

TABLE 6: CITY OF PORTLAND WILDLIFE HABITAT MODEL CRITERIA

Habitat Patch Size¹		
High Value (3 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is 585 acres or larger.	Medium Value (2 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 30 acres and smaller than 585 acres.	Low Value (1 point) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres and smaller than 30 acres.
Interior Habitat Area²		
High Value (3 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the interior area of the forest vegetation and/or wetland patch area is 500 acres or larger.	Medium Value (2 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the interior area of the forest vegetation and/or wetland patch area is at least 15 acres and smaller than 500 acres.	Low Value (1 point) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the interior area of the forest vegetation and/or wetland patch area is at least 2 acres and smaller than 15 acres.
Connectivity to Other Patches³		
High Value (3 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area comprised of forest vegetation and/or wetland is at least 2 acres, and the patch proximity index value is 100 or more.	Medium Value (2 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area comprised of forest vegetation and/or wetland is at least 2 acres, and the patch proximity index value is at least 30 and less than 100.	Low Value (1 point) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres and the patch proximity index value is less than 30.
Connectivity to Water⁴		
High Value (3 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and where at least 75% of the patch area is within 300 feet of a river, stream/drainageway or wetland.	Medium Value (2 points) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area in forest vegetation and/or wetland area is at least 2 acres, and where at least 25% and less than 75% of the patch area is within 300 feet of a river, stream/drainageway or wetland.	Low Value (1 point) Patches of forest vegetation and/or wetland, with adjoining woodland vegetation, where the area comprised of forest vegetation and/or wetland is at least 2 acres, and less than 25% of the patch area is within 300 feet of a river, stream/drainageway or wetland.

Footnotes:

- 1 A habitat patch is defined as an area of contiguous forest and/or wetland greater than 2 acres in size, plus woodland vegetation adjacent and contiguous to the core forest/woodland patch area.
- 2 "Interior area" is defined as the area within the forest and/or wetland portion of a habitat patch that is situated at least 200' from the edge of that portion of the patch.
- 3 Proximity to other patches is calculated using the Fragstats 3.3 proximity index (PROX). The specified search radius is ¼ mile. The proximity index is a dimensionless measure of the relative size and distance of all patches whose edges are within the spec
- 4 Proximity to water relative value thresholds were determined by identifying "natural breaks" in the distribution of the values using the Jenk's Natural Breaks method, which determines the best arrangement of values into a specified number of classes by co

3C2.3 Step 3: Species Lists and Special Habitat Areas

Updating Regional Species Lists

To support the City natural resource inventory update effort and watershed planning activities, the Bureau of Environmental Services (BES) worked with local and regional wildlife experts to update the regional fish and wildlife (vertebrate) “special status” fish and wildlife species lists for Portland. The City lists have been culled to remove species that would not be expected to occur in Portland. The lists also indicate the status of species as designated by the U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, the Oregon Natural Heritage Information Center, the Oregon Watershed Enhancement Board, and Partners in Flight. The updated Portland species lists are summarized in Table 8. For the complete list of special status fish and wildlife species, refer to Appendix 2.

TABLE 7: SPECIAL STATUS FISH AND WILDLIFE SPECIES IN PORTLAND

Birds		Fish	Amphibians	Reptiles	Mammals
Wood Duck	Common Yellowthroat	River Lamprey	Clouded Salamander	Western Painted Turtle	White-footed Vole
Great Blue Heron	Bald Eagle	Pacific Lamprey			Red Tree Vole
Short-eared Owl	Yellow-breasted Chat	Oregon Chub	Northern Red-legged Frog	Northwestern Pond Turtle	American Beaver
American Bittern	Bullock's Oriole	Chum Salmon			Townsend's Big-eared Bat
Bufflehead	Varied Thrush	Coho Salmon			Silver-haired Bat
Swainson's Hawk	Loggerhead Shrike	Steelhead			Hoary Bat
Green Heron	Thayer's Gull	Sockeye Salmon			Northern River Otter
Dunlin	Hooded Merganser	Chinook Salmon			California Myotis
Western Sandpiper	Red Crossbill				Long-eared Myotis
Purple Finch	Long-billed Curlew				Fringed Myotis
Swainson's Thrush	American White Pelican				Long-legged Myotis
Brown Creeper	Downy Woodpecker				Yuma Myotis
Vaux's Swift	Red-necked Grebe				Western Gray Squirrel
Common Nighthawk	Vesper Sparrow				Camas Pocket Gopher
Northern Harrier	Sora				
Band-tailed Pigeon	Purple Martin				
Olive-sided Flycatcher	Bushtit				
Western Wood-Pewee	Rufous Hummingbird				
Black-throated Gray Warbler	White-breasted Nuthatch				
Hermit Warbler	(Slender-billed)				
Yellow Warbler	Chipping Sparrow				
Pileated Woodpecker	Western Meadowlark				
White-tailed Kite	House Wren				
Pacific-slope Flycatcher	Winter Wren				
Hammond's Flycatcher	Orange-crowned Warbler				
Willow Flycatcher (Little)	Nashville Warbler				
Streaked Horned Lark	Hutton's Vireo				
Merlin	Red-eyed Vireo				
Peregrine Falcon	Wilson's Warbler				
American Kestrel					

The City has also developed a list of special status plant species that are found in Portland. The list includes plant species that have been assigned a special status designation by U.S. Fish and Wildlife Services, Oregon Department of Fish and Wildlife, Oregon Natural Heritage Information Center, or City of Portland Bureau of Parks and Recreation. The City’s plant species (common name) list includes:

Howell’s bentgrass	Tall bugbane	Salt heliotrope	Toothcup
Grand redstem (loosestrife family)	Mountain lady’s-slipper	Holy grass	Pale bulrush
Northern wormwood	White rock larkspur	Howellia	Sierra mock-stonecrop
Texas bergia	Nuttall’s larkspur	Howell’s montia	White-topped aster
Oregon bolandra	Peacock larkspur	Loose-flowered bluegrass	Meadow checker-mallow
Bristly sedge	Nuttall’s waterweed	Weak bluegrass	Oregon sullivantia
Retorse sedge	Western wahoo	Dotted smartweed	Columbia water-meal
Golden paintbrush	Indian rice / black lilly	Columbia cress	Golden alexanders

For the complete list of special status plant species, refer to Appendix 3.

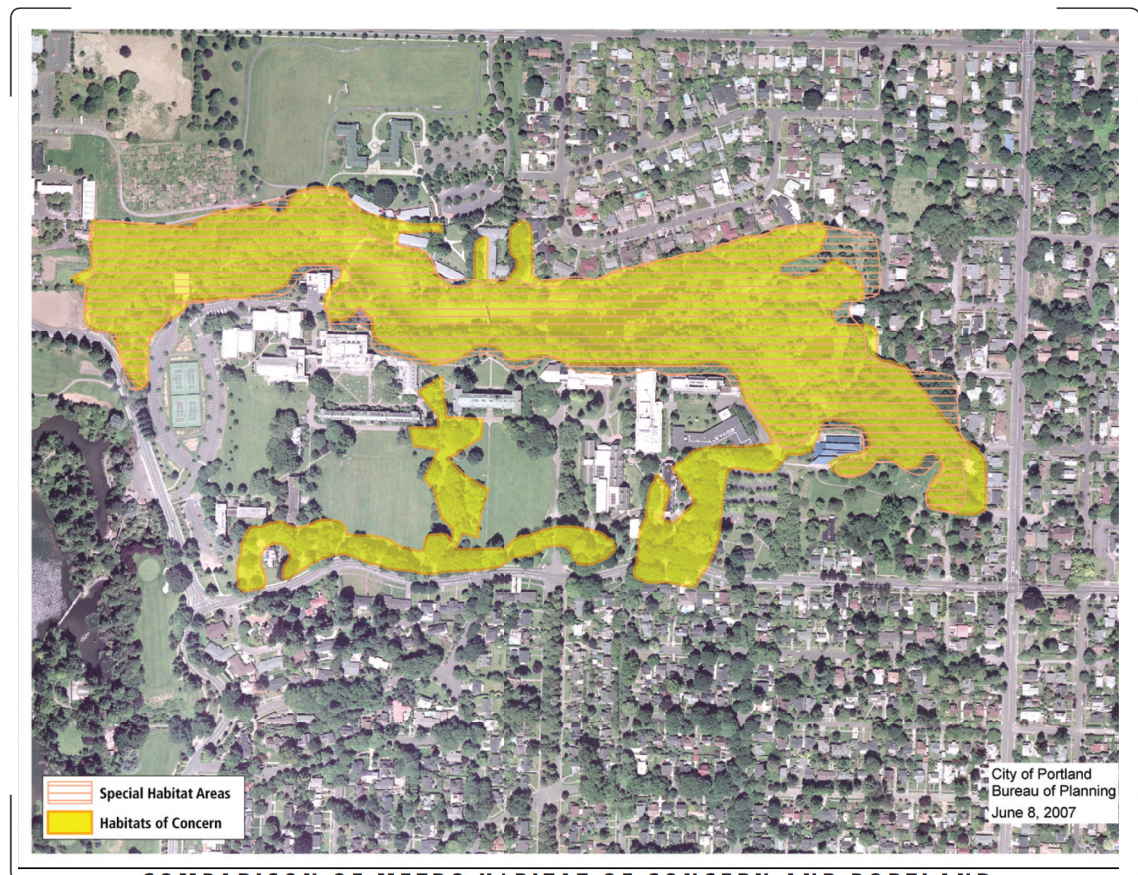
Designating Special Habitat Areas

Special Habitat Areas are an important part of the City inventory of riparian corridors and wildlife habitat. Special Habitat Areas are the updated equivalents of the Portland-area Habitats of Concern that Metro designated for the regional inventory. Special Habitat Areas contain or support special status fish or wildlife species, sensitive/unique plant populations, wetlands, native oak, bottomland hardwood forests, riverine islands, river delta, migratory stopover habitat, connectivity corridors, grasslands, and other unique natural features. The name “Special Habitat Area” was chosen in order to focus on the unique or unusual habitat features and functions, and to avoid implying that all these areas have been officially deemed at-risk by state or federal regulatory agencies.

Special Habitat Area mapping

The Bureau of Planning worked closely with the Bureau of Environmental Services and Portland Parks and Recreation to update and hone the descriptions and boundaries for the Special Habitat Areas. The Special Habitat Areas (SHA) boundaries generally follow the adopted regional Habitat of Concern (HOC) boundaries. However, the boundaries have been updated to:

1. Reflect more detailed analysis of resource location
2. Incorporate new stream or vegetation information
3. Consider information from more recent studies
4. Improve mapping consistency (e.g., removing peripheral buildings, streets and other structures; eliminating small holes in areas where they suggest a greater level of mapping precision than is warranted).



COMPARISON OF METRO HABITAT OF CONCERN AND PORTLAND SPECIAL HABITAT AREA: REED LAKE/CRYSTAL SPRINGS CREEK

Special Habitat Areas (like Metro’s regional Habitats of Concern) differ from the GIS natural resource feature and model-based ranking maps in some important ways. First, while the natural resource feature and ranking maps were developed using citywide data sets, the Special Habitat Areas are based on information developed by different agencies and organizations for specific areas or sites. As such, the SHA information may vary from one area to another. In addition, some special habitats may be left out of the inventory due to lack of available information. Nevertheless, the SHA information enriches the inventory by providing more current and detailed information about important habitat areas throughout the city.

Second, the model-based rankings maps correspond directly with specific landscape feature data, while many Special Habitat Area boundaries were mapped more generally to capture areas that contain specific features, provide special functions, and/or support special-status fish and wildlife species within their boundaries. For example, the Forest Park has been designated as an SHA in its entirety because it provides habitat for special-status species such as Pileated Woodpecker as well as an elk migratory corridor. Within the West Wye/T-5 Powerline Wetlands SHA are wetlands that provide critical habitat for the Western Painted Turtle. Appendix 7 includes a map and a list of Special Habitat Areas in Portland.

Portland’s Special Habitat Areas are bounded by the city limits. Where a Special Habitat Area corresponds with a regional Habitat of Concern that crosses jurisdictional boundaries, the City’s inventory maps will show SHA boundary and the HOC boundary. This will help inform resource management decisions and inter-jurisdictional coordination.

Special Habitat Area eligibility criteria

Table 8 lists the eligibility criteria used to designate Special Habitat Areas for the City inventory. These criteria are generally consistent with the criteria Metro used to designate Habitats of Concern; however the City has updated, clarified, and further defined the eligibility criteria. Some criteria have also been broadened to address habitat features and other agency habitat designations found specifically in Portland. For example, the City inventory includes certain urban structures that provide important habitat for special-status species, e.g., bridges that provide nesting habitat for Peregrine falcons.

The City’s SHA eligibility criteria and specifications are outlined below.

TABLE 8: SPECIAL HABITAT AREA ELIGIBILITY CRITERIA

Code	Criteria
P	Area contains sensitive or unique plant populations
W	Wetlands and associated seeps, springs and streams that are part of the wetland complex
O	Native oak
B	Bottomland hardwood forest
I	Riverine island
D	River delta
M	Migratory stopover habitat
C	Corridor between patches or habitats
S	An at risk wildlife species uses the habitat area or feature on more than incidental basis to complete one or more life history stages
E	Elk migratory corridor
G	Upland habitat or landscape feature important to individual grassland-associated species or assemblages of grassland-associated species on more than an incidental basis
U	Resource or structure that provides critical or unique habitat function in natural or built environments (such as bridges or street trees)

P - Area contains sensitive or unique plant species

This criterion applies to areas containing the following plant species:

1. Those 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. Species that receive an Oregon Natural Heritage rank 1, 2 or 3
 - a) 1 = Critically imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
 - b) 2 = Imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
 - c) 3 = Rare, uncommon or threatened, but not immediately imperiled

Not included are plant populations that are listed by USFWS/NOAA or ODA/ODFW as Candidate Taxa or Species of Concern, unless the plant population received an Oregon Natural Heritage rank of 1-3 or is a wetland indicator species. Also not included are those plant populations that received an Oregon Natural Heritage rank of 4 = not rare and apparently secure, but with cause for long-term concern, or 5 = demonstrably widespread and secure.

W – Wetlands and associated seeps, springs and streams that are part of a wetland complex

This criterion applies to selected wetlands, and associated seeps, springs and streams that provide critical watershed functions (i.e., water quality, hydrology, wildlife habitat, etc.) and are increasingly rare within Portland. SHAs include primarily those wetlands that:

1. Are connected to a stream or flood area;
2. Are part of a larger resource area, such as a wetland located within or adjacent to a forest; or
3. Provide connectivity between other high value habitats.

