APPENDIX 4

PORTLAND NATURAL RESOURCE INVENTORY UPDATED PROJECT: TECHNICAL REVIEW SYNTHESIS REPORT AND STAFF RECOMMENDATIONS (OCTOBER 2006)

Portland Natural Resources Inventory Update Project

TECHNICAL REVIEW SYNTHESIS REPORT AND STAFF RECOMMENDATIONS

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REPORT PURPOSE

The purpose of this report is to summarize and document the Portland *Natural Resource Inventory Update* Technical Review process, including input received from technical reviewers, staff responses and decisions to date. Staff will create an addendum to this report to document how the City's inventory results change as a result of the decisions presented in this report. The addendum will summarize the updated inventory model results including acres mapped, relative functional rankings, and comparisons to Metro's regional inventory. If additional refinements to data or model criteria are considered to address unforeseen problems with the models or new information, these will be addressed in the addendum as well.

BACKGROUND

The City of Portland Bureau of Planning is currently leading an effort to update and refine its natural resource inventories that range from 10 to 20 years old. The update project applies to areas within the city and urbanizing portions of Multnomah County. This effort continues the City's long-term investment in conserving natural resource values and functions that are critical for neighborhood livability, public health and safety, and fish and wildlife habitat. Portland's "Natural Resource Inventory Update" (NRIU) project also helps to implement the City's *River Renaissance Strategy (2004)* and the *Portland Watershed Management Plan (2005)*.

The NRIU project will improve the quality and accessibility of information on riparian resources and wildlife habitat in the City. New GIS data management, modeling, and mapping tools will allow the inventory to be updated regularly over time.

The products of the NRIU project will supplement the natural resource inventories that the City has produced over the last two decades. New data, maps and reports will inform a broad array of City and community activities such as:

- Developing citywide or area plans and strategies to improve watershed health and meet other goals (e.g., River Plan project, Terrestrial Enhancement Strategy)
- Identifying priority locations for restoration and willing-seller land acquisition
- Updating and improving existing regulatory programs, including the Willamette Greenway Plan and the City's environmental and greenway overlay zones
- Preparing strategies to comply with current and emerging regulatory requirements, including Metro's recently adopted Nature in Neighborhoods Program (Title 13 of the Urban Growth Management Functional Plan)
- Designing development and resource enhancement projects
- Targeting public education and outreach to specific areas

The Portland NRIU project incorporates and builds on the fundamental science and methodology that Metro developed and employed to produce the *Regionally Significant Riparian Corridors and Wildlife Habitat Inventory* which provides the technical basis for Title 13: Nature in Neighborhoods of the Urban Growth Management Functional Plan. The Metro Council first endorsed the regional inventory in 2001 after extensive technical review and input from local, state and federal agencies (including the City of Portland) and completion of a public hearings process. The Metro Council adopted the regional inventory in September 2005 and amended the inventory again in December of 2005.

The City is not proposing to reopen the fundamental science, assumptions and approach that provide the basis for Metro's regional inventory. However, the City is proposing to refine the regional inventory by:

- Incorporating more recent landscape feature data (i.e., vegetation);
- Updating plant and wildlife species lists and Habitats of Concern;
- Refining some of the regional inventory modeling/mapping criteria to reflect local conditions and research and analysis of more recent scientific literature; and
- Using a different but accepted model for evaluating connectivity between wildlife habitat patches.

As a result, the refinements should:

- Increase the level of detail of the inventory maps;
- Improve clarity and transparency in the inventory methodology;
- Enhance mapping accuracy;
- Integrate Portland-specific watershed conditions and functions; and
- Enable regular inventory updates for Portland.

Central to the City's inventory update and refinement effort is the production of new GIS data for streams and vegetation. The methodologies used to develop this data are documented and can be found in on-line at http://www.portlandonline.com/planning/index.cfm?c=40437. The Bureau of Planning has also developed a number of refinements to Metro's inventory modeling criteria. Proposed refinements are intended to reflect specific local watershed conditions and functions, information from recent local empirical research, and review of scientific literature published since the regional inventory was developed. Staffs from the Portland bureaus of Planning, Environmental Services and Parks and Recreation have also been collaborating in an effort to update the criteria Metro used to designate regional Habitats of Concern for Portland, as well as the boundaries of these areas.

The products of this effort will include maps showing landscape features that individually and collectively comprise the City's riparian corridors and wildlife habitat areas. Products will also include maps depicting the relative functional value of these resource areas. Various reports will be developed to describe and document the City's inventory update methodology and process, as well as updated inventory reports for different areas in the City.

Initial products of the City's effort have already been put to use. Metro incorporated Portland's new stream information when updating the regional inventory in 2003 and 2005. Initial draft maps were also used to inform the recently adopted *Portland Watershed Management Plan* and to inform the identification of Portland's local target areas for Metro's 2006 Natural Area Bond Measure. Currently, draft inventory maps are being used to support several activities of the River Plan/North Reach Project. The Bureau of Planning intends that this inventory update be provided in time to support the completion of the River Plan/North Reach project and the initiation of subsequent River Plan phases. Further, the products of the NRIU will be used to inform a future multi-objective planning effort for the Columbia Corridor area.

TECHNICAL REVIEW PROCESS

In early 2006, the Bureau of Planning initiated a technical review process to ensure that the proposed refinements to Metro's regional inventory:

- Are reasonable, appropriate, and scientifically acceptable.
- Are generally consistent with the intent of Metro's inventory, *and* will complement and enhance the applicability of the inventory for use in Portland.
- Would not invalidate or affect the credibility of the regional inventory in other cities or counties with different characteristics or data availability.

After the technical review process has been completed, the Bureau of Planning will finish drafting the Natural Resource Inventory Update methodology report and produce new working draft resource and inventory maps for broader review and use. Staff will seek stakeholder review and comment on the maps by planning area (e.g., the River Plan/North Reach, Columbia Corridor, and/or by watershed).

The inventory methodology and products will be submitted to the Planning Commission and City Council for endorsement, and to Metro as part of the City's Nature in Neighborhoods compliance package. The City will be crafting its compliance strategy over the next year or so, however the strategy may take several years to implement fully.

The first major step in the technical review process was for City and Metro staffs to review, discuss, and modify the initial inventory refinement proposal. These discussions were critical to ensuring that the proposed refinements would meet the criteria above.

Once City and Metro staffs reached general agreement on most of the proposed refinements, the City invited a broader set of experts and stakeholders to review all or parts of the refinement proposal. Technical experts were selected based on their expertise in watershed systems, riparian functions, and/or fish and habitat ecology. In addition, some of the reviewers represented key environmental regulatory agencies and some reviewers also have particular knowledge about specific local watershed conditions and functions, such as the workings of the managed floodplain within local drainage districts.

Most of the selected reviewers were familiar with Metro's inventory methodology. Some of the reviewers served on Metro technical committees during the inventory process. Others provided extensive comments on the regional inventory as it was being developed.

Given that the regional inventory was subject to extensive technical and public review before Metro Council adoption, technical reviewers were asked to focus on proposed refinements to the regional inventory methodology rather than critiquing aspects of Metro's methodology for which no changes were being proposed.

Technical Reviewers:
Susan Barnes/Patty Snow, Oregon Department of Fish and Wildlife
Jim Labbe/Bob Sallinger, Audubon Society of Portland
Tom Bouillion/Paul Fishman, Port of Portland
Nancy Munn, NOAA Fisheries
Karen Font Williams, Oregon Department of Environmental Quality
Mike Houck, Urban Greenspaces Institute
Paul Ketcham, Metro
Lori Hennings, Metro
Jennifer Thompson, U.S. Fish and Wildlife Service
Tom McGuire, Adolfson Associates
Alan Yeakley, Environmental Science, Portland State University
Bob Eaton/Dave Hendricks, Multnomah County Drainage District

City Bureau Reviewers
Bureau of Environmental Services
Portland Parks and Recreation

To orient the technical reviewers to the refinement proposal, project staff prepared the *Natural Resource Inventory Update Project Technical Review Briefing Paper*, Bureau of Planning *Draft* – May 31, 2006. The briefing paper provided background information, project context, an overview and general comparison of Metro and Portland inventory methodologies (including models, mapping criteria, ranking and scoring), a summary of the City's proposed refinements to the regional approach, and a table presenting specific refinements and associated rationale. The briefing paper concluded with a section describing how the results of the City's proposed refinements compared to the regional inventory. This section compared total acres mapped in the City's and Metro's inventories and the relative functional rankings for riparian corridors and wildlife habitat areas. The briefing paper included a number of attachments including maps, species lists, and mapping criteria comparison matrices. The body of the briefing paper is provided in Appendix 1. Attachments are available on request.

Project staff sent the briefing paper to technical reviewers in preparation for a half-day meeting that was held on June 13, 2006. The PowerPoint presentation used to inform and guide this discussion is available on request. Additional meetings were held with staff from the Bureau of Environmental Services and Portland Parks and Recreation (July 12, 2006), Bureau of Environmental Services (July 19, 2006), the Port of Portland (July 25, 2006) and the Multnomah County Drainage District (August 10, 2006). Meeting summaries are available on request.

The technical reviewers provided extensive, informative, and extremely constructive feedback on the City's proposal. Overall, the reviewers generally appreciated the intent of the City's efforts as well as the process used to develop the proposed refinements. Many of the refinements received general approval from most of the technical reviewers. However, individual views ranged from strong concurrence on some topics, to strong concerns about a few topics.

Comments from the technical reviewers are summarized in the next two report sections. Here, staff attempts to relate the reviewers' views by excerpting and paraphrasing, without linking specific comments to individual reviewers. Verbatim comments from individual reviewers are provided in Appendix 3. Revised versions of the inventory mapping criteria and Special Habitat Area criteria descriptions are presented in Appendices 4 and 5.

General/overarching comments

Some of the technical reviewers' comments were not tied to specific proposed inventory refinements. These comments seemed to relate to three general or overarching themes as presented below.

- **Relationship to Metro inventory** – Some reviewers commented about how the proposed refinements for the Portland inventory update relate to the Metro's regional inventory. It was noted that the City did a good job of building upon and maximizing consistency with Metro's approach. The proposal makes good use of more detailed data that are available for Portland, and tailors the regional methodology to reflect local conditions. The approach also makes good use of all the hard work and thinking Metro put into their inventory (scientific information, public review, etc.) and helps promote regional consistency in natural resource management. ***Staff appreciates this feedback.***

- **Restoration Potential** – There has been extensive discussion during the technical review process regarding the policy implications of ranking sites low in terms of current relative function if these

same sites also have very high restoration potential. Some reviewers suggested that the City begin correlating low rankings with high restoration potential and high rankings as high protection potential. It was also suggested that areas ranked relatively low in terms of current watershed function should not be viewed as unimportant. Reviewers wanted to make it clear that these areas may still need protection from development so as not to preclude future restoration and enhancement of watershed conditions over time. There seems to be general agreement among reviewers that this topic should be addressed in discussions with the public and decision-makers. ***Staff agrees and is committed to bringing this issue forward as the project proceeds.***

- **Criteria/Modeling Limitations for Watershed-Scale Processes** - Reviewers have pointed out that watershed hydrology and sediment, pollution, and nutrient production and control are determined by the landscape from ridgetop to ridgetop, including groundwater. The inventory modeling evaluates these functions and processes only in the context of riparian corridors. This approach does not recognize the relationship between forest cover throughout a watershed and stream health. This relationship should be made explicit in the inventory reports. ***Staff agrees. This is a limitation in both the Metro and City inventories and should be pointed out as such in the NRIU methodology report. In addition, it should be made clear that the upland vegetated areas mapped in the inventory as wildlife habitat also provide important functions and benefits relating to watershed hydrology and water quality.***

Comments on specific inventory refinements and staff decisions

This report section is comprised of discrete sub-sections pertaining to each of the proposed refinements presented to the technical reviewers. Each sub-section contains a brief description of the proposed refinement. (For more detailed explanations and rationale for the proposed refinements refer to the Technical Review Briefing Paper in Appendix 1.) Following this description is a synthesis of the technical reviewers' comments on that specific refinement. The sub-sections conclude with an explanation of staff's decision having considered all comments provided by the technical reviewers.

Consistent with the *Technical Review Briefing Paper* contained in Appendix 1, these discussions are presented under the following category headings:

- Data and Model Inputs
- Riparian Inventory Model
- Wildlife Habitat Model
- Species Lists and Habitats of Concern
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This section concludes with some additional comments from the technical reviewers and brief staff responses listed under the heading "Other Topics."

Data and Model Inputs

1. **Proposed Refinement:** ***Using new vegetation data to improve model inputs and refine Habitats of Concern for Portland.***
Within 300 feet of the region's streams Metro mapped vegetated areas greater than 1 acre and classified landcover as forest vegetation, woody vegetation, or low structure vegetation/undeveloped soils. Beyond 300 feet from a stream, Metro mapped only forest vegetation patches 2 acres or larger.

   To update the regional vegetation data, the City used 2004 aerial photos and selective field visits to produce GIS maps for vegetated areas that are greater than ½ acre and located within ¼ mile (1320 feet) of a river, stream/drainageway, existing environmental zones, and regionally significant habitat areas. (One-quarter mile was selected for data management purposes.) Establishing the ½ acre minimum mapping unit and ¼ mile distance would allow the City to produce more detailed vegetation maps for Portland while also maintaining the ability to manage the data. For these areas the City has classified vegetation as forest, woodland, shrubland, or herbaceous per the National Vegetation Classification System (NVCS).

   Synthesized comments: Technical reviewers expressed general concurrence and support for this proposed refinement. Some reviewers asked for more information on the NVCS definitions (which was provided). One reviewer noted that while mapping vegetated areas down to ½ acre is an improvement over the regional level of resolution significant habitats for native plants and fauna can exist in smaller units. Questions about how the City's inventory addresses the shape of a vegetated patch are addressed in the discussion of *Interior Habitat Area* below.

