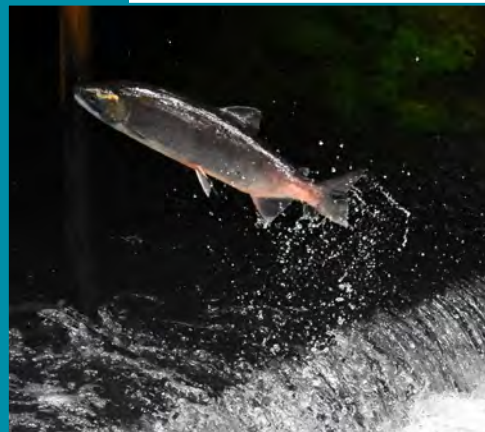


ENVIRONMENTAL OVERLAY ZONE MAP CORRECTION PROJECT

VOLUME 4:
Regulatory Compliance

PROPOSED DRAFT
June 2020



How to Testify

You may submit comments to the Portland Planning and Sustainability Commission on the Proposed Draft Environmental Overlay Zone Map Correction Project in the following ways:

Use the Map App:

Go to www.portlandmaps.com/bps/mapapp

Click on “Ezone Project” and then click the “Testify” button.

By U.S. Mail

Planning and Sustainability Commission
Ezone Map Correction Project Testimony
1900 SW 4th Avenue, Suite 7100
Portland, Oregon 97201

In person at the public hearings

The hearing, on July 28, 2020 will be held virtually. The meeting starts at 4 p.m. Please check the PSC calendar at <https://beta.portland.gov/bps/psc> a week in advance to confirm the time of this agenda item. You can use a computer, mobile device or telephone to testify during the hearing.

To testify during the hearing, please visit the project website to register: www.portland.gov/bps/ezones. You will receive a confirmation email containing information about joining the virtual hearing. The deadline to sign up for the July 28 PSC hearing is Monday, July 27 at 4:00 p.m. Individuals have two minutes to testify, unless otherwise stated by the Commission Chair at the meeting.

The Bureau of Planning and Sustainability is committed to providing meaningful access.

For accommodations, modifications, translation, interpretation or other services, please contact at 503-823-7700 or use the City’s TTY at 503-823-6868, or Oregon Relay Service at 711.

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الترجمة التحريرية أو الشفهية	Письмовий або усний переклад	翻訳または通訳	Turjumida ama Fasiraadda	ການແປພາສາ ຫຼື ການອະທິບາຍ
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Acknowledgements

This plan is the culmination of two years of work across the City of Portland. Many thanks to the thousands of stakeholders, property owners, renters, business owners and interested people who attended dozens of neighborhood and community meetings and invited staff to their homes and businesses to perform site visits.

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A. INTRODUCTION

Through the Environmental Overlay Zone Map Correction Project, Portland is amending its compliance with Metro Urban Growth Management Functional Plan Title 13, Nature in Neighborhoods, and Oregon Statewide Land Use Planning Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources. Portland is in compliance with Metro Title 13 (2012) and Statewide Goal 5 (2002) for riparian corridors and wildlife habitat. This document explains how Portland is amending its environmental program to remain in compliance with both rules. Section C of this document addresses Metro Title 13 compliance and Section D of this document addresses Statewide Goal 5. The results are presented in Volume 2, Parts A – G, for each sub-geography in Portland.

B. BACKGROUND

Beginning in 1989 and finishing in 2002, Portland adopted 13 natural resource conservation and protection plans for areas in the city where there are significant natural resources (Figure 1). Each of these plans was originally adopted to comply with Oregon Planning Goal 5 for riparian corridors and wildlife habitat, as well as contributing towards compliance with Goal 6, Air, Water and Land Resources Quality and Goal 7, Areas Subject to Natural Hazards. In 2002, protection and conservation plans had been adopted and environmental overlay zones applied to resources throughout all of Portland and Portland was deemed fully in compliance with Oregon Planning Goal 5.



Figure 1: City of Portland History of Protection Plans

In September 2005, Metro adopted Title 13 of the Urban Growth Management Functional Plan. Title 13 established baseline requirements to protect, conserve and restore the region's significant riparian corridors and wildlife habitat resources, which are collectively referred to as Habitat Conservation Areas. These Habitat Conservation Areas include rivers, streams, wetlands, and adjacent resource areas, as well as Habitats of Concern.

Title 13 was acknowledged by the Land Conservation and Development Commission as complying with portions of Oregon Planning Goals 5 specific to riparian corridors and wildlife habitat, as well as Goal 6, Air, Water and Land Resources Quality specific to water quality protection.

In December 2012, Metro found Portland to be in substantial compliance with Title 13. Portland's compliance relied on existing programs including environmental overlay zoning codes and maps, as well as section of Title 17 Public Improvements that include the Stormwater Management Manual and Drainage Reserve rules, City Title 10 Erosion Control and City Title 11 Trees and non-regulatory programs such as the Willing Seller Land Acquisition program and Watershed Revegetation Program.

C. METRO TITLE 13 COMPLIANCE

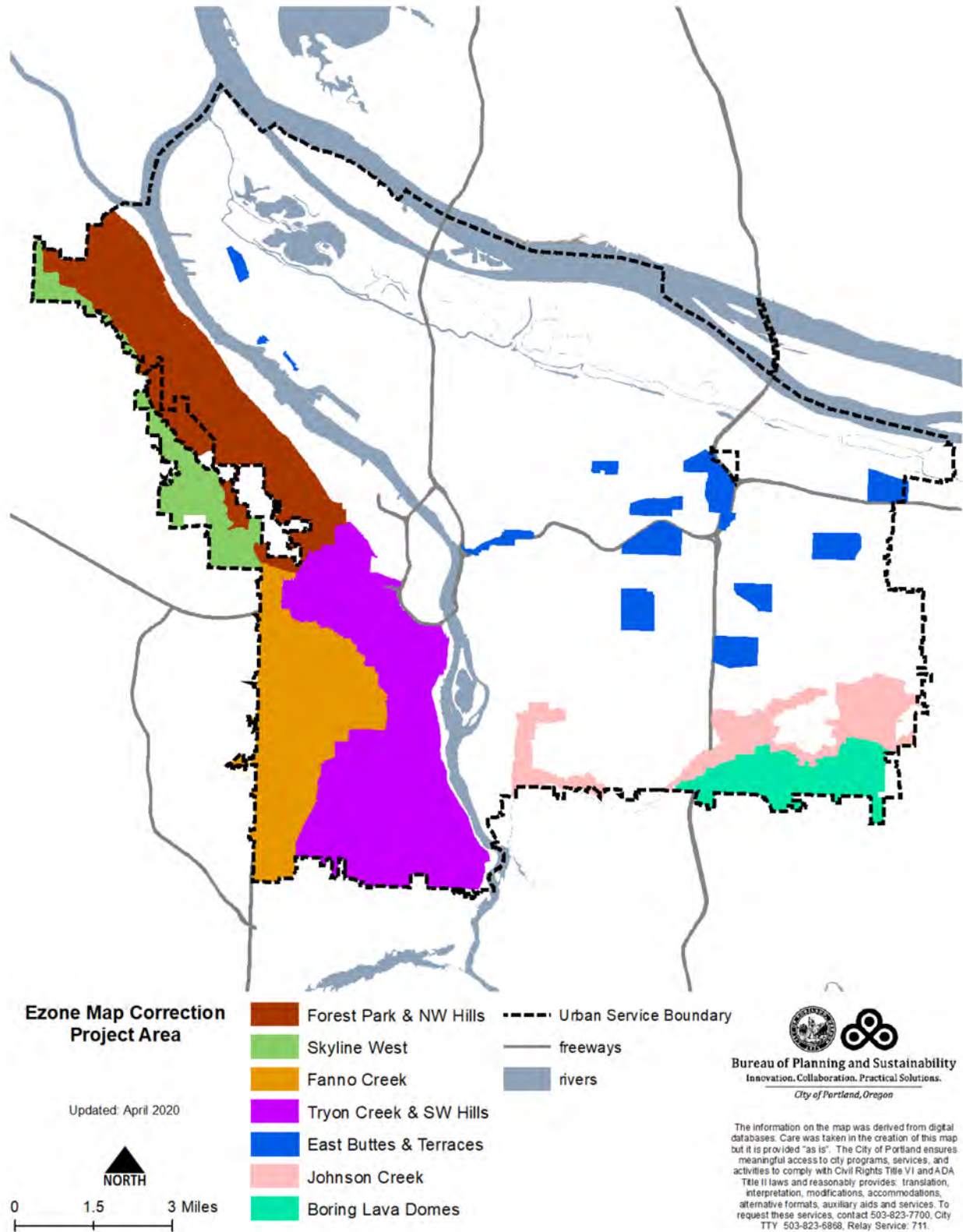
The Environmental Overlay Zone Map Correction Project only amends the application of conservation and protection overlay zones, and associated zoning codes, for the project area (Map 1). All other elements of the 2012 Metro Title 13 compliance remain in place and are not amended.

Summarized from Metro Title 13, the general intent of the rules is to:

- Protect, conserve and restore a continuously viable stream corridor system, in a manner that is integrated with upland wildlife habitat and the urban landscape; and
- Control and prevent water pollution for the protection of public health and safety, and to maintain and improve water quality throughout the region.

As stated in Metro Title 13, the rules are also intended to:

- Achieve its purpose through conservation, protection and restoration of fish and wildlife habitat using voluntary and incentive-based, educational and regulatory components;
- Balance and integrate goals of protecting and restoring habitat with regional goals for livable communities, a strong economy, preventing pollution, and compliance with federal laws including the Clean Water Act and Endangered Species Act;
- Include provisions to monitor and evaluate program performance over time, including meeting program objectives and targets, and local compliance; and,
- Establish minimum requirements and is not intended to repeal or replace existing local resource protections, nor is it intended to prohibit cities and counties from adopting or enforcing fish and wildlife habitat protection and restoration programs that exceed the requirements of this title.



Map 1: Environmental Overlay Zone Map Correction Project Area

The City of Portland was an active participant in the development of Title 13. City staff participated in advisory committees and contributed input and updated natural resource data throughout the project. City managers and elected officials contributed to Title 13 through participation in the Metro Technical Advisory Committee (MTAC) and Metro Policy Advisory Committee (MPAC).

The outcome of Title 13 is Metro-area cities and counties must demonstrate that their programs substantially comply with Title 13 requirements, including programs to prevent detrimental impacts on Habitat Conservation Areas and to mitigate for unavoidable impacts on these resource areas. Title 13 allows local jurisdictions to achieve substantial compliance through a combination of regulatory and non-regulatory tools such as comprehensive plans and ordinances, zoning, willing-seller land acquisition, easements, and restoration programs.

Portland developed its original compliance package with Metro and multiple other stakeholders including city bureaus, state agencies and the public. The compliance package included the city's Natural Resources Inventory, existing environmental overlay zone maps and codes and an Intergovernmental Agreement directing Portland Bureau of Planning and Sustainability complete comprehensive planning for specific areas of the city including the Willamette River¹. The compliance package was accepted by Metro in December 2012.

This plan is amending compliance with Title 13.

C.1. Metro Title 13 Compliance Steps

Metro code section 3.07 includes the rules that local jurisdictions must follow when amending compliance with Title 13. To demonstrate compliance with Title 13, the Ezone Map Correction Project uses the methodology set out by 3.07.1330(b)(2): "Demonstrate that its existing or amended comprehensive plan and existing, amended, or new implementing ordinances substantially comply with the performance standards and best management practices described in Metro Code Section 3.07.1340, and that maps that it has adopted and uses substantially comply with the Metro Habitat Conservation Areas map."

The specific Title 13 steps include:

1. Verifying habitat areas.
2. Determining urban development value.
3. Confirming Habitat Conservation Areas.
4. Demonstrating program's substantial compliance.

Each step is described below.

¹ The River Plan/Central Reach was completed with Central City 2035 (adopted July 2020) and the River/Plan South Reach is underway (anticipated adoption fall 2020). Next will be River Plan/North Reach, which will complete the comprehensive planning for the Willamette River in Portland.

C.2. Verifying Habitat Areas

Local jurisdictions are required to verify the location and extent of the following habitat areas:

- Water features – rivers, streams, wetlands, other open water and flood area.
- Vegetation cover – forests, woodland, shrubland and herbaceous vegetation.
- Steep slopes – land with greater than 25% slope upward from river, streams and open water.
- Habitats of Concern – habitats that meet specific criteria adopted by the Metro Title 13 Inventory; called Special Habitat Area in Portland.
- Habitat class – ranks associated with natural resource features; see Table 3.07-13d.

The Natural Resources Inventory, Volume 3, documents the verification of habitat features and methodology used to determine habitat classifications. The City's Natural Resource Inventory (NRI), like the Metro Title 13 inventory, focuses on riparian corridors and wildlife habitat. The City has incorporated more current, higher resolution natural resource feature data as input to the NRI GIS models. Specifically, the City updated the mapping data for streams, wetlands, topography, flood areas and vegetation using recent aerial photographs, LiDAR data and/or local and state permit information as available and applicable.

The City spent several years developing the NRI, basing it on the science and methodology Metro used to develop the Title 13 Inventory of Regionally Significant Fish and Wildlife Habitat. Generally, the outcomes of the NRI are as follows:

The riparian area classifications are assigned to natural resource features:

- **Class I** – Rivers, streams and wetlands; forest or woodland vegetation within a flood area or in close proximity (0 to 100 feet) to a water feature.
- **Class II** – Shrubland and herbaceous vegetation within a flood area or in close proximity (0 to 100 feet) to a water feature; and forest or woodland vegetation on steep slopes out to 200 feet from a water feature.
- **Class III** – Vegetated areas outside the flood area and further from a water feature; developed, non-vegetated flood areas; forest or woodland vegetation on steep slopes further than 200 feet from a water feature; and hardened, non-vegetated banks of the Willamette River North Reach and Central Reach and Columbia River surrounding Hayden Island.²

The wildlife habitat classifications are assigned to natural resource features:

- **Class A** – Large (>30 acres) forest and wetland areas such as Forest Park, Smith and Bybee Wetlands, and Tryon Creek State Natural Area.
- **Class B** – Moderate-sized (2-30 acres) forest and wetland areas such as those at Rocky Butte Natural Area.
- **Class C** – Numerous smaller (<2 acres) forest and wetland areas throughout the city.

The City also updated the information relating to Title 13 Habitats of Concern, refining and clarifying the eligibility criteria, providing additional documentation and adjusting area boundaries. Metro Title 13

² Hardened, non-vegetated riverbanks include seawalls, pilings and non-vegetated riprap.

specifically assigns a Riparian Area Class I classification to all Habitats of Concern. The updated Habitats of Concern are called Special Habitat Areas in the City's NRI.

Table 1: Special Habitat Area (Portland)/Habitats of Concern Criteria (Metro)	
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 an incidental basis to complete one or more life history stages
E	Elk migratory corridor
G	Upland grassland 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)

The City worked closely with Metro and a group of technical experts to ensure that the refinements were scientifically sound and remained consistent with Metro's general approach and intent for the Title 13 regional inventory. In 2012, the NRI methodology was approved by Metro as complying with Title 13.

The NRI identifies 26,365 acres of natural resources throughout Portland. Similar to Metro, the resources are assigned scores for individual riparian functions and wildlife habitat attributes. The scores are aggregated into riparian, wildlife habitat and combined relative ranks.

The City's updated NRI was reviewed through a series of hearings before the Planning and Sustainability Commission and the Portland City Council. In October 2012 the City Council adopted the NRI, along with other information sources, to inform the Comprehensive Plan update, (i.e., part of the Comprehensive Plan factual basis).

The NRI contains about 2,582 acres more resource area than Metro's 2005 inventory, or about 11 percent. The increased acreage reflects the City's addition of streams through incorporation of LiDAR data and site visits, wetland determinations completed by the Bureau of Environmental Services, updated vegetation mapping using current aerial photography and site visits, and refinements to the

Special Habitat Areas to reflect new data (such as Metro’s regional oak habitat mapping). A summary comparison of the City’s Natural Resources Inventory is presented in Table 2 and Map 2 – 7.

Table 2: Portland’s Natural Resources Inventory (2020)

Feature	Portland
Rivers (acres)	6,483
Streams (miles)	310
Wetlands (acres)	2,984
Flood Area (acres)	
Vegetated	27,271
Unvegetated	61,693
Vegetation Patches (acres)	
Forest Vegetation	15,727
Woodland Vegetation	3,694
Shrubland Vegetation	1,208
Herbaceous Vegetation	6,643
Steep Slopes (acres)	22,066
Special Habitat Areas (acres)	21,159
Riparian Corridors (acres)	
High	16,738
Medium	5,528
Low	8,374
Wildlife Habitat (acres)	
High	9,447
Medium	7,345
Low	1,378

Map 2 – Water Features

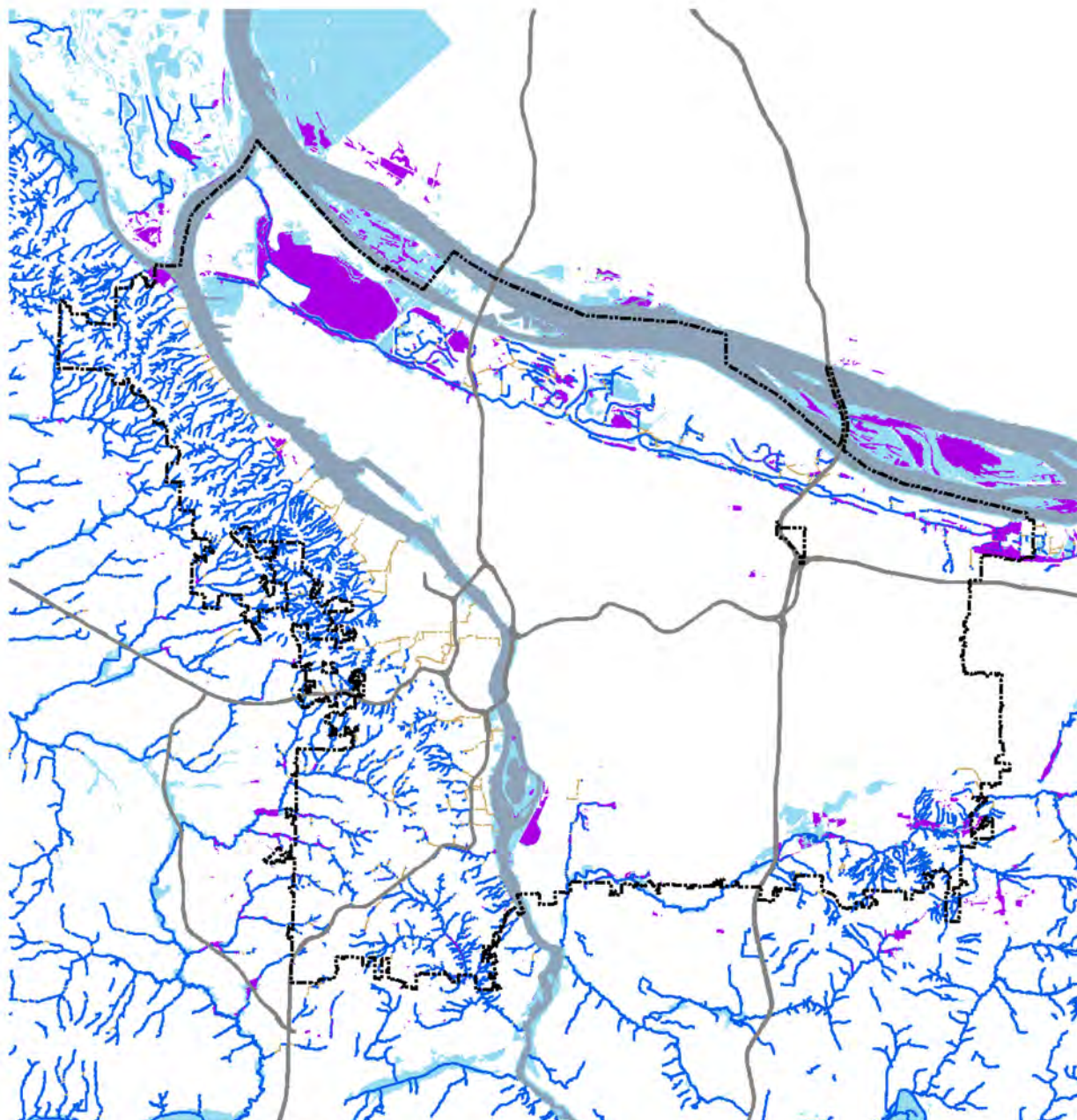
Map 3 – Vegetation Features

Map 4 – Steep Slopes

Map 5 – Special Habitat Areas

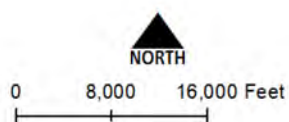
Map 6 – Riparian Corridor Classifications

Map 7 – Wildlife Habitat Classifications



Map 1: Water Features

Updated: April 2020



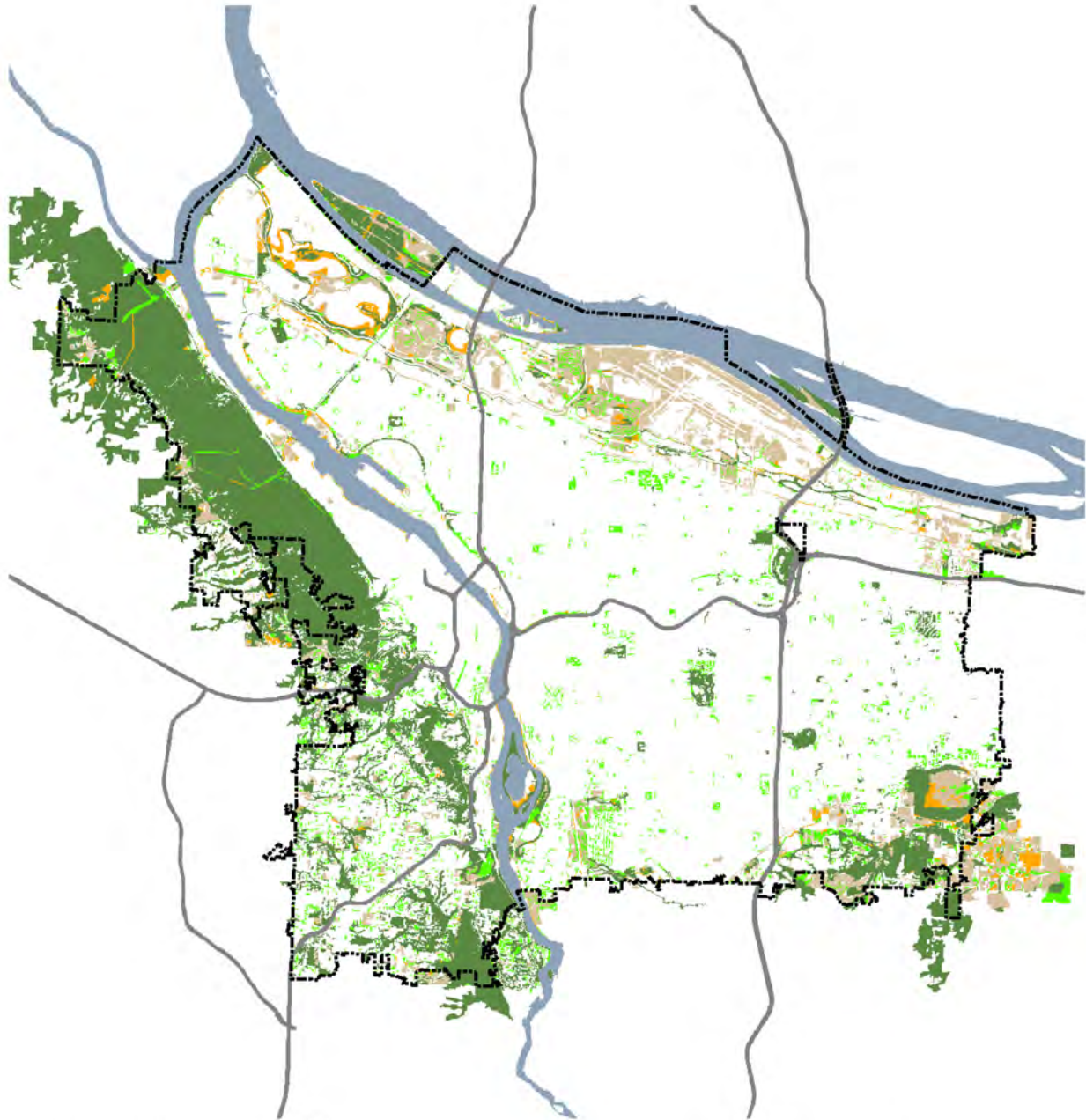
- City of Portland
- rivers
- wetlands
- open stream channel
- piped stream segment
- flood area



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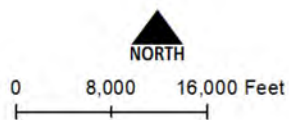
The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.