This criterion may incorporate constructed wetlands where the purpose of the wetland includes providing fish and wildlife habitat.

Upland wetlands that are very small and are surrounded by development or intense land uses, such as golf courses, and certain water quality facilities are generally not designated as SHAs.

O – Native oak

The native oak criterion applies to areas that contain Oregon white oaks. Other tree species and vegetation, including invasive plants such as Himalayan blackberries, may be present.

B – Bottomland hardwood forest

This criterion applies to selected areas that contain remnant bottomland hardwood. Not all bottomland hardwood forests in the city are designated as a SHA. To be designated, an area must be considered unique, rare or declining within a particular watershed.

I – Riverine island

This criterion applies to islands or the portions of riverine islands that provide habitat for shorebirds, waterfowl, terns, gulls, Bald Eagles, river otter and other river/island-associated resident and/or migrating wildlife species. Beaches, mudflats, shoals and areas of large wood deposits are included along with other relevant resource features.

D – River delta

This criterion applies to river deltas that provide habitat for shorebirds, waterfowl, terns and gulls, Bald Eagles or other wildlife. The area shall contain beaches, mudflats and/or large wood deposits.

M – Migratory stopover habitat

This criterion is applied to vegetated areas and other landscape features (e.g., buttes) where use by migratory bird species has been documented, or is reasonably expected to occur, on more than an incidental basis. The criterion applies to areas that:

1. Provide nesting opportunities;
2. Provide food and resting opportunities;
3. Provide sufficient cover to reduce predation; and
4. Support a diverse assemblage or high concentration of migratory species

On more than an incidental basis means the identified species is documented to repeatedly or periodically use the habitat or feature.

Reasonably expected to occur generally applies to resource features that typically provide the functions listed above (e.g., buttes, ridge-topes/high elevation features, wetlands, mudflats, riparian areas or focal sites) and where local or regional technical experts state such uses by migratory birds is expected based on existing information or observations.

C – Corridor between patches or habitats

This criterion applies to vegetated areas that:

1. Provide connectivity between high value habitats including other Special Habitat Areas;
2. Provide connectivity between water bodies, riparian areas and upland habitats; or
3. Extend outward from another SHA to provide a wildlife movement corridor.

S – An at risk wildlife species uses the habitat area or feature on more than incidental basis to complete one or more life history stages.

This criterion applies to areas with documented use by the following wildlife species (see Appendix 2: Special Status Fish and Wildlife Species in Portland):

1. Species listed by USFWS or NOAA Fisheries as:
 - a. LE Listed Endangered
 - b. LT Listed Threatened
 - c. PE Proposed Endangered
 - d. PT Proposed Threatened
 - e. SoC Species of Concern
 - f. C Candidate
 - g. Includes areas designated as Critical Habitats by NOAA Fisheries
2. Species Listed by Oregon Department of Agriculture (ODA) or ODFW as:
 - a. LE Listed Endangered
 - b. LT Listed Threatened
 - c. SC Critical
 - d. SV Vulnerable
3. Species that received an Oregon Natural Heritage rank or list 1, 2 or 3.
 - a. 1 = Critically imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
 - b. 2 = Imperiled because of extreme rarity or especially vulnerable to extinction or extirpation
 - c. 3 = Rare, uncommon or threatened, but not immediately imperiled;

Life cycle phases include but are not limited to:

- courtship, nesting, breeding
- rearing young, juvenile development
- feeding, foraging, hunting
- resting, basking, perching
- cover/protection from predators or disturbances (e.g. noise, light)
- dispersal, migration, migratory stopover
- over-wintering

This criterion may apply to individuals that make up a local population, pairs, colonies or a regional population.

On more than an incidental basis means the identified species is documented to repeatedly or periodically use the habitat or feature.

E – Elk migratory corridor

This criterion is applied to areas that ODFW has designated as elk migratory corridors.

G – Upland habitat or landscape feature important to individual grassland-associated species or assemblages of grassland-associated species on more than an incidental basis

This criterion is applied to areas that contain vegetative structure, topography or soil substrates that provide functions similar to a native meadow, prairie or grassland and where use by grassland-associated wildlife species has been documented. This criterion is also applied to areas that:

1. Are part of a larger resource area, such as a grassy area located adjacent to a forest;
2. Provide connectivity between other high value habitats; or
3. Extend outward from an SHA to provide a wildlife movement corridor.

On more than an incidental basis means the identified species is documented to repeatedly or periodically use the habitat or feature.

U – Resource or structure that provides critical or unique habitat function in natural or built environments

This criterion applies to resources or structures that are generally not accounted for by other criteria, and that provide a documented critical or unique habitat function. Examples include: bridges, chimneys, rock outcrops, groundwater upwelling areas, and street trees.

As noted above, Special Habitat Areas have been designated based on documented information about specific sites or areas. In addition, some of the SHAs reflect specific watershed conditions. For instance, areas of bottomland forest along the Willamette River has been designated as Special Habitat Areas, in part because there are so few such areas left along the Willamette in the city. Bottomland forest is more common along the Columbia Slough and may not be designated as Special Habitat Area in that watershed.

3C2.4 Step 4: Technical Review Process

The previous sections describe criteria for assigning functional scores to riparian corridors and wildlife habitat. As noted, these criteria reflect refinements to Metro's regional inventory criteria. It is important to recognize that the refinements result in differences between Metro's and the City's inventory maps. By incorporating new resource data, the City can produce more detailed natural resource maps than the regional resource maps. The City's inventory maps also differ somewhat from the Metro maps in terms of the area, shape, and boundaries of the inventoried resource areas. Using new resource data can also result in higher or lower relative resource rankings. For example, riparian corridors within a drainage district or which are comprised of lawn and no trees will rank lower for some riparian functions than the regional inventory. In addition, wildlife habitat patches may rank higher in the City inventory than in the regional inventory due to the scaling of size and connectivity ranking criteria. These differences are an expected result of the intentional efforts to customize the regional inventory to better fit localized conditions in Portland.

The Bureau of Planning worked closely with Metro and the Bureau of Environmental Services to ensure that the refinements would be consistent with the scientific and methodological basis of Metro's work and would support the City's watershed health goals.

MAY 2006 TECHNICAL REVIEW

In May 2006, the Bureau of Planning convened a group of technical experts to review proposed refinements to Metro's regional inventory methodology. Reviewers were selected based on their expertise in regional watershed systems, aquatic and terrestrial ecology, and local watershed conditions. In addition, many of the reviewers had participated in, or had at least some familiarity with the development of Metro's regional inventory. The technical reviewers included representatives from U.S. Fish and Wildlife Services, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Metro, Multnomah County Drainage District, Audubon Society of Portland, Port of Portland, Portland State University, and consulting companies in science and planning related fields.

Given the extensive scientific and public review of the regional inventory prior to adoption by Metro Council in 2005, the Bureau asked that technical reviewers focus solely on proposed changes to the Metro's regional inventory data and methodology. Reviewers were asked whether the proposed refinements:

- Are generally consistent with the intent, scientific basis, and approach used to develop the regional inventory,
- Are scientifically acceptable, and
- Will enhance the inventory for use in Portland.

The technical reviewers provided valuable critique, information, insights, and suggestions. They concurred with many parts of the inventory update proposal, commending the City for incorporating more recent data and locally-based research. They also raised concerns and provided valuable suggestions to improve several parts of the proposal. For example, while most reviewers agreed with the proposal to downgrade rankings assigned to riparian corridors dominated by herbaceous vegetation (i.e., without trees or woody vegetation), a number of reviewers had concerns because even low-functioning riparian corridors still provide important functions for water quality and wildlife movement and may also have high restoration potential.

Some reviewers raised concerns about aspects of the regional inventory that the City has not changed. One concern relates to continued the inclusion of the developed floodplain as a low-ranked riparian resource. Another concern relates to the use of certain scientific literature sources as the basis for mapping specific functions. Staff considered these concerns however elected not to deviate from the regional approach.

The reviewers' input helped to hone and clarify some of the proposed refinements, resulting in several changes to the City's mapping and Special Habitat Area eligibility criteria. The refinements are summarized in the table below. More detailed information about the City refinements to the regional inventory and the technical review process are documented in the *Technical Review Synthesis Report and Staff Recommendations*, October 24, 2006 (Appendix 4).

JANUARY 2008 TECHNICAL REVIEW - WILLAMETTE INVENTORY

In August 2007, the Bureau of Planning produced a discussion draft Willamette Natural Resources Inventory (WNRI). The WNRI was produced to support the River Plan, among other efforts. The River Plan is a multifaceted plan for the Willamette River corridor in Portland, and includes an update of the City's 20-plus year-old Willamette Greenway Plan. The WNRI report is the first to utilize the natural resource inventory update for a specific area of the City. Comments on the discussion draft were received through October 2007. Stakeholders providing comments included the Audubon Society of Portland, the Port of Portland, Schnitzer Steel and other property owners or their representatives, US Fish and Wildlife Services, Portland Bureau of Environmental Services, and others. The comments were categorized as editorial, site specific, methodological or programmatic. Editorial, site-specific, and methodology-related comments were addressed individually, while programmatic comments were channeled to the River Plan project.

Staff convened a group of technical experts in January 2008 to discuss key comments pertaining to WNRI methodology. The group included some of the commenters and other technical experts. Following this discussion, staff conducted additional analysis and drafted recommendations to address the issues discussed. As a result some of the riparian corridor GIS model criteria were refined. Most of the refinements are specific to the Willamette River North Reach, while some of the refinements apply citywide. The refinements are summarized in the table below.

TABLE 9: CITY OF PORTLAND REFINEMENTS TO METRO RIPARIAN CORRIDOR AND WILDLIFE HABITAT INVENTORY DATA, MAPPING/SCORING CRITERIA AND SPECIAL HABITAT ELIGIBILITY CRITERIA

Refinement	Description and comparison to Metro approach	Explanation
Data/Model Inputs		
Improved vegetation data	<p>Metro mapped vegetation using 2000 aerial photos. Metro mapped forest canopy >1 acre throughout the region, and classified forest, woody, shrub and low structure/undeveloped soils landcover only w/in 300' of a stream. Beyond 300' of a stream, Metro mapped forest vegetation only</p> <p>Portland used 2004 aerial photos and targeted field visits to produce GIS data for vegetated areas > ½ acre in size, and located within ¼ mile of any river, stream, environmental zone or regionally significant habitat area. The City classified these vegetated areas as forest, woodland, shrubland, or herbaceous per the National Vegetation Classification System (NVCS).</p>	Portland's vegetation data is more detailed and current than the regional vegetation data. Small mapping units allow for more detailed identification and assessment of riparian corridors and wildlife habitat. 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.
Clarified landcover types	<p>Metro included low structure vegetation/undeveloped soils as one of its landcover categories.</p> <p>City landcover types include forest, woodland, shrubland, and herbaceous vegetation, but do not include undeveloped soils.</p> <p>The City also classified vegetation patches as natural/semi-natural or cultivated.</p>	<p>In an urban area like Portland, most areas that are not vegetated, paved and/or covered by structures \ are highly compacted features such as gravel roads, parking lots, ball fields, construction sites. These features do not contribute significantly to most riparian and wildlife habitat functions unless located in the floodplain or river/stream bank areas.</p> <p>In an urban area like Portland, much of the vegetation is cultivated – landscaped, manicured, intensely managed (e.g. mowed). Cultivated vegetation includes common areas, golf courses, parks and rights-of-way, and yards.</p>
Local topography data	<p><i>Applies to Bank Function, Sediment, Pollution and Nutrient Control</i></p> <p>Metro assigned secondary functional scores to vegetation located on slopes >25% that began w/in 175' of a surface stream, and extending to "the first effective break in slope."</p> <p>The City is using local topography data instead of regional break-in-slope data to apply this mapping criterion.</p>	Regional break-in-slope data were not developed for areas with recently mapped streams. The City's topography data are more comprehensive and can be used to meet the intent of the regional approach.
Riparian Mapping Criteria		
Recognizing functions of rivers, streams and wetlands	<p><i>Applies to all riparian functions</i></p> <p>Metro's did not attribute riparian functions to rivers and stream explicitly, although these features were captured indirectly by ranking adjacent vegetation and land within 50 feet of a waterway.</p> <p>The City assigns rivers, streams and wetlands primary scores for riparian functions. The City assigns the Willamette River North and Central Reach a secondary, instead of primary, score to the river for riparian functions associated with bank function and sediment, pollution and nutrient control.</p>	<p>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 although doing so does not change the ultimate mapping or ranking of such features.</p> <p>Assigning a lower score to the Willamette River North and Central Reach reflects the extent of bank hardening, vegetation removal, and existing contamination</p>
Narrowing primary functions assigned to wetlands	<p><i>Applies to the Large Wood and Channel Dynamics</i></p> <p>Metro assigned primary functional value to forest vegetation adjacent to wetlands that are located within ¼ mile of a stream.</p> <p>The City assigns primary scores to wetlands and adjacent forest vegetation only if the wetland is within a flood area or within 150' of a river or stream. (150' is the functional distance in which forest vegetation receives a primary score for Large Wood and Channel Dynamics.)</p>	Wetlands can affect watershed hydrology, sediment patterns and flooding, and can large wood in riparian corridors. Within a flood area or near a river or stream these functions would be expected to affect channel dynamics. Beyond these areas it is not clear that wetlands and associated vegetation would have a primary effect on channel dynamics.