   Staff response/decisions:
While vegetated areas smaller than ½ acre can provide important habitat (e.g., individual trees), it is infeasible to map smaller units for purposes of the citywide inventory. Staff proposes to continue using the revised vegetation data as proposed. In addition, the City should continue updating the data to reflect new information (e.g., 2005 aerial photographs), and to improve the quality of the vegetation data over time (e.g., improve precision and consistency in classification, etc.).

2. **Proposed Refinement:** ***Not specifying an "undeveloped soils" landcover type in City inventory.***
As noted above, Metro combined low structure vegetation and undeveloped soils into one of the regional landcover types used in the regional modeling. Metro scanned the aerial photographs for the region in efforts to eliminate areas where non-vegetated soils would be highly compacted. The City has not included a specific "undeveloped soils" component in the herbaceous vegetation. In a highly urbanized environment, areas that are not vegetated or covered with pavement or structures are likely highly compacted (e.g., gravel parking lots, dirt or gravel roads, exterior storage areas, construction sites, etc.).

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Synthesized comments: Most reviewers expressed concerns that the City has not included "undeveloped soils" in the inventory. Many expressed concerns about potentially missing opportunities for restoration by not identifying these areas on the map. Some suggest that undeveloped areas, particularly near streams, do provide function. One reviewer suggested that undeveloped lots function differently than paved areas and that soil quality is extremely variable (e.g., compacted or pervious). A couple of reviewers pointed out that even compacted soil near a stream could serve functions related to flood water movement, channel migration and water storage. One reviewer concurred with the City's proposal and expressed disagreement with Metro's original use of an "undeveloped soils" landcover layer.

Staff response/decisions: Staff appreciates the reviewers' concerns and agrees that soil types are variable, and that undeveloped soil can, depending on the circumstances, provide more riparian function than impervious area. Highly compacted soil or graveled areas would not provide significant functions other than storage of water during flooding. At this point, staff believes that it would not be appropriate or productive to invest additional public resources in establishing a separate "undeveloped soils" landcover type at this time. However, it is important to note that the City inventory model assigns *all areas* within 50 feet of a stream or wetland, or within a flood area, some level of riparian function. Staff hopes that this clarification addresses the reviewers' concerns to some extent.

Riparian Inventory Model

3. **Proposed Refinement:** ***Recognizing the contribution of rivers and streams to riparian function and developing a new "surrogate stream channel" mapping criteria.***

Metro's mapping criteria did not explicitly attribute riparian functions to rivers and streams themselves (though functional values were assigned indirectly through other criteria pertaining to riparian vegetation and 50-foot buffers to protect basic waterway functions). The City proposal included attributing riparian functions directly to rivers, streams and hydrologically connected wetlands, and creating a protocol for mapping stream channels where only stream centerline data are available (i.e., 10' on each side of stream centerline to create a surrogate stream channel).

Synthesized comments: Most reviewers concurred with the proposal to recognize the role of streams and rivers in providing riparian function. One reviewer suggested that stream channel functions and riparian functions are different and that clarification was warranted. Regarding the proposed mapping criteria, technical reviewers expressed qualified concurrence in most written comments. However, reviewers urged care in explaining the role of the "surrogate channel." During the June 13 meeting, reviewers expressed concern that the mapped channel area would often be either smaller or larger than the actual channel width, triggering questions about the accuracy of the model. Reviewers noted that mapping "surrogate stream channels" would cause confusion and controversy without really providing additional information with which to differentiate between the functional values of different streams.

Staff response/decisions: Staff understands that although the technical reviewers agree that rivers and streams provide important watershed functions, there are many valid concerns

raised regarding the surrogate stream channel mapping approach. In order to prevent public concern and confusion, staff proposes to abandon the "10-foot from centerline" surrogate channel mapping protocol and eliminate specific reference to rivers and streams in mapping criteria. Alternatively, staff proposes that rivers and streams be assigned a high level of resource significance without modifying the maps, either descriptively in the report and/or by designating them as Special Habitat Areas.

4. **Proposed Refinement:** ***Broadening the assignment of secondary riparian functional values to vegetation within specified proximities of a wetland.***
Both Metro and the City assign primary riparian functional value to vegetation located within 150 feet of a wetland. Metro assigned secondary functional value to wetland-associated vegetation only for the *Microclimate and Shade function* (to a maximum distance 780 feet from a wetland). The City is proposing to assign secondary functional value to vegetation proximate to wetlands for each of the riparian functions evaluated by the model, not just microclimate. This would not change the maximum riparian functional distance (the maximum distance would remain 780 feet) but would increase the total ranked area by approximately 180 acres (most of which rank low for riparian function). This approach could also increase the relative ranking of wetland-associated vegetation.

Synthesized comments: Most of the technical reviewers concurred with the concept of assigning secondary value to wetland-associated vegetation for a broader array of riparian functions. A couple of reviewers agreed that wetland vegetation functions extend to and beyond 150 feet. One reviewer noted that adjacent riparian areas may be more important to the adequate functioning of a wetland than for streams, given that the riparian areas often represent the primary source of water to a wetland. Another reviewer disagreed with retaining the maximum functional distance of 780 feet, pointing out that progressively larger buffers are needed to achieve progressively smaller increases in effectiveness. It was also noted that the impacts from intense surrounding land uses (e.g., heat island effect) may warrant including even more vegetation to buffer the wetland. One reviewer asked if mitigation/constructed wetlands and natural wetlands are treated the same for this criterion, and what the breakpoint is between a natural and mitigation/constructed wetland. It was suggested that developing a Local Wetlands Inventory or some equivalent for Portland would provide more detail about the types and significance of local wetlands.

Staff response/decisions: Reviewers raised a number of salient points pertaining to this proposed refinement. Currently, the inventory methodology does not distinguish between the functions provided by constructed wetlands and natural wetlands if the constructed wetlands do in fact function like wetlands. Staff also agrees that developing more detailed wetland information (e.g., a local wetland inventory) would help refine the inventory further in the future. However at this point in time, staff proposes to retain this refinement as proposed which reflects the general concurrence of most technical reviewers.

Proposed Refinement: ***Assigning primary value to wetlands for Large Wood and Channel Dynamics functions and narrowing the area in which wetlands and associated vegetation contribute to Large Wood and Channel Dynamics functions.***
Metro assigned primary functional value for *Large Wood and Channel Dynamics* to forest vegetation existing within 150 feet of "hydrologically connected wetlands" (defined for this purpose as wetlands located within ¼ mile of a stream). The City proposes to broaden this approach by assigning primary functional value for *Large Wood and Channel Dynamics* both to wetlands *and* to associated forest vegetation. The City also proposes to narrow the approach by including only those wetlands that are located partially or fully within a flood area or within 150 feet of a river or stream. This proposed refinement focuses on the critical role of floodplain wetlands in shaping channels. The proposed refinements also reflect an assumption that within 150 feet of a stream are somewhat more to likely have a subsurface connection with the stream than wetlands located ¼ mile from a stream, and that within 150 feet wetlands could collect large wood and sediment which would have a direct effect on channel dynamics. (Note: All but two of the wetlands mapped within the City are within 150 feet of a stream.)

Synthesized comments: Most of the technical reviewers generally concurred with this proposed refinement. However, several concerns were raised as well. One reviewer noted that wetlands located further than 150 from a stream could still affect the baseflow hydrology of the stream via subsurface flows. However, this reviewer thought it unlikely that such flows would significantly affect channel dynamics except possibly over the long term. Another reviewer noted that while wetlands beyond 150 feet may provide functions linking to streams, it would be difficult to make a link to large wood and channel dynamics. One reviewer questioned the rationale for 150 feet, and another emphasized that unless a wetland is actually hydrologically connected to a stream, there would be no pathway for large wood to reach the stream, even during overbank flows. Another reviewer noted that the hydrologic connection between streams and wetlands is not always apparent from surface topography. It was suggested that subsurface contributions of wetlands within 250 feet of a stream be evaluated if alterations to the wetland are planned.

Staff response/decisions: Given general concurrence from technical reviewers and the lack of information on the actual hydrologic connection between wetlands and streams, staff believes that this proposed refinement hones and enhances the regional inventory and proposes that it be retained.

Proposed Refinement: ***Recognizing limitations on certain riparian functions for managed floodplain areas within drainage districts.***
The City proposed to modify several of the regional mapping criteria relating to *Streamflow Moderation, Water Storage and Watershed Hydrology* and *Large Wood and Channel Dynamics* functions. The proposed modifications are intended to recognize that hydrologic and floodplain functions are different within drainage districts than in other parts of the City. Drainage districts manage flows and channel movement intensively and regularly remove large wood to maintain channel conveyance. Flows and hydrology within drainage districts are managed rigorously through a system of levees and pumps. Flooding and channel movement are highly restricted. There is virtually no active floodplain within the drainage

districts, although there are many wetlands and active surface water/groundwater interaction. Modifying the mapping criteria is intended to reflect local hydrologic and channel dynamics functions more accurately.

The initial refinement proposal did not include changing mapping criteria for riparian functions relating to water quality, microclimate and shade, organic inputs or wildlife habitat.

Modifying the criteria as proposed would lower the relative functional rankings for some riparian areas within drainage districts. Some flood areas without woody vegetation (e.g., paved or grass) would be dropped from the inventory as well.

Synthesized comments: Technical reviewers provided extensive feedback on this issue during each of the three meetings and in written comments. Most reviewers expressed qualified concurrence with the proposal. Many reviewers expressed concern that lower relative rankings could result in lesser protections or missed opportunities for restoration. One reviewer recommended that the model results be reviewed closely to ensure that known, important riparian habitat areas are not dropping out of the inventory completely. This reviewer also asked that changes in the modeling results be described in the discussion document. Some reviewers noted that streamflow, floodplain, and channel dynamics functions are also degraded through many other parts of the City. One reviewer concurred with the proposal so long as it is clear that the inventory reflects current, not future conditions. Many reviewers emphasized that there is considerable potential to improve many riparian functions within the Columbia Slough channel (e.g., 10 miles of restored habitat funded by Clean Water Act Section 1135 grants).

Some reviewers requested staff to emphasize the important role of these areas for other functions such as habitat for wildlife and aquatic species, filtration, shade, food web, etc. One reviewer recommended that the same criteria refinements proposed for areas in drainage districts be applied to the Willamette River, suggesting that river flows and the channel are also intensively managed.

After the June 13 Technical Review meeting, project staff conducted additional sensitivity analysis to compare inventory model results with and without modifying certain functional criteria for areas within a drainage district. Applying the modified criteria resulted in relatively minor changes in relative rankings for riparian areas within the Multnomah County Drainage District's (MCDD) jurisdiction. Approximately 200 acres of flood area located more than 100 feet from a drainageway and without woody vegetation (in other words, covered with herbaceous vegetation, bare soil or impervious surfaces) would be dropped from the inventory because the management prevents these areas from flooding. Meetings with staff of the Bureau of Environmental Services (BES) Columbia Slough Watershed staff (July 19, 2006) and MCDD staff (August 10, 2006) focused on these criteria specifically. MCDD staff concurred that the proposed criteria refinements accurately reflect their activities in the managed floodplain and associated impacts on flooding and channel dynamics. MCDD also emphasized the importance of continued restoration (as evidenced by projects to create wetland benches and targeted placement of large wood). BES staff also concurred that certain riparian functions are affected by management activities within the drainage district, but cautioned that these areas remain critical for water quality, habitat and overall watershed health.

Staff response/decisions: Taking into consideration extensive feedback from technical reviewers and additional input with MCDD and BES staff, project staff propose to retain the mapping criteria refinements for areas within a drainage district for the time being. Several additional riparian mapping criteria will be modified to exclude areas within a drainage district where the function of the landscape feature (e.g., vegetation) is being ascribed solely due to location within a flood area. These additional changes are needed to achieve consistent treatment of the floodplain in the inventory methodology. However, the additional changes will *not* affect the riparian rankings for landscape features that meet other mapping criteria (e.g., resources within x distance from a stream or wetland).

Note: Staff is working with MCDD and other stakeholders to update the flood area maps for Portland. At such time the City's flood area maps are updated to more accurately reflect actually flooding activity, the flood-area specific criteria refinements would no longer be necessary and would be dropped.

Staff does not recommend applying these refined criteria to the Willamette River in Portland. Although Willamette River flows have been altered through the operation of dams in tributary sub-basins, the effects are regional rather than local. In addition, large wood is allowed to collect along the banks of the Willamette and there remain some areas of active floodplain along the Willamette in Portland. The Columbia Slough is the only water body within the City that has this system of levees and pumps. Secondary drainageways are also highly managed. Flooding is virtually non-existent. Trees may not be planted on the levees and large wood is regularly removed from waterways within the drainage districts to maintain flood storage capacity.

7. **Proposed refinement:** ***Applying secondary functional value to vegetation up to 300 feet from river, stream or wetland in lieu of using Metro's "break-in-slope" (where slopes >25%) as the functional distance limit for Bank Stabilization, and Sediment, Nutrient, and Pollution Control.***

Metro assigned secondary functional value to vegetation located on slopes >25% that began w/in 175' of a surface stream, and extending to "the first effective break-in-slope." Metro developed he regional break-in-slope information by drawing generalized boundaries based on regional topographic information. The City's initial refinement proposal included establishing a 300' maximum secondary functional distance instead of using Metro's "break-in-slope" data. The 300 foot distance limit was proposed because the regional break in slope data is very general and does not include information for miles of newly mapped stream segments. Also, the additional specificity of the City's contour data actually makes it more difficult to establish and map break-in-slope as conceptualized by Metro. Applying the 300-foot distance limit would have captured most of the area Metro mapped for this criterion. This approach would also have included some areas that are not steeply sloped but where vegetation may be contributing to sediment and pollutant removal.