Map 2: Water Features



Map 2: Vegetation

Updated: April 2020

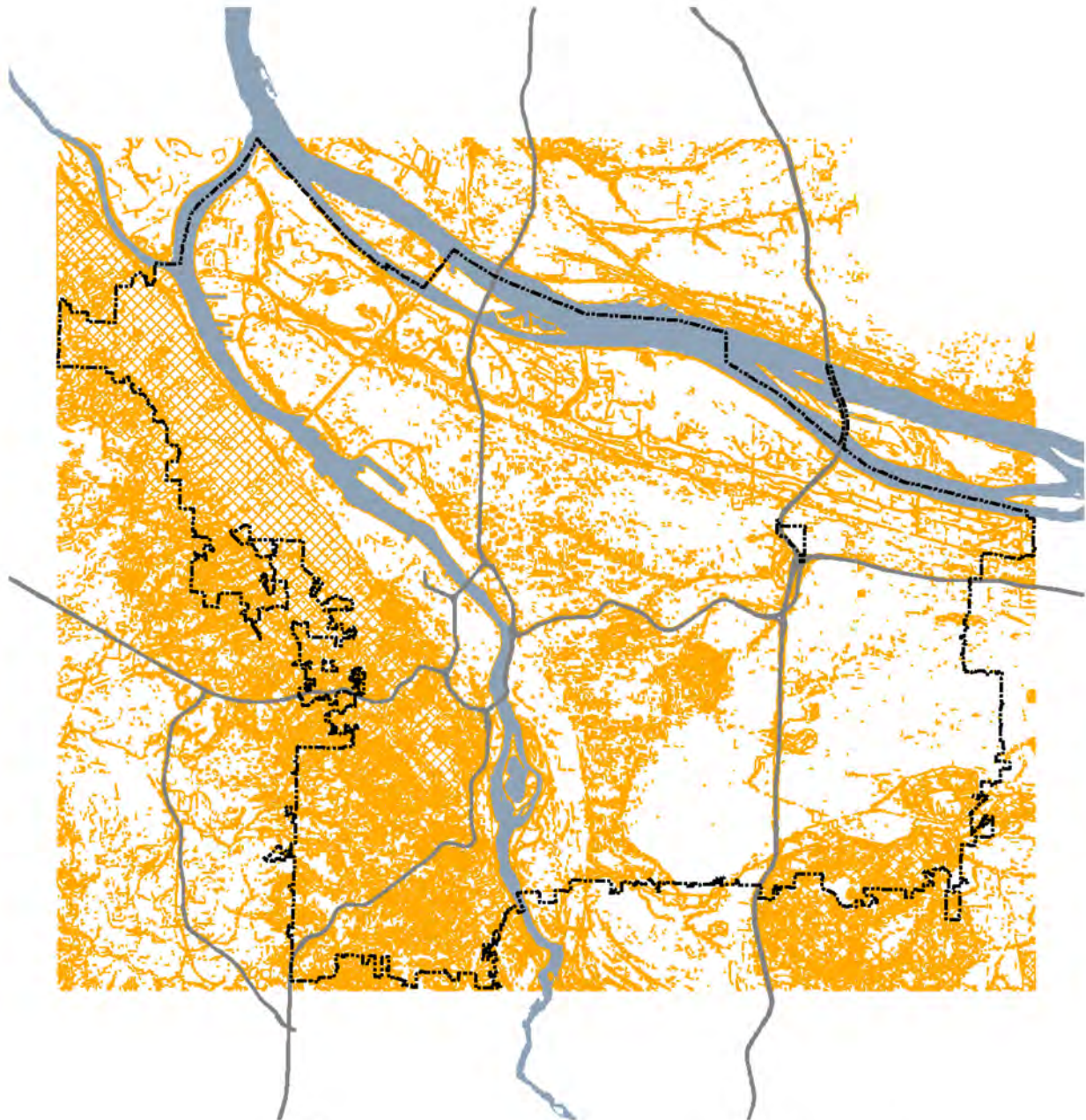


-  City of Portland
-  forest vegetation
-  woodland vegetation
-  shrubland vegetation
-  herbaceous vegetation
-  rivers



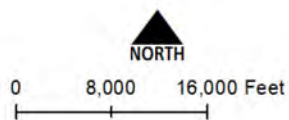
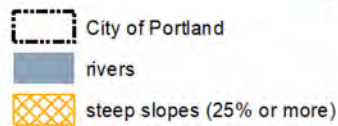
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Map 3: Vegetation



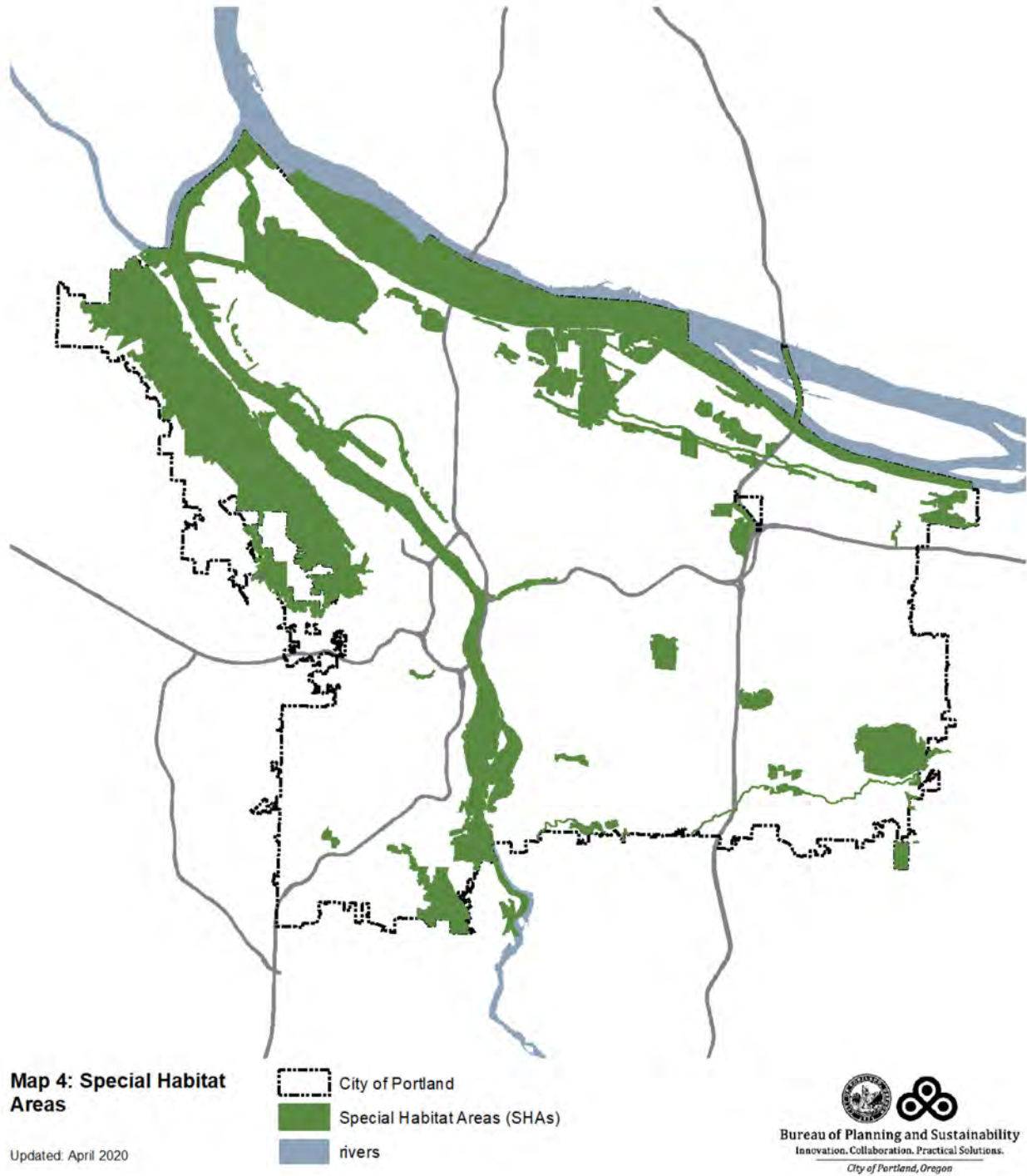
Map 3: Steep Slopes

Updated: April 2020

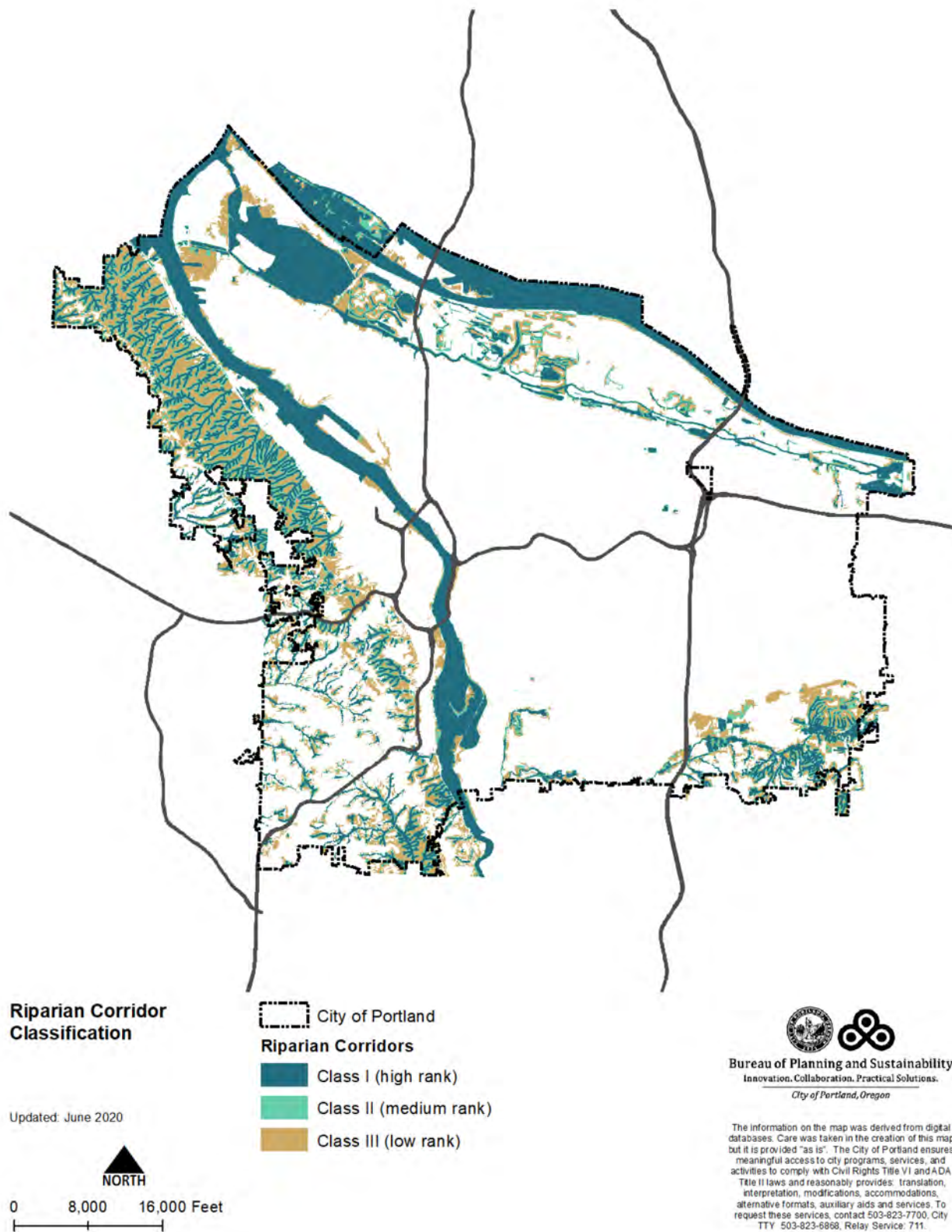


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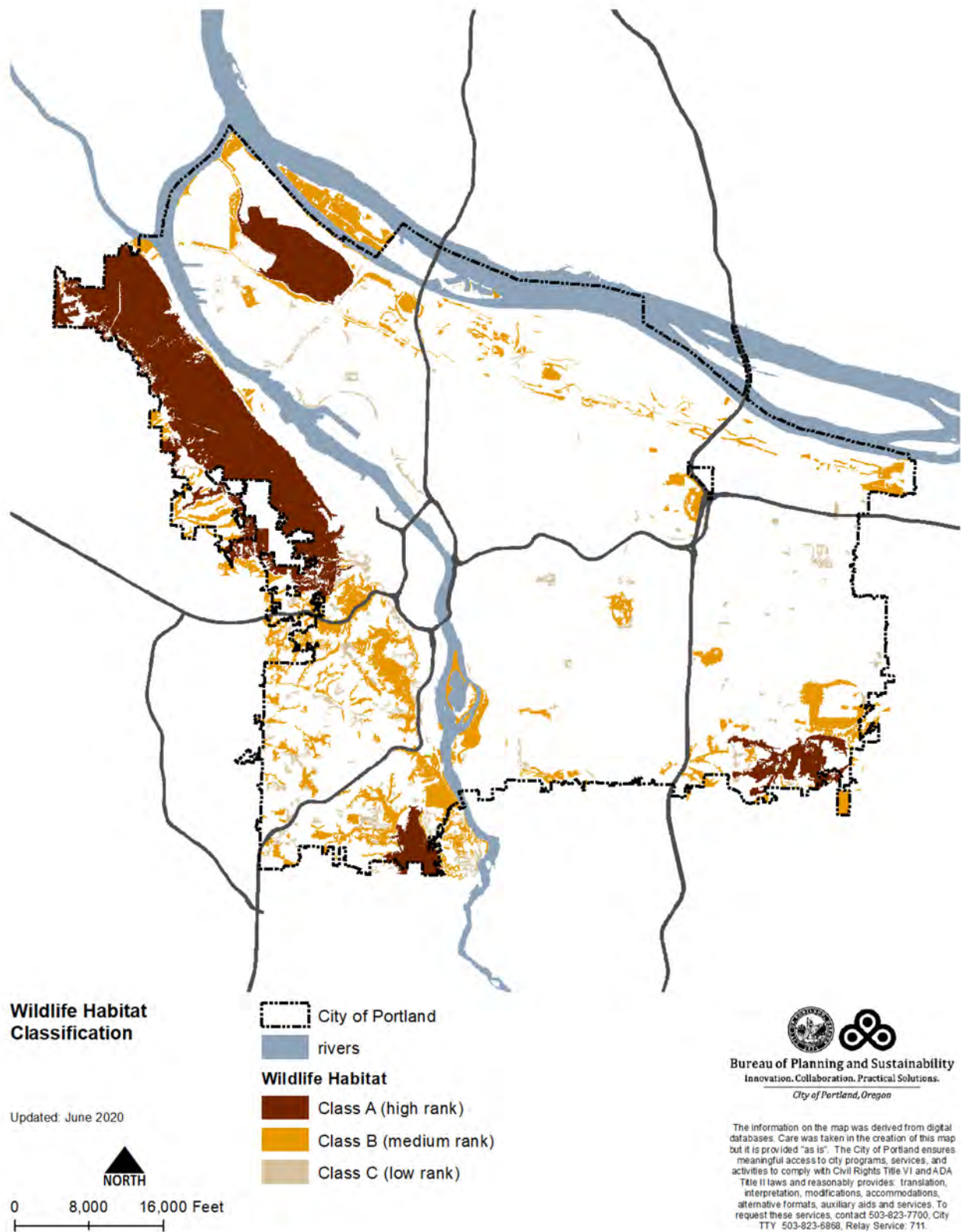
Map 4: Steep Slopes



Map 5: Special Habitat Areas



Map 6: Riparian Corridor Classifications



Map 7: Wildlife Habitat Classifications

C.3. Determining Urban Development Value

Metro Title 13 included an ESEE analysis with the outcome being an urban development value assigned to specific land uses. With adoption of this plan, the Title 13 ESEE replaces the previously adopted City ESEE analyses within the project area.

To confirm the Urban Development Value as it applies in Portland, the requirements of 3.07.1340(e) were followed:

- Properties designated as the Central City, Regional Centers, Town Centers and Regionally Significant Industrial Areas, as well as regionally significant educational or medical facilities, are of high development value;
- Properties designated as Main Streets, Station Communities, Other Industrial Areas and Employment Centers are of medium development value; and
- Properties designated as Neighborhoods and Corridors are low development value.

Parks and open space are not defined in Title 13 as having urban development value; however, parks and open space are included in the methodology for determining Habitat Conservation Areas (see Table 3). Therefore, it is assumed that parks and open space are low development value.

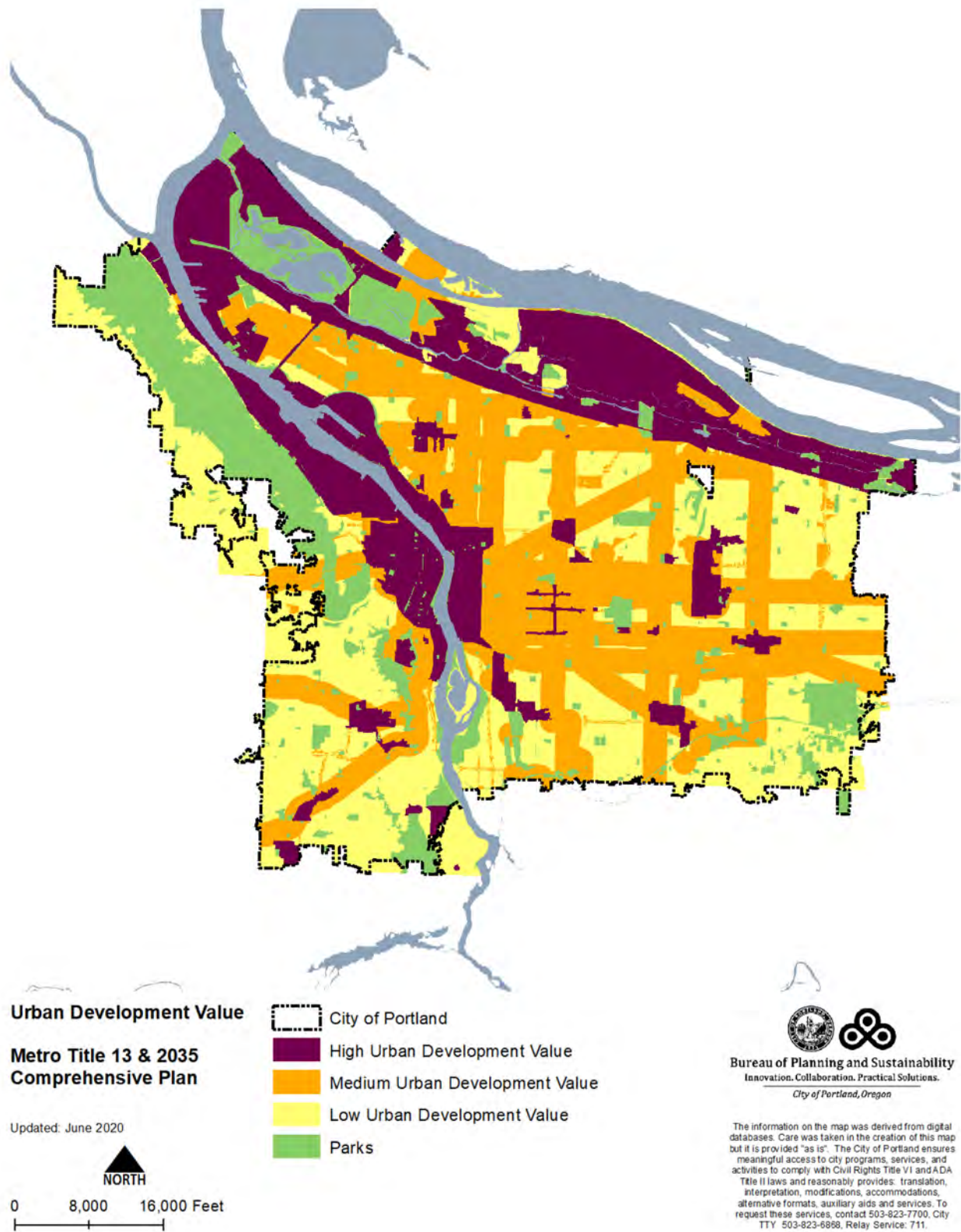
Map 7 presents the urban development value updated based on the 2035 Comprehensive Plan, which was acknowledged in May 2018.