TABLE 9: CONTINUED

Refinement	Description and comparison to Metro approach	Explanation
Broadening secondary functions assigned to wetlands.	<p><i>Applies to all riparian functions</i> Both Metro and the City assign primary scores to vegetation within 150' of a wetland.</p> <p>Metro's applies secondary functional value to vegetation extending beyond 150' of a wetland only for the Microclimate and Shade function.</p> <p>The City assigns a secondary functional value to vegetation that extends beyond 150' from a wetland for all riparian functions.</p>	Vegetated buffers help to sustain a multiple wetland functions (e.g., sediment and nutrient control, fecal coliform removal, temperature moderation, water level fluctuation, and wildlife habitat. Buffer widths of 100, 200, 300 feet and greater are noted in the literature. Larger buffers are especially important on steep slopes, where land uses have potentially more damaging effects such as in urban areas. (Castelle et al, 1992, Castelle et al, 1994, Washington Department of Ecology and Department of Fish and Wildlife, 2005, Desbonnet et al., 1994, in Kitsap County Summary of Best Available Science, 2004). It is appropriate to assign secondary functional value for the broad array of riparian functions.
Recognizing the effect of drainage districts on riparian corridor functions.	<p><i>Applies to Large Wood and Channel Dynamics, and Streamflow Moderation and Water Storage</i> Metro's regional inventory did not recognize how riparian functions are affected along waterways within a drainage district.</p> <p>The City has modified certain mapping criteria to account for the effect of drainage district management activities on flows, flooding and channel dynamics.</p>	Several drainage districts operate within the Columbia Slough watershed in Portland. The districts are managed by the Multnomah County Drainage District (MCDD). MCDD maintains an extensive levee system, controls water levels and flows in drainage ways, and routinely removes large wood that can impede conveyance. These management activities affect hydrology and channel dynamics, and virtually eliminate the active floodplain. Recognizing how riparian corridors function differently within the drainage district increases the accuracy and usefulness of the inventory.
Downgrading functional scores for herbaceous vegetation	<p><i>Applies to Bank Function and Sediment, Pollution and Nutrient Control</i> Metro assigned primary scores to low structure vegetation w/in 100' of a stream or wetland, or w/in 100-200' where slopes are >25%. The City downgrades the score to secondary for herbaceous vegetation meeting the same distance criteria.</p> <p>Metro assigned secondary functional scores to all vegetation on slopes greater than 25% that starts within 175 feet and extends to the first effective break in slope. The City assigns secondary scores only to forest, woodland and shrubland vegetation on slopes greater than 25% that starts within 200 feet and extends to the end of the 25% slope area.</p>	It is appropriate to downgrade the value assigned to herbaceous vegetation in Portland. Within the City's urban watersheds, much of the herbaceous vegetation is managed lawn. Although grass can filter and slow stormwater runoff, the scientific literature generally ascribes a lesser functional value to lawn than to the more diverse riparian vegetation assemblages. Shallow-rooted lawn species have a limited soil and bank-holding capacity, which can increase risk of bank erosion lawn species. Also, lawn is associated with increased runoff, where runoff is laden with phosphorus and other nutrients into water bodies (USGS, 2003) Infiltration and evaporation are much higher for forested land as compared with lawn (Kennebec County SWCD, 2001)
Downgrading riparian functional scores for cultivated vegetation associated with rivers and flood area.	<p><i>Applies to Bank Function and Sediment, Pollution and Nutrient Control; and Organic Inputs, Food Web and Nutrient Cycling</i> Metro did not differentiate between cultivated and semi-natural/natural vegetation. The City downgraded the scores applied to cultivated river and flood area associated woodland and shrubland vegetation for certain riparian functions. This type of refinement may be considered for tributary streams through one or more separate inventory update projects.</p>	Cultivated vegetation is landscaped, highly manicured, intensely managed (e.g. mowed) vegetation and generally includes lawn and common areas, golf courses, parks and rights-of-way. This refinement recognizes that cultivated vegetation provides lesser resource functions than more natural vegetation assemblages. Cultivated vegetation can also have a negative impact on natural resource functions fertilizers and pesticides are applied and runoff into nearby waterways.

TABLE 9: CONTINUED

Refinement	Description and comparison to Metro approach	Explanation
	<p><i>Applies to Streamflow Moderation and Water Storage</i> Metro assigns secondary scores to low structure vegetation w/in 300' of a stream.</p> <p>The City assigns a secondary score to herbaceous vegetation only if located within 100' of a stream and 200' where slopes exceed 25% (same for Bank Stabilization, etc.)</p>	<p>The City applies a more stringent criterion than Metro for assigning value to herbaceous vegetation. Often the herbaceous vegetation in an urban environment has also been highly compacted which reduces opportunity for infiltration (City of Tacoma/WA Hydrology Model, 2003).</p>
Downgrading scores assigned to hardened, non-vegetated river banks and associated land within 50 feet of the Willamette River North and Central Reach	<p><i>Applies to Bank Function and Sediment, Pollution and Nutrient Control; and Large Wood and Channel Dynamics Functions</i> Metro assigned a primary score to all land with 50 feet of the Willamette River. The City assigns a secondary score to hardened, non-vegetated land within 50 feet of the Willamette River North Reach and Central Reach.</p>	<p>The land within 50 feet of the Willamette River in the North and Central Reach has been significantly altered by extensive bank hardening, vegetation removal and development. These alterations significantly reduce the overall bank function and channel dynamics.</p>
Linking recruitment of large wood from riparian corridors to topography	<p><i>Applies to Large Wood and Channel Dynamics</i> Metro assigned a secondary score to forest vegetation located 150-260 feet from a waterway. The City refined this criterion to assign a secondary score to forest vegetation located 150-260 feet from a waterway only when it is located on slopes 25% or steeper.</p>	<p>Forest vegetation that is located further from a stream or river has a greater potential to contribute large wood to banks and the waterway when it is located on steep slopes.</p>
Establishing a maximum riparian corridor mapping width for modeling purposes	<p><i>Applies to Streamflow Moderation and Flood Storage and Microclimate and Shade</i> Metro did not establish a maximum secondary functional distance for forested land contiguous to and extending beyond 300 feet from a stream.</p> <p>The City inventory limits riparian corridor mapping to a maximum distance of 780' from a river, stream or wetland for this function.</p>	<p>The scientific literature does not identify specific distances from rivers and streams within which vegetation helps moderate streamflows and store water as a riparian function. This is in part because the streamflow and watershed hydrology are affected by vegetation, particularly forest, located throughout a watershed. The City is using a 780' limit for mapping this function to establish the area within which predominantly riparian functions are occurring. 780' was chosen because it is the greatest functional distance ascribed to any of the riparian functions (secondary functional distance for Microclimate and Shade).</p>
Wildlife Habitat Mapping Criteria		
Broadening secondary function of shrubland vegetation	<p><i>Applies to Microclimate and Shade</i> Metro and the City assign primary function to forest or woody vegetation within 100 feet of a stream, wetland or flood area and secondary function to forest or woody vegetation extending out from 100 feet, to a maximum of 780 feet within the City inventory.</p> <p>The City also assigns secondary function to shrubland located within 50 feet of a stream, drainageway or wetland.</p>	

TABLE 9: CONTINUED

Refinement	Description and comparison to Metro approach	Explanation
Developing a Riparian Wildlife Movement Corridor	<p><i>Applies to Riparian Wildlife Movement Corridor</i></p> <p>Metro addressed riparian wildlife corridors by assigning connectivity value to different vegetation types (Type 1 and Type 2 patches) within 300 feet of a stream. Type 1 patches contain forest vegetation and Type 2 patches contain other types of vegetation and were ranked lower than Type 1 patches</p> <p>The City assigns primary scores are to mapped vegetation contiguous to and within 100 feet of a river, stream or wetland. Secondary scores are assigned to vegetation that is contiguous to the primary vegetation and is between 100 and 300 feet.</p>	<p>Riparian wildlife corridors are valued similarly in the Metro and City inventories. However, the City inventory places a higher value on 1) more types of vegetation, 2) vegetation contiguous to the water feature and 3) to vegetation located closer to the water feature (i.e., within 100 feet). The City also applies the riparian wildlife corridor criterion to wetlands which is well-supported by the literature (Castelle, 1992; Duncan, 2003; Kennedy, 2003).</p>
Simplifying assessment of habitat connectivity in riparian corridors	<p><i>Definition of Wildlife Habitat Patches</i></p> <p>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 within 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.</p> <p>The City inventory includes only one type of wildlife habitat patch, which is equivalent to Metro's Type 1 patch, and including adjacent woodland vegetation (described in the next row of the table). The City inventory replicates the function of the Type 2 patches through the application of the Riparian Wildlife Corridor criterion described above.</p>	<p>Using more detailed vegetation data and the riparian movement corridor criterion, the City inventory provides an equivalent valuation of riparian wildlife corridors using a simpler approach.</p>
Including woodland vegetation in wildlife habitat patches.	<p><i>Definition of Wildlife Habitat Patches</i></p> <p>Metro did not include woodland vegetation in regional wildlife habitat patches due to limited vegetation information at the regional scale.</p> <p>The City is including woodland vegetation in wildlife habitat patches where the woodland vegetation is adjacent to core forest/wetland patches at least 2 acres in size.</p>	<p>Woodland vegetation extends and improves the diversity of forest and wetland habitat patches, and can buffer interior habitat area. Woodland vegetation can also provide corridors or links to other habitat patches or water. Including woodland is consistent with views that cultural savannahs and woodland should be included within patch boundaries if doing so can help minimize negative effects of surrounding land uses, strengthen internal linkages, and connect patches to watercourses or each other. (Forman, R.T., 1983.) It is intended that woodland vegetation augments but would not comprise the majority of the delineated patch area. Most of the refined patches in the City contain more than 80 percent forest or wetland.</p>

TABLE 9: CONTINUED

Refinement	Description and comparison to Metro approach	Explanation
Scaling habitat patch size and interior area scoring thresholds.	<p><i>Applies to Habitat Patch Size and Interior Habitat scoring</i></p> <p>Metro determined Habitat Patch Size and Interior Habitat scoring thresholds based on natural breaks in the distribution of patch sizes for the region as a whole.</p> <p>The City has scaled the regional patch size and interior area thresholds to reflect local research, additional guidance from the scientific literature, and the scale of Portland habitat patches.</p>	<p>Metro's scored patch size and interior area based on natural breaks in the distribution of patch sizes and interior area across the region. Given that many parts of the region are still suburban or rural in character, habitat patches are relatively large. Metro's "high" and "medium" scoring thresholds for size are 2,470 acres and 585 acres, respectively. Applying the regional criteria, only Forest Park ranks high for patch size, while the 160-acre Oaks Bottom Wildlife Refuge receives a low ranking for size.</p> <p>Based on additional information and analysis, the City has scaled the regional patch size and interior habitat area criteria. Patches at least 30-acres in size receive a "medium" score for patch size. This is consistent with local research indicating that species richness for multiple species types increased significantly where greenspaces are at least 10 hectares (~25 acres), (Murphy et al, 2003). 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.</p> <p>The City also revised the regional "high" patch size criterion after additional literature review. ~75 – 100 acres have been identified as an "optimal" patch size in an urban area (Washington Department of Fish and Wildlife, 1997). Habitat areas of at least >42 hectares (~105 acre)s have also been recognized as patch size to strive for (Marzluff and Donnelly 2002, cited by King County 2004). Some assign high value to smaller habitat patches, e.g., >4 hectares (City of London, Ontario, 2002), while others call for larger areas e.g., greater than 250 to 12,000 acres. (Barnes, 1999) The City inventory now scores patches "high" for size if they are at least 585 acres. This is consistent with literature suggesting that urban areas should maintain habitat area at least 250 hectares (or about 500 acres). (Canadian Wildlife Service, 2005).</p> <p>The proposed Interior Habitat Area scoring thresholds represent the refined Habitat Patch Size scoring thresholds, minus the 200-foot internal "edge" buffer used in the Metro model. Linking the Habitat Patch Size and Interior Habitat Area scoring thresholds links the City's adjusted scores for total patch area and the shape of habitat patches, appropriate for the spatial scale and habitat conditions found there. Thus, as with Metro's regional model, the same patch that receives a medium or high score for Patch Size could potentially receive a low ranking for Interior Habitat Area if the patch is long and narrow.</p>
Using a more flexible model to assess habitat patch connectivity; ranking based on Portland patches	<p><i>Connectivity Between Patches</i></p> <p>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.</p> <p>The City is using 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 has adjusted the ranking thresholds to reflect natural breaks in the distribution of habitat patches within Portland.</p>	<p>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 community.</p> <p>Basing the connectivity ranking thresholds on natural breaks determined for habitat patches in Portland provides a more relevant analysis of relative habitat value in the City than using distribution of patches throughout the Metro region.</p>

TABLE 9: CONTINUED

Refinement	Description and comparison to Metro approach	Explanation
Using Portland patches to assess connectivity to water; including wetlands; adding riparian wildlife movement corridor criterion	<p>Connectivity to Water Metro scored patches for Connectivity to Water based on the percentage of a patch within 300 feet of a stream. The scoring thresholds were derived based on natural breaks in the distribution for all patches in the region. Metro applies this criterion only to rivers and streams.</p> <p>The City has adjusted the scoring thresholds to correspond to natural breaks in the distribution of patches in Portland.</p> <p>The City is also applying Connectivity to Water criterion to wetlands as well as rivers, and streams.</p> <p>The City further recognizes the importance of proximity to water by adding the riparian wildlife movement corridor criterion described above.</p>	<p>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.</p> <p>As noted above, the scientific literature supports maintenance of a vegetated buffer to maintain wildlife habitat movement and other habitat functions out to at least 300' from wetlands.</p>
Habitats of Concern (HOC) / Special Habitat Areas (SHA)		
Including seeps, springs in wetlands Special Habitat Areas	<p>Metro designated all locally significant wetlands as regional HOCs but did not specify seeps and springs.</p> <p>The city is including known seeps, springs and streams that are associated with a "wetland complex" in locally-designated SHAs.</p>	Wetlands are often functionally part of a larger hydrologic complex that includes seeps, springs and streams. Seeps and springs also provide biologically unique habitats for invertebrates and the animals that feed on them
Developing a plant list.	<p>Metro did not include a plant species list in its HOC criteria.</p> <p>The City has developed a list of sensitive plants species that are known or expected to occur within the City. This list include species:</p> <ol style="list-style-type: none"> 1. 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. That receive an Oregon Natural Heritage rank 1, 2 and 3. 	A plant species list was added to be clear plants would currently qualify an area for SHA status in the City inventory. The list can be found in Appendix C.
Revising the fish and wildlife species list	<p>Metro included a fish and wildlife list for the region in its technical report.</p> <p>The City has updated the list to reflect species known or expected to occur within the city.</p>	It is consistent and appropriate to include only those fish and wildlife species known or expected to exist within the city.
Including federally designated Critical Habitats.	<p>Metro did not explicitly include areas designated as Critical Habitats for ESA-listed salmonids.</p> <p>The City has designated these areas as SHAs.</p>	It is consistent and appropriate to include federally-designated habitats as Special Habitat Areas per the "Species" criterion.
Including urban structures that provide habitat for sensitive species.	The City inventory has broadened the "U" category Metro used to identify unique Habitats of Concern to include urban structures that provide habitat to sensitive species.	Peregrine falcons are using several bridges for nesting and Vaux's swifts are chimneys for roosting. These structures provide a unique and important habitat function in urban Portland.

3C2.5 Step 5: Assigning “Relative Ranks” To Riparian Corridors And Wildlife Habitat Areas

Using the GIS inventory modeling results and information on Special Habitat Areas, the Bureau of Planning assigned relative quality ranks to identified riparian corridors and wildlife habitat areas. The Bureau used ranking formulae that are similar to the formulae Metro used for the regional inventory. The riparian corridor and wildlife habitat GIS models assign relative ranks of “high,” “medium,” “low” or no rank to natural resource features. The ranks are produced using a consistent and replicable method and represent a simple ordinal scale depicting the relative number and distribution of functions provided by natural resource features in the city. The ranks are not tied to a reference or baseline condition, but allow comparison of the existing relative condition of natural resources within the region or city.