Synthesized comments: Technical reviewers generally concurred with this proposed refinement, although several expressed concern about losing the relationship between slope and water quality related riparian function. Some reviewers suggested using the 300 foot

maximum distance or break-in-slope, whichever offers the greater area of protection. One reviewer noted that soil quality (e.g., compaction, texture, organic matter) is as important as slope in terms of how riparian areas reduce nonpoint source runoff and associated toxics and nutrients. Another reviewer asserted that the inventories are attributing too much to riparian areas and emphasized that upland processes and conditions have a critical impact on riparian resources and streams (e.g., mass wasting and landslides). Reviewers suggested that the inventory be linked to landslide hazards maps and public health and safety issues.

Staff response/decisions: Staff agrees that it is important to recognize the importance of slope conditions for functions relating to bank and slope stability, and control of sediments, nutrients and pollution. In order to do so, staff proposes to modify the original proposal. If GIS model test runs are successful, this functional criterion will be tied to the City's 25% slope data instead of the 300-foot functional distance presented in the initial refinement proposal. Mapping secondary functions using the City's >25% slope data should produce results that are generally consistent with Metro's break-in-slope approach, and will also ensure that steep areas surrounding newly mapped steams are included. The City will also continue to collaborate with Metro and others to improve the accuracy and consistency of local and regional topography maps as LiDAR data is produced for the region as a whole (expected sometime in 2007).

8. Proposed Refinement: ***Downgrading the riparian functional value of herbaceous vegetation relative to the value of more complex riparian vegetation assemblages.***
All vegetation types, including herbaceous or low-structure vegetation, can contribute significantly to how riparian corridors function. Metro recognized this by assigning primary functional value to all vegetation types for *Bank Stabilization and Sediment, Nutrient and Pollution Control.* More specifically, Metro assigned primary functional scores to low structure vegetation, which includes herbaceous vegetation, within 100 feet of a stream or wetland, or within 200 feet of a stream in areas where slopes exceed 25% for this function. Where slopes exceed 25%, Metro assigned secondary value to all contiguous vegetation, including low structure, starting within the primary functional area and extending to break-in-slope.

For *Streamflow Moderation and Water Storage* functions, Metro assigned secondary functional value to non-floodplain low structure vegetation. Metro applies the secondary value to low structure vegetation extending to 300 feet from a stream.

In Portland, much of the herbaceous vegetation consists of lawn and other areas that are often highly compacted, frequently mowed, and managed through application of fertilizers and pesticides. The City proposes to refine the regional mapping criteria to reflect differences in the functions provided by herbaceous vegetation and more complex riparian vegetation assemblages. These refinements are intended to hone the City's inventory and increase its credibility. The resulting maps will provide more detailed information that better inform priority setting for restoration, protection, land acquisition, etc.

Toward this objective, the City has proposed to downgrade the functional value assigned to herbaceous vegetation from primary to secondary for *Bank Stabilization and Sediment, Nutrient and Pollution Control* functions. For *Streamflow Moderation and Water Storage*

functions, the City's refinement proposal would assign secondary value to herbaceous vegetation (as Metro did), but would apply the same functional distances as used to model the *Bank Stabilization and Sediment, Nutrient and Pollution Control* functions (i.e., within 100 feet of a river, stream or wetland, and extending to 200 feet where slopes exceed 25%).

Synthesized comments: Technical reviewers expressed strong and varied opinions on this proposed refinement. Metro staff and others pointed out the important contribution of herbaceous vegetation to riparian functions. Some asserted that grass provides considerably more riparian function than pavement. However, most of the reviewers agreed that grass functions differently than more complex riparian vegetation. For example, one reviewer supported the proposal, asserting that low structure vegetation outside of forest and shrub areas in Portland is fairly rare and consists mostly of lawn or graveled and weedy areas.

A number of the reviewers agreed with assigning secondary functional value but questioned limiting the hydrology-related functional distances for herbaceous vegetation. And many reviewers expressed concern that lowering the relative ranking for these areas could result in reduced levels of protection and lost restoration opportunities. Several suggested that such areas may not currently function as well but are still important for stream health.

One reviewer supported reducing the value assigned to lawns, noting that lawn care and managed vegetation leads to an increase in nutrients and pesticide pollution. However, this reviewer does not support reducing the functional value assigned to unmanaged herbaceous vegetation and suggests placing managed and unmanaged herbaceous vegetation in different categories. Another reviewer suggested that the City assign secondary value to herbaceous vegetation within 300 feet of a slope exceeding 25%.

Staff response/decisions: Of all the proposed refinements, this is the most difficult to resolve given the strong opinions and concerns expressed by technical reviewers. Most of the technical reviewers confirmed the rationale to distinguish between Portland's herbaceous vegetation and other riparian vegetation types. Several reviewers could not support the modification because they are concerned that a lower inventory ranking could result in policy decisions not to not protect or restore these areas. Staff acknowledges this concern and is committed to bring this issue forward into future policy and resource management discussions and decision-making processes.

In addition, while staff is interested in the future potential to distinguish between functions provided by "unmanaged" and "managed" vegetation, the current vegetation data are not precise enough to do so at this time. In addition, it is very difficult to determine if and how herbaceous vegetation is or is not managed using aerial photos (e.g. pesticide application is not visible on an aerial photograph). In a highly urbanized area like Portland, most herbaceous landcover is managed to some degree and it is often unclear where to draw a line between levels of function.

After considering all the feedback, and recognizing the diverse perspectives and concerns, staff has concluded that the proposed shift in ranking for herbaceous vegetation continues to make overall sense from a bank stabilization and sediment, nutrient and pollution control perspective, and therefore proposes to retain the mapping criteria as initially presented. Staff also proposes to retain the proposed criterion for evaluating the relative function of Portland's

herbaceous vegetation for *Streamflow Moderation and Storage*. The soil compaction often associated with herbaceous vegetation in an urbanized environment reduces its ability to provide the level of interception and infiltration compared to the function provided by more complex vegetation assemblages. It seems appropriate in this circumstance to establish consistent criteria for assigning secondary hydrologic and water quality related functional value to herbaceous vegetation.

9. **Proposed Refinement:** ***Establishing a maximum riparian corridor functional width for modeling purposes.*** The City recognizes that riparian areas are not defined by specific widths, but rather by how they function as ecological units. However, the City proposes to refine the regional mapping criteria by establishing a maximum riparian functional distance "search area," primarily for modeling purposes. Without establishing a spatial limit, riparian functions could conceivably be mapped thousands of feet from a water body. To address this issue, the City proposed to establish a riparian corridor mapping boundary using the largest functional distance ascribed by the riparian model, specifically the 780-foot secondary functional distance that both Metro and the City is using to map *Microclimate and Shade* functions.

Synthesized comments: Technical reviewers generally concurred with a few qualifiers. One reviewer noted that this approach does not recognize the relationship between forest cover throughout a watershed and stream health, noting that while the Wildlife Habitat Model may capture some of these upland areas, the relationship of these areas to stream health needs to be made explicit in inventory reports. Another reviewer pointed out that if riparian areas represent ecological units (vs. a buffer or setback), a standard width is not appropriate. This reviewer also questioned the applicability of the literature source on which Metro and the City base the 780 foot functional distance for *Microclimate and Shade*. One reviewer suggested that 780 feet seems overly large and wondered if there are any riparian areas that are this wide in Portland. Another reviewer recommended that the City address impact areas, and suggested that primary impact areas should consist of all forest canopy that drains directly to streams and secondary impact areas would include all other areas within a watershed.

Staff response/decisions: Staff appreciates the questions and comments from technical reviewers on this somewhat confusing topic. In terms of questions about the 780-foot functional distance used to map *Microclimate and Shade* functions, staff reiterates that this number underwent extensive technical and public review, and has been adopted by Metro Council as part of the regional inventory. Barring the introduction of a scientifically-based functional distance that is more appropriate for Portland, the City will continue to use this assumption.

Staff also appreciates reviewer comments regarding the influence of vegetation throughout a watershed on stream health and will discuss this in the methodology report. Staff will make sure to explain and distinguish between riparian functional distances in the modeling criteria, the role of actual riparian areas, and buffer area concepts.

After considering technical reviewer feedback on this topic, staff proposes to proceed in establishing the proposed maximum riparian corridor width for modeling purposes.

10. **New Refinement:** ***Assigning secondary(instead of primary) functional value shrubland vegetation within 50 feet of a river, stream/drainageway or wetland***

Staff is also proposing a new refinement to the riparian inventory model; one that was not provided to technical reviewers. Metro's inventory assigned primary functional value for microclimate and shade to forest and woody vegetation within 100 feet of a stream. Metro did not assign value to low structure vegetation for these functions. The initial criteria provided by the City to the technical reviewers would have assigned a primary microclimate and shade value to forest, woodland, and shrubland vegetation within 100 feet of a river, stream/drainageway, or wetland.

City staff is now proposing to assign a secondary value to shrubland vegetation within 50 feet of a river, stream/drainageway or wetland. Portland varies extensively in terms containing woody vegetation. Some shrubland vegetation is comprised of riparian understory vegetation with some trees, including patches of Himalayan blackberry. These areas would generally qualify as woody vegetation that can contribute significantly to microclimate and shade functions. However, Portland's shrubland vegetation also includes shrub orchards and extensive landscaped areas comprised primarily of smaller plants, groundcover and grass. These types of areas may not contain much woody vegetation. Typically, riparian microclimate and shade functions are associated primarily with multi-story vegetation assemblages that include tree canopy. Still, shrubland vegetation on or near stream banks can provide shade that helps to moderate stream temperature. Staff believes that the proposal to assign secondary value to shrubland adjacent or very near a waterway or wetland is appropriate to capture this function.

Wildlife Habitat Model

11. **Proposed Refinement:** ***Relying on new vegetation data in lieu of creating two patch types.***

Metro established two types of patches as inputs to the regional wildlife habitat model. Type 1 patches are comprised of forest landcover and/or wetlands at least 2 acres in size. Type 2 patches are comprised of shrubland/scrubland or grassland/open soils landcover at least 2 acres in size and w/in 300' of a surface stream. With this information Metro was able to model wildlife habitat connectivity and other functions provided by medium and low structure vegetation within riparian corridors. The City proposes to rely on more detailed vegetation data instead of establishing 2 patch types. Details about the City's vegetation data are provided in item #1 and on the web at http://www.portlandonline.com/planning/index.cfm?c=40440.

Synthesized comments: Technical reviewers concurred with this proposed refinement. One reviewer noted that the new vegetation data recognizes the value of smaller patches in Portland not picked up in the regional inventory. Another noted that while mapping vegetated areas as small as ½ acre is an improvement over the regional inventory, significant habitat for native plants and small fauna can yet exist in small units.

Staff response/decisions: Proceed as initially proposed.

12. Proposed Refinement: ***Including woodland/shrubland vegetation in wildlife habitat patches.***

The City has proposed to include in wildlife habitat patches woodland/shrubland vegetation that is adjacent to forest/wetland patches at least two acres in size. Metro identified 2-acre minimum forest/wetland habitat patches but did not include other types of vegetation in habitat patches due to limitations in the regional vegetation data.

Synthesized comments: Technical reviewers concurred with this proposal and the underlying rationale. One issue that came up is whether this refinement meant that the inventory would include large patches of Himalayan blackberry or other invasive monocultures. Some technical reviewers noted that blackberry attract nuisance species and that including this type of invasive plant could be a public point of contention. Other reviewers commented that blackberry can serve as a buffer to protect natural areas and provide some value for specific wildlife habitat species. Blackberry can also effectively expand the habitat patch size and provide connectivity. Another concern is the potential for large areas of shrubland comprised of residential, commercial, or industrial landscaping to be included in wildlife habitat patches. It was also noted that any woodland/shrubland vegetation is potential habitat, and that even strips of single trees can provide green corridors down the center of residential blocks for birds and mammals.

Technical reviewers asked how the inventory addresses grasslands and meadows since the habitat patches being modeled do not include herbaceous vegetation.

Staff response/decisions: Staff appreciates the thoughtful discussion and comments from technical reviewers on this topic. Staff recognizes continuing concern about including Himalayan blackberry and other non-native or invasive species in the City's natural resource inventory. However, many of the most significant riparian corridors and wildlife habitat areas in the City contain non-native plant and animal species. City staff share the technical reviewers concern Recognizing that technical reviewers had different opinions on the topic, staff proposes to include woodland vegetation in wildlife patches if adjacent to areas that are 2 acres or larger and are comprised of forest vegetation and/or wetland. Staff proposes not to include shrubland vegetation in the wildlife patches. This is in part to address concerns expressed above. This is also because Portland's shrubland vegetation is, in many instances, by development or part of an area of cultivated landscaping. Where shrubland vegetation is part of an identified critical habitat corridor or connector, it can be mapped in the inventory through designation as a Special Habitat Area (like grassland areas).

13. Proposed Refinement: ***Scaling the regional relative habitat rankings criteria for Habitat Patch Size and Interior Habitat Area.***

In producing the regional inventory, Metro established relative ranking thresholds for Habitat *Patch Size* and *Interior Habitat Area* attributes by identifying natural breaks in the distribution of patch sizes for the region as a whole. Because much of the region is far less urban than Portland, the ranking thresholds were fairly high. For example, using Metro's thresholds, the Oaks Bottom Wildlife Refuge would receive a low ranking for *Habitat Patch*

Size. The City is proposed to scale these ranking thresholds to reflect Portland's urbanized landscape as well as recent research findings. The City's proposed rankings thresholds are shown below with the regional ranking thresholds.