C.4. Confirming Habitat Conservation Areas

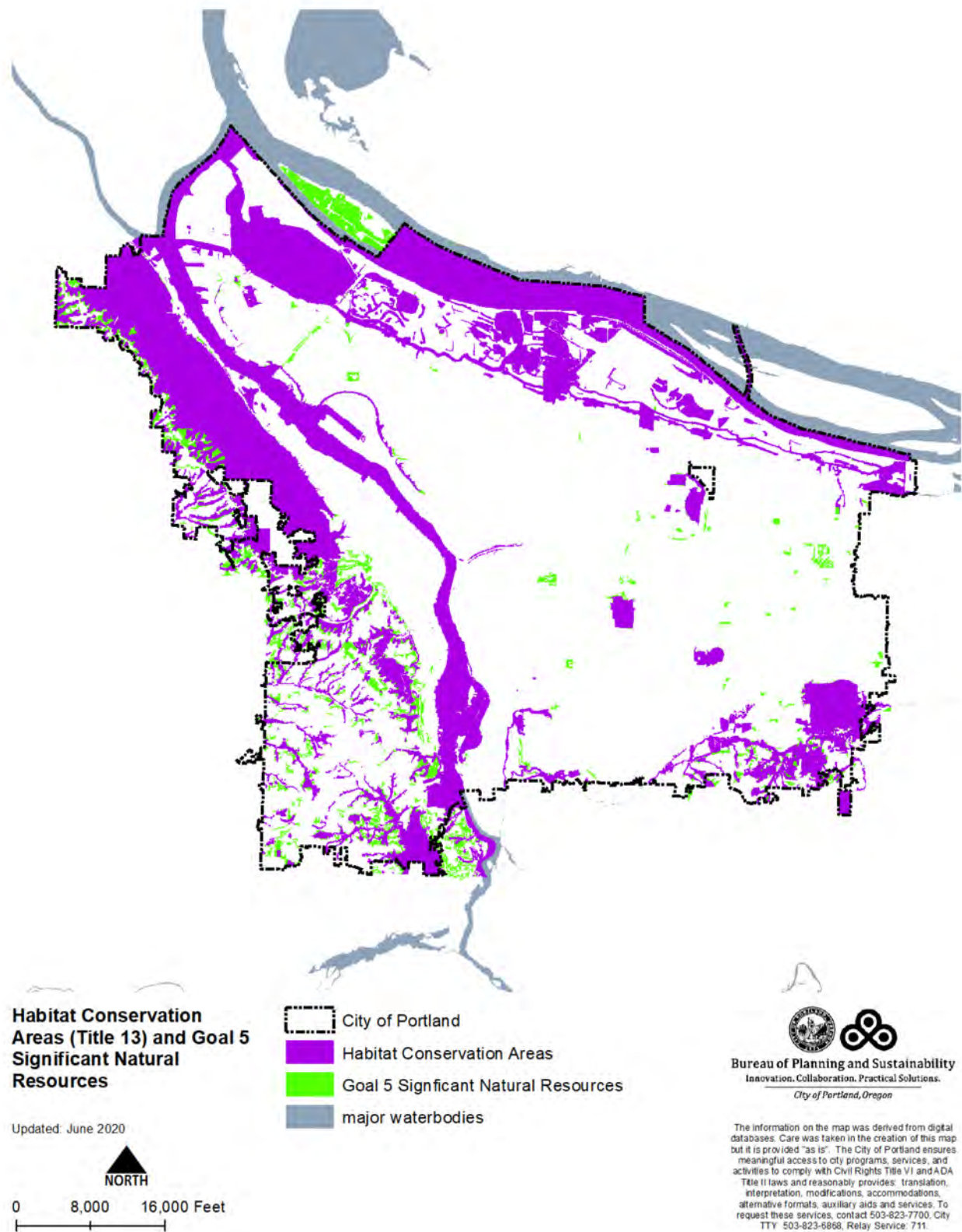
Habitat Conservation Areas (HCA) are the areas for which local jurisdictions must provide a program to protect and conserve the natural resources. Table 3 summarizes Title 13 Table 3.07-13a, which is the methodology used for confirming HCA. HCAs are Class I and Class II Riparian Areas and Class A and Class B Wildlife Habitat within parks and open spaces. Title 13 specifically classifies Metro Habitats of Concern (aka Special Habitat Areas in Portland) as Class I riparian areas. Natural resources that are not a Habitat Conservation Areas, for which the local jurisdiction is considering protection, must follow the Oregon Planning Goal 5 rules.

Table 3: Methodology for Determining Habitat Conservation Areas (Title 13, Table 3.07-13a)				
Rank	High Development Value	Medium Development Value	Low Development Value	Parks and Open Space
Riparian Class I	Moderate HCA	High HCA	High HCA	High HCA
Riparian Class II	Low HCA	Low HCA	Moderate HCA	Moderate HCA
Wildlife Class A	None	None	None	High HCA
Wildlife Class B	None	None	None	High HCA
Riparian Class III Wildlife Class C	None			

Map 9 presents the Title 13 Habitat Conservation Areas following the methodology laid out in Table 3.



Map 8: Urban Development Value



Map 9: Habitat Conservation Areas and Significant Natural Resources

C.5. Applying the Environmental Program to Metro Title 13 Habitat Conservation Areas

The location of conservation and protection overlay zones is updated to apply to the confirmed Habitat Conservation Areas.

For natural resources that are not a Habitat Conservation Area, Metro Title 13 rule 3.07.1330(a)(1) states “a city or county shall apply the requirements of division 23 of OAR chapter 660 in order to adopt comprehensive plan amendments or land use regulations that (i) would otherwise require compliance with division 23 of OAR chapter 660 but for the adoption of this title (i.e., amendments or regulations adopted to protect other Goal 5 resources²), and (ii) will limit development in areas not identified as riparian habitat on the Inventory Map, ...”

Natural resources that are not a Habitat Conservation Area include Class A and B wildlife habitat, except within parks and open space, and Class III riparian areas and Class C wildlife habitat. For these natural resources, direct compliance with Goal 5 OAR 660-23 is required. Please refer to Volume 4, Part D, for Goal 5 compliance. Map 8 also presents the significant natural resources that are not a Title 13 Habitat Conservation Area.

D. OREGON STATEWIDE PLANNING GOAL 5 COMPLIANCE

Portland is amending compliance with Oregon Statewide Land Use Planning Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources. Between 1989 and 2002, Portland adopted 13 plans that demonstrated Goal 5 compliance for riparian corridors and wildlife habitat. The Environmental Overlay Zone Map Correction Project is repealing and replacing six of those plans and amending two of those plans.

With the adoption of Metro Title 13 in December 2005, Oregon Planning Goal 5 only applies directly to habitat not identified by Title 13 as Habitat Conservation Areas (HCA). Natural resources that are not a Habitat Conservation Area include Class A and B wildlife habitat, except within parks and open space, and Class III riparian areas and Class C wildlife habitat. These natural resources will be addressed through direct application of Goal 5 OAR 660-023. Please see Volume 4, Part C, Metro Title 13 compliance for the process to protect rivers, streams, wetlands, floodplains, riparian areas and Special Habitat Areas.

Oregon Planning Goal 5 establishes rules for the protection of natural resources under OAR 660-023-0030 through 660-023-0070 and 660-023-0090 and 660-023-0110. The local government must inventory natural resources and evaluate the resource for significance. If the resource is found to be significant, the local government must assess the economic, social, environmental and energy (ESEE) consequences of three policy choices: protecting the resource, allowing proposed uses that conflict with the resource, or limiting proposed uses that conflict with the resource by establishing a balance between protecting and allowing uses. The local government must then adopt a program based on the results of this ESEE analysis.

D.1. Statewide Goal 5 Compliance Steps

The Goal 5 rule (OAR 660-023) requires local governments to follow the steps described below. Except for the inventory, which is used for both Title 13 and Goal 5 compliance, steps 2 through 6 are only completed for upland wildlife habitat that are not a Title 13 Habitat Conservation Area (HCA).

1. **Identify Resource Sites.** Local governments must determine resource sites, which are areas where resources are located. A site may consist of a parcel or lot or portion thereof or may include an area consisting of two or more contiguous lots or parcels. Resource sites were adopted in Portland with the previous 13 conservation and protection plans and are retained, with minor boundary edits to reflect existing conditions. The methodology used to refine resource sites is documented in Volume 2, Part A – G.
2. **Inventory Process.** The local government must collect information about the location of natural resource features and assess the quantity and quality of the features. The information on quality is relative to comparable resources in the city and region. Information on quantity should include abundance or scarcity of the resource. The Natural Resources Inventory methodology is

documented in Volume 3 and the results are presented in Volume 2, Part A – G, for each resource site.

3. **Determination of significance.** Local governments must assess inventoried natural resources to determine if the resources are “significant” based on location and relative quantity and quality. Resources that have been deemed significant must then be evaluated to determine if and how those resources should be protected.
4. **Determine the impact area.** Local governments shall determine an impact area for each resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified significant scenic resources. The impact area defines the geographic limits within which to perform ESEE analysis.
5. **Identify conflicting uses.** Local governments shall identify conflicting uses that exist, or could occur, within resource sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and in its impact area. A "conflicting use" is a land use or other activity reasonably and customarily subject to land use regulations, that could adversely affect a significant resource (except as provided in OAR 660-023-0180(1)(b)). Conflicting uses described in two categories: 1) common impacts of conflicting uses that occur in any zone; and 2) conflicting uses that are specific to each base zone.
6. **Analyze the ESEE consequences.** Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses.

This volume includes a general ESEE analysis that looks at types of conflicting uses and the impacts on similar natural resource features. For example, clearing trees and vegetation on steep slopes similar consequences for any slope by reducing water retention, increasing erosion potential, increasing landslide risk, decreasing shade, reducing habitat, etc. General ESEE recommendations are made by resource feature type and land use types allowed with base zones. In Volume 2, Part A – G, the general ESEE consequences and recommendations are confirmed, clarified or modified based on resource site-specific information.

7. **Develop a program.** Based on and supported by the analysis of ESEE consequences, local governments shall determine whether to allow, limit, or prohibit identified conflicting uses that could negatively affect significant natural resources:

(a) *Prohibit* – A local government may decide that a significant natural resource is of such importance compared to the conflicting uses and the ESEE consequences of allowing the conflicting uses are so detrimental to the resource that the conflicting uses should be prohibited.

(b) *Limit* – A local government may decide that both the significant natural resource and the conflicting uses are important compared with each other and, based on the ESEE analysis, the conflicting uses should be allowed in a limited way that protects the resource to a desired extent or requires mitigation of loss of scenic resources.

(c) *Allow* – A local government may decide that the conflicting uses should be allowed fully, notwithstanding the possible impacts on the significant natural resources. The ESEE analysis must demonstrate that the conflicting use is of sufficient importance relative to the resource and must indicate why measures to protect the resource to some extent should not be provided, as per subsection (b) of this section.

The City of Portland has an established program that applies environmental overlay zones to significant natural resources based on the adopted ESEE decisions. The established program does not result in a *prohibit* decision for any significant natural resources. Instead the program clarifies that for some natural resources the conflicting uses should be *strictly limited*, while for other natural resources the conflicting uses should simply be *limited*. The *strictly limit* and *limit* decisions are both consistent with the Goal 5 *limit* definition because neither *prohibits* conflicting uses.

Volume 2, Part A – G, documents the ESEE decisions for each resource site. The implementation of those decisions is presented in Volume 1, Part B1 (zoning code amendments) and B2 (zone map amendments).

D.2. Determination of Significance

Metro, under Title 13, determined that all inventoried natural resources are ecologically significant and that riparian areas and all wildlife habitat, except Class C (low) wildlife habitat, are regionally significant. Metro went on to state that jurisdictions may find that Class C wildlife habitat is locally significant, in addition to being ecologically significant. The following is consistent with Title 13 and meets Goal 5 requirements for determination of significance.

OAR 660-023-0110(4) states that a determination of significance is made using the standard inventory process as described in OAR 660-023-0030(4). The standard inventory process for determining significance is based on the quality, quantity and location information as well as any additional criteria adopted by the local government. Pursuant to OAR 660-023-0030(4), all resource sites containing areas mapped as riparian corridors or wildlife habitat are determined to be significant (Map 10).

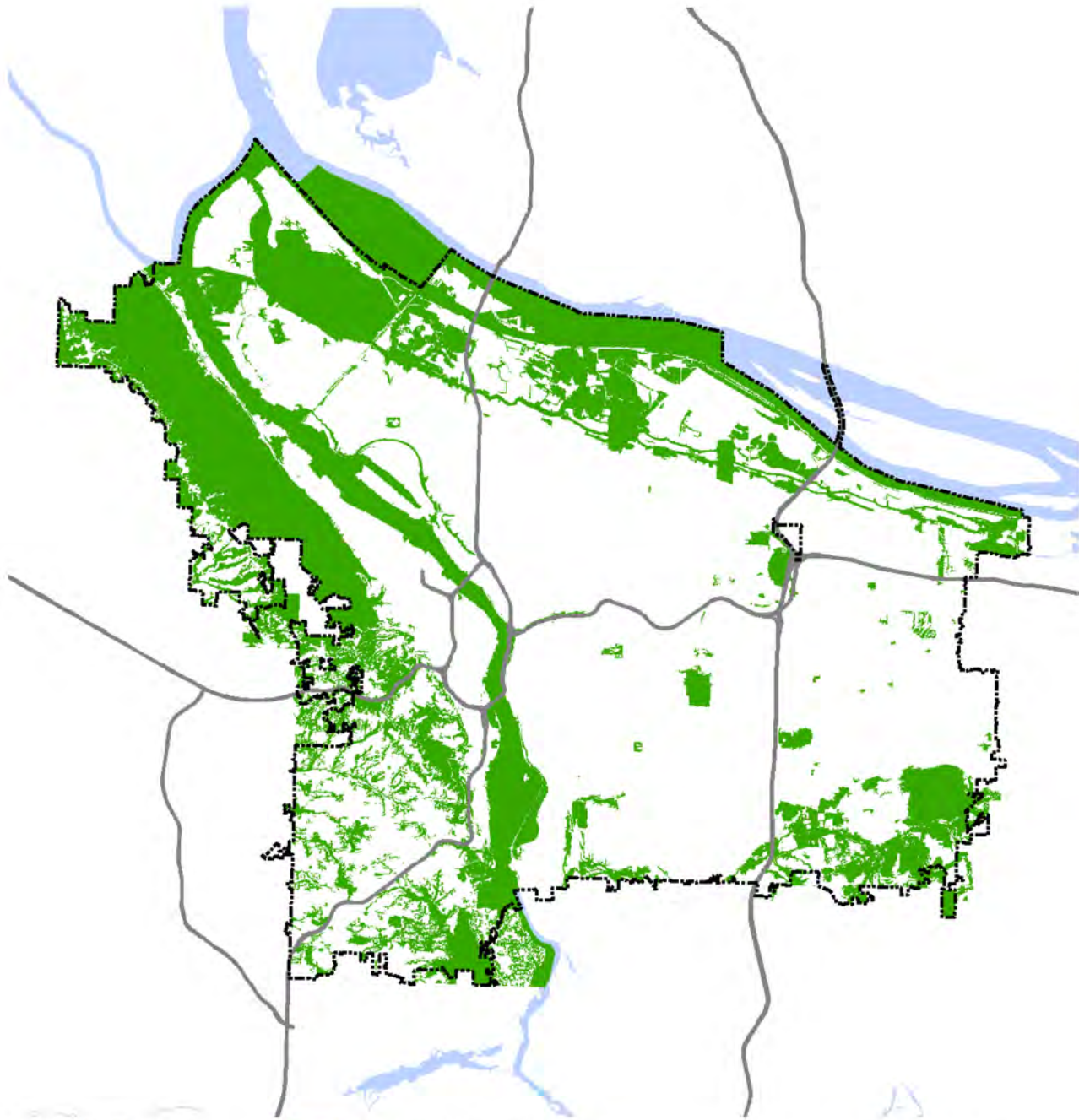
Significant riparian corridor features: open stream; wetland; flood area; land within 50 feet of waterbodies; forest, woodland, shrubland and herbaceous vegetation within 300 feet of waterbodies; and forest vegetation on steep slopes (>25% slope) contiguous to and within 780 feet of waterbodies.

Significant riparian corridor functions: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.

Significant wildlife habitat features: forest patches and associated and contiguous woodland patches two acres in size or larger; wetlands; and Special Habitat Areas.




Significant wildlife habitat functions: food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and functions specific to Special Habitat Areas including habitat patches that support special status plant, fish and wildlife species.

Wildlife habitat loss has been pervasive in Portland and the region and has resulted in widespread fragmentation and degradation of the remaining habitats. Several habitat types and many wildlife and fish species are considered *at-risk* by federal, state or local natural resource agencies. Therefore, all remaining wildlife habitat is significant for supporting native plants and wildlife. Remaining large patches of habitat typically contain more diversity of vegetation, more downed wood and leaf litter, and less edge impacts (noise, light, vibration) than smaller patches. However, in the urban context even small patches of habitat or lines of street trees provide critical stepping blocks between riparian areas and larger habitat areas. Urban habitat is also impacted by non-native plants that can push out native vegetation. Non-native plants do provide functions, such as food and resting/nesting opportunities. Areas with a high density of non-native vegetation represent an opportunity for restoration.



Determination of Significance

Updated: April 2020

-  Significant Natural Resources
-  City of Portland
-  Major Waterbodies



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City of Portland, Oregon

The information on the map was derived from digital databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland ensures meaningful access to city programs, services, and activities to comply with Civil Rights Title VI and ADA Title II laws and reasonably provides: translation, interpretation, modifications, accommodations, alternative formats, auxiliary aids and services. To request these services, contact 503-823-7700, City TTY 503-823-6868, Relay Service: 711.

Map 10: Significant Natural Resources

D.3. Impact Area

A required step in the ESEE analysis is to identify “impact areas.” An impact area is the area surrounding natural resources that may impact the quality, quantity, functionality or extent of those resources. Per the Goal 5 rule:

Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource. (OAR 660-023-040 (3)).

The effects of urbanization on the natural resource feature and functions are pervasive. The cumulative effects of vegetation removal, development of impervious surfaces, and filling in flood areas and wetlands impact natural resources throughout Portland. More direct impacts are seen in closer proximity to the significant natural resource features. Metro, in Title 13, established the impact area as land, natural features and development, within 100 feet of significant riparian corridor habitat and land, natural features and development within 25 feet of significant wildlife habitat. Portland is following the Title 13 guidance and applying a 25-foot impact area around all significant wildlife habitat as 25-foot impact area.

D.4. Conflicting Use Analysis

In Portland there are uses, such as vegetation removal and development of structures, that if allowed would negatively impact significant natural resources. These are called *conflicting uses*. Conflicting uses are identified by evaluating what is allowed, outright or conditionally, by the base zones applied throughout Portland.

The conflicting uses are consolidated into two categories: 1) common impacts of conflicting uses that occur in any base zone; and 2) conflicting uses that are specific to each base zone. Below are descriptions of the conflicting uses and how those uses may negatively impact significant natural resources.

D.4.a. Common Impacts of Conflicting Uses

Development and disturbance activities can adversely affect natural resources found within each of the City’s base zones; however, the degree or intensity of the impacts may vary depending on the intensity of the land use, the form, layout or design of the development, construction protocols or ongoing operation and maintenance activities. Below is a description of activities associated with the conflicting uses, and their related impacts on natural resources.

The following impacts are site specific and cumulative with respect to other impacts and conditions in the watershed.

Clearing vegetation

Rainwater is intercepted and taken up by vegetation. This function is impaired when vegetation is cleared, resulting in increased overland runoff. In turn, this increases runoff volume and rate flows into receiving water bodies following storm events. Increased streamflow volume and rate flows can cause bank erosion, undercutting, slumping, and flooding. Vegetation also filters surface stormwater removing pollutants and sediment. Vegetation clearing can affect hydrology and water quality functions in streams that are far from the development site because stormwater is often piped great distances within the city.

Vegetation within 100 feet of streams also contributes to in-stream food web functions and can contribute beneficial structure to the stream. Trees can contribute large wood to streams and create habitat for aquatic species. This is especially important when trees are located near shallow water areas used by Endangered Species Act-list aquatic species.

Clearing vegetation removes roots systems that hold soils in place and canopy that intercepts rain water. This can result in soil erosion and landslides, particularly on steep slopes. Soil erosion can impact water bodies by adding additional sediment to streams and wetlands, impairing the functions including hydrology, channel dynamics, water storage, water quality, flooding and in-water habitat. Landslides can impact land even far away from the resources, causing significant damage to public infrastructure and private property.

Clearing vegetation removes important structural features of the forest such as multiple canopy layers, snags and downed logs, large trees, and root systems. This can result in impaired habitat for native wildlife. Vegetation removal reduces food, nesting opportunities, cover, and perching and roosting opportunities for wildlife. Removing streamside or shoreline vegetation also eliminates sources of leaf litter, which provide food and nutrients for aquatic organisms, and woody debris, which provides river habitat structure and food resources for fish. Wildlife affected by vegetation removal includes mammals, birds, reptiles, amphibians, fish and insects. Removal of vegetation can fragment riparian and upland wildlife movement corridors, isolate remaining vegetation patches, and limit wildlife access to water. These impacts impede wildlife migration and can limit recruitment from other areas, making wildlife populations more vulnerable to disease, predation and extirpation.

Tree canopy and associated understory vegetation create shade and local microclimate effects that cool the air and water and maintain humidity and soil moisture. Trees and vegetation also help capture carbon dioxide; carbon dioxide is a contributing factor to climate change. All of these functions are affected when the vegetation is removed.

Some vegetation types have been declining in the Portland area due to clearing and grading for development and the use of ornamental vegetation in landscaping (not replacing cleared vegetation with similar native species). Certain assemblages, such as native bottomland hardwood forests and native oak stands, require specific soil, water and sun exposure to survive and are slow growing, taking many years to become established. These vegetation assemblages still exist including bottomland forest along the Columbia Slough and Columbia River and oak escarpments along

buttes, bluffs and terraces. Removal not only reduces habitat functions as discussed previously, but also contributes to the decline in these unique vegetation types, and potentially, extirpation within the city.

Grading, excavation, filling and soil compaction

Grading activities and soil compaction can reduce the capacity of soil to support vegetation by disturbing the soil structure, accelerating erosion, and decreasing soil fertility, microorganisms, seeds and rootstocks. Soil porosity and stormwater infiltration can be reduced by grading, excavating, filling and soil compaction. This in turn can reduce groundwater recharge and in-stream summer and fall low flows, which adversely affects aquatic species. Grading, excavation, filling and compaction also affect wildlife habitat for some species. For example, long-toed salamanders require forest leaf litter and downed logs for thermal protection and foraging areas.

Adding impervious surface (e.g. buildings, parking areas, roads, sidewalks, driveways)

Impervious surfaces alter the hydrologic cycle by preventing natural stormwater infiltration into the ground and concentrating overland flow. This results in increased stormwater runoff and decreased groundwater recharge. Increased stormwater runoff can result in increased volume and flows into receiving water bodies (see vegetation clearing). Decreased groundwater recharge can reduce in-stream summer low flows (see grading, excavation, filling and soil compaction). Concentration of overland flows can also increase soil erosion and landslides, particular on steep slopes. Impervious surfaces also contribute to urban heat island effect, which affects local air quality. Increased impervious surfaces can also cause wildlife habitat fragmentation and create hazards or barriers to wildlife movement (see vegetation clearing).

Modifying rivers and flood areas (e.g. filling, bank armoring, channelizing)

Altering the natural configuration, geomorphology, and structure of river banks and the flood area results in:

- increased in-stream flow velocity, which can cause bank erosion, undercutting and slumping on-site or at upstream or downstream locations
- a decrease in aquatic habitat area and simplified remaining habitat when side channels, wetlands and oxbows are disconnected from the main river channel
- removal of shallow water habitat that supports Endangered Species Act-list aquatic species
- a decrease in areas of wood deposition where side channels and wetlands are filled in
- reduced flood storage capacity and other benefits associated with active flood areas (e.g., nutrient transport, off-channel habitat)
- reduced flood storage capacity and increased flow volume and rate also increases flood risks to downstream properties
- reduction in vegetation that attenuates flows and provides important fish habitat during flood events

Generating pollution

Oil, gas, tar, antifreeze, dissolved metals, pesticides, herbicides, fertilizers, and other contaminants degrade habitat and water quality. These pollutants are transported to water bodies in stormwater via runoff from streets, driveways, parking lots, farms, parks, golf courses, and buildings. Dirt and sediments from eroded areas or deposited from vehicles can also be transported via stormwater to

water bodies and degrade aquatic habitat. Pesticides, herbicides and fertilizers used in landscaping can pollute ground and surface waters, degrade habitat, and harm fish and wildlife.

Landscaping with non-native and/or invasive vegetation (e.g., ornamental trees)

The removal of native vegetation and establishment of cultivated landscapes can change or reduce food, cover, and nesting opportunities for native wildlife. Manicured landscaped areas generally lack complex vertical structure – little if any multi-layered canopy, large trees, snags, thick understory vegetation, and downed logs are retained in landscaped areas. The reduction in vertical structure impairs wildlife habitat and alters microclimate effects and hydrology. Some non-native plants used in landscaping are invasive (e.g. ivy, morning glory, holly and laurel) and can out-compete native plants reducing biodiversity. Non-native landscapes may also require irrigation and may be treated with chemical fertilizers and pesticides, which can run-off into local waterways and wetlands, or may be ingested by wildlife.