Riparian Corridor Ranking

As noted above, the GIS model assigns mapped natural resources a primary or secondary score to natural resource features for each of the six riparian functions:

- Microclimate and shade
- Bank function and control of sediments, nutrients and pollutants
- Stream flow moderation and flood storage
- Large wood and channel dynamics
- Organic inputs, food web and nutrient cycling
- Wildlife habitat/corridors

The primary and secondary scores for each function are combined to produce aggregated relative riparian corridor rankings of “high,” “medium,” or “low.” The formula is similar to those Metro used for the regional inventory and also reflects the distribution of primary scores assigned to features in the city. Features that receive at least one secondary score and no primary scores receive a low relative rank. Features that receive one or more primary scores receive a medium or high relative rank; the number of secondary scores does not affect medium and high ranks. Table 2 shows the formula used to establish the aggregate relative ranks.

Riparian Corridor Aggregated Relative Ranking Formula

	<i>Primary Functions</i>	<i>Secondary Functions</i>
High	4-6	0-6
Medium	1-3	0-6
Low	0	1-6

Wildlife Habitat Ranking

Using the GIS model, each wildlife habitat patch receives a score for:

- Patch size
- Interior habitat area
- Connectivity between patches
- Connectivity/proximity water.

For each attribute, patches receive 3 points for a high value, 2 points for a medium value, and 1 point for a low value. The overall wildlife habitat patch ranking is assigned as shown below. As with the riparian corridor model, the formula used to generate the aggregate wildlife habitat ranks is similar to that used by Metro.

Wildlife Habitat Patch Ranking Formula

Relative Ranks

High	9 or more points
Medium	4 to 8 points
Low	1 to 3

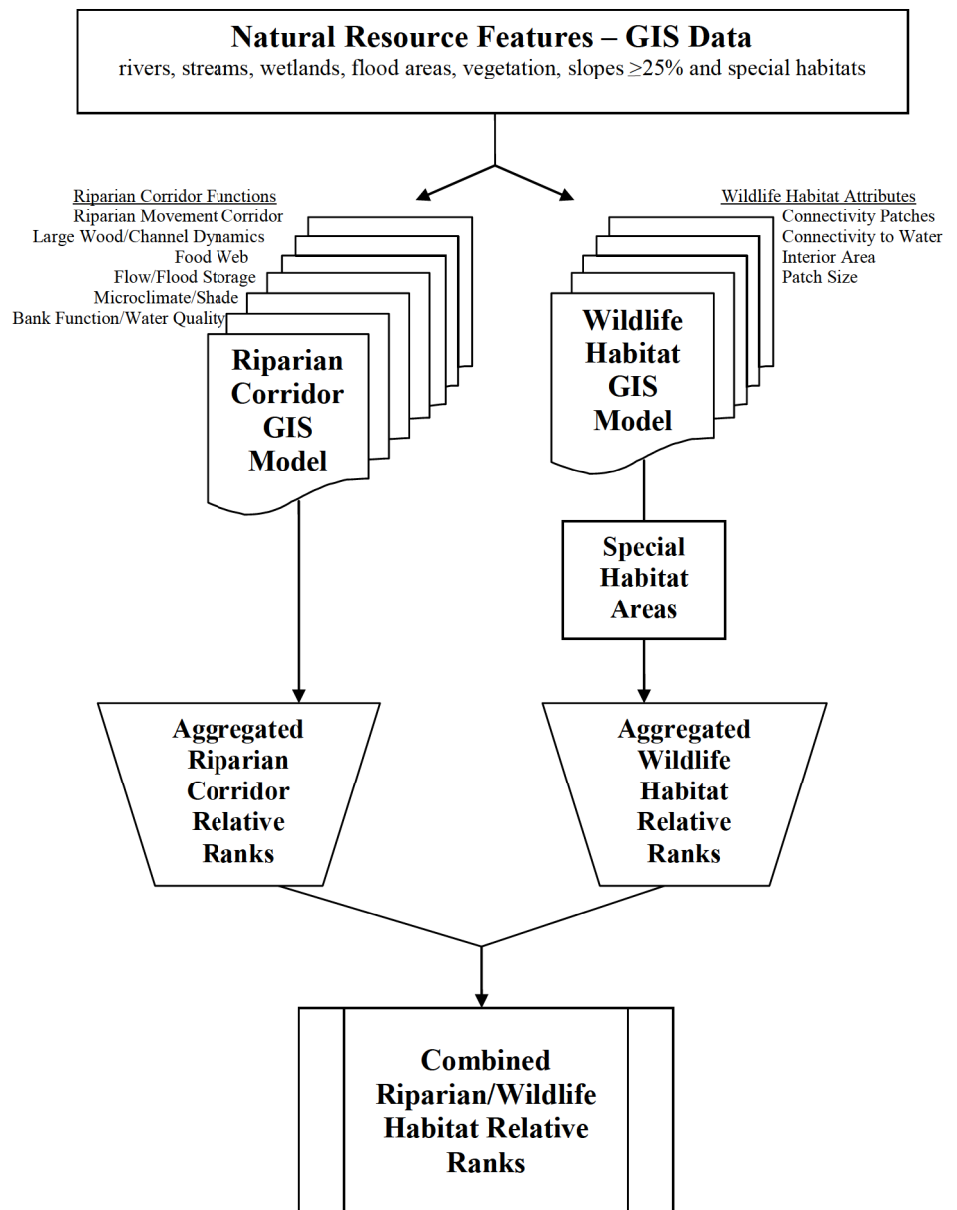
Consistent with Metro's approach, all Special Habitat Areas receive a high relative rank for wildlife habitat, which would supersede any lower ranks assigned by the GIS model.

Combined Riparian Corridor/Wildlife Habitat Ranking

The final step in the ranking process involves combining the riparian corridor and wildlife habitat rankings to produce a single map showing the combined relative ranks. Where riparian corridors and wildlife habitat areas overlap, the higher of the two relative rankings is presented on the combined inventory map. This follows the approach

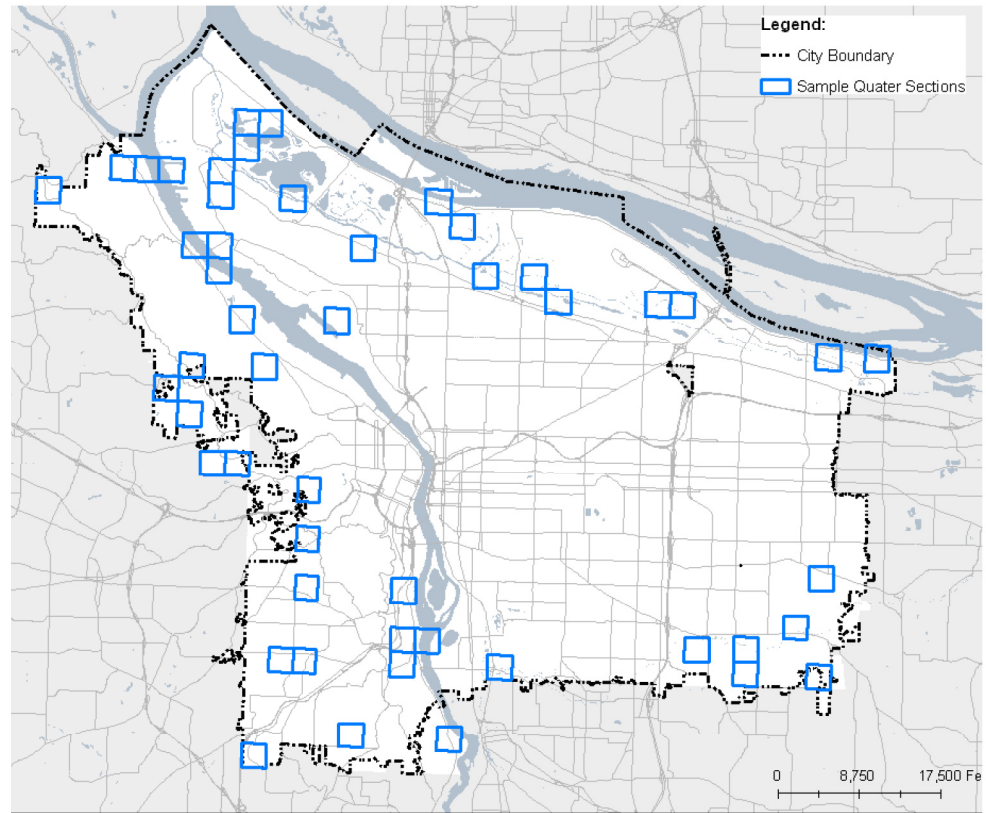
Metro used to assign a single overall relative rank to inventoried resources. This approach reflects the substantial overlap between riparian and wildlife habitat resources and the inter-dependencies between the functions they provide (e.g., water quality and microclimate contribute to wildlife habitat character and quality).

The following figure is a flow diagram of the GIS models and steps used to produce the relative ranks of natural resource functions.



3C2.6 Step 6: Quality Control – Quarter-Section Assessments

To help ensure the quality of the updated Natural Resource Inventory, project staff designed an exercise to examine the landscape feature data (inputs) and the inventory model results (outputs) for quarter sections in the city. The primary purpose of the exercise was to identify any fundamental or systemic problems with the GIS landscape feature data (e.g., streams, wetlands, vegetation) and/or the model outputs. The exercise also involved comparing the updated natural resource inventory information with Metro's regional inventory and City environmental overlay zones.



QUALITY CONTROL - QUARTER-SECTION ASSESSMENT

Because the area being inventoried is large, staff generated a random sample of 49 (out of 518) quarter-sections in the city. The sample included quarter-sections where 20 percent of the total area was comprised of ranked natural resources. The sample was also stratified to contain from each of Portland's five major watersheds, and adjusted to represent the Willamette or Columbia rivers.

To complete the quarter-section assessment, staff:

1. Reviewed 2005 aerial photographs to become familiar with the quarter section landscape (also 2000 to 2004 aerial photographs, including “leaf on” and “leaf off” images).
2. Reviewed landscape features data including streams and drainageways, wetlands, floodplain, and vegetation, and identified obvious inconsistencies in resource location/boundaries or vegetation classification.
3. Reviewed inventory model results (relative functional rankings) and identified questions or anomalies, such as high rankings for small or highly fragmented patches of vegetation.
4. Compared inventory model results with Metro inventory to identify any major inconsistencies (e.g., area Metro ranked high are ranking low or are not included in the City inventory). Staff attempted to discern reasons for such differences including the use of new vegetation data and revised mapping/ranking criteria.
5. Compared inventory model results with existing environmental zones. Staff attempted to identify the causes of significant or common discrepancies. For example, the existing environmental zones often do not comport with the City’s new stream maps. In addition, the mapping convention used to establish the environmental overlay zoning was, in many areas, fairly general and did not necessarily follow feature lines.
6. Entered comments and questions into a database and made corrections as needed.

The quarter-section assessment yielded the following information:

- o **“Mega” vegetation patches** – Staff discovered several vegetation patches that extended over very large areas. These patches contained diverse vegetation types and characteristics ranging from large forested areas of Tryon Creek State Park to very narrow fragmented street tree canopy that extended from larger forested areas into and throughout low and medium density residential neighborhoods. Because these patches were so large, the wildlife habitat inventory model had assigned high relative functional rankings areas with very different characteristics.

To address this problem, staff developed a process re-delineate the mega-patches and reduce the model bias. For patches that are larger than 100 acres, breaks in the patch were created manually so that each patch represents a cohesive unit. “Patch breaks” were implemented by modifying the vegetation data. The location of patch breaks were determined based on one or more of the following criteria:

- 1) Patch “width” – Where the vegetation narrows to a strip that is one or two trees wide (often confined by buildings or roads).
- 2) Character/fragmentation – Where large areas of closed canopy with few buildings and minimal impervious surfaces shift to narrow vegetated areas interspersed with buildings, roads, driveways, and yards.
- 3) Streets – Where a street creates a clear break between vegetated areas, or where there is a significant difference in vegetation character on each side of the street.

Breaking up the mega-patches resulted in lower habitat rankings for patches that are relatively small, narrow, or highly fragmented. Further, patches smaller than 2 acres in size were dropped from the inventory unless they were also mapped and ranked for riparian function, or are designated Special Habitat Areas.

- o **Inconsistent vegetation classifications** – In reviewing the quarter-sections, staff observed some inconsistencies in vegetation classifications, both within and across quarter sections. Inconsistencies were most prevalent in the classification of woodland and shrubland vegetation, and in assigning “natural” and “cultural” sub-classifications.

Staff has and will continue to refine the vegetation data over time. The acquisition of LiDAR data should help in distinguishing between woodland and shrubland vegetation types. In the future, staff will revisit the “natural” and “cultural” sub-classifications to determine if it is feasible to apply the designations more consistently to Portland’s urbanized landscape. However, for the time being, the “natural” and “cultural” sub-classifications are not used to assign relative resource rankings.

- o **Differences between City and Metro inventory results** – The City’s and Metro’s inventory results were observed to be generally consistent in terms of areas mapped and ranked, especially the highest and lowest-ranked resource areas. City and Metro resource area boundaries varied across the quarter-sections, largely due to the use of different vegetation data sets. Also, because the City used more detailed vegetation data and mapping criteria, the City’s resource rankings tend to be more variable than the rankings Metro produced for the regional inventory.
- o **Differences between City inventory results and existing environmental overlay zones** – Staff observed both considerable overlap and discrepancies between the updated inventory information and the existing environmental zones. Consistency was greatest where inventory results assign high relative rankings to riparian areas near streams that are currently within the environmental protection zone. Areas within environmental conservation zones included resources of varying relative quality (i.e., ranked high, medium or low by inventory models). Discrepancies were prevalent where environmental zone boundaries do not follow actual resource locations or specific distances from water features. Staff also observed many newly mapped streams and associated riparian areas, and upland habitat patches that are not within existing environmental overlay zones.

Overall, the quarter-section assessment exercise provided several benefits. First, the process required staff to become more familiar with the inventory inputs, criteria and outputs as well as its strengths and limitations. Second, the exercise allowed staff to spot key problems that required immediate attention (e.g., corrections to vegetation data). Third, the exercise provided greater understanding of how the City’s inventory compares to Metro’s regional inventory of riparian corridors and wildlife habitat. This will be helpful in working with Metro and other agencies, and in developing strategies to comply with the requirements of Title 13 of the Metro Urban Growth Management Functional Plan. And finally, comparing the updated inventory information with City environmental zones will help inform future program directions.