City High:	>585 acres	(Metro High:	> 2,467 acres)
City Medium:	30 to 585 acres	(Metro Medium:	585 to 2,467 acres)
City Low:	2 to 30 acres	(Metro Low:	2 to 585 acres)

Similarly, the City's proposal involves linking the ***Interior Habitat Area*** and ***Habitat Patch Size*** rankings to provide a sound measure of the shape of a patch (relative to the size), while also continuing to scale the evaluation to Portland's urban environment. The City would continue to measure *Interior Habitat Area* using Metro's method (patch area minus a 200-foot interior buffer inward from the edge of the patch), and then linking the interior area ranking thresholds to the patch size thresholds above. The City's proposed ranking thresholds are shown below with the regional thresholds.

City High:	>500 acres of interior habitat	(Metro High:	> 1,118 acres)
City Medium:	15 to 500 acres of interior habitat	(Metro Medium:	386 to 1,118 acres)
City Low:	2 to 15 acres of interior habitat	(Metro Low:	2 to 386 acres)

Synthesized comments: Technical reviewers concurred with these two proposed refinements. Several reviewers commended the City for incorporating recent local research into the project. Another reviewer noted that the refinements help account for the fact that in urban areas there are smaller patches to work with and build upon. A couple of reviewers suggested that the two-acre minimum patch size Metro and Portland are using may be too large and asked if the City had considered using smaller patch sizes.

Staff response/decisions: In response to questions regarding the 2 acre minimum patch size, staff has encountered literature citing the important role of smaller vegetated areas, such as backyard trees, as habitat. However literature discussing habitat patches primarily addresses areas of 2 acres or larger. For the riparian wildlife movement corridor the City's model will map and evaluate vegetated areas down to ½ acre.

Consistent with general concurrence by technical reviewers, staff intends to proceed with refinements as proposed.

14. **Proposed Refinement:** ***Using FRAGSTATS to model Connectivity between Habitat Patches and adjusting ranking thresholds to reflect the distribution of patches in Portland.***

Metro developed a model to evaluate patch proximity/connectivity and established connectivity ranking thresholds based on natural breaks in the proximity data for the region as a whole. The City proposes to adjust the ranking thresholds to reflect natural breaks in the distribution of habitat patches within Portland. The City also proposes to use FRAGSTATS 3.3 to model connectivity/proximity between habitat patches. FRAGSTATS is an accepted, user-supported modeling platform used to evaluate proximity, connectivity and fragmentation between wildlife habitat patches based on a "dimensionless proximity index." The proximity

index of a habitat patch is the sum of the area of each patch divided by the squared nearest edge-to-edge distance between each patch and the habitat patch for which the index is being calculated. The proximity index increases as a specified "search area" around each patch is increasingly occupied by other habitat patches and as those patches become closer, larger, and more contiguous (or less fragmented) in their distribution. For more information on FRAGSTATS, please refer to http://www.umass.edu/landeco/research/fragstats/fragstats.html.

Metro attempted to use this model for the regional inventory but the size of the regional data sets made use of FRAGSTATS infeasible. FRAGSTATS is generally equivalent to the approach Metro developed to evaluate connectivity between habitat patches in the region, but is more effective in identifying connectivity between smaller habitat patches. FRAGSTATS also has the advantage of regular use by the broader scientific community and will be updated over time. Given that this factor is being evaluated generally (e.g., not for specific species), Metro and the City are using a ¼ mile "search area" for evaluating patch connectivity. The ¼ mile was selected based on data management and modeling considerations.

Synthesized comments: Most technical reviewers concurred generally with this refinement; however several were not very familiar with FRAGSTATS. One reviewer requested a more explicit explanation of the criteria used to evaluate connectivity. Another noted that FRAGSTATS simply quantifies the areal extent and spatial configuration of patches within a landscape; it is incumbent on the user to establish a sound basis for defining and scaling the landscape and how the patches are classified and delineated. This reviewer went on to note FRAGSTATS, like the Jenks optimization used by Metro, looks at numbers and finds groups within them, and asked if this meaningful in terms of wildlife ecology.

Staff response/decisions: Staff appreciates technical reviewer comments on this topic and agrees that the FRAGSTATS is in many ways similar to the approach Metro used to evaluate connectivity between patches. Staff also agrees that like the approach used to develop the regional inventory, FRAGSTATS is not species-specific and the index created evaluate relative connectivity is based solely on the geographic distribution of habitat patches in the Portland area.

Staff intends to proceed as proposed, and will continue to work with Metro and others to monitor advancements in evaluating habitat patch connectivity, particularly in urban areas.

15. **Proposed Refinement:** ***Applying the "Connectivity to Water" factor to wetlands (as well as rivers and streams), basing connectivity rankings on Portland habitat patches, and adding a riparian wildlife movement corridor function.***

In developing the regional inventory, Metro ranked habitat patches based in part on an attribute called *Connectivity to Water*. Metro established the ranking thresholds for this attribute based on the percentage of a patch that is located within 300 feet of a stream. Metro established ranking thresholds by identifying natural breaks in the distribution of percent area within 300 feet of a stream for all the habitat patches in the region. The City proposes to adjust the ranking thresholds to reflect percent area within 300 feet of a stream for habitat patches in Portland.

The City also proposed to apply the *Connectivity to Water* criterion to wetlands, while Metro applies this criterion only to streams.

The City's refinement proposal also included evaluation of riparian wildlife habitat as movement corridors by assigning primary value to forest, woodland, and shrubland vegetation within 300' feet of a river, stream, drainageway or wetland, and to apply a secondary functional value to herbaceous vegetation w/in 100' of these features. Metro addressed riparian wildlife movement corridor functions by assigning function to multiple vegetation types (type 2 patches) within 300 feet of a stream.

Synthesized comments: Technical reviewers expressed mixed views on these proposed refinements. There was general concurrence regarding the application of the *Connectivity to Water* factor to wetlands, although one reviewer expressed concern that for small wetlands a functional distance of 300 feet could be much larger than the resource. A couple of reviewers also had concerns about limiting the movement corridor functional distance for herbaceous vegetation. One reviewer noted that herbaceous vegetation may provide some of the best and most significant opportunities for wildlife movement in some locations. Another stated that the proposal does not reflect the importance of meadow habitat and provides a disincentive for planting trees or shrubs in areas that are currently grass. One reviewer suggested distinguishing between functions provided by managed and unmanaged herbaceous vegetation.

Staff response/decisions: Staff proposes to retain the proposed riparian movement corridor function which supports movement of wildlife to and along or around a stream or wetland. Staff proposes to modify the initial refinements to assign primary value to *all* vegetation types located within 100 feet of a stream or wetland and that is contiguous to the river, stream or wetland. (Where only stream centerline data are available, vegetation up to 10 feet from the centerline will be mapped as contiguous to the waterway.) Further, staff proposes to assign secondary value to vegetation (all types) that is contiguous vegetation receiving a primary score for this function (i.e., within 100 feet of a stream or wetland) and extending to a maximum distance of 300 feet from a river, stream or wetland. It may in the future be possible to distinguish between functions provided by natural/semi-natural herbaceous vegetation and managed herbaceous vegetation if/when the data could support this distinction. Herbaceous areas that are cultivated as lawn or landscaping are often highly fragmented by development, fences, roads and other barriers to wildlife movement some of which might present significant wildlife hazards.

Species and Special Habitat Areas

16. Proposed Refinement: ***Broaden the regional wetlands criteria used to designate Habitats of Concern to include known seeps and springs that are associated with a wetland complex.***

Metro included all locally significant wetlands in the regional Habitats of Concern but did include wetland-associated seeps and springs in the wetland criterion. The city has proposed to broaden this criterion to include seeps, springs and streams that are associated with the wetland, thus creating a "wetland complex."

Synthesized comments: Technical reviewers concurred with this refinement. One reviewer noted that the modification would better capture wetland hydrological and water quality functions. Another reviewer noted that it may be unrealistic to capture all seeps and springs.

Staff response/decisions: Staff agrees that it will not be feasible to identify all seeps and springs associated with wetlands. However the purpose of this criterion is to provide a mechanism recognize the importance of these seeps and springs and document their occurrence where know. Staff proposes to retain the refinement as proposed.

17. **Proposed Refinement:** ***Adding a new criterion for identifying Special Habitat Areas in Portland: Willamette Beach.***

The City proposed that this new criterion would be applied to documented natural and semi-natural beaches at least 1700 feet long (1700 feet is the mean Willamette beach length in Portland) and located along the Willamette River. This proposal is based on the importance of beach habitat to many species of shorebirds and significant correlations between Willamette Beaches and listed fish species as documented in *Biology, Behavior, and Resources of Resident Anadromous Fish in the Lower Willamette River* report, completed by the Oregon Department of Fish and Wildlife (ODFW 2005).

Synthesized comments: Most reviewers concurred with this proposal. Several noted that adding this habitat type was a good improvement. One reviewer asked what was meant by natural and semi-natural and said they saw flaws in the ODFW study. Another reviewer noted that the OFDW study provides strong support for inclusion of Willamette beaches. One reviewer asked how beaches would be distinguished from riparian areas. Some reviewers questioned the proposed 1700-foot minimum beach length limitation. One reviewer recommended that this criterion be broadened to include beaches along the Columbia River and Hayden Island, or that the Riverine Island or River Delta criterion be modified to include Columbia River and Hayden Island Beaches.

Staff response/decisions: To address questions raised by reviewers, staff conducted additional analysis regarding beach length. Bank treatment types were first inventoried by Greenworks et al in 2000, and were then modified by the Oregon Department of Fish and Wildlife for use in the *Biology, Behavior and Resources of Resident and Anadromous Fish in the Lower Willamette River*, 2005. This data layer contains 43 beach segments within the City of Portland. ODFW conducted statistical analyses for a subset of these, ranging in length from 200 feet to more than 3000 feet. At each transect ODFW found statistically

significant correlations between Willamette beaches and occurrence of listed salmonids; no distinction was made between longer and shorter beaches). Thus, staff proposes to change the initial 1700-foot minimum to a 200-foot minimum beach length for this criterion.

The establishment of Special Habitat Areas is intended to reflect documented information about specific areas. Therefore, staff does not propose to apply this criterion to other beaches along the Columbia River or other streams unless area-specific documentation is provided.

18.* Proposed Refinement: *Developing a plant list for Special Habitat Areas.

Metro did not include a plant species list to accompany the Habitats of Concern "Plants" criterion. The City proposes to create a list of plants to clarify what is meant by the "Plants" criterion being used to designate Special Habitat Areas in the City's inventory. The list would include species that are known or expected to occur within Portland. Preliminary eligibility criteria include:

1. Plant species listed by USFWS or NOAA Fisheries as *Endangered*, *Threatened*, *Proposed Endangered*, or *Proposed Threatened* under the Endangered Species Act or by the ODA or ODFW under the Oregon Endangered Species Act; OR
2. Plant species receiving an Oregon Natural Heritage rank 1, 2 and 3; OR
3. Selected species from the City of Portland Bureau of Parks and Recreation (PPR) Species of Interest List.

Synthesized comments: Reviewers concurred with the proposal to develop a plant list. One reviewer suggesteed reviewing more recent species lists and consideration of additional species. Another noted that the list is not a complete list of native species for Portland and suggested incorporating all the relevant species. This reviewer also asked if the inventory would address invertebrate species, noting that various mollusk and insect species native to this area use vegetated patches that are generally smaller than sizes needed for vertebrates.

Staff recommendation: Staff proposes to work with Bureau of Environmental Services and Parks and Recreation staff to convene a group of plant experts to review these criteria and the initial draft list, and develop recommendations to revise the list before finalizing. Staff proposes to not include the Species of Interest List because that was not developed to meet the intent of Special Habitat Areas (the Bureau of Parks and Recreation staff concurs with removing these plant species.)

Other Topics

19. Regarding the developed floodplain: During the technical review process, some reviewers questioned why the City is assigning any riparian functional value to developed floodplains. Reviewers pointed out that the developed floodplain can be essentially impervious, with few natural resources remaining to provide beneficial wildlife habitat or other riparian functions. It was also pointed out that these areas can pose risks to water quality during flooding events. *Staff agrees that riparian functions in the developed floodplain are highly degraded and that these areas can pose risks during flooding events (for example, if stored contaminants were mobilized under flood conditions). These issues were also raised and discussed extensively during the development of Metro's inventory of regionally significant riparian corridors and wildlife habitat. The Metro Council directed that developed floodplains be assigned a secondary*

value for functions relating to streamflow moderation, water storage, and channel dynamics. This decision resulted in the developed floodplain receiving a low significance ranking in the regional inventory. The City's inventory approach is consistent with the Metro decision and no changes are currently proposed.

20. **Regarding the "U" Unique Special Habitat Area designation criterion – Comment:** It is important the city capture urban structural habitats within its inventory. Five percent of the known falcon nests in the state occur on bridges. The largest known swift roost in the world is at Chapman Elementary School. These sites can have significant ecological importance.
    Staff agrees.

21. **Regarding the Special Habitat Area mapping protocol - Comment:** The City's proposal to narrow HOC/SHA boundaries to exclude street trees (e.g., at Reed College) could have implications. In general the delineation of SHAs should err on the side of being inclusive rather than narrow. Consider areas that are used by wildlife that are adjacent to the significant habitat areas (street trees, parks, etc.) – the periphery is important. SHA could be applied to smaller areas and to neighborhood habitat.
    Staff appreciates this comment; however, it is important that the SHA boundaries are mapped consistently and can be justified based on existing documentation.