Building fences and other wildlife barriers

Barriers to wildlife movement can include buildings, roads, rail lines, fences, and other manmade features. These barriers fragment connectivity between wildlife habitats and reduce the ability of native wildlife species to thrive (see clearing vegetation). Some barriers, such as roads and rail lines, may create hazards that increase the risk of wildlife mortality.

Other impacts: pets, light, noise, vibration, litter, etc.

Human activities that create outdoor noise, vibration and light can disrupt the competition, communication, reproduction, and predation habits of wildlife (Brown, 1987). For example, night-time lighting can interrupt the navigation of migrating birds and bats. Domestic pets can kill or injure native wildlife or compete for limited space. For example, allowing dogs to run freely in a grassland area can disrupt grassland-associated wildlife that build nests on the ground. Domestic pet waste, litter, and garbage can degrade natural resources including soil and water quality.

D.4.b Impacts of Specific Conflicting Uses by Base Zone

The previous section outlines the impacts generally associated with conflicting uses like clearing and grading. This section evaluates the impacts associated with specific land uses such as residential or industrial. Conflicting uses are identified by looking what is allowed, outright or conditionally, by the base zones applied throughout Portland. Map 11 shows the existing base zones.

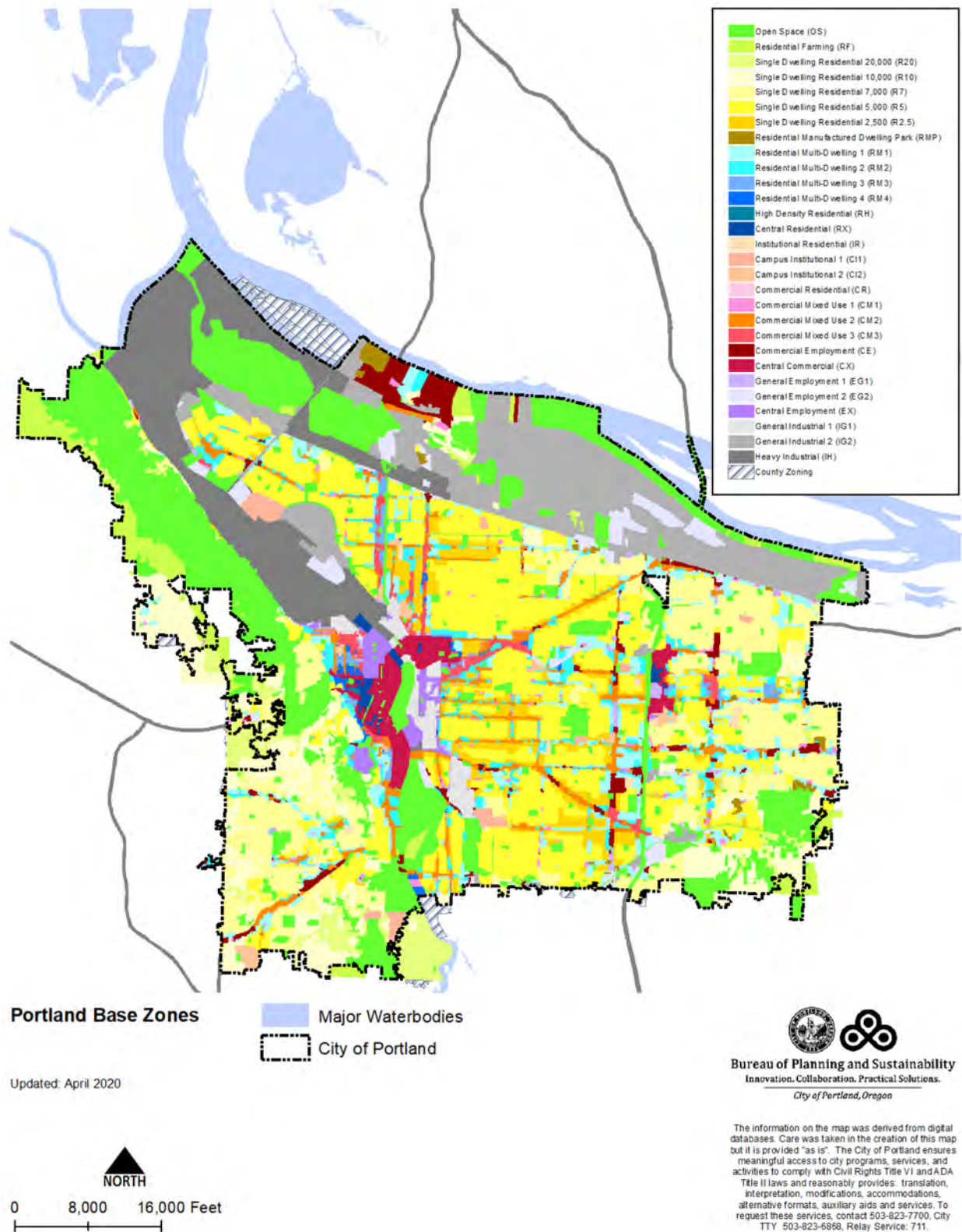
Industrial and Employment Uses

Industrial and employment uses are allowed outright or conditionally in the IH, IG1, IG2, EG1, EG2 and EX base zones. Examples of uses are warehouse, manufacturing and production, freight movement, aviation, vehicle service and repair, self-service storage, agriculture, and commercial recreation. Development patterns are typically large buildings or warehouse type structures with surrounding parking and loading areas. Sites generally have medium to low building coverage and the buildings are typically set back from the street and are arranged in irregular lot patterns.

Industrial and employment uses have similar negative impacts as other uses, including vegetation clearing, grading, filling and soil compaction, impervious surfaces, landscaping with non-native plants, generating pollutants and creating edge impacts (e.g., noise, light).

Some industrial activities require the use of water in the manufacturing processes (e.g. cooling equipment) and draw substantial amounts of water from wells and public water sources. The resulting effluent, which is typically warm, may be discharged to receiving waters, such as a river, and influence in-water temperature. Cool water temperature is a fundamental requirement for many native aquatic species in this region, particularly federal Endangered Species Act-listed aquatic species. Industries that discharge effluent into water bodies are generally required to obtain a discharge permit through the Oregon Department of Environmental Quality.

Industrial areas can contribute high quantities of heavy metals and other toxic material to the soil, water, and air, but are typically regulated to manage the impacts. In addition, the use, storage, and transport of hazardous materials, waste storage and recycling, and similar activities often occurs in industrial areas and can require special permitting. Shipping via trucks can have a negative impact on water quality and air quality.



Map 11: Existing Base Zones

Commercial Uses

Commercial uses are allowed outright or conditionally in the CR, CM1, CM2, CM3, CE and CX base zones. Commercial uses include office, retail, vehicle servicing and repair, self-service storage, event facilities, hotels, apartments and condos and associated parking, churches, daycare and single-dwelling houses. Institutional uses include schools, churches and campuses. Development of new uses would involve vegetation clearing, grading, filling, and soil compaction, as well as the addition of impervious surfaces, landscaping with non-native plants and new edge impacts (e.g., noise, light, vibration), all of which impact the natural resources. In commercial base zones, development is allowed to cover most of the site with impervious surfaces. Replacement of existing uses could preclude opportunities to restore natural resources.

Residential Uses

Residential uses are allowed outright or conditional in the RF, R20, R10, R7, R5, R2.5, R4, R3, R2, R1, RX and RMP base zones. Residential uses include single dwelling houses, townhomes, duplexes, triplexes and quadplexes, accessory dwelling units, apartments, condos and manufactured housing development. Residential uses have similar negative impacts as other uses, including vegetation clearing, grading, filling and soil compaction, impervious surfaces, landscaping with non-native plants, generating pollutants and creating edge impacts (e.g., noise, light, pets). More intense development including condos and apartments often cover most of the site with impervious surfaces. Less intense development including single dwellings and plexes may have less impervious surface but include more landscaping with non-native vegetation including lawn and use of fertilizers and pesticides.

Campus Institutional Uses

Campus institutional uses are allowed outright or conditionally in the CI1, CI2 and IR base zones. Institutional uses include schools, churches and campuses. Development of new uses would involve vegetation clearing, grading, filling, and soil compaction, as well as the addition of impervious surfaces, landscaping with non-native plants and new edge impacts (e.g., noise, light, vibration), all of which impact the natural resources.

Open Space

Undeveloped open space has the least amount of disturbance of all urban uses; however, all open spaces can be formally developed with trails, landscaping and other uses. Trails can create different levels of impact on natural resources depending on trail design and location. Examples of trail-related impacts are fragmenting habitats and creating opportunities for invasive plant intrusion into a habitat area. Landscaping with non-native plants and the use of irrigation, herbicides, pesticides, and fertilizers can have detrimental effects on natural resources.

Impacts associated with more active open space uses can be similar to residential or commercial development. For example, sports fields or golf courses generally require significant grading and vegetation management. Some open space uses require development of parking lots, which can generate stormwater runoff. Areas used for large-scale events often experience significant soil compaction, resulting in nearly impervious surfaces.

Basic Utilities

Basic utilities are infrastructure services such as water and sewer pump stations, electrical substations, and power line corridors that need to be located in or near areas where the utility service is provided. Construction and maintenance of utilities can have negative impacts on natural resources. Corridors cleared of vegetation can increase wind and light penetration into adjacent habitat areas and can provide opportunities for intrusion of invasive, non-native plant species. Construction of basic utility facilities often fragments wildlife habitat. Operation of existing facilities has few adverse impacts on natural resources, except in the case of overhead electrical lines, which must be cleared of high structure vegetation.

Mining

Mining is allowed as a conditional use in the Open Space (OS) base zone and is prohibited in all other zones. Mining has the most severe environmental impacts of all uses allowed in the OS zone, as it generally eliminates all natural resources from the area being mined and often results in long-term water quality degradation. Once the mining operation is closed, enhancement of soil and vegetation is possible, but natural resources often cannot be fully restored.

Radio and Television Broadcast Facilities

Low powered transmitters, such as cordless telephones and citizen band radios, are allowed in all zones. More powerful and larger radio, television, and cell phone broadcast facilities are allowed in all zones subject to limitations or as conditional uses. The impacts of these facilities are minimal as compared to other uses, except in areas that are zoned open space. Certain of these facilities can pose hazards to migratory birds. During bad weather, birds fly lower and may be disoriented by the lights of the towers and may run into towers or guy wires.

Rail Lines and Utility Corridors

Construction of rail lines often requires substantial quantities of excavation and fill to meet the 0-3 percent slope standards. Generally, additional grading results in natural resource disturbance and degradation of soil, vegetation and wildlife habitat. Most rail corridors are maintained by extensive chemical vegetation treatment with a potential for ground and surface water impacts. Rail corridors can also create wildlife hazards or barriers to wildlife movement.

Rail and utility corridors can pose additional risk of wildfire. Rail lines can cause sparks that can ignite dry vegetation. Utility corridors typically must be kept clear of tall vegetation that could harm overhead facilities. Topping or removal of trees is a common practice in utility corridors. Topped trees are more susceptible to disease and are less inhabitable by wildlife.

Other Land Use and Enabling Procedures

There are certain allowed uses and enabling procedures that are not assigned to a single category by the City zoning code. These include infrastructure, nonconforming situations, land divisions, partitions and property line adjustments.

Infrastructure – Infrastructure uses are accessory to urban development and include roads, water, sewer, electric, television lines and other public and private utilities not described by the zoning code category “basic utilities.” Infrastructure is allowed in all city zones. Some of these uses are regulated by city public works and building codes. The uses generally have similar impacts to other development activities like vegetation clearing, soil grading, piping streams, etc. Transportation infrastructure creates impervious surfaces that increase stormwater runoff and decrease infiltration, contributes to urban heat island and can create wildlife movement barriers. Vehicle use of transportation infrastructure, particularly single occupancy gasoline vehicles, can decrease air quality, increase public health risks and contribute towards climate change.

Land Divisions, Partitions and Property Line Adjustments – These are procedures that establish lots or relocate property lines within a zone. While the act of adjusting or creating lot lines does not directly impact resources, the new or modified lots may allow more conflicting uses or a greater intensity of development than the original lots. Often the outcome of adjusting lot lines or creating lots is to increase development opportunities, thus increasing impacts on natural resources.

Table 4: Employment and Industrial Zone Primary Uses						
Use Categories	EG1	EG2	EX	IG1	IG2	IH
Residential Categories						
Household Living	N	N	Y	CU [1]	CU [1]	CU [1]
Group Living	N	N	L/CU [2]	N	N	N
Commercial Categories						
Retail Sales And Service	L/CU [3]	L/CU [3]	Y	L/CU [4]	L/CU [5]	L/CU [6]
Office	Y	Y	Y	L/CU [4]	L/CU [5]	L/CU [6]
Quick Vehicle Servicing	Y	Y	N	Y	Y	Y
Vehicle Repair	Y	Y	Y	Y	Y	Y
Commercial Parking	CU [15]	CU [15]	CU [15]	CU [15]	CU [15]	CU [15]
Self-Service Storage	Y	Y	L [7]	Y	Y	Y
Commercial Outdoor Recreation	Y	Y	Y	CU	CU	CU
Major Event Entertainment	CU	CU	CU	CU	CU	CU
Industrial Categories						
Manufacturing And Production	Y	Y	Y	Y	Y	Y
Warehouse And Freight Movement	Y	Y	Y	Y	Y	Y
Wholesale Sales	Y	Y	Y	Y	Y	Y
Industrial Service	Y	Y	Y	Y	Y	Y
Bulk Fossil Fuel Terminal	L [17]	L [17]	N	L [17]	L [17]	L [17]
Railroad Yards	N	N	N	Y	Y	Y
Waste-Related	N	N	N	L/CU [8]	L/CU [8]	L/CU [8]
Institutional Categories						
Basic Utilities	Y/CU [12]	Y/CU [12]	Y/CU [12]	Y/CU [13]	Y/CU [13]	Y/CU [13]
Community Service	L [9]	L [9]	L [10]	L/CU [11]	L/CU [11]	L/CU [11]
Parks And Open Areas	Y	Y	Y	Y	Y	Y
Schools	Y	Y	Y	N	N	N
Colleges	Y	Y	Y	N	N	N
Medical Centers	Y	Y	Y	N	N	N
Religious Institutions	Y	Y	Y	N	N	N
Daycare	Y	Y	Y	L/CU [11]	L/CU [11]	L/CU [11]
Other Categories						
Agriculture	L [16]	L [16]	L [16]	L [16]	L [16]	L [16]
Aviation And Surface Passenger Terminals	CU	CU	CU	CU	CU	CU
Detention Facilities	CU	CU	CU	CU	CU	CU
Mining	N	N	N	CU	CU	CU
Radio Frequency Transmission Facilities	L/CU [14]	L/CU [14]	L/CU [14]	L/CU [14]	L/CU [14]	L/CU [14]
Rail Lines And Utility Corridors	Y	Y	Y	Y	Y	Y

Y = Yes, Allowed

CU = Conditional Use Review Required

L = Allowed, But Special Limitations

N = No, Prohibited

Table 5: Commercial Zone Primary Uses						
Use Categories	CR	CM1	CM2	CM3	CE	CX
Residential Categories						
Household Living	Y	Y	Y	Y	Y	Y
Group Living	L/CU [1]	L/CU [1]	L/CU [1]	L/CU [1]	L/CU [1]	L/CU [1]
Commercial Categories						
Retail Sales And Service	L [2]	L [2]	Y	Y	Y	Y
Office	L [2]	L [2]	Y	Y	Y	Y
Quick Vehicle Servicing	N	L [2]	L [2]	L [2]	Y	N
Vehicle Repair	N	N	Y	Y	Y	L [5]
Commercial Parking	N	N	L [9]	L [9]	Y	CU [9]
Self-Service Storage	N	N	N	L [4]	L [4]	L [4]
Commercial Outdoor Recreation	N	N	Y	Y	Y	Y
Major Event Entertainment	N	N	CU	CU	CU	Y
Industrial Categories						
Manufacturing And Production	N	L/CU [3,5]	L/CU [3,5]	L/CU [3,5]	L/CU [3,5]	L/CU [3,5]
Warehouse And Freight Movement	N	N	N	L [3,5]	L [3,5]	N
Wholesale Sales	N	N	L [3,5]	L [3,5]	L [3,5]	L [3,5]
Industrial Service	N	N	CU [3,5]	CU [3,5]	CU [3,5]	CU [3,5]
Bulk Fossil Fuel Terminal	N	N	N	N	N	N
Railroad Yards	N	N	N	N	N	N
Waste-Related	N	N	N	N	N	N
Institutional Categories						
Basic Utilities	Y/CU [8]	Y/CU [8]	Y/CU [8]	Y/CU [8]	Y/CU [8]	Y/CU [8]
Community Service	L/CU [6]	L/CU [6]	L/CU [6]	L/CU [6]	L/CU [6]	L/CU [8]
Parks And Open Areas	Y	Y	Y	Y	Y	Y
Schools	Y	Y	Y	Y	Y	Y
Colleges	Y	Y	Y	Y	Y	Y
Medical Centers	Y	Y	Y	Y	Y	Y
Religious Institutions	Y	Y	Y	Y	Y	Y
Daycare	Y	Y	Y	Y	Y	Y
Other Categories						
Agriculture	L [10]	L [10]	L/CU [11]	L/CU [12]	L/CU [12]	L/CU [11]
Aviation And Surface Passenger Terminals	N	N	N	N	CU	CU
Detention Facilities	N	N	N	CU	CU	CU
Mining	N	N	N	N	N	N
Radio Frequency Transmission Facilities	N	L/CU [7]	L/CU [7]	L/CU [7]	L/CU [7]	L/CU [7]
Rail Lines And Utility Corridors	N	CU	CU	CU	CU	CU

Y = Yes, Allowed

L = Allowed, But Special Limitations

CU = Conditional Use Review Required

N = No, Prohibited

Table 6: Mult-Dwelling Zone Primary Uses						
Use Categories	RM1	RM2	RM3	RM4	RX	RMP
Residential Categories						
Household Living	Y	Y	Y	Y	Y	Y
Group Living	L/CU [1]	L/CU [1]	L/CU [1]	L/CU [1]	L/CU [1]	N
Commercial Categories						
Retail Sales And Service	L [2]	L [2]	L [2]	L [2]	L [2]	L [11]
Office	L [2]	L [2]	L [2]	L [2]	L [2]	N
Quick Vehicle Servicing	N	N	N	N	N	N
Vehicle Repair	N	N	N	N	N	N
Commercial Parking	N	N	N	N	CU [3]	N
Self-Service Storage	N	N	N	N	N	N
Commercial Outdoor Recreation	N	N	N	N	N	N
Major Event Entertainment	N	N	N	N	N	N
Industrial Categories						
Manufacturing And Production	N	N	N	N	N	N
Warehouse And Freight Movement	N	N	N	N	N	N
Wholesale Sales	N	N	N	N	N	N
Industrial Service	N	N	N	N	N	N
Bulk Fossil Fuel Terminal	N	N	N	N	N	N
Railroad Yards	N	N	N	N	N	N
Waste-Related	N	N	N	N	N	N
Institutional Categories						
Basic Utilities	L/CU [9]	L/CU [9]	L/CU [9]	L/CU [9]	L/CU [9]	L/CU [9]
Community Service	L/CU [5]	L/CU [5]	L/CU [5]	L/CU [5]	L/CU [4]	L/CU [5]
Parks And Open Areas	L/CU [6]	L/CU [6]	Y	Y	Y	L/CU [6]
Schools	CU	CU	CU	CU	L/CU [4]	CU
Colleges	CU	CU	CU	CU	CU	CU
Medical Centers	CU	CU	CU	CU	CU	CU
Religious Institutions	CU	CU	CU	CU	CU	CU
Daycare	L/CU [7]	L/CU [7]	L/CU [7]	L/CU [7]	Y	L/CU [7]
Other Categories						
Agriculture	L [10]	L [10]	L [10]	L [10]	L [10]	L [10]
Aviation And Surface Passenger Terminals	N	N	N	N	N	N
Detention Facilities	N	N	N	N	N	N
Mining	N	N	N	N	N	N
Radio Frequency Transmission Facilities	L/CU [8]	L/CU [8]	L/CU [8]	L/CU [8]	L/CU [8]	L/CU [8]
Railroad Lines And Utility Corridors	CU	CU	CU	CU	CU	CU

Y = Yes, Allowed

CU = Conditional Use Review Required

L = Allowed, But Special Limitations

N = No, Prohibited

Table 7: Single-Dwelling Zone Primary Uses						
Use Categories	RF	R20	R10	R7	R5	R2.5
Residential Categories						
Household Living	Y	Y	Y	Y	Y	Y
Group Living	CU	CU	CU	CU	CU	CU
Commercial Categories						
Retail Sales And Service	CU [10]	CU [10]	CU [10]	CU [10]	CU [10]	CU [10]
Office	N	N	N	N	N	N
Quick Vehicle Servicing	N	N	N	N	N	N
Vehicle Repair	N	N	N	N	N	N
Commercial Parking	N	N	N	N	N	N
Self-Service Storage	N	N	N	N	N	N
Commercial Outdoor Recreation	N	N	N	N	N	N
Major Event Entertainment	N	N	N	N	N	N
Industrial Categories						
Manufacturing And Production	CU [6]	N	N	N	N	N
Warehouse And Freight Movement	N	N	N	N	N	N
Wholesale Sales	N	N	N	N	N	N
Industrial Service	N	N	N	N	N	N
Bulk Fossil Fuel Terminal	N	N	N	N	N	N
Railroad Yards	N	N	N	N	N	N
Waste-Related	N	N	N	N	N	N
Institutional Categories						
Basic Utilities	L/CU [5]	L/CU [5]	L/CU [5]	L/CU [5]	L/CU [5]	L/CU [5]
Community Service	CU [1]	CU [1]	CU [1]	CU [1]	CU [1]	CU [1]
Parks And Open Areas	L/CU [2]	L/CU [2]	L/CU [2]	L/CU [2]	L/CU [2]	L/CU [2]
Schools	CU	CU	CU	CU	CU	CU
Colleges	CU	CU	CU	CU	CU	CU
Medical Centers	CU	CU	CU	CU	CU	CU
Religious Institutions	CU	CU	CU	CU	CU	CU
Daycare	L/CU [3]	L/CU [3]	L/CU [3]	L/CU [3]	L/CU [3]	L/CU [3]
Other Categories						
Agriculture	L [7]	L [7]	L/CU [8]	L/CU [8]	L [9]	L [9]
Aviation And Surface Passenger Terminals	CU	N	N	N	N	N
Detention Facilities	N	N	N	N	N	N
Mining	CU	N	N	N	N	N
Radio Frequency Transmission Facilities	L/CU [4]	L/CU [4]	L/CU [4]	L/CU [4]	L/CU [4]	L/CU [4]
Railroad Lines And Utility Corridors	CU	CU	CU	CU	CU	CU

Y = Yes, Allowed

CU = Conditional Use Review Required

Table 8: Open Space and Campus Institutional Uses				
	OS	CI1	CI2	IR
Use Categories				
Residential Categories				
Household Living	N	N	Y	Y
Group Living	N	N	Y	Y [9]
Commercial Categories				
Retail Sales And Service	CU [1]	CU [1]	Y	L/CU [10]
Office	N	N	Y	L/CU [10]
Quick Vehicle Servicing	N	N	N	N
Vehicle Repair	N	N	N	N
Commercial Parking	N	N	Y	N
Self-Service Storage	N	N	N	N
Commercial Outdoor Recreation	CU	N	N	N
Major Event Entertainment	N	CU	CU	CU
Industrial Categories				
Manufacturing And Production	CU [6]	L [2]	L/CU [2]	N
Warehouse And Freight Movement	N	N	N	CU
Wholesale Sales	N	N	N	N
Industrial Service	N	L [2]	L/CU [2]	N
Bulk Fossil Fuel Terminal	N	N	N	N
Railroad Yards	N	N	N	CU
Waste-Related	N	N	N	N
Institutional Categories				
Basic Utilities	L/CU [5]	L/CU [3]	L/CU [3]	L/CU [3]
Community Service	CU [4]	CU [4]	Y	CU [4]
Parks And Open Areas	L/CU [2]	L/CU [5]	L/CU [5]	L/CU [5]
Schools	CU	N	N	L/CU [5]
Colleges	N	Y/CU [6]	Y/CU [6]	L/CU [11]
Medical Centers	N	Y	Y	L/CU [11]
Religious Institutions	N	CU	CU	CU
Daycare	CU	Y	Y	L/CU [12]
Other Categories				
Agriculture	L [7]	L [7]	L [7]	L [7]
Aviation And Surface Passenger Terminals	N	N	N	N
Detention Facilities	N	N	N	N
Mining	CU	N	N	N
Radio Frequency Transmission Facilities	L/CU [3]	L/CU [8]	L/CU [8]	L/CU [8]
Rail Lines and Utility Corridors	CU	CU	CU	CU

Y = Yes, Allowed

CU = Conditional Use Review Required

D.5. General ESEE Analysis

This section presents the general ESEE analysis and recommendation. This portion of the ESEE analysis is intended to describe the potential consequences of allowing, limiting, and prohibiting conflicting uses for categories of significant natural resources.