3C2.7 Step 7: Determining Resource Significance

Subsequent steps in the inventory process will include:

- Determining the adequacy of the information;
- Determining the significance of resource sites; and,
- Adopting a list of significant resource sites. (OAR 660-023-0300)

The adopted significant resource sites are then subject to the remainder of the Goal 5 process, including completion of an Economic, Social, Environmental, and Energy analysis and development of a program to protect natural resources.

Before adopting an inventory, local jurisdiction must determine 1) if the inventory information meets Goal 5 requirements for “adequacy,” and 2) which of the inventoried resources are “significant.” These determined actions can only be made once the inventory information is produced for individual resource sites.

At this point, the updated natural resource information (GIS data and models, Special Habitat Area information, and relative resource quality ranks) has been produced for the city as a whole and for each of the major watersheds in the city. Information for individual resource sites will be produced when the City initiates legislative projects to update the adopted natural resource inventories. At such time, updated inventory information and maps will be produced for resource sites located within the project area. It is anticipated the information will meet “adequacy” requirements of Goal 5, and that all mapped riparian corridors and wildlife habitats receiving a relative rank should be deemed ecologically and regionally and/or locally significant. This result is expected for several reasons:

1. **Consistency with historical City policy.** The updated natural resource inventory information addresses primarily the same types of resources, values and functions that the City has included and deemed significant in earlier adopted inventories. In addition, the resource areas identified in the updated inventory coincide substantially with areas that the City has already deemed significant through the adoption of nine prior inventories. The updated inventory information builds on and improves the quality and accessibility of information about key natural resource features and functions they provide.
2. **Consistency with Metro determination of adequacy and significance.** The City inventory is based on the approach Metro used to develop their adopted inventory of riparian corridors and wildlife habitat. Metro determined that the information produced for the inventory met Goal 5 adequacy requirements. Metro also determined that all inventoried riparian corridors, and all but the lowest-ranked wildlife habitat areas, are both ecologically and regionally significant. The Oregon Department of Land Conservation and Development acknowledged the regional inventory and associated “Nature in Neighborhoods” program with regard to compliance with the Goal 5 rule in January 2007. It is appropriate to assume that areas deemed regionally significant would also be deemed locally significant as well.

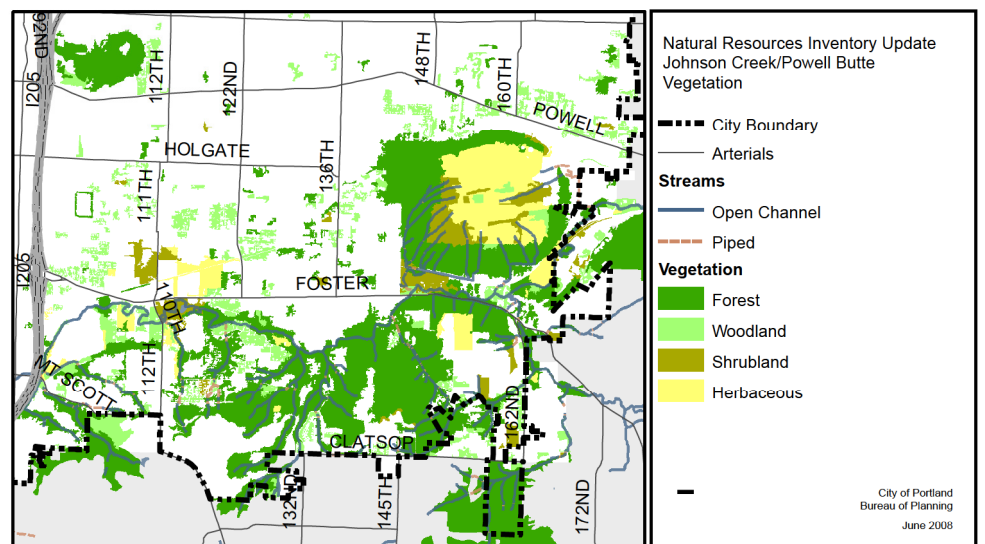
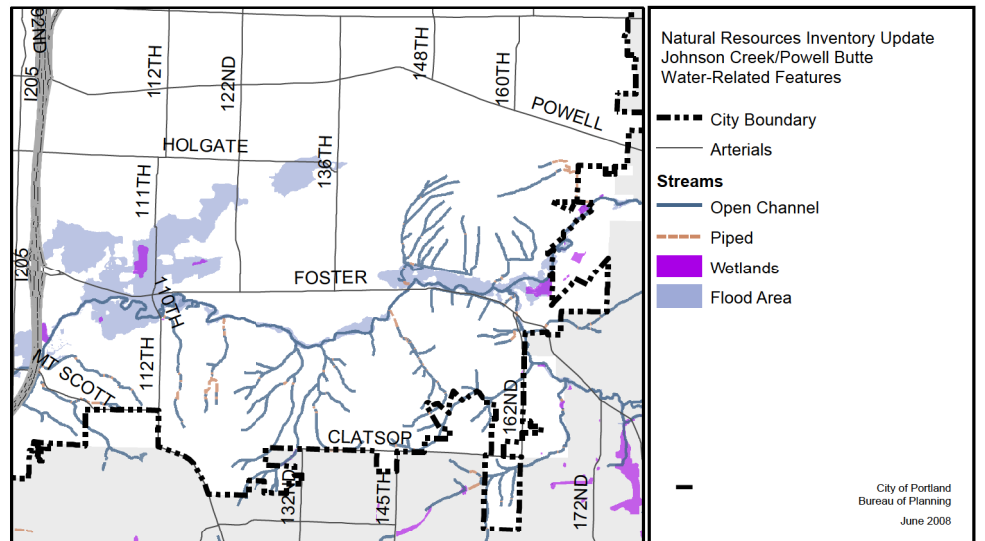
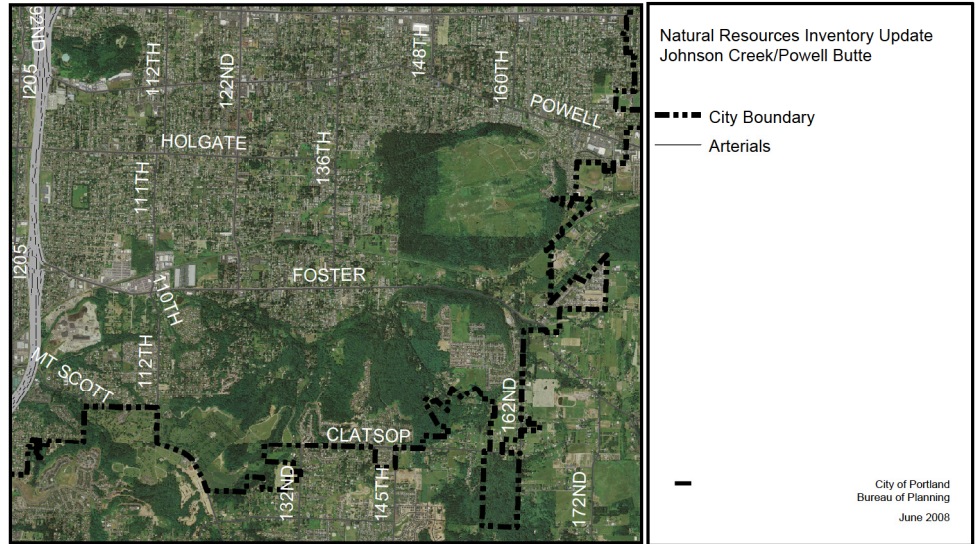
3. **City refinements to the regional inventory further support a determination of significance for inventoried resources.** The City inventory reflects updates and refinements to the regional resource data, modeling criteria and information on special habitats. These improvements have increased the accuracy and level of detail of the City inventory information. The City inventory also relates more closely to existing relative quality and functions of Portland's natural resources than was depicted by the regional inventory. These refinements are expected to support and bolster future determinations of significance.

3D. SAMPLE MAPS

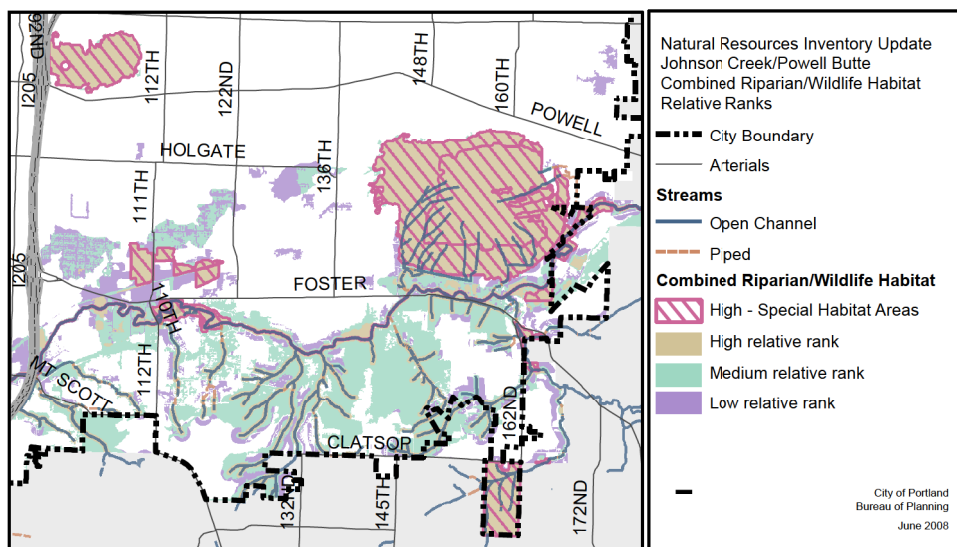
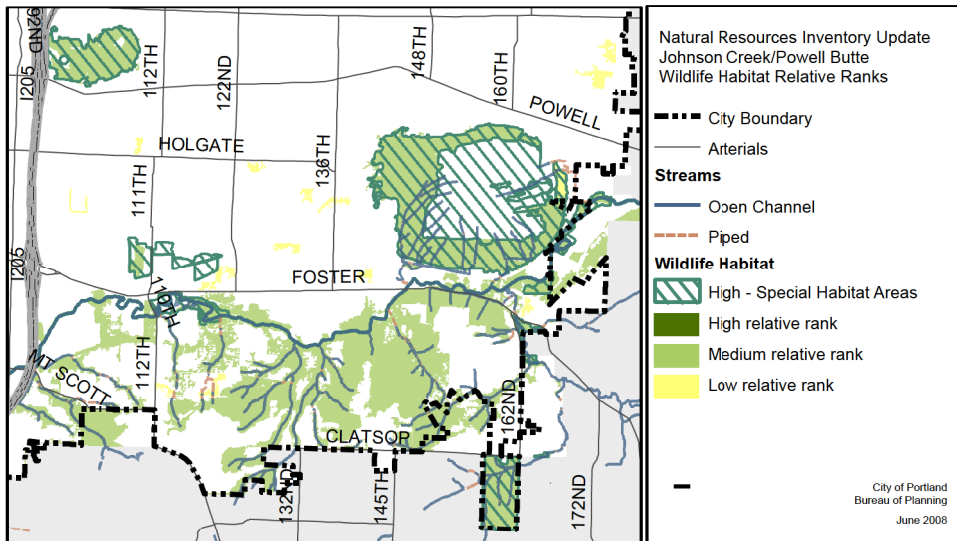
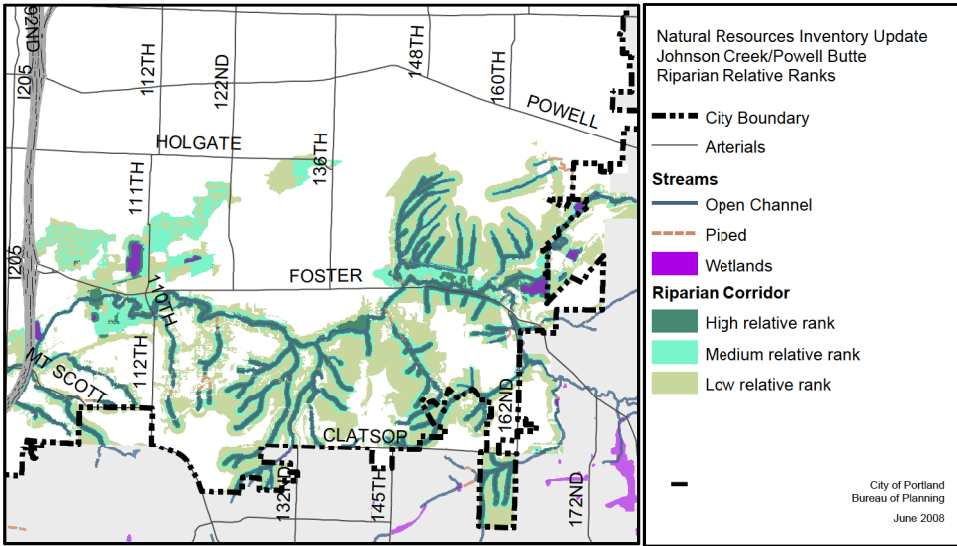
The two map series presented on the next pages show the City's inventory "building blocks" for different areas of the city: 1) Southwest Hills and Willamette River, including Ross Island, and 2) Johnson Creek, Kelley Creek and Powell Butte. The maps are presented in the following order to demonstrate how natural resource features provide the basis mapping and ranking riparian corridor and wildlife habitat functions and values.