22. **Regarding elevation of Special Habitat Area rankings:** The City's inventory models assign "High" relative functional rankings to most areas proposed as SHAs. However a few SHAs and some portions of SHAs receive "Medium or "Low" relative rankings. The City's initial refinement proposal involved using the model rankings as significance rankings for SHAs, rather than elevating SHAs to a high significance ranking as Metro did. Some reviewers found this approach to be somewhat counter-intuitive and confusing in that the resources comprising or located within SHAs are by definition "highly significant." Questions were also raised as to how this information would play out in future discussions of management tools including protections and restoration.
    To address these issues, staff now proposes to present the model results as one element of the NRI, to be followed by the assignment of "significance levels." SHAs will be assigned a "high" level of significance even if their model-based rankings are low or medium.

23. **Regarding Impact Areas:** As noted above, one technical reviewer suggested that the City include impact areas in its Natural Resource Inventory as Metro did. Metro identified impact areas within certain distances of inventoried riparian and wildlife habitat resource areas. This reviewer also suggested the City use a more inclusive approach to identifying the impact areas (i.e., including all forested areas draining directly to streams as primary impact area, and including entire watersheds as secondary impact areas).
    Although Metro elected to identify impact areas as part of the regional inventory, the City is choosing to defer identifying an impact area. The Oregon Administrative Rule for compliance with Goal 5 defines impact area as "a geographic area within which conflicting uses could adversely affect a significant Goal 5 resource." The rule requires determination of an impact area as part of the evaluation of tradeoffs conducted through an Economic, Social, Environmental, and Energy (ESEE) analysis. Cities and counties are expected to rely on Metro's ESEE analysis when updating local Goal 5 program to meet Title 13 requirements. Therefore, it may not be appropriate for local jurisdictions to update the regional impact area specifications unless the city or county intends to conduct additional ESEE analyses.

Conclusions and Next Steps

The technical review process described in this report constitutes a critical step in the City's Natural Resource Inventory Update (NRIU) project. Throughout the process, technical reviewers provided invaluable critique, information, insights, and suggestions that have led, in many instances, to important improvements in the City's inventory methodology. Key improvements include multiple modifications to the inventory modeling/mapping criteria and Special Habitat Area (SHA) designation criteria. As a result the City's NRIU methodology better meets the criteria stated at the outset of this report, specifically, to build and improve on Metro's inventory of significant riparian corridors and wildlife habitat, while also maintaining overall consistency with the intent, approach and scientific underpinnings of the regional inventory.

Suggestions from technical reviewers will also be incorporated into the text of the City's inventory methodology report to ensure the City's approach and rationale is presented clearly and comprehensively. Where suggestions from technical reviewers have not been incorporated into the inventory, staff has attempted to provide clear responses explaining the decisions.

Staff will be creating an addendum to this report will be created after the City's inventory models have been revised and run to create new maps and statistics that can be compared to Metro's inventory and the original refinement proposal. The full set of SHA criteria will be presented in the addendum along with updated plant and animal species lists.

In addition, the technical review process and products will be noted in a project briefing before the Portland Planning Commission on October 10, 2006. This briefing will update the Planning Commission on the status of the NRIU work and how it fits into recent and upcoming Bureau of Planning and other City activities.

Natural Resource Inventory Update Project

Technical Review Briefing Paper

City of Portland Bureau of Planning
Draft – May 31, 2006

BACKGROUND

The City of Portland Bureau of Planning is currently leading an effort to update and refine existing natural resource inventories for areas within the city and urbanizing portions of Multnomah County. Portland's "Natural Resource Inventory Update" (NRIU) project is an implementation element of the *River Renaissance Strategy* and the *Portland Watershed Management Plan*. The project also supports the City's long-standing investments in conserving natural resource values and functions that are critical for neighborhood livability, public health and safety, and fish and wildlife habitat.

The NRIU project will improve the quality and accessibility of information on riparian resources and wildlife habitat in the City. New GIS data management, modeling, and mapping tools will allow the inventory to be updated regularly over time.

The products of the NRIU project will supplement the natural resource inventories that the City has produced over the last two decades. New data, maps and reports will inform a broad array of City and community activities such as:

- Developing citywide or area plans and strategies to improve watershed health and meet other goals (e.g., River Plan project, Terrestrial Enhancement Strategy)
- Identifying priority locations for restoration and willing-seller land acquisition
- Updating and improving existing regulatory programs, including the Willamette Greenway Plan and the City's environmental and greenway overlay zones
- Preparing strategies to comply with current and emerging regulatory requirements, including Metro's recently adopted Nature in Neighborhoods Program (Title 13 of the Urban Growth Management Functional Plan)
- Targeting public education and outreach to specific areas.

The Portland NRIU project incorporates and builds on the fundamental science and methodology that Metro developed and employed in producing an inventory of riparian corridors and wildlife habitat for the tri-county metropolitan region. The Metro Council endorsed an earlier draft of the inventory in 2001 after extensive technical review and input from local, state and federal agencies (including the City of Portland) and completion of a public hearings process. The Metro Council adopted an updated edition of the inventory in December of 2005.

Through the NRIU project, the City will refine Metro's inventory for Portland. Proposed refinements include:

- incorporating more recent landscape feature data;
- updating species lists and Habitats of Concern;
- refining several mapping criteria to address local conditions and data availability; and
- using a different, but widely-accepted model for evaluating connectivity between wildlife habitat patches.

These refinements are needed to:

- increase level of resolution;
- increase clarity and transparency;
- improve mapping accuracy;
- address data limitations;
- integrate Portland-specific watershed conditions and functions; and
- enable regular inventory updates for Portland.

The Bureau of Planning is submitting the proposed refinements to a group of technical experts for review. The purpose of the review is to ensure that:

1. The refinements are reasonable, appropriate, and scientifically acceptable.

2. The refinements are generally consistent with the intent of Metro's inventory, *and* will complement and enhance Metro's inventory for use in Portland.

3. The refinements make sense for Portland, and, at the same time do not invalidate the regional inventory in other cities or counties with different characteristics or date availability.

The technical review group will be asked to focus on aspects of the City's NRIU approach that differ from Metro's inventory methodology rather than critiquing portions of the NRIU that are virtually identical with Metro's adopted approach.

The remainder of this report:

- Provides additional context for the NRIU project

- Presents a general overview and comparison of Metro and Portland inventory methodologies

- Describes the rationale and scientific basis for City-proposed refinements to Metro's inventory for Portland, and

- Explains how the refinements will change the inventory results.

PROJECT CONTEXT

Portland's Natural Resource Inventory Update (NRIU) project is part of the City's long-term investment in producing natural resource inventories and establishing mechanisms to protect, conserve and restore important resources. The following is a chronology of events leading up to and guiding the NRIU project.

In 1982, the City adopted a map of local streams and water features. Setback standards were added to the Zoning Code to prevent development from coming too close to the waterways. In 1986, the City began producing more comprehensive natural resource inventories for specific areas in Portland. Starting with the Willamette and Columbia Corridors, the City produced ten natural resource inventories and protection plans over a 15 year period. The most recent inventory and protection plan was completed in 2001 for urbanizing pockets of Multnomah County.

The Portland City Council adopted these inventories and protection plans and established the resource overlay zones to: protect important resources and habitats; reduce landslides, flooding, pollution and other threats to public health and safety; and help the City comply with the federal Clean Water Act requirements and Title 3 of Metro's Urban Growth Management Functional Plan. To date, the City Council has established some type of resource overlay zoning for approximately 18,200 acres of land in Portland and urbanizing Multnomah County.

In 1997 NOAA Fisheries (formerly the National Marine Fisheries Service) listed steelhead trout as a threatened species under the federal Endangered Species Act (ESA). Steelhead trout inhabit Portland's rivers and streams, as do several other fish species that have since been listed. In response to the fish listings the City conducted a review of activities that could affect listed species and their habitats. Emerging from this review was a recommendation to update the existing environmental zoning program to reflect more recent scientific information and enhance protection for aquatic habitats.

The City initiated the "E-zone Update Project," later called the "Healthy Portland Streams" project. This effort included some initial work to update the City's inventory of streams, wetlands, water bodies and riparian resources. City staff also drafted proposed amendments to Portland's environmental policies environmental zoning regulations, and environmental zoning maps.

The initial Healthy Portland Streams proposal, released in November 2001, would have expanded the environmental overlay zone by approximately 5,000 acres to improve protection of streams and riparian areas. This proposal generated considerable public comment, and controversy. Many people expressed support for the intent of the proposal. However, the City received numerous comments opposing new regulations and, in some instances, questioning the underlying information and methodology used to generate new inventory and zoning maps.

During this same period, Metro began to develop a fish and wildlife habitat protection program for the tri-county region. The first step was to develop an inventory of regionally significant riparian corridors and upland wildlife habitat resources. Endorsed by Metro Council in December 2001, Metro's inventory includes approximately 87,000 acres in Clackamas, Washington and Multnomah Counties. About 28,000 acres are within the City of Portland and urbanizing Multnomah County. The next step was to develop a regional habitat protection program.

Given public concerns over the Healthy Portland Streams proposal, the fact that Metro was developing a new regional habitat protection program, and the then upcoming citywide watershed planning effort, the Bureau of Planning developed a modified workplan. The first phase of the work plan was to include:

- Clarifying and simplifying existing environmental zoning regulations to make them easier to understand, administer, and enforce.

- Revisiting and improving the City's inventory of riparian resources and upland wildlife habitats.

Further discussion of amending the environmental zoning maps would be deferred until the City's inventory update and Metro's program were completed. The Planning Commission concurred with the revised work plan in November 2002, and directed the staff to proceed accordingly.

The Environmental Code Improvement (ECI) project was completed in summer of 2005. The goal of the ECI project was to clarify, simplify and streamline existing environmental regulations, continue to protect important natural resources, and encourage enhancement of site conditions as part of development. The ECI project expanded opportunities for applicants to select simpler, less costly review process for projects that meet environmental development standards or projects that include site enhancement components. The project also established a new, more efficient and equitable process for responding to environmental violations. The ECI project received strong support from community stakeholders and other city bureaus. The City Council adopted the proposal in August of 2005. The code amendments took effect September 27, 2005.

As the first step in continuing to update the natural resource inventories, the Bureau of Planning developed more current and accurate stream and vegetation data for the City. During 2003 and 2004 Bureau of Planning staff, with assistance from the Bureau of Environmental Services, staff remapped approximately 160 miles of stream centerlines and added approximately 75 new stream miles to the maps. (Attachment 1) The Bureau of Planning provided Portland's updated stream data to for incorporation into the regional resource inventory. A detailed account of the stream remapping project can be found on http://www.portlandonline.com/planning/index.cfm?c=40440

The next step was to create new GIS data and maps for vegetation located within ¼ mile of either a stream, existing City resource overlay zone, and/or areas included in Metro's inventory of regionally significant riparian corridors and wildlife habitat. The project

involved using 2004 aerial photographs to map vegetated areas at least ½ acre in size and classifying the vegetation as forest, woodland, shrubland and herbaceous, in accordance with the National Vegetation Classification System (NVCS). The City also attempted to classify vegetation as "natural" or "cultural," as outlined in the NVCS guidelines, however, this information is less reliable than the basic vegetation type classifications. City staff conducted targeted field visits to check the vegetation information where needed. (Attachment 2) More information on the Vegetation Mapping Project can be found http://www.portlandonline.com/planning/index.cfm?c=40440

The Bureau of Planning has also been conducting additional research and analysis, developing proposed refinements to Metro's inventory modeling assumptions, and updating the regional Habitats of Concern criteria and maps for the City of Portland. These refinements and updates are presented in detail later in this report.

In September 2005 the Metro Council adopted Title 13 of the Urban Growth Management Functional Plan, thereby establishing the new Nature in Neighborhoods (NIN) program. The purpose of the program is to protect, conserve, and restore significant riparian corridors and certain wildlife habitat areas in the region. Title 13 establishes provisions intended to prevent impacts or ensure mitigation of unavoidable impacts on habitat conservation areas (HCAs) within the region. HCAs are comprised of the highest value riparian resources identified in the Metro's regional inventory of riparian corridors and wildlife habitat.

The Metro Council adopted the regional resource inventory as the scientific basis for the NIN program. The Metro Council also expressed an intent and expectation that local jurisdictions would continue to update and enhance the regional inventory based on new and improved information over time. .

In May 2006, Metro submitted the NiN program to the Oregon Department of Land Conservation and Development (DLCD) for acknowledgement with respect to the riparian and wildlife provisions of the OAR 660, Division 23 *Procedures and Requirements for Complying with Goal 5.* Except for the Tualatin Basin jurisdictions, cities and counties within Metro's jurisdiction will be required to demonstrate that their programs comply with Title 13 requirements within 2 years of acknowledgement by DLCD. The Tualatin Basin Partners for Natural Places (local cities and unincorporated counties within Metro's jurisdiction) worked together to submit a single package for acknowledgement by the Metro Council as part of Title 13. Tualatin Basin jurisdictions must demonstrate compliance under Title 13 in early 2007).

Two other important documents provide guidance for the NRIU: the *Framework for Integrated Watershed Management* and the *Portland Watershed Management Plan*. Both were endorsed by City Council in December of 2005. These documents establish key ecological principles, restoration priorities, citywide watershed goals and objectives, and recommended strategies and actions to protect and restore watershed health.

METRO AND PORTLAND INVENTORY METHODOLOGIES – OVERVIEW AND GENERAL COMPARISON

Overview

As noted above, Portland's NRIU project relies heavily on the science, methodology, and review processes Metro used to produce the recently adopted inventory of regionally significant riparian corridors and wildlife habitat.