The general ESEE analysis includes a subsection for each of the four ESEE factors evaluated – economic, social, environmental and energy. Each subsection includes a narrative that describes the factors being assessed. For example, the social analysis addresses cultural and historic values, education, physical health, mental health, etc. Following the narrative there is a summary of the consequences of allowing, limiting or prohibiting conflicting uses and a recommendation based on each factor. The recommendation is intended to balance the consequences to produce a recommended level of protection taking only that factor into account.

The recommendations of each ESEE factor are evaluated together to produce an overall ESEE general recommendation. Consistent with the 2035 Comprehensive Plan, the intent of the general ESEE is to recommend program decisions that meet multiple objectives and optimize the economic, social, environmental, and energy consequences for natural resources and conflicting uses in Portland.

The general ESEE analysis and general recommendation establishes a consistent baseline for categories of natural resource features the resource sites. In Volume 2, Part A – G, the ESEE general recommendations are affirmed, clarified or modified for each resource site to address specific conditions, goals, and policies. In Volume 2, Part A – G, ESEE decisions are made for resource sites that contain natural resources that are not a Title 13 Habitat Conservation Area; resources sites with only Title 13 Habitat Conservation Areas require no additional ESEE decision.

D.5.a. Economic Consequences

This portion of the analysis summarizes the economic consequences of protecting significant wildlife habitat that is not a Title 13 Habitat Conservation Area. The economic consequences are expressed as the qualitative and relative costs, benefits, and impacts of allowing, limiting, or prohibiting conflicting uses. The economic analysis relies on current information related to:

- The economic goods and services provided by the conflicting uses (e.g., development); and
- The ecosystem services provided by the significant natural resources (e.g., slope stability).

D.5.a.1. Goods and Services Provided by Conflicting Uses

The information related to the economic goods and services provided by conflicting uses comes from the *Economic Opportunities Analysis* (2016), which was adopted as factual basis for the 2035 Comprehensive Plan.

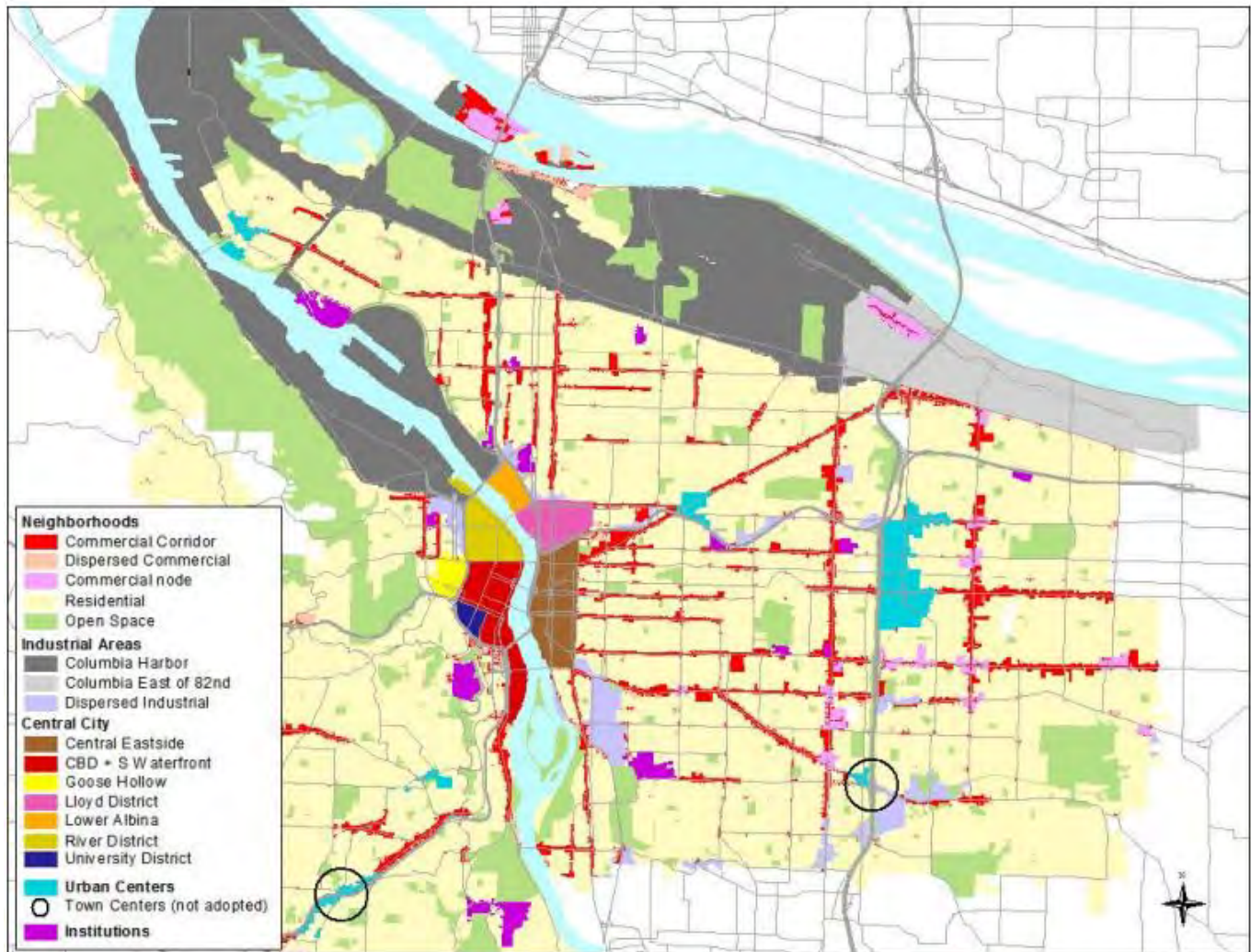
Employment and Wages

Portland is the regional job center, providing 38% of the 1.02 million employment base of the Portland-Metro Service Area. The largest employment sectors are institutional, office and manufacturing. Manufacturing is a particularly important sector with above-average wages and a significant multiplier effect – one manufacturing job supports 3.69 total jobs in the region.

Since 1980, the wage distribution of the economy has been changing, and job growth has become increasingly polarized in low- and high-wage occupations with shrinking middle-wage job opportunities. This national trend is mirrored in the state and the region. For the majority of the workforce that does not have a 4-year college degree, middle-wage job opportunities are primarily in industrial occupations, as seen in the Columbia Harbor (aka Columbia Corridor), and administrative-support occupations that are prevalent in all of the Central City districts (see Map 12).

Wage inequality has become a prominent feature of the Portland area economy's growth since 2000. The region's share of jobs in middle-wage occupations shrunk from 58% in 2000 to 48% in 2018, nearly twice the pace of the national change. A third of Multnomah County households (34%) were poor in 2017, up from 23% in 2008, measured by income self-sufficiency metrics. This trend reduces upward-mobility alternatives for most workers who do not have a bachelor's degree. Large concentrations of high-wage job growth and high-income housing growth have put upward pressure on local prices, while wages in low and middle-wage occupations have remained relatively flat.

Most of the region's middle-wage jobs are in industrial and office-support occupations (72% in 2018), which are particularly concentrated in industrial, employment and central commercial districts. While many metropolitan economies have been able to generate substantial middle-wage job growth and shared-prosperity outcomes, Portland is among the leading regions nationally in wage-polarized growth. Much of the region's growing wage inequality is explained by global and national factors, such as automation and economic globalization changes that have replaced many middle-wage jobs.



Map 12: Economic Opportunity Analysis Subareas (Hovee, 2012)

That said, wide regional differences in the wage distribution of new jobs are also influenced by policy choices that guide how regions grow, including the Portland region's tight growth capacity of industrial land, freight infrastructure, and vocational education.

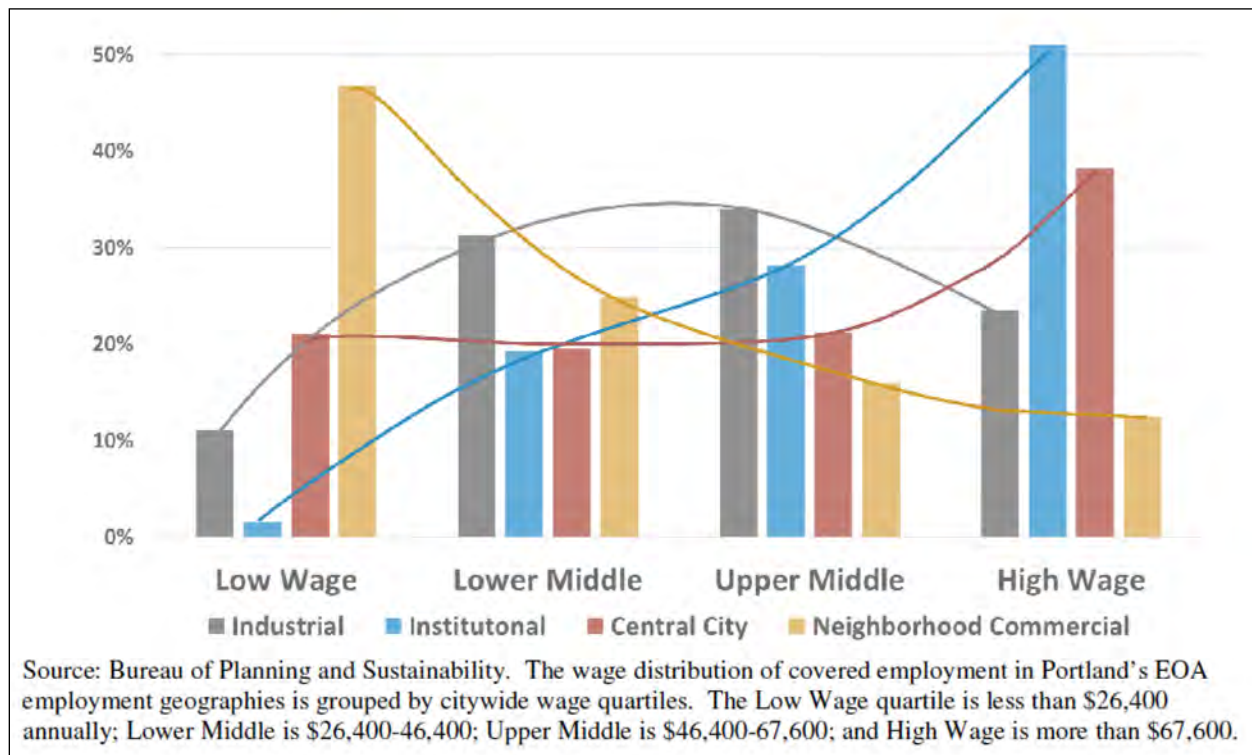


Figure 2: Portland Wage Distribution

The Metro forecast allocates 147,000 additional jobs to the City of Portland by 2035 – an annual average growth rate of 1.3%. This represents a 27% capture rate of the regional employment growth, which is consistent with the historic long-term capture rate for the City of Portland. A goal of the City of Portland is to attract a higher percentage of jobs that provide a living-wage.

The 2035 Comprehensive Plan demonstrated sufficient land supply for job growth projections through 2035. Figure 2 shows the supply and demand of land per job sector. All sectors, with the exception of industrial districts, have more land supply than demand for employment. There is a risk within the industrial districts and any reduction of land supply could result in a shift of employment from middle wage industrial jobs to other job sectors and could exacerbate the wage-polarization in Portland. The two main industrial districts – the Columbia Harbor and the Columbia East of 82nd (see Map 12) – are not included in this project and therefore not part of this ESEE analysis.

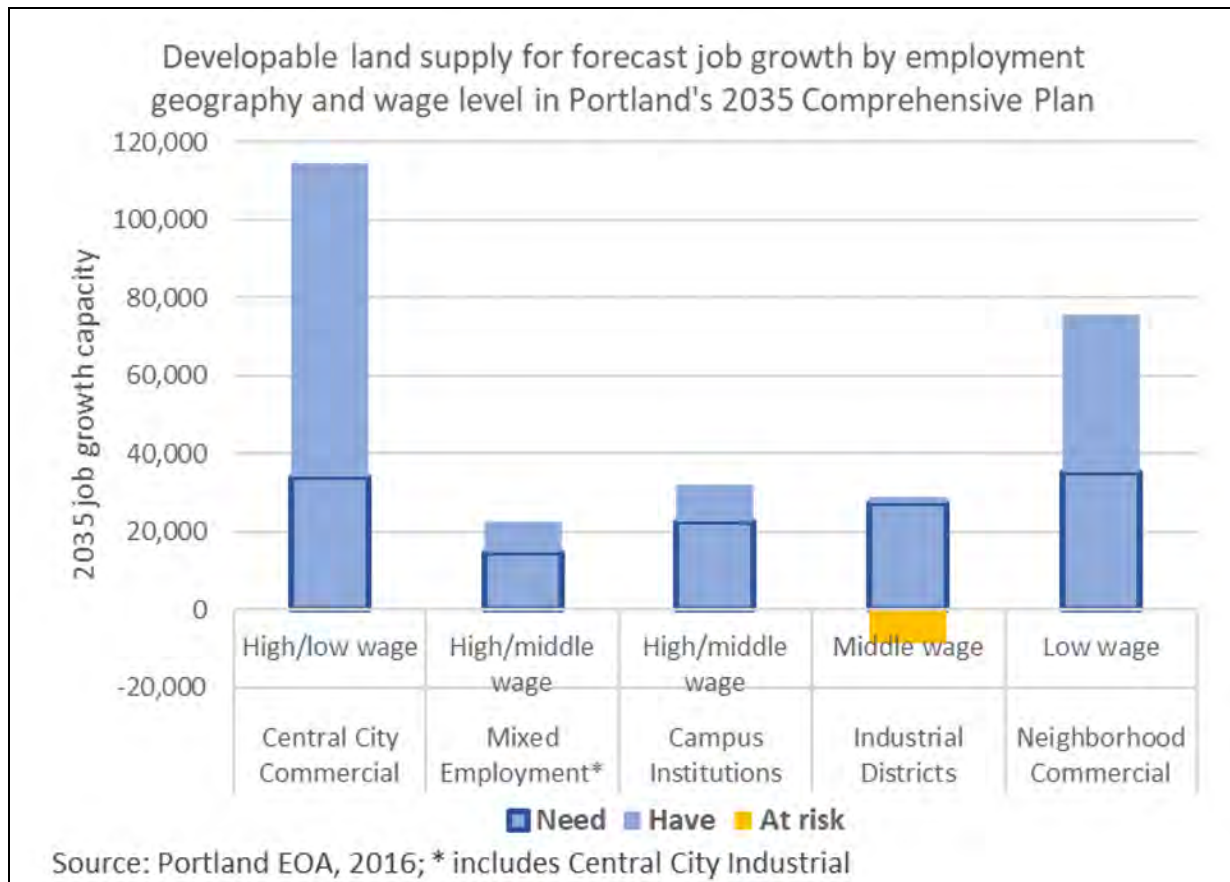


Figure 3: Land Supply and Employment Demand in Portland

Generally speaking, *prohibiting* or *limiting* conflicting uses within areas of significant natural resources would have a negative impact on goods and services provided by employment by limiting the size or extent of commercial, employment or industrial development. However, neither the industrial districts nor the Central City are part of this project. Other job sectors have surplus land supply to meet job growth. Therefore, *limiting* conflicting uses has no impact on land supply needed to meet projected job growth through 2035.

In addition, many of the significant natural resources addressed by this ESEE are also regulated by state or federal rules. For example, the federal government generally *prohibits* development, other than transportation infrastructure and utilities, within river and stream floodways and *limits* development within river and stream flood areas. State and federal rules *strictly limit* development within waters of the state, including wetlands. Areas that are designated critical habitat for Endangered Species Act-listed species have limitations on development as well. The majority of these state and federal regulations are related to riparian corridors. Therefore, the local limits on development within significant riparian corridors have a negligible negative impact on overall employment throughout the city. There may be larger negative impact of local limits on development within significant wildlife habitat areas outside of riparian corridors.

Traded Sector

Traded sector businesses are companies that sell many of their products and services to people and businesses outside the Portland region, nationally and globally. Examples include most manufacturing and many professional and business service companies as well as smaller craft businesses with local and global customers. Traded sector businesses may be locally owned and can be small, medium or large in size. Portland is considered a small to medium-sized hub in the national and international business and trade community.

Traded sector businesses are important to the local economy. By selling to people and businesses outside Portland, locally based traded sector businesses bring new money into the local economy. The additional income brought in from exporting goods is further circulated within the local economy as these local firms purchase additional services. Traded sector productivity and market size tends to lead these businesses to offer higher wage levels. Jobs at traded sector companies help anchor the city's middle class employment base by providing stable, living wage jobs for residents. For these reasons, Portland's traded sector businesses have the power to drive and expand Portland's economy.

Portland has a strong traded sector job base. The EcoNorthwest *Evaluation of Economic Specialization* (2009) found that the City of Portland's 2nd and 5th largest economic specializations are wholesale trade and transportation, which are the city's freight distribution industries. In 2008, the Portland region's traded sector businesses brought \$22 billion of export income into the regional economy, which was 21 percent of total regional economic output. Portland ranked second among U.S. metropolitan areas in export growth over five years. The 118,700 jobs in Portland's industrial districts accounted for 30 percent of the city's employment, including 30,400 manufacturing jobs and 44,000 wholesale and transportation jobs, (Bureau of Planning and Sustainability, 2012). Part of the reason for the strong traded sector is Portland's proximity to shipping channels in the Columbia and Willamette rivers, rail lines and an international airport. However, because the Columbia Harbor and Columbia East of 82nd (see Map 5) are not part of this project, there are no ESEE consequences to these industrial districts.

Portland's Climate Action Plan calls for protection of existing intermodal freight facilities, and support for centrally located and regionally significant industrial areas that may provide for future intermodal facilities. Given geographic and competitive challenges, Portland's role as a leading exporter is fragile because of the limits of the current transportation system. The system is burdened with many obsolete, end-of-life assets (e.g. the functional condition of many roadways and bridges.) Maintaining a cutting-edge built environment is an important aspect of sustaining the region's freight and trade dependent economy.

Generally speaking, *prohibiting or limiting* conflicting uses within areas of significant natural resources would have a negative impact on the traded sector economy by limiting the size or extent of industrial development; however, the impact is negligible because nearly all of the traded sector economy is located in the Columbia Harbor or Columbia East of 82nd, two areas that are not subject to this ESEE.

Housing

Housing can be a conflicting use with respect to natural resources because development of new houses, condos and apartments can remove or displace significant natural resources. Maintaining sufficient land to accommodate population growth in a range of housing options is a goal for Portland. The 2035

Comprehensive Plan demonstrated capacity for 201,000 additional housing units, which is more than the Metro growth projection for Portland of 123,000 housing units. The Residential Infill Project is anticipated to increase Portland's capacity by roughly 35,000 units.

The following information about housing is from the report the *State of Housing in Portland, 2018*.

Portland is the 26th most populous city in the United States and the 5th largest city on the west coast. Within the last five years, Portland has moved up two spots—from 28th to 26th. Between 2000 and 2010 Portland grew by 54,655 people. That puts the average annual growth rate at just under 1 percent. In comparison, Portland grew by 44,046 people between 2011 and 2016—that puts the average annual growth rate about 1.5 percent—a much faster rate of growth. Unlike the population growth, formation of households is occurring at a slower pace. Between 2000 and 2010, households grew 11 percent while between 2011 and 2016, households grew by 4 percent. The noticeable shift is the increasing share of households.

At the neighborhood level, the Central City, MLK-Alberta, Lents-Foster, and East Portland are gaining the greatest number of population growth but in terms of most household growth. Northwest, Central City, South Portland-Marquam Hill, and Interstate Corridor are gaining the greatest number.

In 2017, annual production and permitting levels were higher than at any point in the last fifteen years. Portland added 7,300 units to the housing stock in 2017—a 2 percent increase overall. Multifamily unit production continues to constitute the bulk of new residential development with 91 percent of all new housing units falling within the multifamily category.

The City of Portland recently approved the Residential Infill Project (RIP) to increase the range of housing types. In the R2.5, R5 and R7 base zones RIP allows triplexes and fourplexes on lots. In addition, more opportunities exist for creating additional accessory dwelling units (ADUs) on lots by allowing two ADUs on a lot with a house and one ADU on a lot with a duplex. To qualify, lots are required to meet specific minimum lot sizes: R2.5=3,200 sq ft; R5= 4,500 sq ft; R7=5,000 sq ft. These housing type proposals are counterbalanced with new caps on building floor area that reduce the maximum size of the dwellings by $\frac{1}{3}$ to $\frac{1}{2}$ from what can typically be built in the R2.5, R5 and R7 base zones. Minimum parking requirements are removed for residential uses in these zones, lowering the base cost for providing housing and reducing impacts to stormwater and potential tree canopy from previously required driveway impervious area. The result of RIP is reduced impacts on natural resources by reducing building floor area and removing parking requirements.

Overall, *limiting* or *prohibit* new housing in areas of significant natural resources may reduce the capacity of housing supply but will not impact Portland's ability to meet Metro growth projections through 2035. Generally speaking, *limiting* or *prohibiting* new housing development may affect the scale, location or type of housing that can be provided, but may not necessarily affect the number of potential dwelling units. If a portion of a site has limitations due to natural resources, housing can often be clustered to avoid the resources resulting in smaller lot sizes and/or dwelling units. *Limiting* or *prohibiting* new housing development may result in a slight increase in price to account for site planning or mitigation. This may have a long-term effect on the mix of housing types and size available on the market.

Limiting or prohibiting the conflicting uses could decrease development entitlement on some lots and could negatively impact the value of land for property owners. However, there are many factors that impact property value including access to improved streets and public transit, access to sewer and water, views, proximity to amenities (including tree canopy and natural areas), etc.

