

Current Conditions

CHAPTER

1



This chapter provides an overview of the current land cover and land ownership within the greater Portland-Vancouver region, which, for the purposes of this document and its companion *Regional Conservation Strategy*, is defined as the geographical area shown in Figure 1-1. In general, the region consists of 1,829,575 acres (2,859 square miles, or 7,404 square kilometers) primarily within the northern Willamette Valley and southern Puget Trough ecoregions, along with portions of the the Coast Range and the Cascade Mt. foothills. The region spans parts of two states, parts or all of 10 counties, and parts or all of eight HUC-4 watersheds and 22 HUC-5 watersheds. (HUC stands for hydrologic unit code; see sidebar on page 3.) Figure A-2 in Appendix A and Table 1-1 show the watersheds—at several different HUC levels—that were delineated and explored for this *Biodiversity Guide*.¹

Elevation, habitat, and development patterns within the region are diverse. Elevation varies from just above sea level along the Willamette and Columbia rivers to more than 4,000 feet in the foothills of the Cascades (see Figure A-3).

Most of the region (75 percent) lies below 2,000 feet in elevation, and 8 percent is below 50 feet.

Land cover classes and land ownership also are diverse, and the process of classifying and estimating them within the region was intricate and involved (see Appendix A for a description). For ease in understanding, this chapter describes the region's land cover in terms of seven generalized groupings of land cover classes—agriculture, regenerating forest, developed land, low vegetation, sand bars, tree cover, and water—and two derivatives of land cover: forest patches and forest patch interior. All of these classifications have specific definitions for the purposes of this chapter (see Appendix A), as do categories such as rural and urban areas and public and private lands. For more information on land cover classes, exactly what they indicate, and how they were derived, see Appendix A and the tables in this chapter.

¹ In a few cases, small portions of watersheds near the edge of the region were added to other watersheds in order to cover the entire Willamette Valley ecoregion.

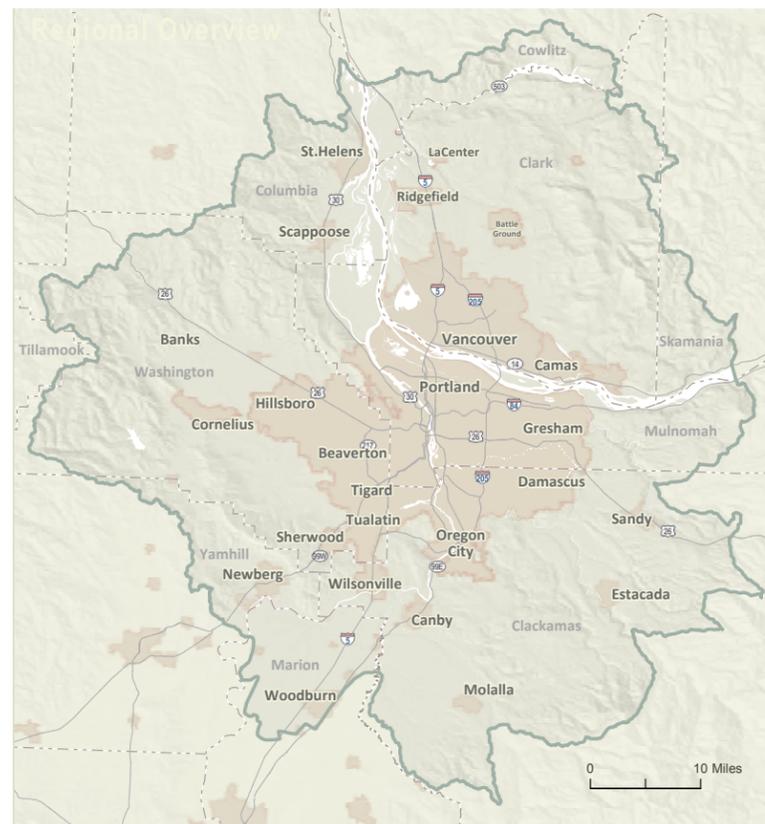
TABLE 1-1
Land Cover by Watershed in the Greater Portland-Vancouver Region