1. **Aerial photo** – 2005 aerial of the area and main arterial streets, which are labeled
2. **Riparian Resources** – water bodies, stream channels both open and piped, wetlands and flood areas
3. **Vegetation** – forest, woodland, shrubland and herbaceous cover
4. **Riparian corridor relative ranks**
5. **Wildlife habitat relative ranks** – including Special Habitat Areas Special Habitat Areas receive a high rank, which supersedes lower ranked wildlife habitat
6. **Combined relative riparian and wildlife habitat ranks**

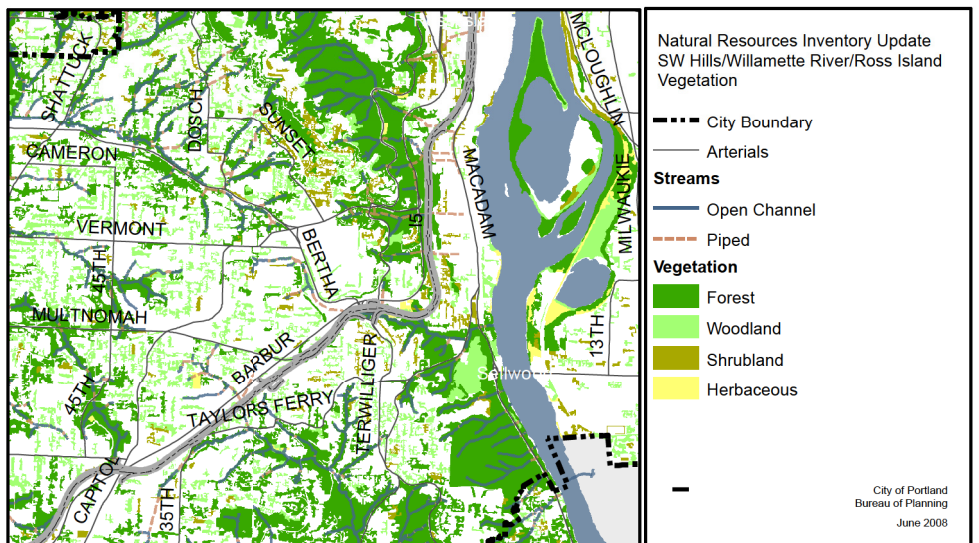
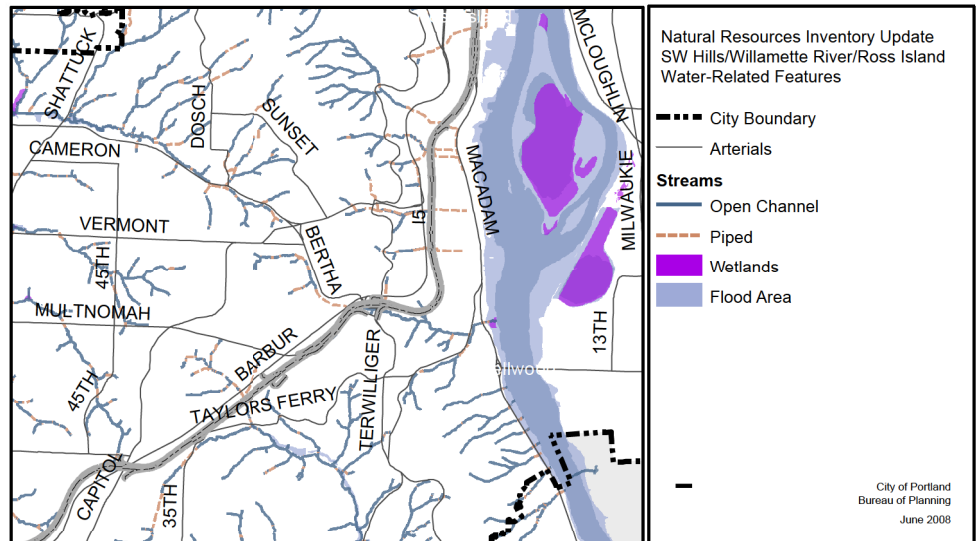
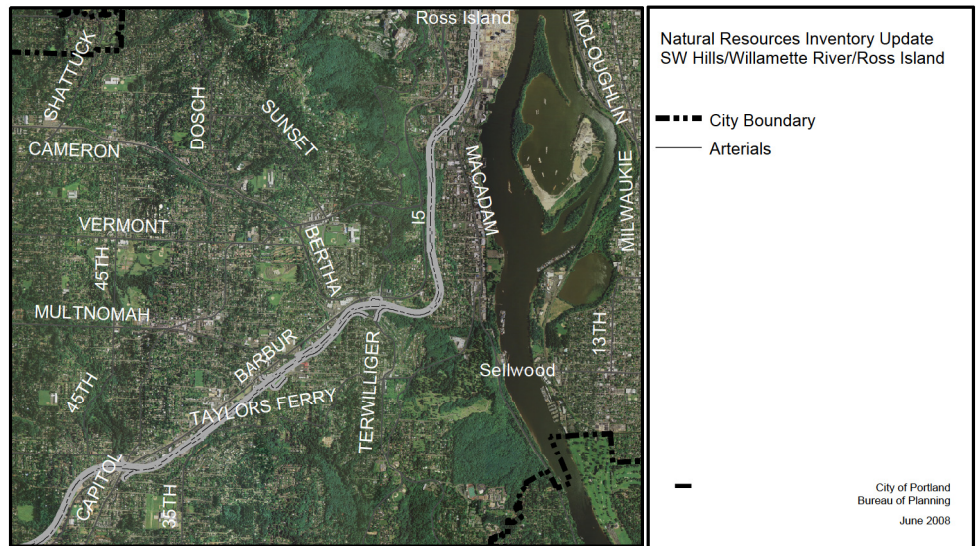
**JOHNSON CREEK
AND POWELL BUTTE
NATURAL RESOURCE
INVENTORY MAP
SERIES**



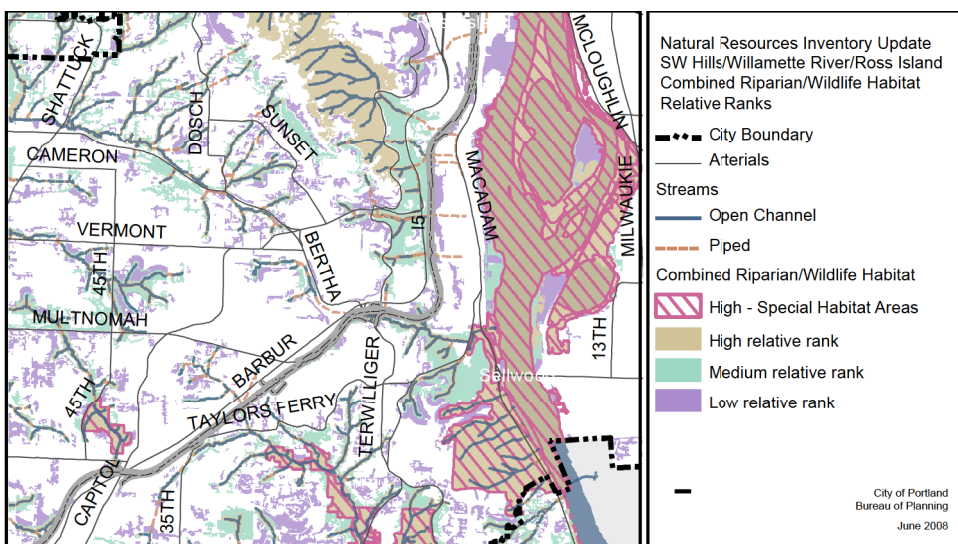
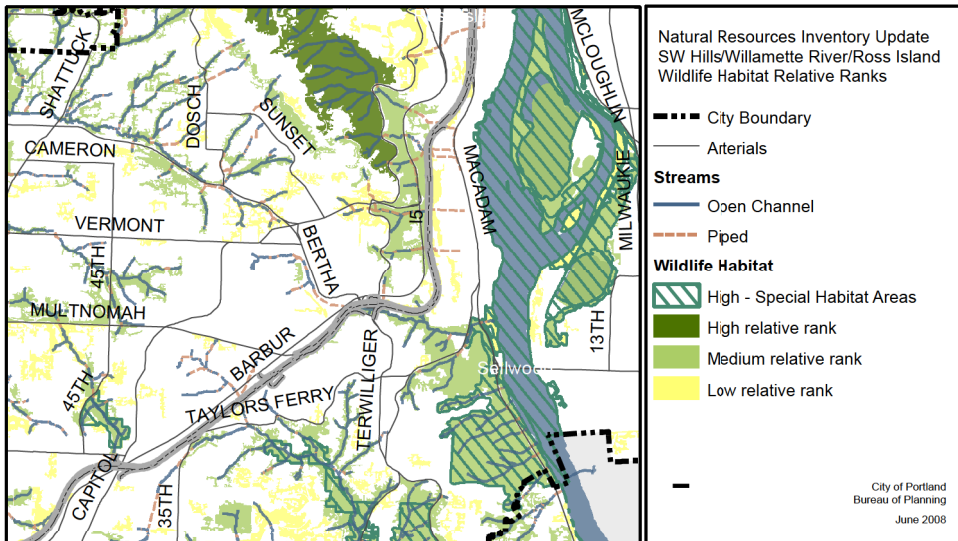
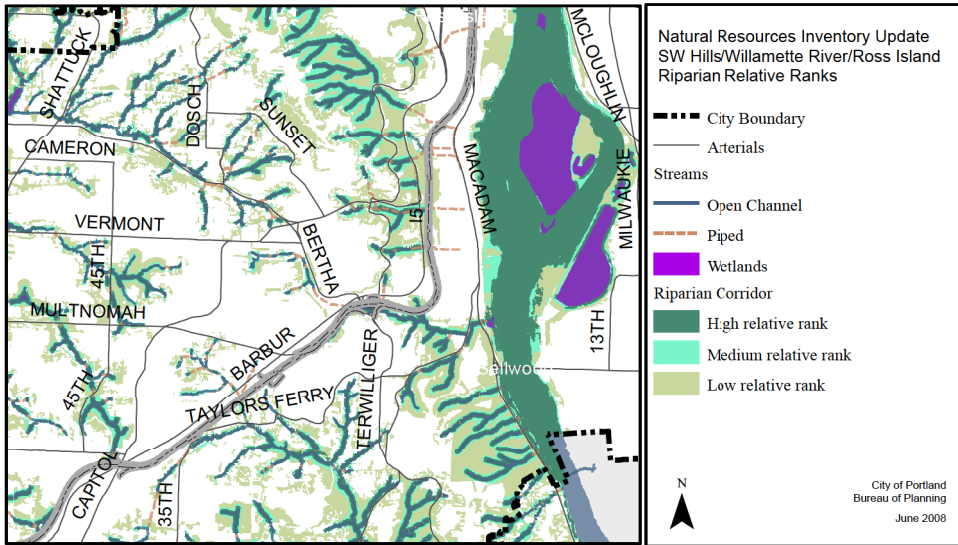
JOHNSON CREEK AND POWELL BUTTE NATURAL RESOURCE INVENTORY MAP SERIES



**SOUTHWEST HILLS,
WILLAMETTE RIVER
AND ROSS ISLAND
NATURAL RESOURCE
INVENTORY MAP
SERIES**



SOUTHWEST HILLS, WILLAMETTE RIVER AND ROSS ISLAND NATURAL RESOURCE INVENTORY MAP SERIES



4. INVENTORY PRODUCTS AND USES

Products

City staff, other agencies and organizations, and citizens now have access to updated information about Portland's natural resources. Maps of local streams, wetlands, flood areas and vegetation are available online, by logging onto PortlandMaps.com. Maps can be viewed for individual properties and nearby areas.

As data regarding the location and extent of natural resources is refined, the online maps can be updated.

New GIS modeling tools have been developed to map Portland's riparian corridors and wildlife habitat, and to assess their relative functional value. Resource rankings have also been produced in draft map form. Maintaining the GIS data and modeling tools will allow the City to update the inventory information data to reflect changing conditions in Portland's watershed. Species lists and special habitat information for Portland are also available.

Updates to City inventories for the Willamette River areas around the Portland International Airport and Hayden Island are currently underway.



WEST HAYDEN ISLAND

Uses

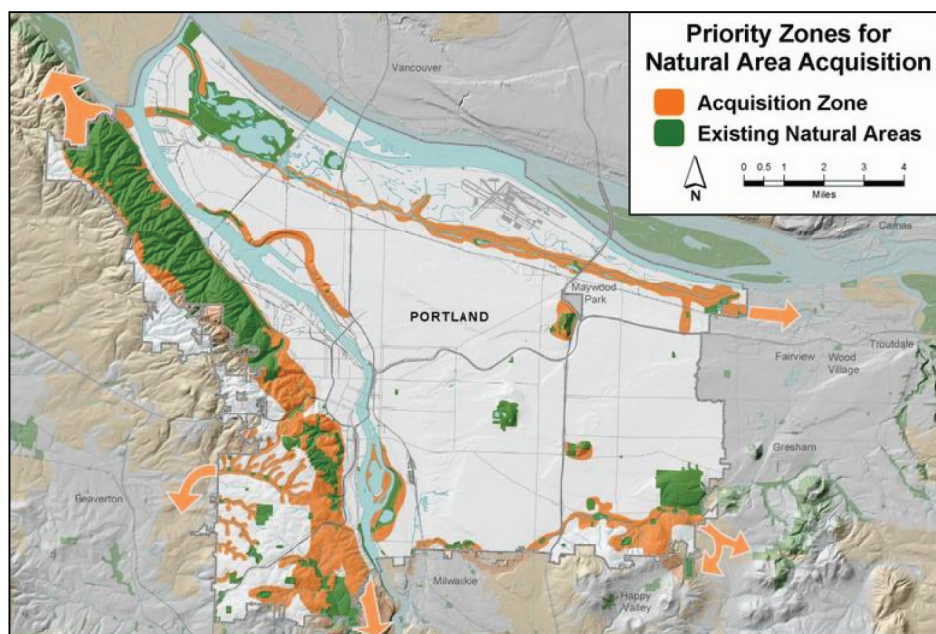
The inventory maps and reports will inform an array of City and community activities, including setting priorities for land acquisition and restoration, updating local regulatory programs, and developing strategies to comply with various regional, state, and federal regulations.

Draft inventory products are already being put to good use. Metro incorporated the City's updated stream data to revise the regional inventory of riparian corridors and wildlife habitat. The City used the draft inventory maps to inform development of the *Portland Watershed Management Plan*. Draft inventory maps are also informing the development of a new City Terrestrial Ecology Enhancement Strategy. The City and Metro have used draft inventory information to help identify local and regional land acquisition priorities. The updated inventory information will inform upcoming updates to the City's existing Willamette Greenway program and the environmental zoning program. The inventory will also support City efforts to comply with regional, state and federal regulatory requirements, including Metro's Title 3 and 13, Clean Water Act, and the Endangered Species Act.

Finally, the inventory provides a useful tool for reaching out to citizens and community organizations. Inventory maps can be used to prioritize public education and outreach activities, and to identify potential partnership opportunities.

IN CLOSING, the following points are important to remember when considering the products and uses of the updated natural resource inventory information:

- **The inventory is “information only”** and will inform a broad array of activities and does not propose any specific programs or regulations.
- **The new inventory information can be put to a number of uses, but will not automatically replace Portland’s adopted inventories.** Inventories used to inform land use decisions will be updated through area-specific or citywide legislative projects, such as the River Plan.
- **The inventory addresses multiple watershed functions (not just a habitat inventory), and reflects Portland’s urban landscape:**
 - **The inventory includes “natural” and “constructed” features** that contribute to the functional values of riparian corridor and wildlife habitats in the city.
 - **The conditions of inventories resources range from relatively good to highly degraded.** Most resource areas in the city are affected to some extent by human disturbance, invasive species, and other factors. Degraded areas still contribute to important watershed functions in the city and the region. Knowing which areas are high and low functions will help set priorities for protection and restoration.
- **The inventory maps reflect current information and technologies, both of which will evolve over time.** State-of-the-art mapping tools will allow the Bureau to incorporate new citywide or site-specific information as it becomes available.



