly high mitigation ratio because of questions around this policy. In the City's WHI Forest Mitigation Framework, credit ratios ranging from 10:1 to 22.5:1, depending on location, can be applied to the protection of bottomland hardwood forests in a situation where the forest could be impacted by development.

In the City's current proposal, credit for protection is applied to forested lands on WHI. The City is not applying a protection credit to Government Island because that land is already protected through a long-term agreement between the Port and OR State Parks

and Recreation. If a third site is needed, protection credit may be applied depending on the existing or potential uses of that land.

Point #11 from ODFW letter: "ODFW questions the feasibility of replacing mature floodplain forest. ODFW is uncertain that forest mitigation at 2-3 different locations would truly mitigate for forest losses on WHI if development were to occur."

City Response: City staff agrees that the age, health and location of the impacted bottomland hardwood forest stand increases the level of effort needed to replace it. To that end, the City has accounted for time lapses and location in the forest mitigation framework.

The City's policy is to maximize on-site mitigation opportunities before looking at off-site options. The current draft proposal includes 149 acres of forest mitigation actions on WHI and 470 acres of forest mitigation actions at Government Island. Depending on the options chosen (see questions #1 and #3) a third site may be needed.

Point #12 from ODFW letter: "Impacts to floodplains have not been adequately addressed. While Metro and the City may have exempted the requirement for balanced cut and fill on WHI, the loss of floodplain function still needs to be considered in the impact analysis and mitigation proposal in terms of lost ecological functions. No-net-loss, let alone net benefit, cannot be achieved without fully addressing the loss of floodplains."

City Response: City staff agrees that the proposal does not fully mitigate for lost floodplain functions. Staff believe that a net ecosystem benefit cannot be achieved without mitigation for loss of floodplains (see questions #18 - #23), unless out-of-kind mitigation is considered. *Out-of-kind mitigation* means loosing one suite of functions and gaining a different suite of functions such that the ecosystem has more overall functionality in the end. For example, loosing some floodplain functions but gaining more grassland functions. There is no accepted methodology staff is aware of for assessing the adequacy of out-of-kind mitigation alternatives.

Point #14 from ODFW letter: "It is unclear if the conceptual industrial development footprint (including associated infra-structures) would total no more than 300 acres as called for by City Council Resolution# 36805."

City Response: The land area zoned industrial (IH) is slightly larger than 300 acres. Through the zoning code, however, 100-foot setbacks are proposed along the Columbia River, and between the IH and OS boundary. There would be some minimal impacts allowed within both setbacks (e.g., two crossing of dock access ramps). However, when the setbacks are accounted for the land that is actually available for industrial development is slightly less than 300 acres.

Point #16 from ODFW letter: "Mitigation of grassland habitat has not been adequately addressed, i.e., actual losses and how where losses would be mitigated."

City Response: In the current proposal, based on a ratio of 1.2:1 and costs used during the recent Airport Futures project for a similar habitat type, a $1.5M grant will go to western meadowlark conservation at an off-site location. The site and implementing entity have not been identified.

Point #17 from ODFW letter: "Potential impacts of recreational facilities and associated activities on fish and wildlife and their habitats have not been adequately addressed. Recreational activities can negatively affect species and their habitats. ODFW recommends that potential impacts be assessed and BMPs included to avoid and minimize negative impacts from recreation on fish and wildlife. ODFW recommended that unavoidable impacts resulting from recreation be part of the mitigation package."

City Response: Impacts associated with future recreational development are addressed in the Plan District zoning code. The location of active recreational facilities, including trails and a boat launch, are restricted to the eastern half of the island. The zoning code has two tracks for evaluating impacts and necessary mitigation related to recreational development. The first are standards that can be applied specific facilities. For example, the standards do not allow trails within wetlands and require tree replacement. If the standards cannot be met, then environmental review is required.