Further, due to state and federal rules that *prohibit or limit* development within rivers, streams, wetlands and flood areas, the impacts of local limitations on housing development within areas of significant riparian corridors is expected to have a small negative impact on the overall housing stock or value of land.

Property Values and Rent

Generally, as an area becomes more densely developed, property values and rents will rise as the concentration of businesses, residents, and customers make the area more attractive.

Homeownership rates in Portland generally have decreased in the last few years. This decrease varies by race and ethnicity. All but two communities—the Hispanic-Latino community and Native American community—experienced decreased homeownership rates from 2011-2016. In 2017, the median home sales price in Portland exceeded \$400,000 in over two-thirds (68 percent) of the neighborhoods in the city.

Rentership continues to increase steadily in Portland as seen from the increase to 47 percent in 2016 from 46 percent in 2011. Portland appears to be heading toward an even split between renter and homeowner households. In 2015 the overall rent growth in Portland was an average of 8 to 9 percent—one of the highest in the nation. Rent growth slowed in 2016 to an average rate of 7 percent over the previous year. In 2017, after years of citywide rent increases, Portland saw a slight softening in rents with a smaller overall rent growth of 2 percent.

Although property values and rents are determined by a number of complex factors, *limiting or prohibiting* new housing development significant natural resource areas may affect the scale, location or type of housing allowed and that may impact property value or rents. However, allowing new housing development within significant natural resource areas can have negative impacts on adjacent properties including increased risk of landslide or flooding, removal of trees that provide shade and reduce heat island affects and reducing the visual amenities provided by trees and water. This could reduce property value.

The existence of trees, greenspaces and other natural resources have been positively correlated with residential property values in Portland (EcoNorthwest, 2009). A Portland-based study done by Donovan and Butry in 2010 found that trees within 100 feet of houses added approximately \$8,870 to the price of a house, which represents 3.0% of sale price. Those trees also provide benefits such as cooling the air in the summer and attenuating rain in the winter. Natural resources contribute to the quality of neighborhood, local and regional recreation and trail systems, and also to the quality of views. Screening and buffering residential from industrial and commercial land uses can be provided by established trees and vegetation and can improve the economic value of both uses (e.g. noise reduction). Therefore, limiting new housing development in significant natural resource areas may maintain or increase property values.

Tourism

Portland is viewed around the world has a city that protects its natural resources and invests in sustainability. Portland is a popular tourist destination with a variety of attractions that draw people to the area. These destinations include natural resources like the Willamette and Columbia Rivers and parks like Forest Park and Smith/Bybee Wetlands. Generally, limited conflicting uses within significant natural resource areas supports tourism. However, limitations can have negative impacts on tourism by reducing opportunity for new hotels, attractions, restaurants or shops within the resource areas.

D.5.a.2. Ecosystem Services Provided by Significant Natural Resources

Natural resources provide ecosystem goods and services, which in turn provide economic and social value. Ecosystem services include water conveyance and purification, flood mitigation, air cooling and purification, carbon sequestration, soil stabilization, rain attenuation, soil fertilization, and pollination. Ecosystem goods include commodities like food, fuel, fisheries, timber, minerals, etc. Ecosystem goods also include supporting recreation and tourism.

Information related to ecosystem services comes from the following reports:

- ECONorthwest, *West Hayden Island Benefits/Costs Analysis*, 2012.
- ENTRIX, *West Hayden Island Environmental Foundation Study*, July 2010.
- ECONorthwest, *Economic Arguments for Protecting the Natural Resources of the East Buttes Area in Southeast Portland*, 2009.
- Bergstrom, Loomis and Brown, *Defining, Valuing and Providing Ecosystem Goods and Services*, Natural Resources Journal, 2007.
- Banzhaf and Boyd, *What Are Ecosystem Services? The Need for Standardized Environmental Accounting Units*, 2006.
- Anielski and Wilson, *Counting Canada's Natural Capital: Assessing the Real Value of Canada's Boreal Ecosystems*, Pembina Institute, 2005.
- Olewiler, N., *The Value of Natural Capital in Settled Areas of Canada*, Published by Ducks Unlimited Canada and the Nature Conservancy of Canada, 2004.

Table 6 provides a summary of the economic value of the ecosystem services provided by different significant natural resource features. Table 7 provides the economic value of the ecosystem services provided by the natural resources (both riparian corridors and wildlife habitat) in Portland. Following the tables is additional information about the ecosystem services provided by **significant wildlife habitat that is not a Title 13 Habitat Conservation Area**.

Table 9: Ecosystem Services Valuation (2011\$/Acre/Year)

Habitat Type	Air Purification	Carbon Sequestration	Water Purification	Wildlife Habitat Value	Total Value
Forest/Woodland	\$73–\$267	\$26–\$92	Not Quantified	\$309–\$516	\$408–\$875
Wetland	\$74–\$266	Not Quantified	\$153–\$664	\$3,095–\$11,347	\$3,322–\$12,277
Shrubland	\$30–\$110	\$24–\$88	Not Quantified	\$309–\$516	\$363–\$714
Grassland	\$24–\$89	\$24–\$88	Not Quantified	\$309–\$516	\$357–\$693
Shallow Water	Not Quantified	Not Quantified	Not Quantified	\$1,037–\$15,473	\$1,032–\$15,473
Source: ECONorthwest (2012)					

Forests and Woodlands

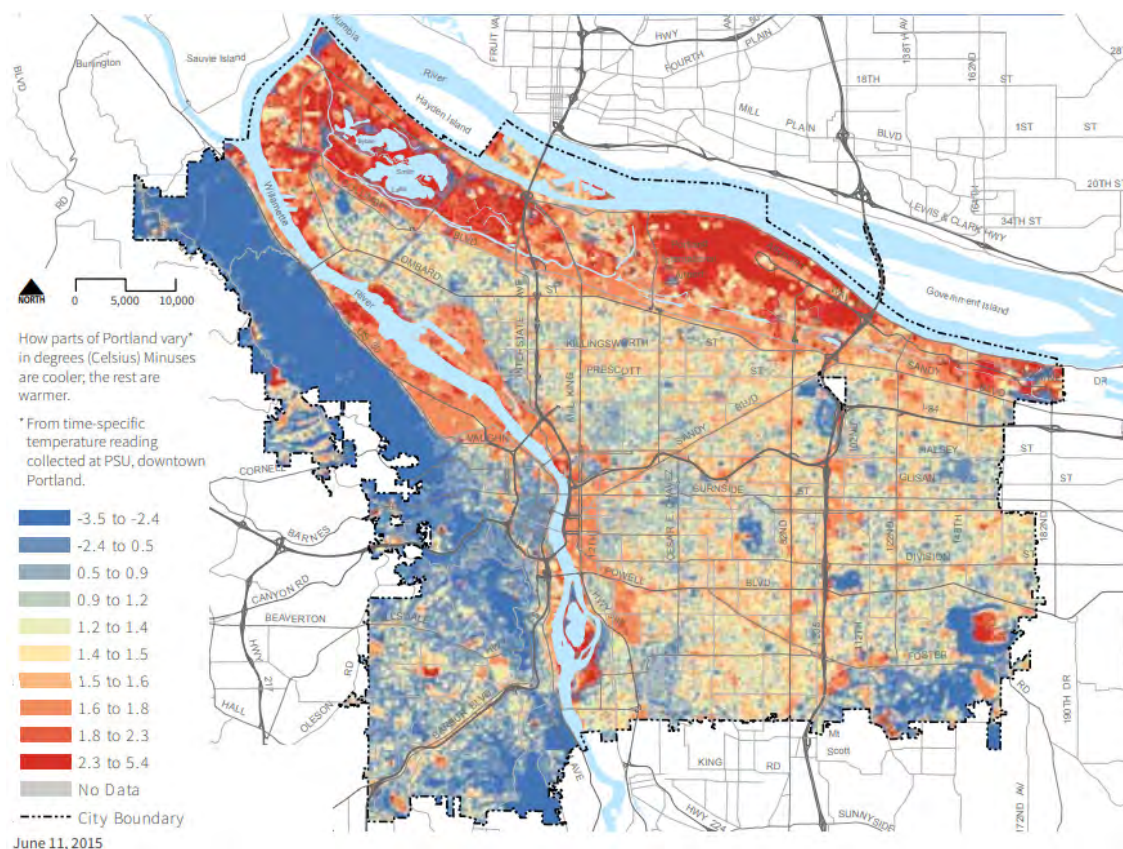
Forests and woodlands also provide air quality benefits from purification and pollutant removal. Table 7 below shows the kilograms of pollutant removal by forestland per acre per year and the economic value of those pollutants in avoided health care costs.

Table 10: Annual Quantity and Value of Pollutant Removal by Forests and Woodlands (2011\$)

Pollutant	Annual Kilograms Removed per Acre	Annual Value per Ton	Annual Value per Acre
CO	2.03	\$1,403	\$3
NO ²	3.65	\$4,039—\$9,875	\$15—\$36
O ³	14.57	\$2,019—\$9,875	\$29—\$144
PM ¹⁰	10.53	\$6,593	\$69
SO ²	2.83	\$2,418—\$9,546	\$7—\$27

Source: ECONorthwest, 2012

Extreme heat events are becoming more common in Portland. In the United States, extreme heat causes more deaths annually than all other weather events and natural hazards (Luber, 2008). Areas with more tree canopy experience less heat than areas with less tree canopy, as shown in Figure 4. Extreme heat events affect public health costs to the individual, hospital visits or equipment to address health issues, as well as to the community as a whole, such as opening cooling centers.



Source: Sustaining Urban Places Research Lab (SURP), Portland State University, 2015

Figure 4: Urban Heat Islands in Portland

Trees also provide soil stabilization functions, particularly on steep slopes. Tree canopy attenuates rain fall, roots uptake ground water and roots hold soil in place. This reduces landslide risks and risks of damage to private property and public infrastructure.



Image: Landslide in Southwest Portland (2008)

Shrublands and Grasslands

One estimate of shrubland value, based on the net primary productivity of various landscapes in the U.S. National Wildlife Refuge System, suggests that the ecosystem service value may be about \$600–\$800 per acre per year. The same study estimated the value of grasslands, and suggests that the ecosystem service values of grassland, generally, may be about \$30–\$140 per acre per year. Table 9 shows the annual per acre pollutant removal by shrubland and grassland, and a range of economic values of those pollutants in avoided health care costs.

Table 11: Annual Quantity and Value of Pollutant Removal by Shrubland and Grassland (2011\$)

Pollutant	Annual Kilograms Removed per Acre	Annual Value per Ton	Annual Value per Acre
CO	0.79	\$0—\$1,403	\$1
NO ²	1.45	\$4,039—\$9,875	\$6—\$14
O ³	6.05	\$2,019—\$9,875	\$12—\$60
PM ¹⁰	4.34	\$0—\$6,593	\$29
SO ²	1.18	\$2,418—\$9,546	\$3—\$11
Source: ECONorthwest			

Value of Wildlife

Economic research has shown that people place a considerable value on the continued survival of sensitive species, such as those listed as threatened or endangered. Such studies also suggest that the value associated with protecting threatened, endangered, and rare species similar to those found in Portland ranges from an annual payment of \$11 per household to a one-time payment of nearly \$400 per household (see Table 10).

Table 12: Willingness to Pay to Protect Threatened, Endangered, and Rare Species

Studies Reporting Annual Values		
	Average Value	Range of Values
Bald eagle	\$43.51	\$23.43-\$50.21
Owl	\$72.52	\$43.51-\$145.05
Salmon/Steelhead	\$90.38	\$11.16-\$155.09
Whooping Crane	\$62.48	\$49.09-\$76.99
Woodpecker	\$17.85	\$14.50-\$22.32
Studies Reporting Lump Sum Values		
	Average Value	Range of Values
Arctic grayling	\$25.66	\$22.32-\$29.01
Bald eagle	\$331.38	\$273.36-\$390.52
Falcon	\$35.70	-
Source: Richardson and Loomis, 2009		

It is important to note that willingness to pay is a different measure than estimating the economic value associated with maintaining individual species and biodiversity. For example, the courts have interpreted Congress to say that the value of threatened and endangered species is incalculable (TVA v. Hill).

Development-related threats to sensitive species in Portland, including ESA-listed salmonids, also may lead to higher future costs for governments, firms, and households engaging in activities that affect the species. Such costs might be associated with reduced, modified or prohibited activities including types of development, required or voluntary species monitoring, as well as measures to ensure their protection. If the population of these species continue to decline, they may be categorized as “endangered,” which would increase the restrictions on development activities, increasing associated costs. Avoiding such costs could be supported by pre-emptive efforts to improve recovery of threatened species, protect sensitive species and prevent future threatened and endangered species listings.

In addition to the ecosystem services described above, existing natural resources in Portland provide other general services that are important considerations in this analysis.

Property Values

The existence of trees, greenspaces and other natural resources have been positively correlated with residential property values in Portland (EcoNorthwest, 2009). Natural resources contribute to the quality of neighborhoods, to local and regional recreation and trail systems, and also to the quality of

views. Screening and buffering between residential and industrial land uses can be provided by established trees and vegetation, and can improve the economic value of both uses (e.g. noise reduction). Other indirect “quality of life” values associated with natural resources include labor force retention, attraction of new employees, and reputation. Portland is generally known nationally and internationally as a *green* city and a desirable place to live, visit, work, and play, which has a positive impact on aspects of the local and regional economy.

A Portland-based study done by Donovan and Butry in 2010 found that trees within 100 feet of houses added approximately \$8,870 to the price of a house, which represents 3.0% of sale price. Those trees also provide benefits such as cooling the air in the summer and attenuating rain in the winter.

As described above, limiting or prohibiting conflicting uses within significant natural resource area can have both a positive and negative economic impact.

Off-Site Benefits of Ecosystem Services

Natural resource benefits can occur beyond the immediate area. For example, maintaining soil stability can reduce the cost of landslide repair for properties and infrastructure down slope. Moderation of heat island impacts also affect properties surrounding forests and woodlands. When benefits occur off-site, the property cannot capture the value of these benefits directly. As a result, the market price for natural resources, whether it’s floodplain habitat or a stand of trees, does not fully reflect a true exchange value relative to other goods. In fact, most natural resources are not priced because they are not bought and sold like other products. This makes establishment of value difficult and often underestimated or oversimplified given the complexity of ecosystems (Norgaard, Richard B. 2010. Ecosystem Services: From eye-opening metaphor to complexity blinder. Ecological Economics).

Temporal Considerations

Some of the benefits provided by natural resources take many years to be realized. For example, the full value of an immature stand of trees may not be realized for 25-50 years, when the trees have grown and matured and are providing maximum shade, carbon sequestration, rainwater interception, and evapotranspiration functions. Wetlands can recharge groundwater supplies for many years following high rain events. Another factor that complicates the determination of the economic value of natural resources is that many natural resources have “irreversibility” properties. If the resource is eliminated there may be little or no chance of regeneration in any meaningful timeframe. Therefore, the cost of losing natural resources must also include the opportunity costs, or the cost of future choices foregone

Scarcity

Another topic of consideration is *scarcity*. As an area develops and natural resources are removed or degraded, the functions those resources provide become scarce. This can increase the value of the remaining natural resources. One example is bottomland hardwood forests. Bottomland hardwood forest is identified by the Oregon Conservation Strategy (ODFW, 2016) as a conservation strategy habitat with a regional priority for preservation. Bottomland hardwood forest is an important habitat type for migrating birds, particularly neotropical birds, and bats. Another example is grassland habitat. In the Willamette Valley, grassland habitat has been reduced to less than 2% of its historic extent. This means that the wildlife species that depend on grassland habitat to complete their life cycle (e.g. ground nesters that need land sparsely vegetated with herbaceous vegetation) have significantly less habitat

areas to choose from. The scarcity of bottomland hardwood forests and grasslands increases the value of the remaining habitat from a biodiversity standpoint and with regard to preventing future species endangerment and listings under the federal Endangered Species Act.

Mitigation

The objective of most mitigation efforts is to make up for disturbances or damages to the ecosystem functions and services in a natural area by improving the functional capacity in another area or portion of a development site. In many instances, state or federal agencies have established guidelines outlining the proper mitigation ratios to consider for a particular type of mitigation. Several studies tracking the success of mitigation projects have found that many mitigation efforts do not result in full replacement of functional or economic value of impacted ecosystem services (ECONW, 2012).

D.5.a.3. Summary of Economic Consequences

Allowing conflicting uses would have the following consequences:

- i. Maintain land supply to meet forecasted job growth demand through 2035
- ii. Expand local and regional economic benefits of industrial development and associated middle-wage jobs
- iii. Enhance opportunities for housing diversity and affordability
- iv. Increase risks and private and public costs associated with natural hazards such as landslides
- v. Have both negative and positive impacts on property values
- vi. Reduce the contribution of natural resource towards tourism
- vii. Reduce the economic benefits derived from multiple ecosystem functions and increase costs, both private and public, associated with replacing the functions lost
- viii. Complicate efforts to comply with regional, state and federal requirements (e.g., Clean Water Act, Endangered Species Act) resulting in potential liability and associated costs
- ix. Reduce the City of Portland's ability to minimize risks and costs associated with Climate Change
- x. Reduce ability to leverage development to protect and improve ecosystem services

Limiting conflicting uses would have the following consequences:

- i. Neither increase or decrease land supply to meet forecasted job growth demand through 2035
- ii. Maintain local and regional economic benefits of industrial development and associated middle-wage jobs
- iii. Maintain opportunities for housing diversity and affordability
- iv. Maintain risks and private and public costs associated with natural hazards such as landslide
- v. Contribute to the maintenance of property values
- vi. Maintain the contribution of natural resource towards tourism
- vii. By requiring mitigation, maintain economic benefits derived from multiple ecosystem functions; however, there would be increased replacement costs
- viii. Support efforts to comply with regional, state and federal requirements (e.g., Clean Water Act, Endangered Species Act)
- xi. By requiring mitigation, may help maintain the City of Portland's ability to minimize risks and costs associated with Climate Change
- ix. Maintain opportunities to leverage development to protect and improve ecosystem services

Prohibiting conflicting uses would have the following consequences:

- i. Decrease the land supply to meet forecasted job growth demand through 2035
- ii. Reduce local and regional economic benefits of industrial development and associated middle-wage jobs
- iii. Reduce opportunities for housing diversity and affordability
- iv. Reduce risks and private and public costs associated with natural hazards such as landslide
- v. Have both negative and positive impacts on property values
- vi. Reduce opportunities for development that supports tourism
- vii. Maintain economic benefits derived from multiple ecosystem functions; however, there would be increased replacement costs
- viii. Support efforts to comply with regional, state and federal requirements (e.g., Clean Water Act, Endangered Species Act)
- ix. Maintain the City of Portland's ability to minimize risks and costs associated with Climate Change
- x. Maintain opportunities to leverage development to protect and improve ecosystem services

D.5.a.4. Economic Recommendation

Based solely on the economic consequences analysis of *allowing*, *limiting*, or *prohibiting* development in significant **wildlife habitat that is not a Title 13 Habitat Conservation Area**, the following general recommendations are intended to optimize the economic values described in the narrative. The recommendations for Title 13 Habitat Conservation Areas are found in Volume 4, Part A.

Limit conflicting uses within forests and woodlands that are contiguous to streams or wetlands

Tree removal changes hydrology and water quality entering the water features, as well as reducing habitat quality and diversity. Tree removal can result in increased erosion and risk of landslides. Tree removal also impacts air quality and temperature. Limiting conflicting uses would neither increase or decrease the supply of land needed to meet forecasted job growth through 2035. Limiting conflicting uses would require minimizing development impacts on the features where possible. Mitigation for unavoidable impacts could replace lost ecosystem services. This could have a negative, but small, impact on housing diversity. Limiting conflicting uses would also retain the ability to leverage future development to enhance and restore ecosystem services.

Limit conflicting uses within forests vegetation on steep slopes

Trees on steep slopes help to stabilize the soil and reduce the risk of landslides. The trees also provide habitat, maintain air temperature, and contribute to property values. Limiting conflicting uses in upland forests and woodlands would have little to no impact on industrial land demand. Limiting conflicting uses would require minimizing development impacts on the features where possible. Mitigation for unavoidable impacts could replace lost ecosystem services. This could have a negative, but small, impact on housing diversity. Limiting conflicting uses would also retain the ability to leverage future development to enhance and restore ecosystem services.

Allow conflicting uses within other areas of significant wildlife habitat

The economic benefit of allowing conflicting uses generally outweigh the economic benefit of non-forested upland wildlife habitat.

D.5.b. Social Consequences

This portion of the analysis summarizes the social consequences of protecting significant wildlife habitat that is not a Title 13 Habitat Conservation Area. The social consequences are expressed as the qualitative and relative costs, benefits, and impacts of allowing, limiting, or prohibiting conflicting uses. The social analysis relies on current information related to:

- Human Health and Welfare
- Historic, Heritage, and Cultural Values
- Regulatory Compliance

D.5.b.1. Human Health and Welfare

Employment Opportunities

One of the most important factors in determining human health and welfare is household income, which is dependent on employment. The reason that income has such a strong influence on health is that it determines whether people are able to make healthy choices such as living in safe, healthy homes and neighborhoods, eating nutritious food, fully participating in family and community life, and obtaining timely and appropriate health care. Many studies have shown that people with health insurance are healthier than those without (Mult. Co. Health Department, 2012). In the United States the risk for mortality, morbidity, unhealthy behaviors, reduced access to health care, and poor quality of health care increases with decreasing socioeconomic circumstances (CDC, 2011). Research has linked unemployment to stress, depression, obesity, and increases in cardiovascular risk factors such as high blood pressure (Mult. Co. Health Department, 2012).

A 2012 informational piece published by the American Psychological Association states that “the current state of the economy continues to be an enormous stressor for Americans...Unemployed workers are twice as likely as their employed counterparts to experience psychological problems such as depression, anxiety, psychosomatic symptoms, low subjective well-being, and poor self-esteem. The piece continues, “Like unemployment, underemployment...is unequally distributed across the U.S. population, with women, younger workers, and African Americans reporting higher rates of involuntary part-time employment and low pay, as well as higher proportions of “discouraged” workers who have given up on searching for a job.

Average median household income for Portland in 2016 is \$76,033. The City of Portland commonly uses an income at or above 80 percent Median Family Income as a proxy for the minimum income needed to pay living expenses. Based on the 2014 data, approximately 40 percent of households are at or below 80 percent MFI.

Generally speaking, *prohibiting* or *limiting* conflicting uses within areas of significant natural resources would have a negative impact on employment by limiting the size or extent of commercial, employment or industrial development. This could have a negative impact on the availability of living-wage jobs.

However, many of the significant natural resources addressed by this ESEE are also regulated by state or federal rules. For example, the federal government generally *prohibits* development, other than

transportation infrastructure and utilities, within river and stream floodways and *limits* development within river and stream flood areas. State and federal rules *strictly limit* development within waters of the state, including wetlands. Areas that are designated critical habitat for Endangered Species Act-listed species have limitations on development as well. The majority of these state and federal regulations are related to riparian corridors. Therefore, the local limits on development within significant riparian corridors have a negligible negative impact on overall employment throughout the city.