Watershed (WS) or Subbasin (SB)	Watershed Acres	% of the Region	Agriculture	Regen. Forest	Developed	Low Vegetation	Sand Bars	Tree Cover	Water
Abernethy Cr-Willamette R	87,000	5%	30%	<1%	15%	10%	<1%	43%	2%
Chehalem Creek-Willamette R	78,000	4%	54%	<1%	10%	6%	<1%	29%	1%
Clackamas SB (partial)	158,000	8%	22%	3%	8%	7%	<1%	59%	<1%
Hayden Island-Columbia R	19,000	1%	<1%	<1%	6%	10%	<1%	9%	75%
Johnson Creek	60,000	3%	6%	<1%	39%	13%	<1%	41%	2%
Lewis SB (partial)	221,000	12%	13%	12%	3%	5%	<1%	64%	3%
Lower Columbia-Sandy SB (partial)	217,000	12%	12%	5%	7%	7%	<1%	64%	5%
Lower Columbia-Clatskanie SB (partial)	22,000	1%	37%	2%	10%	5%	<1%	29%	18%
Molalla-Pudding SB (partial)	181,000	10%	43%	3%	8%	4%	<1%	42%	<1%
Salmon Creek-Frontal Columbia R	131,000	7%	21%	1%	24%	20%	<1%	31%	3%
Scappoose Creek-Frontal Columbia R	123,000	7%	22%	4%	6%	6%	<1%	57%	5%
Tualatin SB	453,000	25%	22%	8%	13%	7%	<1%	49%	<1%
Willamette R-Frontal Columbia R	79,000	4%	1%	<1%	54%	12%	<1%	28%	6%
TOTAL	1,830,000	100%	22%	5%	13%	8%	<1%	49%	3%

It is important to point out that a land cover map is never considered a perfect representation of the landscape. Improvements to land cover maps can, and should, be made as additional “ground truth” information about actual land cover components and spatial patterns is acquired through time. These improvements should be based on independent assessments of the map’s quality.

— D. STOMS
A Handbook for
Gap Analysis, 1994

FIGURE 1-1
The Region



ABOUT THE HYDROLOGIC UNIT CODE (HUC) SYSTEM

The hydrologic unit system is a standardized watershed classification system developed by the U.S. Geological Survey in the mid-1970s. Hydrologic units (HUCs) are geographical areas representing all or part of a watershed. Organized in a nested hierarchy by size, hydrologic units range in size from regions, such as the Willamette Basin (a 3rd-field HUC) to smaller watersheds such as the Clackamas, Sandy, Molalla, Tualatin, and Lewis River watersheds (4th-field HUCs), to local watersheds such as Beaver Creek or Salmon Creek (5th-field HUCs).

Vancouver region. Furthermore, current remote sensing techniques are unable to determine the difference between certain land uses, such as natural versus agricultural land cover where heights or spectral signatures (i.e., reflected colors) are similar. There are always some errors in remote sensing, but techniques have improved substantially over time.

Our land use and land cover estimates are derived primarily from two sources, both of which drew from a variety of data sources and analytic techniques. The Intertwine Alliance contracted with the Institute for Natural Resources in 2012 to develop a fine-scale land cover map (Figure 1-4) (Appendix A) using a combination of high-resolution color aerial photography, light detection and ranging (LiDAR), satellite imagery, and hand digitizing that covers 88 percent of the greater Portland-Vancouver region. Within the 88% of the region covered by LiDAR imagery, the resulting data layer has high precision, including 5-meter pixels in urban areas, but uses relatively few cover types such as plant associations or detailed habitat types. The remaining 12 percent was mapped at 30-meter resolution and resampled to 5 meters.

Limitations in the land cover layer for this Biodiversity Guide include a lack of distinction between agricultural trees (such as orchards or

Data Sources and Limitations

It is difficult to obtain high-quality, consistent data over a large geography such as the greater Portland-Vancouver region when multiple layers of information are needed. Yet consistency enables comparison between watersheds. As a result, there are some precise and accurate data sets for portions of the region that we could not use. At a 5-meter resolution, the land cover data in this Biodiversity Guide are more detailed than anything else that covers this geography but are not as detailed (i.e., not as fine scaled) as some of the local inventories conducted by individual municipalities.

For instance, a tree canopy layer created in 2008 for the Metro urban growth boundary at a 1-meter resolution reported 31 percent tree cover, whereas this Biodiversity Guide reports 34 percent for the same area at a 5-meter resolution. The former may be more accurate, but the latter covers the entire region; the 3 percent difference may be within the margin of error for both data sets. On the other hand, in 2008 ReGAP² mapped 27 percent of the region (30-meter resolution) as agriculture, while this Biodiversity Guide reports 22 percent. Differences may be due to differences in precision, differing definitions of “agriculture,” or error in one or both data sets. Thus, the data are representative at a large scale but not necessarily good for finer-scale analyses.