The scientific basis for Metro's inventory is presented in the report entitled *Revised Draft – Metro's Technical Report for Goal 5 – July 2002*, which synthesizes information from numerous scientific reports and studies on the following topics:

- Watershed systems and processes
- Ecological functions and wildlife uses of riparian corridors and of upland habitats
- Impacts of urbanization on watershed features, systems and functions
- Relevance of applying scientific research conducted for non-urban ecosystems in an urban setting

Metro's inventory methodology and review processes are documented in the report entitled *Metro's Riparian Corridor and Wildlife Habitat Inventories – April 2005*. The report describes:

- Role of Metro advisory committees and public participation process
- Collection of information about riparian and wildlife habitat resource sites, (i.e., landscape feature data sources, fieldwork, and consultations with agencies and organizations including but not limited to those required by the Goal 5 rule)
- Methodology for mapping riparian corridors and wildlife habitats
- Species and Habitats of Concern, and Sensitive Species Descriptions
- Fieldwork to assess mapping criteria
- Explanation of how the inventory provides location, quality, and quantity information for identified resource sites as required by the Goal 5 rule
- Basis for determining regionally significant riparian resources and wildlife habitat

Metro's inventory work was subject to extensive review by the Independent Multidisciplinary Science Team which is comprised of leading experts in Pacific Northwest watershed and ecological systems. The Metro Council first endorsed the draft regional inventory in 2001, after a public review process. Since then, Metro

staff revised the data, maps and documentation reports several times to incorporate input from local jurisdictions (including the City of Portland), agencies, organizations, and property owners. The most recent versions of the regional inventory were adopted as part of the Nature in Neighborhoods program in September 2005, and again as amended in December 2005.

Metro Regional Inventory Models

To produce the regional resource inventory, Metro developed GIS models to generate consistent, well-documented maps of riparian corridors and wildlife habitat areas. Mapping was based on an assessment of key riparian and wildlife habitat functions as gleaned from relevant scientific literature.

Riparian functions

- Microclimate and shade
- Streamflow moderation and water storage
- Bank Stabilization, Sediment and Pollution Control
- Channel Dynamics and Large Wood
- Organic Material Sources

Wildlife Habitat Functions:

Wildlife habitat functions include breeding and rearing, food and foraging, cover, and connectivity and dispersal. Recognizing these critical functions, Metro used the following attributes as the basis for mapping and assigning relative wildlife habitat value:

- Habitat patch size
- Interior habitat area
- Connectivity between patches
- Connectivity to water

Regional Model Inputs – Key Landscape Features

Metro compiled the most current data available to map landscape features that the scientific literature associates directly with the riparian and wildlife habitat functions listed above. These features include:

- Flood areas (included only in riparian inventory)
- Forest Canopy, woody vegetation and low structure/undeveloped soils (w/in 300 feet of streams) – generally larger than 1 acre in size
- Steep slopes >25% (included only in riparian inventory)

- Wetlands (riparian inventory used "hydrologically connected wetlands," or those located within ¼ mile of a stream; wildlife habitat inventory used complete wetland layer)
- Open Water
- Streams (centerlines)
- Culverts
- Satellite land cover
- Riparian and Wildlife Values layers
- Habitats of Concern Layer (only included in wildlife habitat inventory)
- Species of Concern layer (informational and was not used to influence resource values)

Regional Mapping Criteria

For Metro's riparian inventory model, key landscape features are assigned a primary or secondary functional score depending on the type of landscape feature and/or its proximity to a stream or river. Metro performed an extensive review of the scientific literature to determine which features and proximities provide primary or secondary functions. Metro typically assigned primary scores to undeveloped floodplains, hydrologically connected wetlands, steep slope areas, and forest or other vegetation located adjacent to or near a stream. Secondary values were assigned to landscape features adjacent to but extending beyond the primary functional area out to a specified maximum distance from a stream. Secondary values were also assigned to the developed floodplain for certain functions.

For Metro's Wildlife Habitat model the mapping is based on specific assumptions for habitat patches (comprised of forest and wetland areas at least 2 acres in size). Assumptions were identified for how patch size, interior habitat area, connectivity between patches and connectivity to water contribute to the value of wildlife habitat. The Wildlife Habitat Model does not involve assignment of primary and secondary functional values. Rather, a single relative habitat value is assigned to each patch. Metro tested the viability of the wildlife habitat assumptions and mapping criteria by conducting field assessments at randomly selected sites throughout the region and comparing the results of the field visits with the model results. The model was adjusted to reflect the results of the field studies.

A table describing key functions and presenting Metro's final mapping criteria is provided in Attachment 3.

Regional Species and Habitats of Concern

Metro produced lists of the region's fish and wildlife species and species of concern. Metro also worked with agencies, organizations, wildlife experts and local jurisdictions to identify "Habitats of Concern" (HOCs). HOC categories include:

- regionally at-risk or priority conservation habitats (including wetlands);
- riverine islands and deltas,;
- habitat patches providing known unique or critical wildlife functions such as major wildlife crossings or corridors, migratory bird stopover areas, and biologically or geologically unique areas such as rocky outcrops; and
- important habitats that were not picked up by the Metro's models (e.g., uplands known to be important to migratory songbirds).

Metro evaluated potential HOCs against a set of criteria to determine their eligibility. HOCs were mapped as a separate GIS layer to overlay the model-based inventory maps Most but not all of the HOCs are contained within the areas mapped by Metro's riparian and/or wildlife habitat models.

Impact Areas

Metro identified impact areas as part of the inventory of regionally significant riparian corridors and wildlife habitat. These impact areas were not assigned relative function rankings for regional significance. However, the Impact Areas represent areas adjacent and proximate to significant riparian corridors and wildlife habitat areas where land uses and development could have an adverse impact on the significant resources.

Regional Riparian and Wildlife Habitat Ranking/Scoring

Metro devised a scoring system to rate the significance of the landscape features according to their contribution to riparian or wildlife habitat function.

For the riparian inventory, Metro assigned primary and secondary functional value scores to landscape features based on their proximity to a river, stream or hydrologically connected wetland (wetlands located within ¼ mile of a stream). Scores were additive for any landscape feature and were intended to reflect ecological function at any given point on the map. For example, a location on the landscape that contributes significantly to each of the five riparian functions could have received a score of 30 points (five primary functions time six points possible per function). Alternatively, an area could have received a few primary scores and a few secondary scores, or secondary scores only.

For the wildlife habitat inventory, Metro established significance scoring ranges for each of the four criteria (patch size, interior habitat area, connectivity to other patches, and connectivity to water). The scoring ranges were determined by using the Jenks method

to identify "natural breaks" in the regional data, which allowed Metro to create to establish different habitat classes.

Field data confirmed that the scoring ranges provide a reasonable means of differentiating the relative value of the patches from one another based on the specific model criteria.

Wildlife habitat scores were additive for a given habitat patch and reflect relative wildlife habitat value for each of the mapped patches. Habitat patches could have received a score of one to three points for each of the four model criteria, for a maximum of 12 points total.

Ultimately, Metro adjusted and simplified the riparian and wildlife inventory scoring significantly. Significant riparian resources were assigned a Class 1, Class 2 or Class 3 relative ranking. Significant wildlife habitat areas received a relative ranking of Class A, Class B or Class C. Metro gave Habitats of Concern a Class A wildlife habitat ranking, regardless of how the area was otherwise ranked by the model Attachment 4 provides an example of Metro's inventory maps with rankings and showing a regional Habitat of Concern.

Technical and Public Review of Metro's Mapping methodology

In developing the inventory methodologies, Metro consulted with multiple organizations, local, state and federal agencies, local experts, and the Independent Multidisciplinary Science Team. Metro also provided the methodology for review by Metro's Goal 5 Technical Advisory Committee, Metro Technical Advisory Committee and Metro Policy Advisory Committee. After holding public workshops and a public hearing, the Metro Council adopted the methodology as part of Resolution 01-3087A and directed staff to apply the methodology to produce maps on a regional basis.

Portland Natural Resource Inventory Update (NRIU) Methodology – Overview and General Comparison to Metro's Methodology

Overview

The City of Portland participated in the development of Metro's inventory, both by providing data and information, and as active members of the Metro Goal 5 Technical Advisory Committee, Metro Technical Advisory Committee, and Metro Policy Advisory Committee. Given the strong scientific basis underlying Metro's inventory and the extensive technical and public review Metro's inventory underwent, the City is using this work as the basis for the NRIU project.

Following in Metro's footsteps, Portland has continued to work with the riparian and wildlife habitat GIS models to produce maps of key landscape features and functions. Portland is using the same riparian and wildlife habitat functions and mapping criteria categories used by Metro. Portland is also advancing and building on Metro's Habitats of Concern (HOCs) to complement and augment GIS model outputs. The City's scoring and ranking approach is consistent with Metro's, with a couple of exceptions as discussed below.

The City is proposing to update and refine Metro's inventory for Portland by:

- incorporating more recent landscape feature data;
- updating species lists and Habitats of Concern;
- refining several mapping criteria to address local conditions and data availability; and
- using a different, but widely-accepted model for evaluating connectivity between wildlife habitat patches.

These refinements are needed to:

- increase level of resolution;
- increase clarity and transparency;
- improve mapping accuracy;
- address data limitations;
- integrate Portland-specific watershed conditions to improve applicability of the inventory; and
- enable regular updates to the City's inventory to reflect new information and upgrades to modeling tools.

City staff and Metro staff met several times to discuss the proposed refinements to the regional inventory for Portland. It is the intent of City and Metro staff that the proposed refinements are scientifically acceptable, generally consistent with the intent and approach used to produce the regional inventory, and will complement and the regional inventory for applicability in Portland.

Based on these discussions, City staff further modified the proposal. Metro staff has expressed general acceptance and support for most of the proposed refinements, at least in concept. A couple of items were not discussed or not resolved and will be addressed during the upcoming technical review process. In addition Metro staff reserved judgment until they had a chance to review the revised model runs and compare the results with the regional inventory.

Summary of Proposed Refinements

As noted above, the City has proposed several types of refinements to the regional inventory for Portland. Refinements can be grouped into the following categories:

- Data and model inputs
- Riparian mapping criteria
- Wildlife habitat mapping criteria
- Species and special habitat areas

Data and Model Inputs

As described above, the City has produced new data for stream and vegetation as part of the NRIU update project. The City provided the updated stream data to Metro for inclusion in the region. However, given the increased level of detail in the City's vegetation data, it was not feasible for Metro to integrate the new vegetation data into the regional inventory. The City mapped areas greater than ½ acre. Metro's minimum vegetation mapping area was one acre. In the City has classified vegetation types across the mapping area (within ¼ mile of streams, environmental zones and regionally significant habitat areas). Metro was classified vegetation types other than forest landcover only within 300 feet of streams. This new vegetation data enables the City to generate more detailed inventory information, such as include woody vegetation in upland wildlife habitat patches where the woody vegetation is adjacent to the core forest/wetland patches greater than 2 acres in size (Attachment 2).

Riparian Mapping Criteria

The City is using the same set of riparian mapping criteria that Metro used to model the significant riparian corridors in the region. The City is, however, proposing to refine the specifics for a few of the riparian mapping criteria to:

- Produce more explicit and detailed mapping and evaluation of key landscape features;
- Address gaps in the data; and/or
- Address local conditions that Metro did not address in the regional inventory.

Wildlife Habitat Mapping Criteria

The City is using the same set of wildlife habitat mapping criteria that Metro used to model the significant wildlife habitat areas in the region. The City is, however, proposing to refine the specifics for a few of the riparian mapping criteria to:

- Scale habitat patch size and interior area thresholds to reflect empirical data for Portland, information from more recent scientific literature, and the extent to which Portland is urbanized relative to the rest of the region (i.e., at the far end of the regional "urbanization continuum").

- Enhance mapping of connectivity between habitat patches by using the Fragstats model and refining scoring thresholds to reflect further analysis of habitat patch distribution in Portland
- Update mapping of connectivity between wildlife patches and water to reflect habitat patch distribution in Portland

Species of Interest and Special Habitat Areas

As part of the NRIU project, the City in honing the regional lists of fish, wildlife and plant species contained in the supporting documents for the regional inventory. The proposed species lists have been revised to include species that are known or expected to occur in Portland. In addition, the updated lists include species of concern as identified by a broader group of organizations than was included in the regional inventory, including the Oregon Watershed Enhancement Board and Partners in Flight.

The City has also continued to update and refine Metro's Habitats of Concern (HOCs) for Portland. The Bureau of Planning met with staff from other bureaus and Metro, and other wildlife experts to review and update Metro's HOC designations based on additional information and documentation contained in the City's *Portland Watershed Management Plan* and other sources. In addition, the City has developed descriptions for each criterion to further clarify how the criteria would be applied on the landscape. The City has revised a number of the boundaries based on further analysis and is proposing to add a few new areas in the Columbia Slough, Johnson Creek and Fanno/Tryon watersheds.

The City is proposing to rename these areas "Special Habitat Areas (SHA)" rather than "Habitats of Concern. " This purpose of the renaming is to make it clear that these areas are more inclusive than the ODFW-mapped habitats of concern referred to in the state Goal 5 rule. The name "Special Habitat Area" is also intended to focus on positive aspects of these areas, opportunities for restoration, etc. Updated species lists, SHA criteria, SHA matrices, and an example of boundary refinements are provided in Attachments 5, 6, and 7, and 9 respectively.

Impact Areas

The City's inventory methodology does not, as yet, include the identification of Impact Areas. Impact areas could be added to the inventory if the City conducts an additional or supplemental Economic, Social, Environment, and Energy (ESEE Analysis) as specified in the Goal 5 rule.

Table 1. presents more detailed descriptions and explanations of the proposed refinements.