Access to Nature

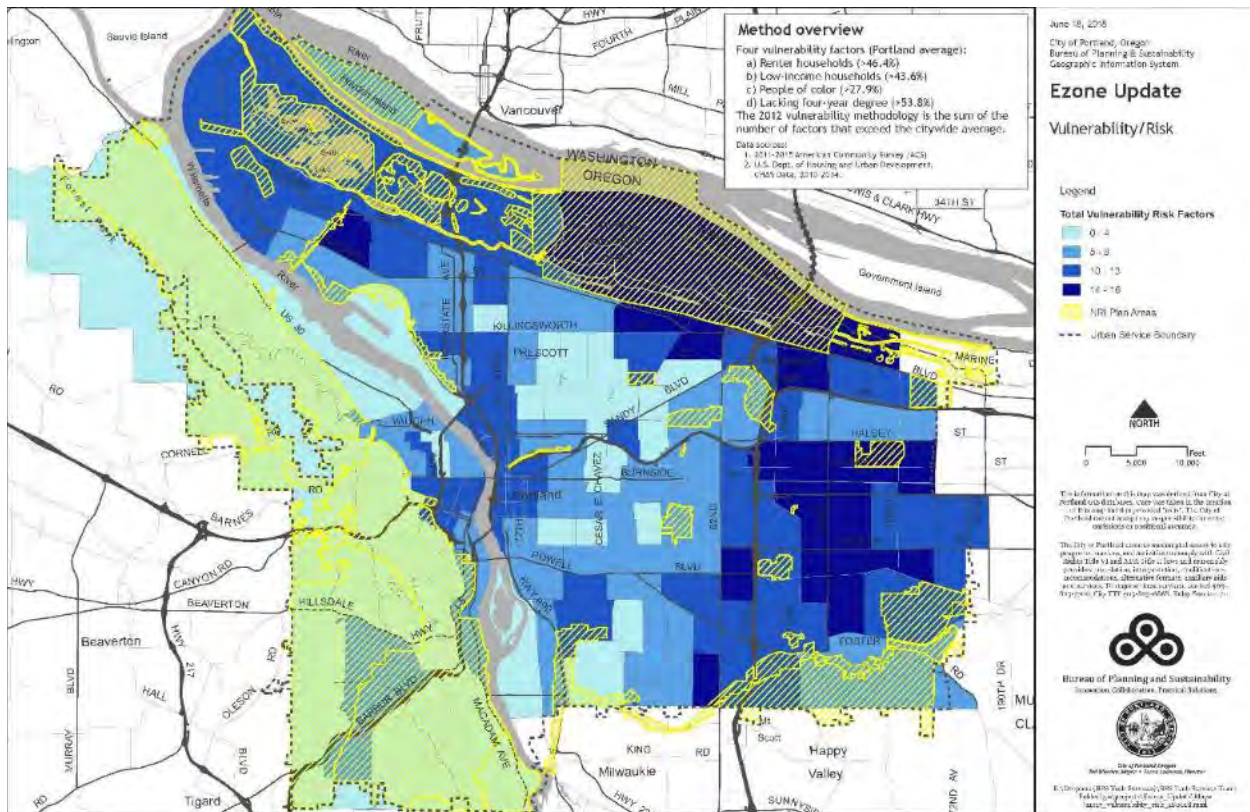
Access to natural areas and open spaces has an impact on human behavior and psyche. Access can mean a range of things from viewing vegetation to bird watching to hiking or boating. Dr. Roger Ulrich of Texas A&M's Center for Health Systems and Design found that passive scenic values, such as looking at trees, reduces stress, lowers blood pressure, and enhances medical recovery (Ulrich et al. 1991). The presence of trees and grass can lower the incidence of aggression and violent behavior (Kuo and Sullivan, 2001b). Common green areas in neighborhoods can also increase community ties and support social networks, which are determining factors in overall health.

Recreation has multiple health benefits. For people who are inactive, even small increases in physical activity can yield numerous health benefits (Mult. Co. Health Department, 2012). Exercise improves overall health, which reduces public and private health care costs, improves quality of life, and may help people live longer (Nieman, 1998). Activities such as walking in forested areas help boost the immune system (Sachs and Segal, 1994). In addition, the Centers for Disease Control and Prevention strongly recommends improving access to places for physical activities such as biking or hiking trails to reduce the risk of cardiovascular disease, diabetes, obesity, selected cancers, and musculoskeletal conditions.

Melody Goodman, an assistant professor at Washington University in St. Louis, conducted research that found "your zip code determines more of your health than your genetic code." (www.hsph.harvard.edu/news/features/zip-code-better-predictor-of-health-than-genetic-code/) This is because people with a higher vulnerability risk typically live in areas of the city that do not support good health – areas near highways/railroads with decreased air quality and increased air temperature, areas without green infrastructure like trees, streams, wetlands and parks, and areas without access to transit, bicycle lanes, or sidewalks. Map 13 shows areas in Portland with high vulnerability risks.

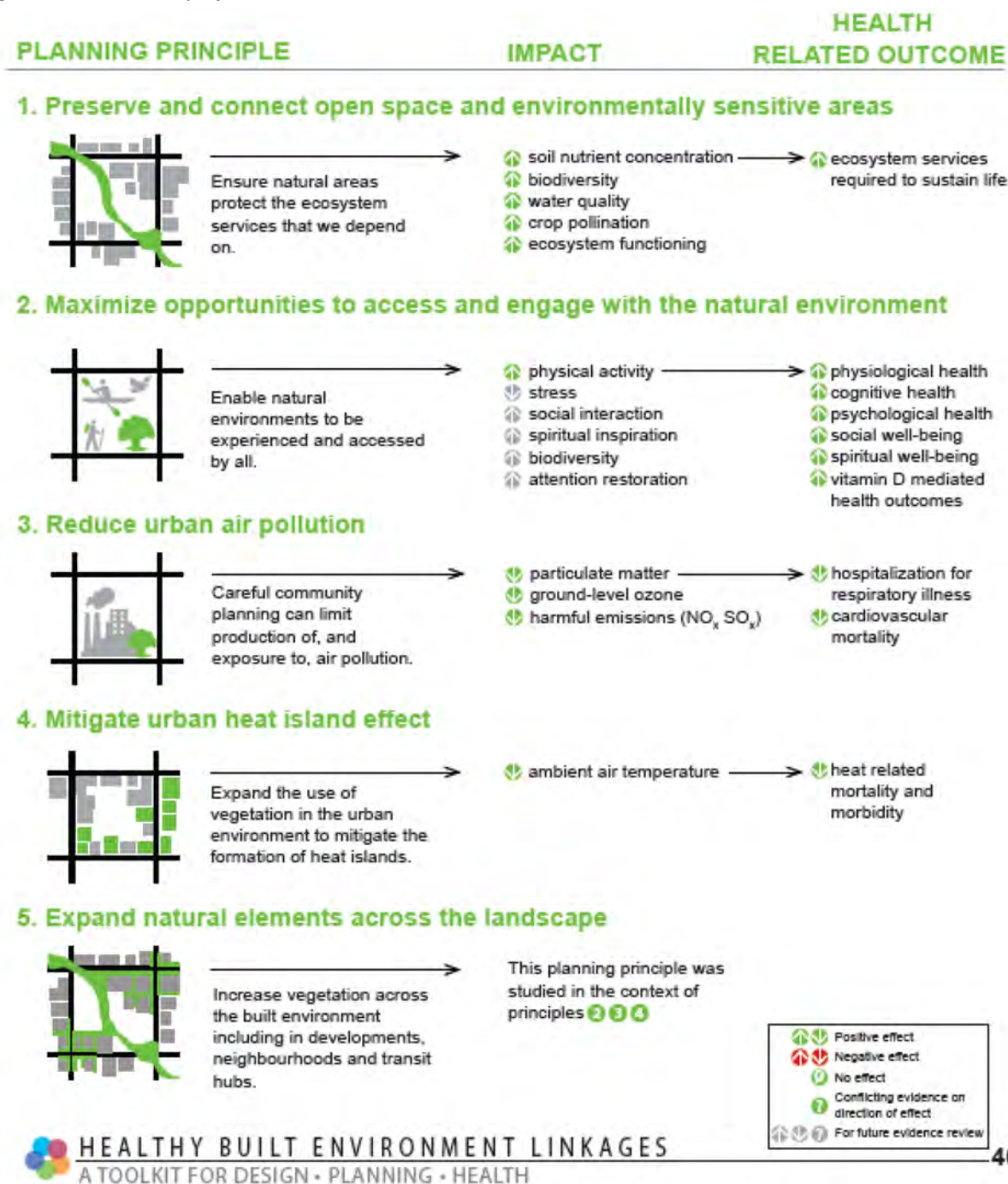
The British Columbia Center for Disease Control, developed a toolkit that makes links between planning, design, and health (Figure 3). The first planning principle is to preserve and connect open space and environmentally sensitive areas. Correcting the environmental overlay zones to better protect existing natural resources, coupled with actions that increase human access to the resources, will contribute towards improved public health for vulnerable communities in Portland.

Generally speaking, *limiting* or *prohibiting* conflicting uses in significant natural resource areas maintains nature and supports access to nature and the associated public health benefits.



Map 13: Vulnerability Risks in Portland

Figure 5: Relationship of Natural Resources to Public Health³



³ BC Centre for Disease Control. (2018). Healthy Built Environment Linkages Toolkit: making the links between design, planning and health, Version 2.0. Vancouver, B.C. Provincial Health Services Authority. Retrieved from http://www.bccdc.ca/pop-public-health/Documents/HBE_linkages_toolkit_2018.pdf.

Climate Change and Public Health

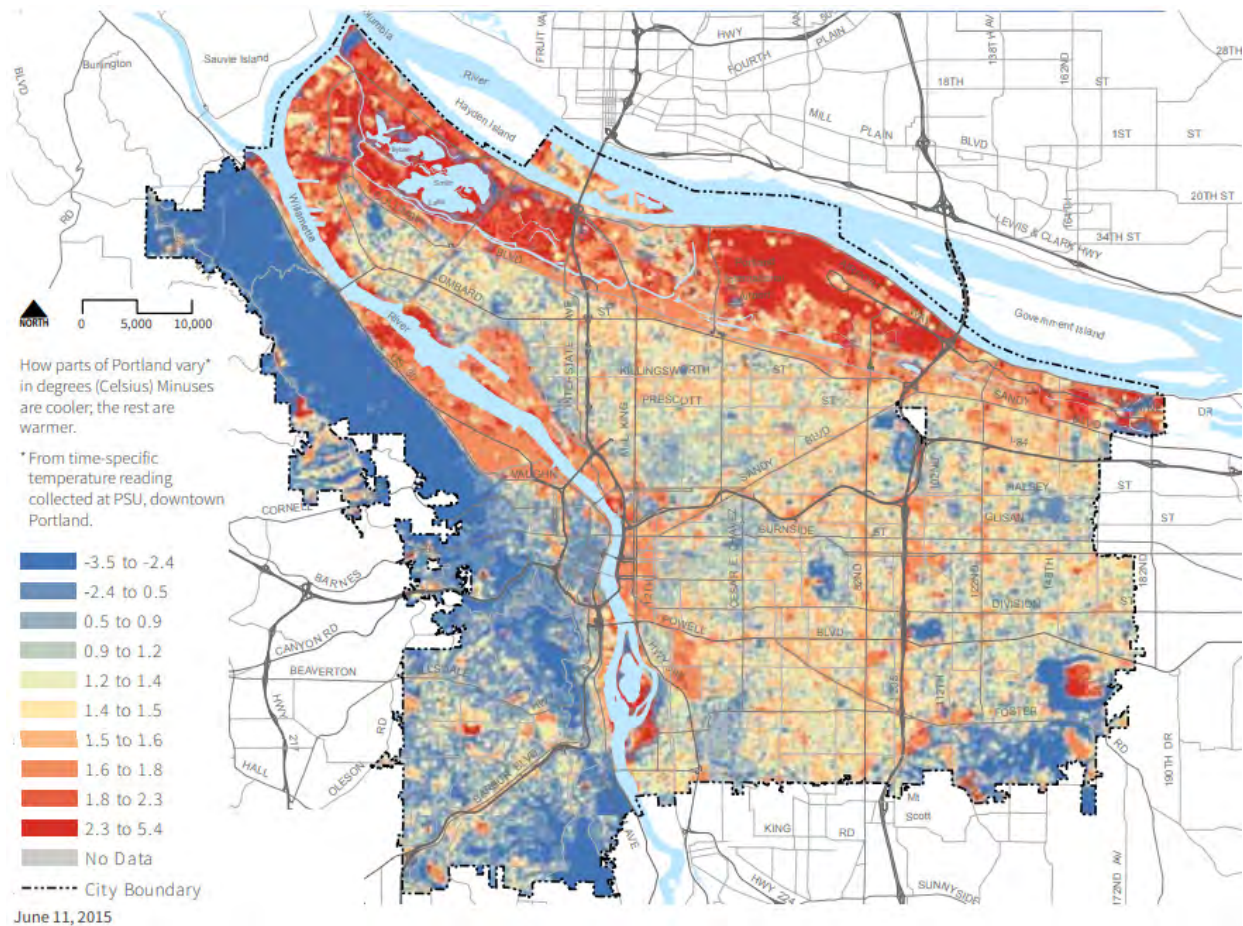
Climate change impacts are already evident, both globally and in Oregon, and more impacts are inevitable, if uncertain. Currently available model projections for the Pacific Northwest have a higher degree of certainty related to expected changes in precipitation patterns and temperature increases but are inconclusive about what should be expected for total annual precipitation or extreme weather events. It is fairly certain that the Portland region will experience the following changes:

- Increased temperatures overall, including average, maximum and minimum temperatures in the summer and winter months (projected 0.5 °F increase per decade).
- Changes in precipitation patterns, with more precipitation falling in mid-winter and less precipitation in the summer. More precipitation falling as rain rather than as snow in lower elevation watersheds.
- Continued influence of ocean-driven weather patterns (e.g. La Niña/El Niño and the Pacific Decadal Oscillation) and swings between hot/dry and cold/wet (Oregon Climate Change Research Institute, 2010).

These changes will have a negative impact on public health through more frequent and longer heat waves, more air quality advisory days, more flooding, and potentially less access to nature if certain habitats cannot adjust to the changes in weather.

Extreme heat events are becoming more common in Portland. In the United States, extreme heat causes more deaths annually than all other weather events and natural hazards (Luber, 2008). Areas with more tree canopy experience less heat than areas with less tree canopy, as shown in Figure 6. Extreme heat events affect public health costs to the individual, hospital visits or equipment to address health issues, as well as to the community as a whole, such as opening cooling centers.

Limiting or prohibiting conflicting uses in significant natural resource area supports efforts to reduce climate change impacts.



Source: Sustaining Urban Places Research Lab (SURP), Portland State University, 2015

Figure 6: Urban Heat Islands in Portland

Noise and Light Pollution

Natural resource areas and open spaces create natural screens and buffers between incompatible land uses, separating them and reducing a broad array of impacts. For example, the US Department of Agriculture reports that a 100-foot wide and 45-foot tall patch of trees (approximately 1/10 an acre) can reduce noise levels by 50 percent (1998). Trees can also reduce the off-site impacts of lighting or visual impacts from intensive development.

Noise and light pollution are often a concern of neighborhood residents living in close proximity to industrial, employment and commercial development. Exposure to bright outdoor lighting, particularly light that is rich in blue wavelengths, can have negative impacts on human health and wellbeing. These impacts include the disruption of circadian rhythms and sleep cycles and possible increases in the incidence of a variety of diseases, including cancer and cardiovascular disease. Rivers, streams and wetlands, as well as vegetated riparian areas around waterbodies form natural screens between land uses and can mitigate for noise and light pollution.

Limiting or prohibiting conflicting uses in significant natural resource area reduces the impacts of noise and light pollution.

D.5.b.2. Historic, Heritage and Cultural Values

Portlanders place a high value on the environment and quality of life. The Oregon state symbols reflect this value. The Oregon state bird is the Western Meadowlark, which is currently a state-listed Species of Concern and has been nearly extirpated from the city due to loss of native grasslands. Portland's City Bird, the Great Blue Heron, is found along rivers, streams and wetlands. Fourteen runs of the state fish, the Chinook salmon, use the Columbia River and all fourteen are federally listed as Threatened or Endangered. The beaver is Oregon's state animal and still resides in many of Portland's waterways.

Portland's identification with nature and wildlife is reflected in many ways. The Audubon Society of Portland is over 100 years old and is the largest chapter of the national Audubon Society. Many Portlanders are avid bird-watchers. Local festivals, Wild Arts Festival, Raptor Road Trip, and annual migratory bird festival at Ridgefield Wildlife Refuge in Washington state are attended by thousands of residents.

Metro has recognized the importance of fish and wildlife and their habitats by adopting the regional Title 13, Nature in Neighborhoods, program in 2005. This program establishes regional baseline requirements to protect fish and wildlife habitat and water quality. The requirements focus on protecting, conserving and restoring natural resource functions and values in riparian corridors. Establishing this program reflects the importance of environmental quality to the residents of the Metro region, including Portlanders.

There is a long history of human inhabitation in the study area. A short summary of the history and current cultural values, focusing on natural resources, is provided below. It is intended to illustrate the history humans have had with the Willamette River, Columbia River and the valley; as well as some of the cultural values humans have placed on the natural resources.

Native American History and Cultural Values

The area now known as Portland has been populated with people from various tribes for thousands of years. In the Portland area, Native Americans lived primarily on the north and south shores of the Columbia River and near the mouth of the Willamette River, and other native peoples also traveled to and through the area. They camped, fished, hunted and gathered first foods such as salmon, lamprey, deer, camas, wapato, acorns and huckleberries. They also used the rivers to travel and trade among area tribes.

Today there are tribes throughout the northwest and beyond that retain an interest in the Portland area. Portland has a robust Native American community of roughly 40,000 people that represent over 300 tribes. These native peoples have an interest in ensuring the long-term protection and abundance of natural and culturally significant resources in order to continue their long-standing connection to the land and its waters. The rivers, streams, wetlands and natural areas have and continue to be important places for gathering food, conducting ceremonies and celebrations and maintaining lifeways practiced since time immemorial.

Post European Contact

European settlement occurred at the confluence of the Willamette and Columbia rivers due to the abundant natural resources and opportunities for trade. As more urban development occurred, the rivers played a key role in the economy. In the 1800's the Willamette River was used to move goods, particularly logs and agricultural products. In the mid-1900's shipbuilding was located in the Willamette River North Reach. The value Portlanders placed on the environment was reflected in city plans, including the 1903 Olmsted vision for a 40-mile loop trail that encompassed Portland and would provide its residents access to open spaces. The 40-mile loop trail is still being realized today through a system of trails throughout the city.

Today, Portlanders value the environment and quality of life. The Oregon state bird is the Western Meadowlark, which is currently a state-listed Species of Concern and has been nearly extirpated from the city due to loss of native grasslands. Five runs of the state fish, the Chinook salmon, use the Columbia and Willamette rivers and all five are federally listed as Threatened or Endangered. Many of Portland's waterways are still inhabited by beaver, the Oregon state animal.

Portland's identification with nature and wildlife is reflected in many ways. The Audubon Society of Portland is over 100 years old and is the largest chapter of the national Audubon Society. Many Portlanders are avid bird-watchers. Local festivals including the Wild Arts Festival and Salmon Festival are attended by thousands of residents. The City co-sponsors the Big Float annually to highlight Portlanders' connections to the Willamette River and to help promote active, water-based recreation.

Metro has recognized the importance of fish and wildlife and their habitats by adopting the regional "Nature in Neighborhoods" program in 2005. This program establishes regional baseline requirements to protect fish and wildlife habitat and water quality. The requirements focus on protecting, conserving, and restoring natural resource functions and values in riparian corridors. Establishing this program reflects the importance of environmental quality to the residents of the Metro region, including Portlanders.

D.5.b.3. Regulatory Compliance

Regulatory compliance is important for the City of Portland to protect infrastructure, avoid cost, liability, and maintain participation in state and federal programs such as the National Flood Insurance Program. There are multiple regulations described in Appendix A for which Portland must maintain compliance. Below are summaries of some regulations the existing Environmental Program complies with or contributes to the compliance with.

Endangered Species Act

After the 1998 listing of steelhead trout in the Lower Columbia River, the City of Portland began developing a comprehensive, coordinated citywide response to threatened and endangered species for City Council adoption (Resolution No. 35715). The City Council established an intent to avoid "take" of a listed species (i.e., harming individuals or populations or their habitat), and to assist with recovery of listed species which now number eighteen species including birds and amphibians. The City has since taken actions such as identifying and prioritizing City programs that could affect listed species, providing technical support to bureaus, providing oversight for activities involving federal permitting or funding,

and developing a watershed management plan to help guide city actions. The protection and enhancement of habitats critical to threatened and endangered species are important actions to aid in the recovery of listed species. The 16 species of listed fish occupy 125 miles of rivers and streams in Portland with efforts to reopen more miles every year.

Areas that provide habitat for ESA-listed species are designated in the NRI as Special Habitat Areas and received the highest rank. *Limiting or prohibiting* conflicting uses in these areas will support recovery of ESA-listed species.

Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES)

In response to the impacts of urbanization on water quality, Congress passed the Clean Water Act of 1972 (amended in 1987), which prohibits the discharge of pollutants into waters of the United States unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Portland has two types of NPDES permits under the Clean Water Act: a stormwater permit and wastewater treatment plant permit that includes the combined sewer collection. The NPDES stormwater permit requirements require large (Phase I) cities such as Portland to obtain an NPDES stormwater permit for their municipal separate storm sewer system (MS4) discharges. Portland's wastewater NPDES permit is updated to current standards and renewed every 5 years. Portland's MS4 system includes conveyance or systems of conveyances such as municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm sewers owned by the City of Portland designed or used for collection or conveyance of stormwater. The Oregon Department of Environmental Quality (DEQ) issued Portland's first MS4 permit in 1995 and it is also updated to current standards and renewed every 5 years. Portland City Council directed the Bureau of Environmental Services (BES) to lead the citywide response for stormwater requirements and implementing key program elements.

Compliance with the NPDES MS4 permit requires cities to establish a comprehensive stormwater management program, including establishing controls on post-development stormwater runoff. Portland adopted its first citywide Stormwater Management Manual (SWMM) in 1999, which includes water quality and flow control design standards for onsite stormwater management facilities. The SWMM focuses on low-impact development practices, stormwater management facilities and conveyance features, and maintenance and operational best management practices (BMPs) designed to improve stormwater quality. The SWMM is part of Portland's NPDES MS4 stormwater management program to improve the quality of Portland's waters. The Environmental Program also contributes to protecting natural drainageways and forested riparian areas.

National Flood Insurance Program (NFIP) and Community Rating System (CRS)

In 1968, Congress created the National Flood Insurance Program to help provide a means for property owners to financially protect themselves from floods. The NFIP offers federally-backed insurance to homeowners, renters, and business owners if their community (whichever agency issues land development permits) participates in the NFIP. Flood insurance is required for all federally-backed mortgages and loans. Federal flood insurance is available, regardless of risk—often, but not always, at a lower cost than private insurance. It is available when private insurance is not.

Participation in the NFIP is conditioned upon communities implementing FEMA requirements in the Special Flood Hazard Area, also known as the 100-year floodplain. Current requirements include building and site development standards for properties in the floodplain, and compliance with applicable federal

laws, including the ESA. In addition, NFIP-participating communities can also help lower insurance rates for residents through participation in FEMA's voluntary Community Rating System program, which incentivizes community flood mitigation and preparation. Today, Portland's mitigation and preparation programs, including the Environmental Program, yield a 20% discount for Portlanders. This is a significant discount, but it can be improved through increased preparation and mitigation programs.