Mapping land cover accurately over a large geographic area is always challenging but especially in highly developed and fragmented areas. This is so because of the small patch size (i.e., the area occupied by one type of land cover), the difficulty of differentiating between some specific land cover types with remote sensing, and the high cost of ground-based verification. Small patch size in particular has typically prevented regional or statewide projects from accurately identifying or mapping habitat in the more urbanized portions of the greater Portland-

**THE REGION’S
MAPPED LAND COVER
CONSISTS OF:**

- 49% Trees**
- 22% Agriculture**
- 13% Developed land**
- 8% Low vegetation**
- 5% Regenerating forest**
- 3% Open water**
- <1% Sand bars**

²ReGAP is a national effort to map land cover and identify cover types that are underrepresented in terms of protection status. See *Final Report on Land Cover Mapping Methods, Map Zones 2 and 7, PNW ReGAP*, by E.B. Grossmann and others, published by the Institute for Natural Resources at Oregon State University.



HOW MUCH OF OUR NATURAL LAND COVER IS PROTECTED?

The truth is, no one knows exactly, in part because the meaning of the word “protected” is not consistently defined. Does it include forestry lands or regulated areas? Some properties are managed for multiple uses. The best we can do right now is to estimate how much of the natural landscape is publicly owned, but that does not guarantee protection, and it leaves out protection by nonprofits such as land trusts, conservancies, and privately owned conservation easements.

Christmas tree farms) and young natural forest, or between natural prairie from lawns and especially commercial grass fields or pasture. Patches of field agriculture 4 acres or larger are reasonably well mapped outside of urban areas, although some low-stature natural vegetation may be mapped as agriculture and vice versa.

Public lands and protected habitat also were difficult to identify and categorize. At the time of publication there was no database or geographical information system (GIS) layer that clearly distinguished between public land and protected habitat. Public land is land owned by some form of government and can consist of natural habitat, public parks, schools, golf courses, or developed land. In some cases future development is not legally prohibited on public land. In contrast, protected land may be in public or private ownership and refers to lands whose current and future management is constrained to—at the very least—prevent outright development.

The mapping team for this *Biodiversity Guide* chose to use a draft version of Metro’s Recreation, Conservation, and Public Lands layer to estimate protected habitat. Although this data set is still being refined, it was determined that the benefit of having a tax lot based-layer, which differentiated between federal, state, special district, regional, local, and nonprofit lands, was more useful for the *Biodiversity Guide* than a more coarsely scaled data set of Pacific Northwest protected lands from the ReGAP project.

As with any large-scale mapping effort, the resulting representation of the land cover of our region is certain to have errors in some or even many specific locations, yet it still provides a reliable representation of the overall patterns of most cover types in the region. An accuracy assessment (see Appendix A) revealed a relatively high degree of accuracy, as long as land cover types were somewhat generalized, as described below. Future mapping priorities may include differentiating habitats and cover types not adequately addressed here such as prairie, oak types, tree farms, natural shrub cover, and small farms, and differentiating between high-structure and low-structure agriculture. Improved land cover data allowed us to improve habitat priority modeling for the region as well (Appendix B). The land cover data and modeled results allow for a scalable, science-based approach to regional priority setting. The modeling effort is described more fully in Appendix A.

Land Cover in the Greater Portland-Vancouver Region

The information below describes land cover in the greater Portland-Vancouver region and explores some differences between urban and rural areas. The information is watershed-based to illustrate the linkages among urban areas, rural areas, predominantly publicly owned lands, and other habitat areas within the Willamette Valley, Puget Trough, and Coast Range and Cascades.

Urban and Developed Areas

With the presence of two major and 48 smaller cities, urban areas occupy one-fifth of the greater Portland-Vancouver region and are a key focus of the conservation efforts described in the *Regional Conservation Strategy* (Figure A-1). Urban areas are defined as urban growth boundaries in Oregon and urban growth areas in Washington. About one-third of urban areas in the region have mapped tree cover, which includes forests as well as many single trees and small clusters of trees. Although “urban” is defined as lands that lie within official jurisdictional boundaries regard-

less of land cover, “developed” is a specific land cover category created using remote sensing information. Developed areas include buildings, paved roads, and parking lots.