Table 1. Proposed Refinements to Metro Inventory of Regionally Significant Riparian Corridors and Wildlife Habitat for Applicability in Portland

City-Proposed Refinement "Snapshot"	Description of City-Proposed Refinement; comparison to Metro approach*	Rationale for City-Proposed Refinement	Metro staff opinion / technical review**
Data/Model Inputs			
The City is using new vegetation data in riparian and wildlife habitat inventory models, and for refinement of Habitats of Concern	Metro mapped vegetation within 300 feet of any river, stream or drainageway, and all forest canopy >1 acre in area. Metro classified vegetation as forest, woody, shrub and low structure/undeveloped soils only w/in 300' of a stream. To update the regional vegetation data, Portland used 2004 aerial photos and targeted field visits to produce GIS maps for vegetated areas > ½ acre, and w/in ¼ mile of any river, stream or drainage way, or within ¼ mile of existing environmental zones or regionally significant habitat areas. For these areas the City has also classified vegetation as forest, woodland, shrubland, or herbaceous per the National Vegetation Classification System (NVCS).	Portland's vegetation data is more detailed and accurate than the regional vegetation data. Classification of vegetation types outside stream corridors makes more detailed upland mapping possible. Classifying vegetation in accordance with NVCS protocol provides compatibility with other data sources and allows "seamless" linkage with Portland Bureau of Parks and Recreation Natural Areas Vegetation Assessments.	Metro staff concurs; additional discussion as needed.
The City is not including an "undeveloped soils" landcover type	Metro included low structure vegetation/undeveloped soils as one of its landcover categories. City landcover types include forest, woodland, shrubland, herbaceous and impervious surfaces. The City is not proposing to specify an "undeveloped soils" type.	The City's herbaceous vegetation layer captures some undeveloped soils in Portland. However, many unvegetated areas without structures or paving tend, in the City, to be comprised compacted features such as gravel roads, parking lots or otherwise compacted sites (e.g., ball fields, construction sites) that would not contribute significantly to most riparian and wildlife habitat functions. Where such areas are within a flood area the City's model will assign functional value for ***Channel Dynamics*** and ***Streamflow Moderation, Water Storage and Watershed Hydrology.***	To be discussed with Metro staff and technical reviewers as needed.
Riparian Mapping Criteria *			
Recognize waterway functions explicitly.	***Apply to all riparian functions*** Metro mapped stream centerlines, open water and locally significant wetlands. Metro's mapping criteria did not explicitly attribute riparian functions to rivers and streams themselves (though functional values were assigned indirectly through other criteria pertaining to riparian vegetation and 50-foot buffers to protect basic waterway functions). The City proposes to attribute riparian functions directly to rivers, streams and hydrologically connected wetlands in the riparian mapping criteria. The City mapped waterway channels based on water surface data where available, or 10' on each side of stream centerline (as a channel surrogate) where water and channel area are not available.	Rivers and streams and drainage ways contribute significantly to riparian functions (streamflow conveyance, flood storage, microclimate, organic inputs/nutrient cycling, etc.). Including waterways in the riparian mapping criteria makes this explicit.	Metro staff concurs; additional discussion as needed.
Broaden the attribution of secondary functional values to wetlands.	***Apply to all riparian functions*** Both Metro and the City assign primary value to vegetation within 150 of a wetland. Metro's applies secondary functional value to vegetation associated with wetlands only for the ***Microclimate*** function. The City's model currently assigns a secondary functional value to vegetation that extends beyond 150' from a wetland, using the same functional distances applied to vegetation along rivers, streams and drainage ways.	The scientific literature clearly confirms the importance vegetated buffers to support the broad array of wetland functions (e.g., sediment and nutrient control, fecal coliform removal, temperature moderation, water level fluctuation, and wildlife habitat. (Castelle, et al, 2002) Many sources confirm the functions of wetland buffers 100 to 200 feet or larger on steep slopes or where land uses have potentially more damaging effects (Castelle et al, 1994. Some cite the benefit of wetland buffers to 300' or further to protect wetland functions, particularly water quality and habitat functions. The City proposes to assign secondary functional values to contiguous wetland vegetation extends beyond primary area to recognize the additional functions associated with larger buffers (Desbonnet et al., 1994 as cited in Kitsap County Summary of Best Available Science, 2004).	To be discussed with Metro staff and technical reviewers

City-Proposed Refinement "Snapshot"	Description of City-Proposed Refinement; comparison to Metro approach*	Rationale for City-Proposed Refinement	Metro staff opinion / technical review**
Narrow the area in which wetlands contribute to channel dynamics.	***Large Wood and Channel Dynamics*** Metro assigned primary functional value to forest within 150' of hydrologically connected wetlands (i.e., located within ¼ mile of a stream). The City proposes to assign primary functional value to wetlands themselves, specifically those located w/in a flood area or located entirely and those located partially w/in 150' from a river or stream.	Channel dynamics are affected by riparian vegetation, sediment deposition, large wood, meander patterns, flow regime and flooding, vertical stability, etc. Wetlands affect sediment patterns and flooding. Wetlands can also attenuate large wood in riparian corridors. It is unclear whether wetlands outside flood areas or vegetated stream corridors would contribute significantly to channel dynamics.	Metro staff concurs; additional discussion as needed.
Recognize limited riparian functions w/in drainage districts.	***Large Wood and Channel Dynamics; Streamflow Moderation, Water Storage and Watershed Hydrology*** Metro's data limitations prevented recognition of the reduced hydrologic and floodplain function of drainage districts in the regional inventory model. The City proposes to modify certain mapping criteria to reflect limitations on hydrologic and floodplain function within drainage districts in Portland.	Several drainage districts operate within the City of Portland under the umbrella of the Multnomah County Drainage District. The drainage districts control water levels and flows in drainage ways which limits significantly the natural hydrologic and floodplain functions. Recognizing these differences improves the applicability of the riparian inventory model to Portland.	Metro staff concurs; additional discussion as needed.
Replace "break-in-slope" threshold w/ reasonable alternative for water quality related functions.	***Bank Stabilization, Sediment, Pollution and Nutrient Control*** Metro assigned secondary functional value to vegetation located on slopes >25% that began w/in 175' of a surface stream, and extending to "the first effective break in slope." The City proposes to use a 300' maximum distance threshold in lieu of Metro's "break-in-slope" threshold.	The City proposes an alternative approach for this criterion because: 1) Adequate break-in-slope information is not yet available for many parts of Portland where streams have been added to the maps. 2) Scientific literature indicates that that riparian forest and woody vegetation w/in 300 feet of streams can control sediment and pollutants on steep or shallow slopes. Using this approach the City is mapping the majority of the land captured in the regional inventory plus additional land along newly mapped streams.	Metro staff concurs; additional discussion as needed.
Reflect that herbaceous vegetation provides lesser value than riparian forest for water quality and hydrological functions	***Bank Stabilization, Sediment, Pollution and Nutrient Control*** Metro assigned primary scores to low structure vegetation w/in 100' of a stream or wetland, or w/in 100-200' of a stream where slopes are >25% (however regional vegetation data includes only forest beyond 300' from a stream) for this function. The City proposes to assign a secondary score to herbaceous vegetation (mostly grass/lawn) w/in 100', or w/in 200' where slopes >25%. ***Streamflow Moderation and Water Storage***, both Metro and the City assign a secondary functional value to herbaceous or low structure vegetation that is located outside of a flood area. The City proposes to apply the secondary function score to herbaceous vegetation within 100' of a stream and 200' where slopes exceed 25%. Metro applies the secondary score to low structure vegetation w/in 300' of a stream.	Mapped herbaceous vegetation in the City is primarily managed, (e.g., lawn). Although grasses can serve to filter and slow stormwater runoff, the scientific literature generally ascribes a lesser functional value to lawn than to the more diverse riparian vegetation assemblages. For example, there is increased risk of bank erosion due to limited soil and bank holding capacity of a number of shallow-rooted lawn species. Also, lawn is associated with increased discharge of phosphorus and other nutrients into water bodies (cit.). Infiltration and evaporation are much higher for forested land as compared with lawn (Kennebec County SWCD, 2001) Often the herbaceous vegetation in an urban environment has also been highly compacted which reduces opportunity for infiltration (City of Tacoma/W.WA Hydrology Model, 2003). Many literature sources call for replacement of lawn with riparian vegetation to improve water quality and other riparian functions.	Metro and City staff agree to raise this issue w/ technical reviewers
Establish maximum functional distance for riparian corridor.	***Streamflow Moderation and Flood Storage function.*** Metro did not establish a maximum distance for secondary functional value of forested land contiguous to and extending beyond 300 feet from a stream. The City proposes to establish a maximum distance of 780' from a river, stream or wetland.	The City's inventory model establishes a maximum distance from streams and wetlands within which ***riparian*** functions are expected to take place. (Outside this distance the functions are presumed to be associated with uplands.) Yet, the scientific literature does not recommend specific riparian corridor widths for vegetation to moderate streamflows and store water, outside the floodplain. Therefore the City proposes to use a distance of 780' for this function because this is the largest distance of all of the other riparian functions that are part of the model (secondary functional distance for ***Microclimate and Shade***).	To be discussed with Metro staff and technical reviewers if needed.

City-Proposed Refinement "Snapshot"	Description of City-Proposed Refinement; comparison to Metro approach*	Rationale for City-Proposed Refinement	Metro staff opinion / technical review**
Wildlife Habitat Mapping Criteria *			
Rely on new vegetation data instead of defining 2 patch types.	***Definition of Wildlife Habitat Patches*** Metro established two types of patches to include in the regional wildlife habitat model. Type 1 patches are comprised of forest landcover and/or wetlands at least 2 acres in size. Type 2 patches are comprised of shrubland/scrubland or grassland/open soils landcover at least 2 acres in size and w/in 300' of a surface stream. With this information Metro was able to model wildlife habitat connectivity and other functions provided by medium and low structure vegetation within riparian corridors. The City proposes to rely on more detailed vegetation data instead of establishing 2 patch types.	The City has produced vegetation data for areas at least ½ acre in size within ¼ mile of rivers and streams in Portland. The City has classified the vegetation types in riparian corridors and uplands and therefore model habitat functions w/out establishing two types of patches.	Metro staff concurs; additional discussion as needed
Include woodland / shrubland vegetation in wildlife habitat patches.	***Definition of Wildlife Habitat Patches*** Consistent with Metro's Type 1 wildlife patches, City-mapped wildlife habitat patches must be of forest vegetation and/or wetland totaling 2 acres or larger in area. The City proposes to include woodland/shrubland vegetation wildlife habitat patches where it is adjacent to forest/wetland patches. Project staff will review patches containing >20% woodland shrubland to confirm functional value. Metro did not have woody vegetation data beyond 300' from streams.	The City is proposing to include woodland/shrubland vegetation in Portland's wildlife habitat patches because such areas can improve the diversity of habitat types and/or provide important buffers or connectors to other patches or water.	Metro staff concurs. To be discussed further w/ technical reviewers.
Scale ***Habitat Patch Size*** scoring thresholds for Portland	***Habitat Patch Size*** Metro determined ***Habitat Patch Size*** scoring thresholds based on natural breaks in the distribution of patch sizes for the region as a whole. The City proposes to scale the regional patch size thresholds to reflect empirical studies in Portland and guidance in the scientific literature. City High: >585 acres (Metro High: > 2,467 acres) City Medium: 30 to 585 acres (Metro Medium: 585 to 2,467 acres) City Low: 2 to 30 acres (Metro Low: 2 to 585 acres)	Metro's scoring thresholds are based on the distribution of habitat patch sizes across the region. In a highly urbanized landscape like Portland, it is appropriate to adjust habitat patch sizes based on local conditions. For example, using Metro's thresholds, the Oaks Bottom Wildlife Refuge would receive a low ranking for ***Habitat Patch Size.*** The City proposes a 30-acre "Medium" patch size threshold, which is consistent with the results of recent species research in Portland parks and greenspaces conducted by Dr. Michael Murphy et al at Portland State University. The 30-acre threshold is also consistent with Metro's field assessments of habitat patches in Portland and mirrors the targets adopted in Title 13. The proposed 585-acre "High" patch size threshold would link to Metro's "medium" ranking for the region. This is supported by some literature sources that suggest urban areas should strive to maintain habitat patches of at least 250 hectares (or about 500 acres). (Canadian Wildlife Service, 2005)	Metro staff concurs To be discussed further w/ technical reviewers
Modify ***Interior Habitat Area*** scoring thresholds	***Interior Habitat Area*** To determine scoring thresholds for this function Metro first subtracted the 200' internal buffer from all Type 1 patches and then identified natural breaks in the distribution of interior area for all patches in the region. The City proposes scoring thresholds that equal the proposed *Patch Size* scoring thresholds minus the 200-foot internal buffer that Metro used to define *Interior Habitat Area* (assumes the patch is round). City High: >500 acres (Metro High: > 1,118 acres) City Medium: 15 to 500 acres (Metro Medium: 386 to 1,118 acres) City Low: 2 to 15 acres (Metro Low: 2 to 386 acres)	The City-proposed ***Interior Habitat Area*** scoring thresholds represent the ***Habitat Patch Size*** scoring thresholds proposed above, minus the 200-foot internal "edge" buffer used in the Metro model. This approach links the scoring for patch area and the shape of habitat patches to the spatial scale and habitat conditions found in Portland. Thus, as with Metro's regional model, the same patch that receives a medium or high score for ***Habitat Patch Size*** could potentially receive a low ranking for ***Interior Habitat Area*** if the patch is long and narrow.	Metro staff concurs To be discussed further w/ technical reviewers