D.5.b.4. Summary of Social Consequences

Allowing conflicting uses would have the following consequences:

- i. Expand local and regional employment benefits associated living-wage jobs
- ii. Reduce human health and welfare benefits associated with natural resources
- iii. Reduce screening and buffering benefits of natural resources between land uses
- iv. Reduce the ability of the City to comply with regional, state, and federal regulatory requirements

Limiting conflicting uses would have the following consequences:

- i. Maintain most or all local and regional employment benefits associated living-wage jobs
- ii. Maintain most human health and welfare benefits associated with natural resources
- iii. Maintain most screening and buffering benefits of natural resources between land uses
- iv. Maintain the ability of the City to comply with regional, state, and federal regulatory requirements

Prohibiting conflicting uses would have the following consequences:

- i. Reduce some local and regional employment benefits associated living-wage jobs
- ii. Preserve human health and welfare benefits associated with natural resources
- iii. Preserve screening and buffering benefits of natural resources between land uses
- iv. Enhance the ability of the City to comply with regional, state, and federal regulatory requirements

D.5.b.5. Social Recommendation

Based solely on the social consequences analysis of allowing, limiting, or prohibiting development in significant **wildlife habitat that is not a Title 13 Habitat Conservation Area**, the following general recommendations are intended to optimize the social values described in the narrative.

Limit conflicting uses within forests and woodlands that are contiguous to streams or wetlands

Forest and woodlands contiguous to rivers, streams, and wetlands directly impact the social benefits provided by the water features by supporting the functions of the water features for human health and welfare and regulatory compliance. Forests and woodlands are culturally and historically important. Limiting conflicting uses would require minimizing development impacts on the features where possible. Mitigation for unavoidable impacts could replace lost social benefits. This could have a negative, but likely negligible, impact on employment. Limiting conflicting uses would support the city's compliance with regional, state, or federal rules.

Limit conflicting uses within forests on steep slopes

Trees on steep slopes help to stabilize the soil and reduce the risk of landslides. The trees provide multiple social benefits such as air quality, air temperature moderation, recreational opportunity, and health benefits. Limiting conflicting uses would require minimizing development impacts on the features where possible. Mitigation for unavoidable impacts could replace lost social benefits. This could have a negative, but likely negligible, impact on employment.

Allow conflicting uses within other areas of significant wildlife habitat

The social benefits of allowing conflicting uses generally outweigh the economic benefit of non-forested upland wildlife habitat.

D.5.c. Environmental Consequences

This portion of the analysis summarizes the environmental consequences of protecting significant wildlife habitat that is not a Title 13 Habitat Conservation Area. The natural environment in urban areas is altered and disturbed by human activities. However, human welfare depends in part on vital ecosystem services provided by natural resources such as fresh air, clean water, slope stability, food supply, shade, and access to nature. Fish and wildlife also depend on having adequate quantity and quality of habitat, especially in urban areas where habitat is limited.

D.5.c.1. Environmental Analysis

Ecosystem Services

Natural resources provide multiple services to associated development; these are called *ecosystem services*. Examples of the ecosystem services provided by natural resources include air purification, maintenance of water quality and quantity, flood storage, soil stabilization, air cooling, aesthetics, screening, and buffering, and employee benefits such as opportunities for recreation and exercise. Some of these services, when displaced by development, must be replaced using infrastructure. For example, when a site is converted from a forest to a parking lot, the hydrologic and water quality functions provided by the forest must be replaced in the form of stormwater management and/or landscaping and the air-cooling benefits must be replaced by HVAC systems. Another example, when trees on steep slopes are removed, erosion and landslides can damage property and public infrastructure and cause erosion in streams that may be hundreds of feet from the trees.

Development can have many negative impacts on natural resources. Development reduces the overall size and complexity of existing natural resources features and reduces wildlife connectivity for the species that live in and migrate through Portland. Often mitigation for these impacts is required through federal, state, or local regulations; however, mitigation actions rarely can replace all impacted features or functions in full (ECONorthwest, 2012).

Development also has negative impacts to adjacent remaining habitat. Reducing the size of the habitat increases the edge to interior habitat ratio. Noise, light, dust, and vibration from the development penetrate into the edge of the remaining habitat. Impacts from actions like construction can last long after the action is completed. Physical pollution, such as chronic noise, light, and vibration, have negative environmental impacts, including significant changes in migration, foraging, predator-avoidance behaviors, reproductive success, and community structure of many fish and wildlife species (Barber et.al., 2009). Light pollution can affect salmon migration (Tabor, 2004) and noise pollution can have impacts on bats. Chemical pollution from industrial accidents, effluent discharge, and particulate releases also disrupts similar behavior and life history strategies of fish and wildlife. Some species can adapt to such changes to their environment; however, many others cannot.

Fragmentation of natural resources by roads and trails creates places where invasive plants can intrude into the habitat. People using these facilities can also have a negative impact on the resources. For example, people hiking on trails cause noise that can disturb wildlife, particularly if people bring dogs on

the hike. Leaving behind trash, pet waste, and trampled vegetation, and the act of plant/animal harvesting are common impacts of human use of natural areas.

Limiting or prohibiting conflicting uses within significant natural resource areas has a positive impact on the environment.

Climate Change

Climate change impacts are already evident, both globally and in Oregon, and more impacts are inevitable, if uncertain. To adapt, the region must understand and prepare for change. Portland's Climate Action Plan calls for a comprehensive review to better understand the possible and the likely impacts of climate change. The purpose is to assess climate-related vulnerabilities, and the strengths and resiliency of: local food, water and energy supplies, infrastructure, transportation and freight movement, flood areas, watersheds, public health, public safety, social services, and emergency preparedness.

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

That being said, it is fairly certain that the Portland region will experience the following changes:

- Increased temperatures overall, including average, maximum and minimum temperatures in the summer and winter months (projected 0.5 °F increase per decade). Prolonged periods of drought during the summer that can increase wildfire risks.
- Changes in precipitation patterns, with more precipitation falling in mid-winter and less precipitation in the summer. More precipitation falling as rain rather than as snow in lower elevation watersheds.
- Continued influence of ocean-driven weather patterns (e.g. La Niña/El Niño and the Pacific Decadal Oscillation) and swings between hot/dry and cold/wet (Oregon Climate Change Research Institute, 2010).
- Changes to frequency, direction, and landfall of atmospheric rivers (e.g., "Pineapple Express").

In addition, the Portland region may also experience:

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

Non-developed areas that provide multiple natural resource functions can play an important role in adapting to climate change in the region. Flood storage provided by active flood areas may become even more important to accommodate potential changes in flows and flood regimes. Maintaining diverse habitats and migration corridors will be critical for resident and migratory wildlife that may be required to adapt their behaviors and life cycles to changes in air and water temperature, weather patterns, habitat ranges, and food sources.

Limiting or prohibiting conflicting uses in significant natural resource area supports efforts to reduce climate change impacts.

D.5.c.2. Summary of Environmental Consequences

Allowing conflicting uses would have the following consequences:

- i. Reduce functions provided to development and people by natural resources including air cooling and purification, maintenance of water quality and quantity, flood storage, aesthetics, and screening, and buffering between uses
- ii. Require replacement of some lost functions with hard infrastructure (e.g., stormwater facilities, erosion control)
- iii. Loss of significant environmental functions and increased negative impacts on environmental functions of remaining, adjacent natural resources (e.g., noise, light, runoff, etc.)
- iv. Complicating efforts to comply with regional, state, and federal requirement (e.g., Clean Water Act, Endangered Species Act)
- v. Increased chance for future Endangered Species Act listings of at-risk fish and wildlife species
- vi. Reduction, incrementally, in the capacity of the region to adapt to climate change
- vii. Foregoing opportunities to leverage future development and redevelopment to help enhance and restore ecosystem services
- viii. Increase risk of damage from flooding or landslides

Limiting conflicting uses would have the following consequences:

- i. By requiring mitigation, maintaining functions provided to development and people by natural resources including air cooling and purification, maintenance of water quality and quantity, flood storage, aesthetics, and screening and buffering between uses
- ii. Would require replacement of some lost functions with hard infrastructure (e.g., stormwater facilities, erosion control)
- iii. By requiring mitigation, maintaining most significant environmental functions; however, some feature and functions cannot be mitigated for and some functions may be shifted elsewhere through off-site mitigation
- iv. Reduce the loss of significant environmental functions and maintain buffers between adjacent natural resources
- v. Support efforts to comply with regional, state, and federal requirements (e.g., Clean Water Act, Endangered Species Act)
- vi. By requiring mitigation, may help avoid risk of future Endangered Species Act listings of at-risk fish and wildlife species
- vii. By requiring mitigation, may help maintain region's capacity to adapt to climate change
- viii. Maintaining opportunity for natural resource enhancement and restoration; however, may forego some opportunities to leverage development to improve environmental functions
- ix. Maintaining similar level of risk of damage from flooding or landslides

Prohibiting conflicting uses would have the following consequences:

- i. Maintaining functions provided to development and people by natural resources including air cooling and purification, maintenance of water quality and quantity, flood storage, aesthetics, and screening and buffering between uses
- ii. Avoid costs associated with replacing lost functions with hard infrastructure
- iii. Maintaining significant environmental functions provided by the natural resources
- iv. Support efforts to comply with regional, state and federal requirements (e.g., Clean Water Act, Endangered Species Act)
- v. Reduce risk of future Endangered Species Act listings of at-risk fish and wildlife species
- vi. Maintaining the region's capacity to adapt to climate change
- vii. Foregoing opportunities to leverage development to enhance and restore environmental functions
- viii. Reduce risk of damage from flooding or landslides

D.5.c.3. Environmental Recommendation

Based solely on the environmental consequences analysis of allowing, limiting, or prohibiting development in **significant wildlife habitat that is not a Title 13 Habitat Conservation Area**, the following general recommendations are intended to optimize the environmental values described in the narrative. The economic, social, environmental, and energy recommendations are balanced and optimized in Section H. General ESEE Recommendation, and further refined in Chapter 3.

Strictly limit conflicting uses within forests located on steep slopes

Trees on steep slopes help manage stormwater and reduce the risks of landslides. Strictly limiting conflicting uses in these areas would maintain the most functions provided by the trees. Mitigation for unavoidable impacts could address most unavoidable impacts. Strictly limiting conflicting uses would retain the ability to leverage future development to enhance and restore the forest and woodland vegetation.

Limit conflicting uses within all other areas providing significant wildlife habitat

Limiting conflicting uses would result in most development needing to avoid, minimize or mitigate for adversity impacts on natural resource features and functions. This approach would help reduce the impacts of development on wildlife habitat. This approach would maintain buffers between development and remaining natural resources and the ability to leverage future development to enhance and restore natural resources.

D.5.d. Energy Consequences

This portion of the analysis summarizes the energy consequences of protecting significant wildlife habitat that is not a Title 13 Habitat Conservation Area. The energy analysis focuses on the following topics: transportation, infrastructure (water, sewer, stormwater), and the heating and cooling of structures. A general discussion of these topics is provided below.

D.5.d.1 Energy Analysis

Transportation

Energy expenditures for transportation relate primarily to travel distances from origin to destination and mode of transportation used. Both variables can be affected by natural resource protection in terms of the location of development and routing of transportation facilities. Major air, road, rail and water transportation infrastructure are located in close proximity to housing and employment in Portland, which helps reduce transportation-related energy consumption.

The availability of jobs near housing reduces commuter miles and energy consumption. Portland is the job and housing center for Oregon. The regional availability of alternative modes of transportation, such as buses, light rail, and walking and cycling routes, can also help reduce transportation-related energy consumption.

Designing transportation routes and facilities to avoid adversely affecting natural resources could increase or decrease the size or length of an infrastructure facility, and could affect the distance or travel time between origin and destination, for both people and goods. However, the majority of the transportation infrastructure in Portland is already built.

Generally speaking, *limiting or prohibiting* new or expanded transportation infrastructure in areas of significant natural resources would have a negligible impact on energy expenditures.

Infrastructure

Infrastructure services require energy to construct, operate and maintain. Efficient site design (e.g., clustered housing and other facilities), enables the provision of adequate sewer, stormwater, and water services while reducing overall demand for infrastructure (e.g., shorter lines, more efficient stormwater and wastewater treatment). Efficient site design can also allow development to avoid significant natural resources, although in some instances additional infrastructure may be needed to avoid the resource. Development located away from flood hazards can eliminate the need for additional structural components or hazard control structures.

Natural resources can be considered part of the infrastructure of the City. Trees and other vegetation intercept rain and snow, which reduces stormwater runoff and the need for stormwater management in the form of pipes and detention ponds. Rivers, streams, wetlands and flood areas provide hydrologic functions including providing a location for water to flow and storing floodwaters. When water bodies are filled, channelized or otherwise altered, additional infrastructure is needed to move water through

the urban landscape (e.g. pipes). Soil, water bodies and vegetation filter pollutants from the water, improving water quality and reducing the need for treatment.

Generally speaking, *limiting* or *prohibiting* new built infrastructure in areas of significant natural resources reduces energy consumption required to build infrastructure required to replace the natural functions provided by water bodies, floodplains and vegetation. However, the energy costs associated with some infrastructure could increase if the distance or size of the infrastructure must be increased to avoid impacts to significant natural resources.

Heating and Cooling

Energy demand for heating and cooling structures can be affected by site design, building form, and presence of trees, vegetation or water bodies. The orientation of buildings and use of vegetation to maximize solar heating in the winter and shading in the summer reduce both heating and cooling needs. The retention of trees, vegetation and water bodies, and the planting of new trees and vegetation reduces ambient air temperature and maintains local humidity, which can also help reduce the demand for mechanical air conditioning in homes and buildings.

Vegetation can also create a windbreak that can slow or divert cold winter winds reducing heat loss. Construction techniques that reduce the surface to volume ratio of a building (e.g., common wall), can also help reduce heating and cooling needs.

Generally speaking, *limiting* or *prohibiting* conflicting in areas of significant natural resources maintains the heating and cooling benefits provided by the natural resources and reduces energy consumption by buildings.

D.5.d.2 Summary of Energy Consequences

Allowing conflicting uses would have the following consequences:

- i. May reduce additional transportation energy demand by maintaining employment opportunities in close proximity to housing
- ii. Would require energy for land preparation and construction of stormwater management, flood control and erosion control
- iii. Would require energy for land preparation and construction of sewer, water and other infrastructure
- iv. May require additional energy for heating and cooling

Limiting conflicting uses would have the following consequences:

- i. May reduce additional transportation energy demand by maintaining employment opportunities in close proximity to housing
- ii. Would require energy for land preparation and construction of stormwater management, flood control and erosion control
- iii. Would require energy for land preparation and construction of sewer, water and other infrastructure
- iv. May require additional energy for heating and cooling

Prohibiting conflicting uses would have the following consequences:

- i. May increase, although the impacts would be negligible, transportation energy demand by reducing employment opportunities in close proximity to housing
- ii. Would retain functions of the natural resources for stormwater management, erosion
- iii. May require additional energy for heating and cooling

D.5.d.3. Energy Recommendation

Based solely on the energy consequences analysis of allowing, limiting, or prohibiting development in **significant wildlife habitat that is not a Title 13 Habitat Conservation Area**, the following general recommendations are intended to optimize the environmental values described in the narrative. The economic, social, environmental, and energy recommendations are balanced and optimized in Section H. General ESEE Recommendation, and further refined in Chapter 3.

Limit conflicting uses within forests

Trees on steep slopes help manage stormwater, reduce the risks of landslides and maintain the heating and cooling benefits of trees. Strictly limiting conflicting uses in these areas would maintain most functions provided by the trees and reduce energy consumption needed to replace the natural functions with built infrastructure. Mitigation for unavoidable impacts could address most impacts. Limiting conflicting uses would retain the ability to continue to development employment and housing and reduce sprawl.

Allow conflicting uses within all other significant wildlife habitat

Allowing conflicting uses in all other areas would maintain the capacity to centralize new housing and employment near the existing built infrastructure in Portland, reducing energy consumption associated with sprawl.

D.6. ESEE General Recommendations

The ESEE general recommendation balances the economic, social, environmental, and energy consequences of protecting significant natural resources that are not a Title 13 Habitat Conservation Area. Portland is a highly developed area and impacts from conflicting uses cannot be fully avoided. Allowing some future development in natural resource areas is inevitable, particularly development associated with utilities and public infrastructure. However, conflicting uses should be limited overall in areas of high and medium ranked wildlife habitat.

The ESEE general recommendations are taken forward into specific resource site ESEE analyses, resulting in an ESEE decision specific to each resource site that contains significant natural resources that are not a Title 13 Habitat Conservation Area. The resource site-ESEE decision will affirm, clarify or modify in the general ESEE recommendation. Please see Volume 4, Part A, Title 13 Compliance, for protection decisions for Habitat Conservation Areas.

D.6.a. No Rollback

Metro Title 13 rule 3.07.1330(a)(2) states that any city that had an acknowledge Goal 5 program prior to December 28, 2005, that applies to upland wildlife habitat shall not repeal or amend such regulations in a manner that would allow more than a de minimis increase in development that could occur in those upland habitat areas. This is known as the “no rollback” policy.

By 2002, Portland had applied environmental overlay zones to upland habitat throughout the city and Portland had an acknowledged Goal 5 program for riparian corridors and wildlife habitat. Previous Goal 5 ESEE decisions applied protections to wildlife habitat and those ESEE decisions will be upheld.

The “no rollback” approach should not be construed to mean that the application of protections, namely the conservation and protection overlay zones, cannot be updated to correctly apply to the location of existing wildlife habitat, thus resulting in removal of an overlay zone or reducing the level of protections for a particular property or properties or a portion of a property. For example, if the previous ESEE decision was a *limit* decision for forest on steep slopes; moving the boundary of the overlay zones to align with the forest canopy and extent of the steep slope is not a rollback even if some properties may have regulations removed.

The combination of corrected environmental overlay zones based on the confirmed Habitat Conservation Areas and the ESEE recommendations for each resource site found in Volume 2, Part A – G, results in a total of 535 acres of environmental overlay zone add throughout Portland. Prior to the Ezone Map Correction Project, there were 7,904 acres of protection overlay zone and 5,180 acres of conservation zone in the project area. With the corrections that are proposed by this project, there are 9,112 acres of protection overlay zone and 4,507 acres of conservation zone in the project area. Overall, the change is an increase, not a decrease, and at 4% within the project area, it would be considered a de minimis change.

D.6.b. ESEE General Recommendation

The City of Portland has an acknowledged Goal 5 program that applies environmental overlay zones to significant natural resources. The established program does not result in a *prohibit* decision. Instead the program clarifies that for some natural resources the conflicting uses should be *strictly limited*, while for other natural resources the conflicting uses should be simply *limited*. Both the *strictly limit* and *limit* recommendation are consistent with a *limit* recommendation as explained in OAR 660-023-0040(4). This approach is maintained.

There are positive and negative consequences to any decision to protect, or not, significant natural resources. For example, protecting forests on steep slopes maintains the soil stabilization functions of the tree canopy, reducing landslide risks, but may limit the location, size or extent of future development. The recommendations intend to balance city-wide goals for natural resources, economic development, housing and public health.

The ESEE general recommendations for significant natural resources that are not a Title 13 Habitat Conservation Area are to:

1. *Strictly limit* conflicting uses within are of significant forest vegetation that are located on slopes >40% steep;
2. *Limit* conflicting uses within areas of significant forest vegetation that are located on slopes >25% steep;
3. *Limit* conflicting uses within areas of significant forest that are 30 acres in size or larger, including contiguous wetland area⁴;
4. *Allow* conflicting uses within all other significant wildlife habitat areas.

The ESEE general recommendations provide a baseline approach that is further analyzed in the ESEE for each resource site. The ESEE general recommendations may be affirmed, modified or clarified. The resource site-specific ESEE decisions may maintain, increase or decrease the level of protection recommended by the general recommendations.

⁴ The patch may be all forest or a combination of forest and wetland. If the combination of forest and wetland are 30 acres or larger then it qualifies for this ESEE recommendation. Example: 20 acres forest + 10 acres wetland is 30 acres total.

D.7. Implementation Tools

The final ESEE decisions, documented in Volume 2, Part A - G, should be implemented through the updates to existing zoning code regulations and maps, presented in Volume 1, in the following ways:

1. Where there is a *strictly limit* decision, it is recommended that conflicting uses be restricted to a narrow set of environmentally appropriate development such as natural resource enhancement, utilities, public infrastructure, or maintenance, repair, and replacement of existing structures. Other development should be very narrowly limited to reduce impacts to significant natural resources. The code should require that negative impacts to natural resource features and functions be avoided and minimized to the maximum extent practicable; and unavoidable negative impacts should be fully mitigated. Mitigation for unavoidable impacts should result in no net loss of features or functions and account for:
 - location of the mitigation site in proximity to the impact site;
 - timing of the mitigation action(s) in relation to the timing of impacts;
 - lag-time to achieve desired future conditions and functions of the mitigation actions;
 - relationship between the mitigation site and adjacent habitats and land uses; and
 - monitoring needed to ensure the mitigation is successful.

A *strictly limit* decision can be implemented using the existing or updated protection overlay zone (p-zone), river environmental overlay zone (river e-zone) or similar code requirements. The boundaries of the overlay zones should be corrected periodically over time to better align with the natural resource features and functions the *strictly limit* decision applies to.

2. Where there is a *limit* decision, it is recommended that impacts to the natural resources be minimized but not fully avoided. The code should require negative impacts to natural resource features and functions be minimized to the maximum extent practicable and unavoidable negative impacts should be fully mitigated. Mitigation for unavoidable impacts should result in no net loss of features or functions and account for:
 - location of the mitigation site in proximity to the impact site;
 - timing of the mitigation action(s) in relation to the timing of impacts;
 - lag-time to achieve desired future conditions and functions of the mitigation actions;
 - relationship between the mitigation site and adjacent habitats and land uses; and
 - monitoring needed to ensure the mitigation is successful.

A *limit* decision can be implemented using the existing or updated conservation overlay zone (c-zone), river environmental overlay zone (river e-zone) or similar code requirements. The boundaries of the overlay zones should be corrected periodically over time to better align with the natural resource features and functions the *limit* decision applies to.

3. Where there is an *allow* decision, it is recommended that conflicting uses be fully allowed.

The *Environmental Overlay Zone Map Correction Project* plan documents:

Volume 1A – Project Report, Summary of Results and Implementation

The purpose of the Project Report is to document the overall project approach and methodology, summarize public engagement, and provide an at-a-glance summary of the results by resource site.

Volume 1B – Zoning Code and Map Amendments

Amendments to zoning code chapter 33.430, Environmental Zones, and the official zoning maps.

Volume 2 – Resource Site Inventory and ESEE Decisions

For each of the geographies listed below, each document presents an inventory of natural resource features and functions, a site-specific Economic, Social, Environmental and Energy Analysis (ESEE), and the ESEE decisions regarding which natural resource should be protected for each resource site.

Part A1 – Forest Park and Northwest District, Resource Sites 1 – 20

Part A2 – Forest Park and Northwest District, Resource Sites 21 – 41

Part B – Skyline West

Part C – Tryon Creek and Southwest Hills East

Part D – Fanno Creek

Part E – East Buttes and Terraces

Part F – Johnson Creek

Part G – Boring Lava Domes

Volume 3 – Natural Resources Inventory

Approach and methodology used to produce the citywide Natural Resources Inventory. The results of the inventory are presented in Volume 2, Part A – G.

Volume 4 – Compliance Report

Compliance with Metro Urban Growth Management Plan Title 13 for Habitat Conservation Areas and Oregon State Planning Goal 5 for significant natural resources that are not a Habitat Conservation Area. The results, recommendations and implementation are reported in Volume 2, Part A – G, and Volume 1, Part B.

Volume 5 – Appendices