KEY FACTS: “Urban” Areas

- 20 percent of the greater Portland-Vancouver region is classified as urban area, meaning that it is within an urban growth boundary or urban growth area.
- 31 percent of the urban area is classified as trees.
- 9 percent of the urban areas is publicly owned.
- Public landowners that own more than 1,000 acres within urban areas include the cities of Portland and Gresham, Vancouver-Clark Parks & Recreation, and Metro.

The developed land cover category includes roads, parking lots, and buildings anywhere within the region, but not the lawns associated with those buildings.

KEY FACTS: “Developed” Land

- The developed land cover classification covers 13 percent of the region.
- Within urban areas, 44 percent of the land cover is classified as developed.
- Within rural areas (i.e., specifically not urban), 5 percent of the land cover is classified as developed.

Low vegetation is a mix of natural and non-natural cover types and includes an unknown but likely significant amount of landscaped and agricultural types, along with natural cover types. Low vegetation covers about 8 percent of the entire region and 17 percent of the land classified as urban.

Open Water and Wetlands

The open water land cover category includes rivers, large streams, lakes, ponds, wetlands, and water bodies where GIS-based land cover classification detected a water signal. The open water land cover category generally excludes small streams and some seasonal or heavily vegetated wetlands.

(For a more detailed description of open water and wetlands see Chapter 3.)

Because water flows downhill and measures of water quality (i.e., temperature and chemical contamination) in rivers and streams generally reflect conditions throughout a watershed, the condition of open-water habitats gives strong clues as to the ecological condition of the surrounding region. Although the region’s river systems have been altered over the past 150 years, its water bodies continue to provide habitat, ecosystem services, biodiversity conservation benefits, and biodiversity linkages that greatly exceed their collectively low percentage of total land cover. The open water cover class includes large rivers, such as the Willamette and Columbia; major tributaries, such as the Clackamas, Lewis, Molalla, Sandy, Tualatin and Washougal rivers; and important lakes, such as Vancouver Lake, Sturgeon Lake, Lake Oswego, and Hagg Lake.

KEY FACTS: “Open Water”

- 3 percent of the region is classified as open water.
- 10 percent of the region is within the Federal Emergency Management Agency’s 100-year floodplain.
- More than 5,500 miles of streams and rivers have been mapped within the region.

The region’s water quality issues are primarily a result of land use changes. Aside from dams, the greatest impacts are typically from urban and agricultural land uses, with forestry practices also impairing water quality. Most water bodies in the region are greatly affected by dams, irrigation withdrawal, or changes in hydrology and water quality that have resulted from increases in the amount of impermeable surfaces and other human influences in the watersheds. Key effects of these changes include flashier streams, increased flooding and property losses, damaged streams, and pollution. These changes are reflected in the existence of a total maximum daily load (TMDL) for the entire Willamette River and also a specific TMDL for the Tualatin Basin to limit further inputs of pollutants, including tempera-

ture, fecal bacteria, and mercury.³ (Chapter 7, “Threats and Challenges,” describes water quality issues in the region in more detail.)

Major rivers in the region whose hydrology is altered by dams include the Willamette, Columbia, Clackamas, Tualatin, Molalla, Washougal, and Lewis. The Sandy River is the largest river without any dams. Most of the smaller rivers and streams have weirs, ponds, or other structures to facilitate water withdrawal for fish hatcheries, irrigation, or other agricultural use. In the most extreme examples, some streams in urban areas have been rerouted into pipes; this is the case in inner east and downtown Portland.

Wetlands are typically—but not always—found in floodplains. Throughout much of the region, wetlands have been drained, filled, or disconnected from their water source by dikes in order to facilitate commercial, residential, or agricultural development. Some wetlands are included in the open water land cover category but not specifically identified. Therefore, we made an effort to collect more detailed information on these special habitats.

KEY FACTS: “Wetlands”⁴

- About 4 percent of the region consists of wetlands.
- The percent cover of wetlands in urban areas does not differ substantially from that in rural areas.
- About one-quarter of known wetlands are publicly owned.

Although the current extent of wetlands has certainly declined over time, surveys from 1850 vastly underrepresented wetlands; for this reason it is not possible to estimate the degree of loss.

Tree Cover and Forest Patches

Forests in our region’s natural areas span a range of forest types and conditions, including

floodplain forests dominated by hardwoods, remnant mixed oak-conifer forests, and riparian and upland forests that range from 100 percent deciduous to 100 percent coniferous (the percentage depending largely on the forest’s management and disturbance history).