City-Proposed Refinement "Snapshot"	Description of City-Proposed Refinement; comparison to Metro approach*	Rationale for City-Proposed Refinement	Metro staff opinion / technical review**
Use Fragstats to model ***Connectivity Between Patches***. Adjust ranking thresholds to reflect distribution of patches in Portland.	***Connectivity Between Patches*** Metro developed a model to evaluate patch proximity/connectivity and established connectivity ranking thresholds based on natural breaks in the proximity data for the region as a whole. The City proposes to use Fragstats 3.3 to model connectivity/proximity between habitat patches. The City and Metro are both using a ¼ mile "search area" to evaluate patch connectivity. The City proposes to adjust the ranking thresholds to reflect natural breaks in the distribution of habitat patches within Portland.	Fragstats is a widely accepted, user-supported modeling platform used to evaluate proximity, connectivity and fragmentation between wildlife habitat patches based on a dimensionless proximity index. Metro attempted to use this model for the regional inventory but the size of the regional data sets made use of Fragstats infeasible. Fragstats is generally equivalent to the approach Metro developed to evaluate connectivity between habitat patches in the region, but is more effective in identifying connectivity between smaller habitat patches. Fragstats also has the advantage of regular use by the broader scientific. Basing the connectivity ranking thresholds on natural breaks determined for habitat patches in Portland provides a more refined analysis of relative habitat value in the City than using distribution of patches throughout the Metro region.	Metro staff concurs; additional discussion as needed.
Adjust ranking thresholds for distribution of patches in Portland. Apply criterion to wetlands. Add wildlife movement corridor component	***Connectivity to Water*** Metro established ranking thresholds for the percentage of a patch within 300 feet of a stream or based on natural breaks in the proximity data for the region as a whole. The City proposes to adjust the percentages to reflect natural breaks in the distribution of habitat patches within Portland. The City proposes to apply the ***Connectivity to Water*** criterion to hydrologically connected wetlands (along with rivers, streams and drainageways. Metro applies this criterion only to streams. The City proposes to use the riparian model to support the evaluation of riparian wildlife habitat by assigning primary value to forest, woodland, and shrubland vegetation within 300' feet of a river, stream, drainageway or wetland, and to apply a secondary functional value to herbaceous vegetation w/in 100' of these features.	Basing the patch percentage thresholds on natural breaks for habitat patches in Portland provides a more refined analysis of relative habitat value in the City than using distribution of patches throughout the Metro region. The scientific literature clearly supports maintenance of a vegetated buffer to maintain wildlife habitat movement and other habitat functions out to at least 300' from wetlands. While herbaceous vegetation in riparian areas can provide habitat and connectivity, much of the herbaceous vegetation in the City is managed as lawn which provides a lesser habitat value than more complex riparian vegetation assemblages.	Metro staff concurs with including the riparian wildlife corridor function, but questions limiting the functional value of herbaceous veg. to 100' from a stream or wetland. To be discussed with technical reviewers
Habitats of Concern / Special Habitat Areas			
Wetlands and associated seeps, springs and streams that are part of the wetland complex	Metro included all locally significant wetlands in the regional Habitats of Concern but did have sufficient regional data to specify seeps and springs. The city proposes to expand this criterion to include seeps, springs and streams that are associated with the wetland, thus creating a "wetland complex."	Wetlands are often functionally part of a larger complex that includes seeps, springs and streams. These features share the same hydrology. Seeps and springs also provide biologically unique habitats for invertebrates and the animals that feed on them.	To be discussed with Metro staff and technical reviewers if needed.
Willamette beach	The City proposes this new criterion that would be applied to documented natural and semi-natural beaches located along the Willamette River. The criterion may be applied to beaches that: 1. Are part of a larger resource area, such as a beach adjacent to a wetland complex; 2. Provides connectivity between other high value habitats; or 3. Extends a SHA to provide a habitat corridor. Metro did not identify beach habitat along the Willamette except as Habitats of Concern important to shorebirds.	The amount of each habitat along the Willamette has been reduced due to development and river use. Beaches also provide an important food source for shorebirds and waterfowl. They also are invertebrate-rich, similar to riverine islands, and provide unique and critical nesting habitat for certain shorebird species. The *Biology, Behavior, and Resources of Resident Anadromous Fish in the Lower Willamette River* report, completed by the Oregon Department of Fish and Wildlife (ODFW 2005), found significant correlations between beach habitats along the Willamette River and use by salmonids.	To be discussed with Metro staff and technical reviewers if needed.
Plants	Metro did not include a plant species list in its HOC criteria. The City proposes to add a list of sensitive plants species that are known or expected to occur within the City. This list include species: 4. Listed by USFWS or NOAA Fisheries as *Endangered*, *Threatened*, *Proposed Endangered*, or *Proposed Threatened* under the Endangered Species Act or by the ODA or ODFW under the Oregon Endangered Species Act; OR 5. That receive an Oregon Natural Heritage rank 1 , 2 and 3; OR 6. Selected species from the City of Portland Bureau of Parks and Recreation (PPR) Species of Interest List. Note: The City also plans to review and consider modifying this list to address relevant plant species of concern in Oregon as identified in ODFW's new statewide wildlife strategy. .	A plant species list was added to be clear which areas of vegetation may have the plant criterion applied to them. The list can be found in Attachment 5.	To be discussed with Metro staff and technical reviewers if needed.

* (Attachments 10 and 11 provide an "at a glance" verbatim comparison of Metro and City-proposed mapping criteria.

Comparison of City and Metro Ranking/Scoring Approach

Both Metro and the City and Metro assign aggregate rankings to mapped areas based on a resource area's aggregated scores for individual riparian and wildlife habitat functions.

For the riparian corridors, both Metro and the City assign primary values for individual functions if at least one primary feature is present. To determine the aggregated riparian ranking (for all functions), the City assigns a high relative value if 3 or more primary functions are present; a medium relative value if 1 to 3 primary functions; and a low relative value if for areas where no primary functions are present but one or more secondary functions are present. This is consistent with Metro's approach in that it determines riparian resource classes based on the total number of points assigned for all functions.

For wildlife habitat areas, the City assigns a high value to patches that received at least 9 points of the 12 points available. Medium rankings are assigned to patches with 5 to 8 points and Low rankings are assigned to patches with 4 points or less. This is consistent with Metro's approach of assigning wildlife habitat classes based on the total number of points assigned for all habitat patch attributes.

Like Metro, the City is producing consolidated resource maps that incorporate significant riparian corridors and wildlife habitat areas. Where riparian corridors and wildlife habitat areas overlap, the City is applies the highest rank produced by either of the models (as did Metro).

One difference between the two ranking approaches is that while Metro elevated the rankings of Habitats of Concern to Class A Wildlife Habitat or Class I Riparian Habitat, regardless of the ranking assigned by the model, the City is proposing to retain the model ranking and continue showing the Special Habitat Areas on the maps. This will help inform viewers regarding whether the relative condition of habitat area vis-à-vis the model criteria, and will help inform the City and community stakeholders in setting restoration priorities. The City will need to keep in mind that where Metro elevated HOC rankings to Class I Riparian, these areas are subject to requirements of the Title 13 Nature in Neighborhoods program.

Attachment 8 provides an example of a City of Portland inventory map showing aggregate relative resource functional rankings and a Special Habitat Area.

Results and Implications: How does Portland's refined inventory compare to the regional inventory?

This section summarizes the how the City's inventory of riparian corridors and wildlife habitat areas compares to the regional inventory with the incorporation of all the proposed refinements described above.

Area of significant riparian corridors and wildlife habitat in Portland:

City inventory:	~25,351 acres (within the City of Portland)
Metro's regional inventory:	~23,898 acres
Difference:	+ ~1,453 acres (or ~6% more than the regional inventory)

Some key reasons for the additional net acreage in the City's refined inventory are:

- The City's new vegetation data allows inclusion of woodland/shrubland vegetation in wildlife habitat patches if the woodland/shrubland vegetation is contiguous to forest/wetland patches that are greater than two acres in size. While the vast majority o these patches contain less than 20% woodland/shrubland, this change adds inventoried area, primarily in uplands (areas extending beyond 300' from a river, stream or wetland)

- Metro did not produce new vegetation information for streams that were added to the maps after Portland's stream re-mapping project. Thus, the City's inventory includes more vegetation within 50' to 300' of the recently mapped streams.

Although the City's inventory includes additional net acreage, the City's inventory does not include approximately 2,047 acres to which Metro did assign functional rankings. More than 1/3 of this difference can be accounted for by the fact that Metro elevated all Habitats of Concern to Class 1 Riparian and Class A Upland Habitat. While the City's inventory likely includes these areas as Special Habitat Areas, the City would not have added or elevated model rankings for these areas. The remainder of the area not ranked by the City is likely attributed to the new vegetation data and other mapping criteria refinements.

Relative Functional Rankings

The City and Metro's overall relative functional significance rankings are generally consistent, and especially for the highest- and lowest-ranked areas, as shown in Table 2.

Metro rankings for regionally significant riparian corridors and wildlife habitat in Portland:

Class I Riparian/ Class A Upland Wildlife Habitat:	18, 243 acres	76%
Class II Riparian/Class B Upland Wildlife Habitat:	3,194 acres	14%
Class III Riparian/Class C Upland Wildlife Habitat:	2,462 acres	10%
Total:	23,899 acres	100%

City's rankings for significant riparian corridors and wildlife habitat in Portland:

High:	17,440 acres	69%
Medium:	4,399 acres	17%
Low:	3,513 acres	14%
Total	25,352 acres	100%

The distribution of City's and Metro's aggregate rankings differs slightly, in large part because most of the additional areas in the City's inventory are ranked Low or Medium. These areas are likely to be comprised of small to moderate size upland patches, or areas along recently mapped streams that have limited or low quality riparian vegetation. This relatively minor shift in ranking could also reflect the City's proposal to limit the functional value attributed herbaceous vegetation and to retain model rankings for Special Habitat Areas (or Habitats of Concern) that could have been ranked high in Metro's regional inventory.

Table 2. Comparison of Metro Inventory and City of Portland Refined Inventory Relative Resource Rankings

	Total Acreage								
	Acres of Regionally Significant Natural resources								
Portland Relative Resource Rankings	in Class I Riparian	in Class II Riparian	in Class III Riparian	in Class A Wildlife Habitat	in Class B Wildlife Habitat	in Class C Wildlife Habitat	in Regional Impact Area	Not in Regional Inventory	*TOTAL*
High Relative Value	9,028.39	552.58	87.97	6,334.23	218.80	93.64	445.04	678.72	17,440.38
Medium Relative Value	787.56	600.22	125.53	929.04	777.61	160.91	316.43	701.73	4,399.05
Low Relative Value	160.16	504.73	1,209.65	119.99	29.24	131.53	241.51	1,115.63	3,512.43
TOTAL ACREAGE	***9,976.11***	***1,657.53***	***1,423.15***	***7,383.27***	***1,025.64***	***386.07***	***1,003.99***	***2,496.09***	***25,351.85***
Not in City inventory	*176.24*	*273.22*	*155.47*	*707.01*	*237.95*	*496.97*	*3,169.17*		*5,216.03*
TOTAL RESOURCE CLASS ACREAGE	*10,152.35*	*1,930.75*	*1,578.62*	*8,090.28*	*1,263.59*	*883.05*	*4,173.15*		*28,071.80*

	Percentage of Metro Regional Resource Class within each City relative value class							
	in Class I	in Class II	in Class III	in Class A	in Class B	in Class C	in Impact Area	Not in Regional Inventory
High Relative Value	88.93%	28.62%	5.57%	78.29%	17.32%	10.60%	10.69%	27.19%
Medium Relative Value	7.76%	31.09%	7.95%	11.48%	61.54%	18.22%	7.58%	28.11%
Low Relative Value	1.58%	26.14%	76.63%	1.48%	2.31%	14.89%	5.79%	44.70%
Not in City inventory	*1.74%*	*14.15%*	*9.85%*	*8.74%*	18.83%	56.28%	75.94%	

	Percentage of City Relative Value Class within each Metro Regional Resource Class							
	in Class I	in Class II	in Class III	in Class A	in Class B	in Class C	in Impact	Not in Regional Inventory
High Relative Value	51.77%	3.17%	0.50%	36.32%	1.25%	0.54%	2.56%	3.89%
Medium Relative Value	17.90%	13.64%	2.85%	21.12%	17.68%	3.66%	7.19%	15.95%
Low Relative Value	4.56%	14.37%	34.44%	3.42%	0.83%	3.74%	6.88%	31.76%
Not in City inventory	*3.38%*	*5.24%*	*2.98%*	*13.55%*	4.56%	9.53%	60.76%	

In terms of the ***highest value resources***, Table 2 shows that Metro classified approximately 89% of the City's High-ranked areas as Class I Riparian or Class A Wildlife Habitat. Similarly, City models assign a High ranking to approximately 88% of Metro's Class I Riparian and 79% o the Class A Wildlife Habitat.

In terms of the ***lowest value areas,*** City models assign a Low rank to about 77% of the regiona Class III Riparian Areas and to about 14% of the regional Class C Wildlife Habitats. The City's inventory did not rank approximately 56% of Metro's Class C Wildlife Habitat. This is likely attributable to the City's refined vegetation data which was more precise about excluding non-vegetated areas. (Note: While 56% may sound like a large discrepancy, this area comprises than 500 acres, about 2% of the total area that Metro deemed regionally in Portland.)

There is more variation between City and Metro rankings for resources assigned Medium or Class II/B functional values. This is a result of the City's use of new vegetation data combined with refined modeling assumptions such as the valuation of herbaceous vegetation and scaling of wildlife patch sizes and interior habitat area scoring thresholds.

Overall Metro Habitats of Concern (HOCs) and City Special Habitat Areas (SHAs) are similar. City SHAs comprise approximately 12,180 acres. Metro HOCs comprise roughly 12,380. As noted above, the city has revised some of the boundaries, and is considering adding a few new areas in the Columbia Slough, Johnson Creek and Fanno/Tryon watersheds.

Conclusion

The City's proposed inventory approach refines and enhances Metro's regional inventory of riparian corridors and wildlife habitat within the City. The City's approach reflects newer, higher resolution data, and a honing of the regional mapping criteria for improved applicability at a smaller spatial scale and taking into account local knowledge in Portland. (Attachments 10 and 11 provide an "at a glance" verbatim comparison of Metro and City-proposed mapping criteria.) The City's refinements complement and are generally consistent with the intent and content of the regional inventory.

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