**CITY OF PORTLAND NATURAL AREA
ACQUISITION STRATEGY, 2006**

5. Next Steps

Next steps in the inventory process:

The Bureau of Planning will make the draft updated inventory maps and project report available to key stakeholders including City bureaus and Metro, local, state and federal agencies (e.g., Port of Portland, ODFW, DEQ, NOAA Fisheries), organizations (e.g., neighborhood associations, watershed councils, business and environmental interests), and interested citizens. Stakeholders will be invited to review and provide feedback on the reports, including more current information about natural resources on the ground. The Bureau will use this information to continue improving the inventory.



JOHNSON CREEK

As directed by the Planning Commission in October 2006, the Bureau of Planning will develop a workplan to update, maintain and improve the City's Environmental Program. The workplan will identify key steps and timelines to update the existing City inventories and to maintain the inventory information over time. The workplan will also include potential strategies to meet the City's watershed goals and to comply with Metro Title 13 and the Clean Water Act pollutant load restrictions. Such steps likely include citywide or area-specific updates to the City's zoning programs and other regulations, as well as an array of non-regulatory approaches. The Bureau will consult with other bureaus, agencies and key stakeholders in developing the work program. The Bureau will ask Planning Commission to endorse the proposed workplan, including the updated inventory methodology in 2008/2009.



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APPENDIX 1

COMPARISON OF PORTLAND AND METRO INVENTORY MODEL CRITERIA

Microclimate and Shade

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
river, stream or wetland	2, 5	----			----
forest within the flood area (except within a drainage district)	3, 4	A forest or woody vegetation landcover type within 100 feet of: a surface stream; a hydrologically connected wetland; or an area subject to flooding	woodland within the flood area (except within a drainage district)	3, 4	
forest that is contiguous to and within 100' of a river, stream or wetland	1, 2		forest that is contiguous to primary forest vegetation and within 780' of a river, stream or wetland	1, 2	A forest or woody vegetation landcover that is (contiguous to the primary area?) beyond 100 feet but within 780 feet
			woodland that is contiguous to and within 100' of a river, stream or wetland	1, 2	
		A forest or woody vegetation landcover type within 100 feet of: a surface stream; a hydrologically connected wetland; or an area subject to flooding	shrubland that is contiguous to and within 50' of a stream or wetland	1, 2	A forest or woody vegetation landcover that is (contiguous to the primary area?) beyond 100 feet but within 780 feet

Stream Flow Moderation and Water Storage

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
river, stream or wetland	2, 5	An area subject to flooding except developed floodplains			Developed floodplain
vegetation within the flood area (except within a drainage district)	3, 4		non-vegetated land within the flood area (except within a drainage district)	3, 4	
			woodland or shrubland within 300' of a river, stream or wetland	1, 2	A forest, woody vegetation or low structure/undeveloped soils land cover type within 300 feet of a surface stream; or forest vegetation that is contiguous to the riparian corridor (starts within 300 feet) but extends beyond
	----		forest that is contiguous to primary forest vegetation or starts within 300' of a river, stream or wetland, and is within 780' of a river, stream or wetland	1, 2	A forest, woody vegetation or low structure/undeveloped soils land cover type within 300 feet of a surface stream; or forest vegetation that is contiguous to the riparian corridor (starts within 300 feet) but extends beyond
			herbaceous vegetation within 100' of a river, stream or wetland	1, 2	
			where the slope is 25 percent or more, herbaceous vegetation that starts within 100' of a river, stream or wetland, and is within 200' of a river, stream or wetland	1, 2	

Bank Function, and Sediment, Pollution and Nutrient Control

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
river, stream or wetland (except Willamette River North and Central Reach)	2, 5	(Land?) that is within 50 feet of a surface stream and is not a forest, woody vegetation, or low structure vegetation/undeveloped soils landcover type	Willamette River North and Central Reach	5	----
land within 50' of a river, stream or wetland (except hardened river banks in the Willamette River North and Central Reach)	1, 2, 7		land within 50' of a hardened, non-vegetated river bank in the Willamette River North and Central Reach	7	
forest, woodland or shrubland within the flood area (except within a drainage district)	3, 4	A forest, woody vegetation, or low structure vegetation/undeveloped soils landcover type within 100 feet of a surface stream; a hydrologically connected wetland; or within an area subject to flooding	vegetation within the flood area (except within a drainage district)	3, 4	A forest, woody vegetation, or low structure/undeveloped soils landcover type located on a slope greater than 25%, that starts within 175 feet of a surface stream reach and runs to the first effective break in slope
forest and natural/semi-natural woodland or shrubland within 100' of a river	1, 6, 8			1, 6, 8	
forest, woodland and shrubland within 100' of a stream or wetland where the slope is 25 percent or more, forest and natural/semi-natural woodland or shrubland within 200' of a river	1, 2 1, 6, 8	A forest, woody vegetation, or low structure vegetation/undeveloped soils landcover type within 100-200 feet of a surface stream if the slope is greater than 25%	vegetation within 100' of a river, stream or wetland	1, 2	A forest, woody vegetation, or low structure/undeveloped soils landcover type located on a slope greater than 25%, that starts within 175 feet of a surface stream reach and runs to the first effective break in slope
where the slope is 25 percent or more, forest, woodland or shrubland within 200' of a stream or wetland	1, 2		where the slope is 25 percent or more, forest, woodland and shrubland that is contiguous to primary vegetation (limited to the area of 25 percent slope)	1, 2	
			where the slope is 25% or more, herbaceous vegetation that is contiguous to primary vegetation and is within 200' of a river, stream or wetland	1, 2	

Large Wood and Channel Dynamics

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
river, beach or stream	2, 5	50 feet from a stream where there is no flood area - low and medium gradient rivers and streams only			----
land within 50' of a river or stream (except land within 50' of a river in the Willamette River North and Central Reach)	1, 4	50 feet from a stream where there is no flood area - low and medium gradient rivers and streams only			----
forest within 50' of a river in the Willamette River North and Central Reach			non-forest land within 50' of a river within the Willamette River North and Central Reach		
forest within the flood area (except within a drainage district)	3, 4	A forest landcover type within 150 feet of a surface stream or hydrologically connected wetland, or within an area subject to flooding	vegetation within the flood area (except within a drainage district)	3, 4	----
forest that is contiguous to and within 150' of a river or stream (except within a drainage district)	1, 3, 4	----	within a drainage district, forest that is contiguous to and within 150' of a stream	1, 3, 4	

Large Wood and Channel Dynamics

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
		----	where the slope is 25 percent or more, forest that is contiguous to primary forest vegetation and is within 260' of a river or stream (except within a drainage district)	1, 4	----
forest that is contiguous to and within 150' of a wetland located completely or partially within the flood area or 150' of a river or stream (except within a drainage district)	1, 2, 3, 4	A forest landcover type within 150 feet of a surface stream or hydrologically connected wetland, or within an area subject to flooding	where the slope is 25 percent or more, forest that is contiguous to primary forest vegetation and within 260' of a wetland located completely or partially within the flood area or 150' of a river or stream (except within a drainage district)	1, 2, 3, 4	A forest landcover within 150 to 262 feet from a surface stream
wetland located completely or partially within the flood area or 150' of a river or stream (except within a drainage district)	1, 2, 3, 4	----			----

Organic Inputs, Food Web and Nutrient Cycling

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
river, stream or wetland	2, 5	A forest or woody vegetation landcover type within 100 feet of a surface stream, hydrologically connected wetland or within an area subject to flooding			A forest or woody vegetation landcover type within 100 to 170 feet of a surface stream.
forest and natural/semi-natural woodland or shrubland within the flood area (except within a drainage district)	3, 4, 8		cultivated woodland or shrubland within a flood area (except within a drainage district)	3, 6, 8	----
forest and natural/semi-natural woodland or shrubland within 100' of a river	1, 2, 6		forest and natural/semi-natural woodland or shrubland that is contiguous to primary vegetation and is within 170' of a river	1, 2, 6	A forest or woody vegetation landcover type within 100 to 170 feet of a surface stream.
			cultivated woodland or shrubland within 100' of a river	1, 2, 6, 8	
forest, woodland or shrubland within 100' of a stream or wetland	1, 2		forest, woodland or shrubland that is contiguous to primary vegetation and within 170' of a stream or wetland	1, 2	

Riparian Wildlife Movement Corridor

Portland Primary Criteria	Footnotes	Metro Primary Criteria	Portland Secondary Criteria	Footnotes	Metro Secondary Criteria
river, stream or wetland	2, 5	----			----
vegetation that is contiguous to and within 100' of a river, stream or wetland	1, 2		vegetation that is contiguous to primary vegetation and is within 300' of a river, stream or wetland	1, 2	

Comparison of Portland and Metro Wildlife Habitat Model Criteria (1)

Wildlife habitat attribute	Portland - High Relative Functional Value	Metro - High Relative Functional Value	Portland - Medium Relative Functional Value	Metro - Medium Relative Functional Value	Portland - Low Relative Functional Value	Metro - Low Relative Functional Value
Habitat Patch* Size	Patch >= 585 acres	Patch > 2,467 acres (2)	Patch >=30 acres and <585 acres	Patch > 585 acres and <=2,467 acres (2)	Patch >=2 acres and <30 acres	Patch < 2 acres and <=585 acres (2)
Interior Habitat Area**	Interior Area >500 acres	Interior Area >1,118 acres (2)	Interior Area >=15 acres and <30 acres	Interior Area >386 acres and <=1,118 acres (2)	Interior Area >=2 acres and <15 acres	Interior Area >2 acres and <=386 acres (2)
Connectivity/Proximity to other Habitat Patches***	Core forest/wetland portion of the patch is >= 2 acres and receives a patch proximity index value >=100.	2,254 10'x10' cells in patch are within ¼ mile of each patch	Core forest/wetland portion of the patch >=2 acres and receives a patch proximity index value >= 30 and <100.	>1,207 and <=2,254 10'x10' cells in patch are within ¼ mile of each patch	Core forest/wetland portion of the patch is >= 2 acres and receives a patch proximity index value <30.	<= 1,207 10'x10' cells in patch are within ¼ mile of each patch
Proximity of Habitat Patch to Water****	>= 75% of patch is within 300' of a river, stream or wetland.	>73% of patch is within 328' of a stream	>=25% and <75% of patch is within 300' of a river, stream or wetland.	>31% and <=73% of patch is within 328' of a stream	<=25% of patch is within 300 feet of a river, stream or wetland.	<=31% of patch is within 328' of a stream

Footnotes:

- 1 Criteria are paraphrased for readability
2 Rounded to nearest acre

The following footnotes apply to Portland criteria:

- * A habitat patch is defined as an area of contiguous forest and/or wetland greater than 2 acres in size, plus any woodland vegetation adjacent and contiguous to the core forest/wetland area.
** "Interior area" is defined as the area within the forest and/or wetland portion of a habitat patch that is situated at least 200' from the edge of that portion of the patch.

- *** Proximity to other patches is calculated using the Fragstats 3.3 proximity index (PROX). The specified search radius is ¼ mile. The proximity index is a dimensionless measure of the relative size and distance of all patches whose edges are within the specified search radius of each vegetation patch. For more information on Fragstats and the proximity index, refer to <http://www.umass.edu/landeco/research/fragstats/fragstats.html>.
**** Proximity to water relative value thresholds were determined by identifying "natural breaks" in the distribution of the values using the Jenk's Natural Breaks method, which determines the best arrangement of values into a specified number of classes by comparing and minimizing the sum of the squared differences of values from the means of potential classes.



APPENDIX 2

SPECIAL STATUS FISH AND WILDLIFE SPECIES

Appendix 2: Special Status Fish and Wildlife Species in Portland

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NWPCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
A	Northern Red-legged Frog	Rana aurora aurora	Species of Concern	SV	G4/T4/S3	2	X		X		<input checked="" type="checkbox"/>
A	Clouded Salamander	Aneides ferreus		SV	G3/S3	3					<input checked="" type="checkbox"/>
B	Purple Martin	Progne subis	Species of Concern	SC	G5/S3B	2	X	X	X		<input checked="" type="checkbox"/>
B	Loggerhead Shrike	Lanius ludovicianus		SV	G4/S3B, S2N	4					<input checked="" type="checkbox"/>
B	Long-billed Curlew	Numerius americanus		SV	G5/S3B	4				Yellow List	<input checked="" type="checkbox"/>
B	Merlin	Falco columbarius			G5/S1B	2					<input checked="" type="checkbox"/>
B	Nashville Warbler	Vermivora ruficapilla					X				<input type="checkbox"/>
B	Northern Harrier	Circus cyaneus					X				<input type="checkbox"/>
B	Olive-sided Flycatcher	Contopus cooperi	Species of Concern	SV	G5/S4	4	X	X	X	Yellow List	<input checked="" type="checkbox"/>
B	Orange-crowned Warbler	Vermivora celata					X				<input type="checkbox"/>
B	Pacific-slope Flycatcher	Empidonax difficilis					X		X		<input type="checkbox"/>
B	Peregrine Falcon	Falco peregrinus	American & Arctic Delisted	SV	G4/T3/S1B	2					<input checked="" type="checkbox"/>
B	Swainson's Thrush	Catharus ustulatus					X				<input type="checkbox"/>
B	Purple Finch	Carpodacus purpureus							X		<input type="checkbox"/>
B	Hooded Merganser	Lophodytes cucullatus							X		<input type="checkbox"/>
B	Red Crossbill	Loxia curvirostra					X				<input type="checkbox"/>
B	Red-eyed Vireo	Vireo olivaceus					X				<input type="checkbox"/>
B	Red-necked Grebe	Podiceps grisegena		SC	G5/S1B, S4N	2					<input checked="" type="checkbox"/>
B	Rufous Hummingbird	Selasphorus rufus					X				<input type="checkbox"/>