OVERALL TREE COVER

Forested areas occur throughout the region. Trees, including street trees and all agricultural trees, cover 49 percent of the region (see Table 1-1 and Figure A-4). Forests are patches of trees, and the size of a habitat patch generally correlates with its biological diversity (see Chapter 7, “Biodiversity Corridors,” in the *Regional Conservation Strategy*). In addition to size, the shape of a habitat patch is important to wildlife because interior habitat, which is away from the edges of the habitat patch, is generally more valuable for sensitive species and contains fewer invasive plant and animal species than does edge habitat.

Our land cover classification had the greatest success in classifying trees within the region. LiDAR imagery was available for the majority of the region, allowing identification not just of tree cover but of tree heights as well. Because the LiDAR data ranged in quality and source year, this chapter only reports on the presence of trees, with no attempt to specify height or tree type (i.e., conifer or deciduous).

KEY FACTS: “Tree Cover”

- Trees of any kind cover about 49 percent of the region, which is equivalent to about 900,000 acres.
- 54 percent of the region is classified as trees or regenerating forest (i.e., regenerating clear cuts). This totals nearly 1 million acres.
- 83 percent of the land cover that is classified as trees or regenerating forest occurs in patches that are more than 30 acres in size.

The total amount of tree cover is clearly important, but the size and shape of forest patches also influence the region’s fish and wildlife, particularly the more sensitive or declining species. We analyzed rough size and shape estimates through forest patches and interior tree patches respectively, below.

FOREST PATCHES

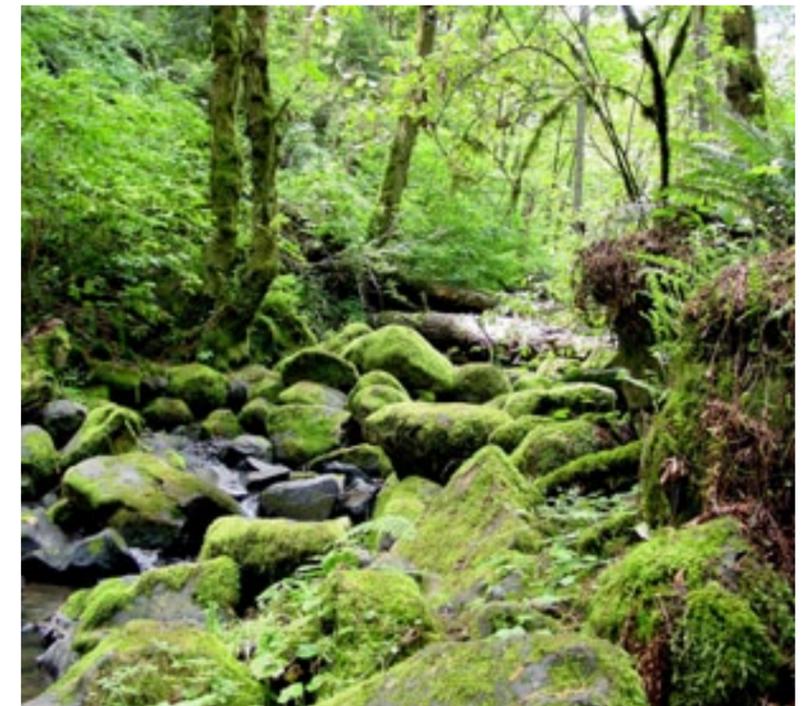
We differentiate between the tree land cover classification and forest patches, with the latter being patches of trees plus areas of regenerating forest. For this analysis, a forest patch is defined as a cluster of trees and/or regenerating forest (i.e., clear cut) that is at least 30 acres in size. Land cover mapping for this Biodiversity Atlas does not distinguish between 30 acres of 20-year-old trees mixed with weeds and 30 acres of old-growth forest with native understory that includes rare plants. Many of the region’s largest forest patches are managed for timber harvest. These are working lands. In terms of mapping, regenerating forests are successional because under current forest practices they are continually replanted. In addition, clear cuts and natural clearings within a forest are important to species such as elk. Research indicates that 30 acres is a reasonable low end for what constitutes a large forest patch.

KEY FACTS: “Forest Patches”

- Forest patches (larger than 30 acres) cover 45 percent of the region (see Figure A-5).
- Forest patches cover about 10 percent of urban areas, compared to 54 percent of rural areas.