Point #18 from ODFW letter: "It is not clear if climate change has been adequately considered. ODFW recommends that potential predicted river fluctuations and risk of flooding be considered in the conceptual development planning process. In general, ODFW recommends avoiding siting of new infrastructure in floodplains and near waterways, and protecting remaining wetlands as a way to retain a measure of ecosystem resiliency and protect and minimize damage to existing infrastructure."

City Response: Please see questions #24 and #25 for the response.

32. Timing of natural resource loss and mitigation? What is the timing of mitigation efforts with respect to development?

Answer: It is the intention of the current draft plan that mitigation actions be implemented before (in the case of forests and grasslands) or concurrent with (in the case of shallow water and wetlands) development impacts.

Staff anticipates the timing would be as follows:

1. The timing of wetland and shallow water mitigation would be determined concurrent with impacts. Wetland mitigation would be determined through state and federal permitting process; shallow water mitigation would be determined through local, state and federal permitting. Staff anticipates that permits could be applied for sometime over the next decade; probably prior to 2023.
2. Mitigation for floodplain impacts would be determined through federal permitting processes such as NEPA, CWA 404 and FEMA floodplain mapping refinements or through the local no-net-rise requirements. Like wetlands and shallow water, staff anticipates permits could be applied for within the next decade.
3. Forest mitigation, per the draft IGA, would be initiated within one year of the resolution of any annexation related legal appeals. The rationale for early forest action is that it takes a long time for trees to mature and develop into a forest with conditions similar to the forest being impacted. Waiting to start forest mitigation until the time of development would increase the acres of mitigation needed to compensate for the impacts.

4. Grassland mitigation, in the form of a grant, would be made within six months of the resolution of any annexation related legal appeals.

34. Is it possible to meet 100% of the mitigation requirements on WHI and still set 300 acres aside for Port development? If, the quantity is less due to potential NRDA requirements, can there be an agreement on timing for when that obligation needs to be met and if it isn't then fall back on the requirement for greater mitigation on WHI.

Answer: No, it is not possible to meet 100% of the mitigation requirements on WHI, because WHI's remaining 500 acres are already functioning as fish and wildlife habitat. While enhancements can be made to improve specific features and function (e.g., invasive plant removal), off-site mitigation is necessary to fully compensate for the impacts of marine terminal development, particularly impacts to forests and grasslands.

Performing mitigation on WHI for marine terminal development impacts would not preclude potential for additional future hydrologic improvements to increase shallow water habitat or improve wetland conditions; provided those improvements don't adversity impact the forest. See also answer to question #1.

35. Status of Jones lawsuit RE wetland fill on WHI? Does it impact this?

Answer: The current draft IGA requires that impacts to *all* wetlands be mitigated. If the result of the lawsuit is that more wetland acres are identified, then impacts to those acres would also have to be mitigated.

36. Is the money that is suggested be allocated to pay for BES's services likely to be forthcoming and are they adequate to the tasks they appear to be assigned to? If not, what might the negative consequences be to other watershed health programs? What are the implications for overall BES budget? Will the money be sequestered in a dedicated account to ensure it's actually used for the work described?

Answer: In the current draft IGA, lump sum amounts were provided for the anticipated costs for the forest mitigation. These costs were based on the BES Revegetation Program's hard costs for perform forest restoration and enhancement projects. EcoNorthwest used BES's costs to derive a Net Present Value (NPV) for forest mitigation. However, NPV does not represent the amount of money that would be need if a lump sum were granted from the Port to the City (or another entity) today to cover all costs into the future. The NPV amounts are too low to cover costs under that scenario.

Staff are working with EcoNorthwest and the Office of Management and Finance to discuss payment options if the Port were to choose to have the City perform the forest mitigation actions.

Costs associated with shallow water and wetland mitigation will be based on the specific actions required under local, state and/or federal regulatory permitting processes.

Estimates have been looked at for the purposes of project budgeting; however, no specific amounts are included in the IGA.