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NWPCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
B	Short-eared Owl	Asio flammeus						X	X	Yellow List	<input type="checkbox"/>
B	Sora	Porzana carolina					X				<input type="checkbox"/>
B	Streaked Horned Lark	Eremophila alpestris strigata	Candidate	SC	G5/T2/S2B	1	X	X	X		<input checked="" type="checkbox"/>
B	Pileated Woodpecker	Dryocopus pileatus		SV	G5/S4	4	X	X			<input checked="" type="checkbox"/>
B	Chipping Sparrow	Spizella passerina					X	X			<input type="checkbox"/>
B	American Bittern	Botaurus lentiginosus							X		<input type="checkbox"/>
B	American Kestrel	Falco sparverius					X	X	X		<input type="checkbox"/>
B	American White Pelican	Pelecanus erythrorhynchos		SV	G3/S2B	2					<input checked="" type="checkbox"/>
B	Bald Eagle	Haliaeetus leucocephalus	Delisted	LT	G4/S3B, S4N	2	X				<input checked="" type="checkbox"/>
B	Band-tailed Pigeon	Columba fasciata	Species of Concern		G5/S4	4		X	X		<input checked="" type="checkbox"/>
B	Black-throated Gray Warbler	Dendroica nigrescens						X			<input type="checkbox"/>
B	Brown Creeper	Certhia americana						X			<input type="checkbox"/>
B	Bufflehead	Bucephala albeola			G5/S2B, S5N	4					<input checked="" type="checkbox"/>
B	Hutton's Vireo	Vireo huttoni						X			<input type="checkbox"/>
B	Bushtit	Psaltiriparus minimus						X			<input type="checkbox"/>
B	House Wren	Troglodytes aedon						X			<input type="checkbox"/>
B	Common Nighthawk	Chordeiles minor		SC	G5/S5	4					<input checked="" type="checkbox"/>
B	Common Yellowthroat	Geothlypis trichas					X				<input type="checkbox"/>
B	Downy Woodpecker	Picoides pubescens						X			<input type="checkbox"/>
B	Dunlin	Calidris alpina					X		X		<input type="checkbox"/>
B	Great Blue Heron	Ardea herodias							X		<input type="checkbox"/>

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NWPCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
B	Green Heron	<i>Butorides virescens</i>					X				<input type="checkbox"/>
B	Hammond's Flycatcher	<i>Empidonax hammondi</i>						X			<input type="checkbox"/>
B	Hermit Warbler	<i>Dendroica occidentalis</i>						X		Yellow List	<input type="checkbox"/>
B	Thayer's Gull	<i>Larus thayeri</i>								Yellow List	<input type="checkbox"/>
B	Bullock's Oriole	<i>Icterus bullockii</i>						X	X		<input type="checkbox"/>
B	Wilson's Warbler	<i>Wilsonia pusilla</i>						X			<input type="checkbox"/>
B	Swainson's Hawk	<i>Buteo swainsoni</i>		SV	G5/S3B	4				Yellow List	<input checked="" type="checkbox"/>
B	Yellow-breasted Chat	<i>Icteria virens</i>	Species of Concern	SC WV	G5/S4?	4		X			<input checked="" type="checkbox"/>
B	Yellow Warbler	<i>Dendroica petechia</i>					X	X	X		<input type="checkbox"/>
B	Winter Wren	<i>Troglodytes troglodytes</i>						X			<input type="checkbox"/>
B	Willow Flycatcher (Little)	<i>Empidonax traillii brewsteri</i>		SV	G5TU/S1B	4	X	X	X	Yellow List	<input checked="" type="checkbox"/>
B	White-tailed Kite	<i>Elanus leucurus</i>			G5/S1B, S3N	2					<input checked="" type="checkbox"/>
B	Vaux's Swift	<i>Chaetura vauxi</i>					X	X			<input type="checkbox"/>
B	Western Wood-Pewee	<i>Contopus sordidulus</i>					X	X			<input type="checkbox"/>
B	Western Sandpiper	<i>Calidris mauri</i>								Yellow List	<input type="checkbox"/>
B	Varied Thrush	<i>Ixoreus naevius</i>						X		Yellow List	<input type="checkbox"/>
B	Western Meadowlark	<i>Sturnella neglecta</i>		SC WV	G5/S5	4	X	X	X		<input checked="" type="checkbox"/>
B	Vesper Sparrow	<i>Poocetes gramineus</i>	Species of Concern	SC	G5/T3/S2B, S2N	2	X	X	X		<input checked="" type="checkbox"/>
B	White-breasted Nuthatch (Slender-billed)	<i>Sitta carolinensis aculeata</i>		SV			X	X	X		<input checked="" type="checkbox"/>
B	Wood Duck	<i>Aix sponsa</i>					X				<input type="checkbox"/>

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NWPCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
F	Steelhead, Lower Columbia River ESU	Oncorhynchus mykiss	LT	SC	G5T2Q/S2	1					<input checked="" type="checkbox"/>
F	Coho Salmon, Lower Columbia R./Southwest Washington ESU	Oncorhynchus kisutch	C	LE	G4T2Q/S2	1					<input checked="" type="checkbox"/>
F	Chum Salmon, Columbia River ESU	Oncorhynchus keta	LT	SC	G5T2Q/S2	1					<input checked="" type="checkbox"/>
F	River Lamprey	Lampetra ayresi	SoC		G4/S4	4					<input checked="" type="checkbox"/>
F	Coastal Cutthroat Trout, SW WA/Col. R. ESU	Oncorhynchus clarki clarki	PT	SC	G4T2Q/S2	2					<input checked="" type="checkbox"/>
F	Steelhead, Upper Willamette River ESU, winter run	Oncorhynchus mykiss	LT	SC	G5T2Q/S2	1					<input type="checkbox"/>
F	Chinook Salmon, Snake River Spr/Sum.run	Oncorhynchus tshawytscha	LT	LT	G5T1Q/S1	1					<input type="checkbox"/>
F	Pacific Lamprey	Lampetra tridentata	SoC	SV	G5/S3	2					<input checked="" type="checkbox"/>
F	Chinook Salmon, Upper Col. R. Spring-run	Oncorhynchus tshawytscha	LE		G5T1Q/SU						<input type="checkbox"/>
F	Steelhead, Middle Columbia River ESU	Oncorhynchus mykiss	LT	SC/SV	G5T2Q/S2	1					<input type="checkbox"/>
F	Steelhead, Snake River Basin ESU	Oncorhynchus mykiss	LT	SV	G5T2T3Q/S2S3	1					<input type="checkbox"/>
F	Steelhead, Upper Columbia River ESU	Oncorhynchus mykiss	LE		G5T2Q/SU						<input type="checkbox"/>
F	Sockeye Salmon, Snake River ESU	Oncorhynchus nerka	LE		G5T1Q/SX	1 - ex					<input type="checkbox"/>
F	Chinook Salmon, Lower Columbia R. ESU	Oncorhynchus tshawytscha	LT	SC	G5T2Q/S2	1					<input checked="" type="checkbox"/>

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NW/PCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
F	Coastal Cutthroat Trout, Upper Will. R. ESU	Oncorhynchus clarki clarki	SoC		G4T?Q/S3?	4					<input type="checkbox"/>
F	Chinook Salmon, Snake River Fall-run ESU	Oncorhynchus tshawytscha	L ^T	LT	G5T1Q/S1	1					<input type="checkbox"/>
F	Chinook Salmon, Upper Will. R spring run	Oncorhynchus tshawytscha	L ^T		G5T2Q/S2	1					<input type="checkbox"/>
M	Red Tree Vole	Arborimus = Phenacomys longicaudus	Species of Concern	SV	G3G4/S3S4	3	X				<input checked="" type="checkbox"/>
M	Yuma Myotis	Myotis yumanensis	Species of Concern		G5/S3	4					<input checked="" type="checkbox"/>
M	White-footed Vole	Arborimus = Phenacomys alipes	Species of Concern		G3G4/S3	4					<input checked="" type="checkbox"/>
M	Western Gray Squirrel	Sciurus griseus		SV	G5/S4	3	X				<input checked="" type="checkbox"/>
M	Silver-haired Bat	Lasionycteris noctivagans	Species of Concern	SV	G5/S3S4	4					<input checked="" type="checkbox"/>
M	Northern River Otter	Lontra canadensis					X				<input type="checkbox"/>
M	Long-legged Myotis	Myotis volans	Species of Concern	SV	G5/S3	4					<input checked="" type="checkbox"/>
M	Long-eared Myotis	Myotis evotis	Species of Concern		G5/S3	4					<input checked="" type="checkbox"/>
M	Hoary Bat	Lasiurus cinereus		SV	G5/S3	4					<input checked="" type="checkbox"/>
M	Fringed Myotis	Myotis thysanodes	Species of Concern	SV	G4G5/S2	2					<input checked="" type="checkbox"/>
M	Canas Pocket Gopher	Thomomys bulbivorus	Species of Concern		G3G4/S3S4	3					<input checked="" type="checkbox"/>
M	California Myotis	Myotis californicus		SV	G5/S3	4					<input checked="" type="checkbox"/>
M	American Beaver	Castor canadensis					X				<input type="checkbox"/>
M	Townsend's Big-eared Bat	Corynorhinus townsendii townsendii	Species of Concern	SC	G4/T3T4/S2	2	X				<input checked="" type="checkbox"/>
R	Western Painted Turtle	Chrysemys picta bellii		SC	G5/S2	2			X		<input checked="" type="checkbox"/>
R	Northwestern Pond Turtle	Actinemys marmorata	Species of Concern	SC	G3T3/S2	1	X		X		<input checked="" type="checkbox"/>

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NWPCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
Code	B	bird									
	F	fish									
	A	amphibian									
	R	reptile									
	M	mammal									
Federal Status	LE	Listed Endangered									Species listed by the by the USFWS or NMFS as Endangered
	LT	Listed Threatened									Species listed by the USFWS or NMFS as Threatened
	PE	Proposed Endangered									Species proposed by the USFWS or NMFS to be listed as Endangered under the ESA
	PT	Proposed Threatened									Species proposed by the USFWS or NMFS to be listed as Threatened under the ESA
	SoC	Species of Concern									Former C2 candidates which need additional information in order to propose as Threatened or Endangered under the ESA. These are species which USFWS is reviewing for consideration as Candidates for listing under the ESA.
	C	Candidate									Species for which NMFS or USFWS have sufficient information to support a proposal to list under the ESA
ODFW Status	LE	Listed Endangered									Species listed by ODFW or ODA as Endangered
	LT	Listed Threatened									listed by ODFW or ODA as Threatened
	SC	Critical									Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species that are at risk throughout their range, and some disjunct populations.
	SV	Vulnerable									Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.
	SP	Peripheral or Naturally Rare									Peripheral species refer to those whose Oregon populations are on the edge of their range. Naturally rare species are those which had low population numbers historically in Oregon because of naturally limiting factors. Maintaining the status quo for the habitats and populations of these species is a minimum requirement. Disjunct populations of several species that occur in Oregon should not be confused with peripheral.
ODFW StratSp		Strategy Species									Identified as a 'Strategy Species' in the ODFW Comprehensive Wildlife Conservation Strategy for Oregon (2005) for the Willamette Valley Ecoregion. Strategy species are those closely associated with 'Strategy Habitats' or are declining for a variety of reasons.
ORNHP Rank	1	Critically imperiled									Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.
	2	Imperiled									Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences.
	3	Rare									Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences.
	4	Long-term Concern									Not rare and apparently secure, but with cause for long-term concern, usually more than 100 occurrences.
	5	Secure									Demonstrably widespread, abundant, and secure
	H	Historical									Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered.
	T	Trinomial									The taxon has a trinomial (a subspecies, variety or recognized race)

Code	Species Name	Scientific Name	USFWS	ODFW	ORNHIC Rank	List	NWPCC	PIF Focal Species	OWEB	ABC	City of Portland Sensitive Species
U	Unknown	Unknown	Unknown rank.								
NR	Not Ranked	Not Ranked	Not yet ranked								
G	Global Rank	Global Rank	The system was developed by The Nature Conservancy and is maintained by The Association for Biodiversity Information (ABI) in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries.								
S	State Rank	State Rank	The system was developed by The Nature Conservancy and is maintained by The Association for Biodiversity Information (ABI) in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries.								
Q	Taxonomic Questions	Taxonomic Questions	Indicates the taxon has taxonomic questions								
?	Uncertain	Uncertain	Assigned rank is uncertain.								
X	Extirpated	Extirpated	Presumed extirpated or extinct.								
ORNHP List											
1	Threatened or extinct	Threatened or extinct	List 1 contains species that are threatened with extinction or presumed to be extinct throughout their entire range.								
2	Threatened or extirpated	Threatened or extirpated	List 2 contains species that are threatened with extirpation or presumed to be extirpated from the state of Oregon. These are often peripheral or disjunct species which are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. ORNHP regards extreme rarity as a significant threat and has included species that are very rare in Oregon on this list.								
3	Imperiled, more information needed	Imperiled, more information needed	List 3 contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.								
4	Conservation concern	Conservation concern	List 4 contains species that are of conservation concern but are not currently threatened or endangered. This includes species which are very rare but are currently secure, as well as species which are declining in numbers or habitat but are still too common to be proposed as threatened or endangered. While these species currently may not need the same active management attention as threatened or endangered species, they do require continued monitoring.								

APPENDIX 3

SPECIAL STATUS PLANT SPECIES

Appendix 3: Special Status Plant Species in Portland

November 2009

Latin Name	Common Name	USFWS Status	ODFW Status	ORNHIC Status
Carex comosa	Bristly sedge			2
Rorippa columbiae	Columbia cress		C	1
Wolffia columbiana	Columbia water-meal			2
Polygonum punctatum	Dotted smartweed			3
Zizia aptera	Golden alexanders			3
Castilleja levisecta	Golden paintbrush	LT	LE	1-extirpated
Ammannia robusta	Grand redstem (loosestrife family)			3
Hierochloa odorata	Holy grass			3
Howellia aquatilis	Howellia	LT		1
Agrostis howellii	Howell's bentgrass			1
Montia howellii	Howell's montia			4
Fritillaria camschatcensis	Indian rice / black lilly			2
Poa laxiflora	Loose-flowered bluegrass			4
Sidalcea campestris	Meadow checker-mallow			4
Cypripedium montanum	Mountain lady's-slipper			4
Artemisia campestris var. wormskioldii	Northern wormwood			1-extirpated
Delphinium nuttallii	Nuttall's larkspur			2
Elodea nuttallii	Nuttall's waterweed			3
Bolandra oregana	Oregon bolandra			4
Sullivantia oregana	Oregon sullivantia	SOC	C	1
Scirpus pallidus	Pale bulrush			3
Delphinium pavonaceum	Peacock larkspur			1
Carex retrorsa	Retorse sedge			2
Heliotropium curassavicum	Salt heliotrope			2
Sedella pumila	Sierra mock-stonecrop			2-extirpated
Cimicifuga elata var. elata	Tall bugbane		C	1
Bergia texana	Texas bergia			4
Rotala ramosior	Toothcup			2
Poa marcida	Weak bluegrass			4
Euonymus occidentalis	Western wahoo			4
Delphinium leucophaeum	White rock larkspur			1
Sericocarpus rigidus (syn Aster curtus)	White-topped aster			1

LE - Listed Endangered LT - Listed Threatened C - Candidate SOC - Species of Concern