Forests are not equally distributed throughout the region. The watersheds that have the highest number of acres of forest are the Tualatin, Lewis, Lower Columbia-Sandy, and Clackamas; collectively these watersheds total 57 percent of the region and contribute nearly one-third of the region’s forest. Similarly, some urban areas have more tree cover than others, particularly where there are many streams or large protected natural areas, such as nature parks.

The largest contiguous areas of forestlands are in the eastern, northeastern, northern, and west-



ern fringes of the region, in the foothills of the Coast Range and Cascades. However, three major Coast Range spurs—Chehalem Ridge, Parrett Mountain, and the Tualatin Mountains, including Forest Park and Tryon Creek State Park—support substantial forested areas, as do the East Buttes area of Clackamas County and the Sandy River Gorge (Figures A-4 and A-5). In Washington, significant forested habitat is found near Lacamas Lake, Camp Bonneville, Whipple Creek Park, and Ridgefield National Wildlife Complex. Large forested areas also are found near outlying cities such as Battleground and in areas near the Cascade foothills.

The age of trees and the condition of the understory help in determining the species mix and structure of a forest. Most actively managed, commercial, and private industrial forests in the greater Portland-Vancouver region are composed mostly of Douglas fir trees (or occasionally ponderosa pine) that are between 1 and 60 years old. These stands typically have few snags, limited native shrubs, and scant large wood on the forest floor. As a result they are unlikely to support

³ The Federal Clean Water Act is implemented at the state level under the TMDL process. In Oregon this is done by the Department of Environmental Quality and in Washington by the Department of Ecology. For more information see www.deq.state.or.us/wq/tmdls/tmdls.htm or <http://www.ecy.wa.gov/programs/wq/tmdl/index.html>. Key facts about wetlands are based on a hybrid of mapping efforts, using the best available local data.

⁴ Key facts about wetlands are based on a hybrid of mapping efforts, using the best available local data.

species that depend on old-growth (i.e., mature) forest or species that require native shrub communities. This likely also is the case in state-owned forests managed by the Washington Department of Natural Resources and Oregon Department of Forestry to produce income for state school trust programs and, to a lesser extent, in so-called matrix lands owned and managed by the federal government (especially the U.S. Bureau of Land Management and U.S. Forest Service), where a focus on commercial thinning rather than clear cutting may enhance shrub communities and create some larger trees. Exceptions are likely to occur along streams protected by Oregon and Washington state forest protection acts, where species diversity and average age may be higher. Family-owned forests may also have greater age and species diversity, depending on management approach.

In urban areas and, increasingly, in rural areas, forests are suffering from high levels of invasive plant species such as English or Irish ivy (*Hedera* sp.), garlic mustard (*Alliaria petiolata*), invasive blackberry (*Rubus* sp.), Scotch broom

(*Cytisus scoparius*), false brome (*Brachypodium sylvaticum*), and traveler's joy (*Clematis vitalba*), among others. This is especially the case along unmanaged roadside and in riparian areas. (For more on this issue, see Chapter 7, "Threats and Challenges.")

OLD-GROWTH/MATURE FOREST

Old-growth and mature forest has largely disappeared within the greater Portland-Vancouver region. No comprehensive layer of old-growth forest exists for the region, and conversations with land managers suggest that only a tiny fraction of old-growth, mature, or previously unharvested forest remains. However, there are a few small patches of old-growth forest within the region. Notable examples on the Oregon side include two patches totaling less than 200 acres on public land on the Sandy River, a small patch along the Clackamas River near Eagle Fern Park, and small amounts in or near Forest Park. In Washington, nearly 2,000 acres of patches that include mature or old-growth forest have been mapped; these are scattered throughout lands owned by PacifiCorp, mostly along the Lewis River.

The effort invested in mapping relatively small areas of old-growth forest showcase the rare and valuable nature of the region's remaining old-growth forest.

PRAIRIE AND NATIVE OAK

In 1850, prairie, oak savanna, and oak woodland habitats occupied about 25 percent of the greater Portland-Vancouver region. Evidence for this can still be seen today in the small patches and individual mature oak trees scattered throughout residential, commercial, and agricultural lands and mixed within the region's less intensively managed forestland at elevations below about 2,000 feet. Although these habitats are scattered throughout much of the region, they are most abundant in the southern end of the region, at the western edge of the Willamette Valley in Oregon, along the Willamette River, and in the eastern edge of the region in the Columbia River Gorge, especially in Washington.



TABLE 1-2

Regional Examples of Significant Prairie and Oak Habitats

Area	Owner/Manager
Sauvie Island	Oregon Department of Fish and Wildlife
Willamette Narrows	Metro, Oregon Parks and Recreation and The Nature Conservancy, among others
Cooper Mt. Nature Park	Metro, Tualatin Hills Parks and Recreation District
Ridgefield National Wildlife Refuge Complex	U.S. Fish and Wildlife Service
Washougal Oaks Preserve	Washington Department of Natural Resources
Lacamas Park and Lacamas Prairie	City of Camas, Washington Natural Heritage Program and multiple private owners
Lands in the Lake River/Columbia River lowlands between the Shillapoo Wildlife Area and the Ridgefield National Wildlife Refuge Complex	Private

The mapping effort for this *Biodiversity Guide* did not attempt to map oak and prairie habitats. Although these habitat types do fall within tree cover or other land use classes, there are no comprehensive and accurate maps of oak and prairie habitats available for most of the region from other sources. However, various Oregon entities have partial oak maps, and the Washington Department of Fish and Wildlife has mapped thousands of acres of oak and prairie habitats as part of its Priority Habitats and Species program.

The ReGAP project estimates that 3 percent (49,000 acres) of the greater Portland-Vancouver region supports oak woodland. However, that small number, which represents a 90 percent loss since 1850, is still likely to be an overestimate. This is so because, even though potentially suitable habitat for oak woodland is widespread, few large examples of oak woodlands are known to exist, and present-day oak is often mixed in with other types of trees. Data on oak savanna and prairie are similarly unreliable, although ReGAP estimates that less than 1 percent of the region (1,500 acres) is currently prairie. Reliable figures for the percent of oak woodland, savanna, and prairie in public ownership do not exist, but a high percentage is thought to be in private ownership. Table 1-2 lists some significant areas of prairie and oak within the region.

Agriculture

There are no accurate statewide or, in most cases, even county-level map layers for agriculture. The mapping effort for this *Biodiversity Guide* used a combination of a modeling approach and hand digitizing from aerial photographs to separate agriculture from other short-stature land cover types. The mapping and acreage estimates in this *Biodiversity Guide* lack precision around Christmas trees farms, nut and fruit orchards, and vineyards (all of which are likely included in other land cover categories) and probably underestimate even row crops and grass fields because the hand-digitizing process excluded small areas. The hand digitizing substantially improved the quality of this land cover category.

KEY FACTS: "Agriculture"

- 22 percent of the region's land cover —just over 400,000 acres—is mapped as agriculture.
- 82 percent of the classified Agriculture land falls within four counties:
- Clackamas County: 31 percent (approximately 125,000 acres)
- Washington County: 23 percent (approximately 93,000 acres)
- Clark County: 17 percent (approximately 68,000 acres)
- Marion County: 11 percent (approximately 45,000 acres)

Most of the region’s largest agricultural areas lie in the interface between urban areas and the outer large forested areas, where lands are relatively flat, soils are good, and water is accessible. Depending on management and type of crop, agricultural lands can provide important habitat for birds and other wildlife, such as grassland birds and wintering waterfowl. However, loss of habitat and management activities such as mowing during nesting season can reduce wildlife populations.



Derivatives of the Land Cover

Natural Lands and Natural Patches

Natural lands were defined by removing developed and agricultural lands from the land cover and adding wetlands and small water bodies. Natural land cover types with a cumulative contiguous area larger than 1 acre were grouped as “natural patches.” This was integral to the subsequent habitat modeling process (see Appendix B) where we wanted to value small natural urban patches in relationship to their surroundings. In the habitat model, this



kept the urban patches from being eclipsed by the larger, mostly publicly-owned patches in the foothills of the region.

KEY FACTS: “Natural Lands and Natural Patches”

- 60 percent of the landscape was classified as natural patches larger than 1 acre.
- 53 percent of all the natural patches acres (or roughly 30 percent of the total region) are in patches larger than 30 acres.
- 25 percent of the urban area is classified as natural patches that are larger than 30 acres.⁵

Interior Forest Habitat⁶

Table 1-3 provides information on the habitat differences between urban and rural areas as illustrated by the tree cover and forest patch size statistics described above, as well as by the amount of interior forest habitat.

KEY FACTS: “Forest Habitat”

- 53 percent of the region’s tree cover occurs in areas classified as interior forest habitat (i.e., at least 50 meters inside a forest patch).
- 97 percent of all interior forest habitat lies outside areas classified as urban.
- About 14,000 acres of interior forest habitat are located within areas classified as urban.

⁵ See Chapter 6, “Issues and Concepts,” for information on patch size and the relative importance of interior versus edge habitat.

⁶ For the purposes of this *Biodiversity Guide*, interior habitat is defined as that which is 50 meters or more to the inside (away from the edge) of the patch of forest. Research suggests that in the greater Portland-Vancouver region, that is the approximate distance at which adverse edge effects, such as non-native species proliferation and simplified forest structure, are substantially reduced.

TABLE 1-3

Publicly and Privately-Owned Lands, Forest Patches (FP) and Interior Forest Habitat (IF) in the Region, by Watershed (WS)

Watershed or Subbasin	Ownership (Total Area in Watershed)		Forest Patches > 30 Acres (FP)			Interior Forest Habitat (IF)		
	% Pub.	% Priv.	% Cover in WS	%FP That is Public	WS’s Contrib. to all Regional FP	% Cover in WS	%IF That is Public	WS’s Contrib. to all Regional IF
Abernethy Cr-Willamette R	4%	96%	31%	7%	3%	13%	10%	2%
Chehalem Creek-Willamette R	1%	99%	21%	2%	2%	8%	1%	1%
Clackamas Subbasin (Partial)	9%	91%	55%	15%	11%	35%	18%	11%
Hayden Island-Columbia R	13%	87%	6%	53%	<1%	2%	55%	0%
Johnson Creek	11%	89%	16%	37%	1%	6%	57%	1%
Lewis Subbasin (Partial)	22%	78%	71%	28%	19%	48%	34%	20%
Lower Columbia-Sandy Subbasin (Partial)	26%	74%	63%	36%	17%	43%	43%	18%
Lower Columbia-Clatskanie Subbasin (Partial)	0%	100%	23%	0%	1%	14%	0%	1%
Molalla-Pudding Subbasin (Partial)	3%	97%	37%	8%	8%	23%	10%	8%
Salmon Creek-Frontal Columbia	11%	89%	19%	17%	3%	8%	25%	2%
Scappoose Creek-Frontal Columbia	16%	84%	55%	14%	8%	39%	15%	9%
Tualatin Subbasin	12%	88%	47%	20%	26%	31%	25%	26%
Willamette R-Frontal Columbia	15%	85%	10%	65%	1%	6%	77%	1%
TOTAL	13%	87%	45%	22%	100%	29%	27%	100%

Note: Publicly owned is defined as federal, state, local jurisdiction, and special district ownership.

Land Management and Public Lands

Although land ownership data are available, land protection data are imperfect. Most public land is not specifically designated according to management focus, such as natural area, recreational area, or playground. This limited our ability to make definitive statements about the amount of conserved or protected land. Clearly, not all publicly owned land is protected from future development or managed for conservation purposes. Some parcels, such as parks, golf courses, and some school properties, have mixed

uses and values, while also providing important wildlife habitat within urban areas. Other areas, such as some publicly owned forests and agricultural areas, are managed primarily for economic production rather than biodiversity values. Our definition of “publicly owned” is a broad category that includes publicly owned golf courses; public parks; federal, state, county, and city-owned lands; schools; and special districts (Figure A-6). There is a higher proportion of forest in public lands than in private lands.

continued on page 14

FIGURE 1-1
Regional Conservation Modeled Output

High-Value Lands in the Region

This graphic shows ecologically high-value lands in the greater Portland-Vancouver region, based on The Intertwine Alliance's conservation priority model. High-value areas on the regional map ranked in the top one-third of all areas because of the type, location, and size of their habitat. In short, these areas represent regional priority lands within our nearly 3,000-square-mile region.

Our scientifically based prioritization model divided the region into 5 meter pixels (5 x 5 meter squares) and analyzed them for a number of features, including: existing vegetation, wetlands, habitat patch size and shape, and the presence of roads. To account for habitats in both urban and rural settings, pixels were scored independently and patch size was assessed in relative and absolute terms. This approach generated information that can help prioritize conservation strategies at a variety of geographic scales - from the entire region to the local neighborhood; and allows us to prioritize urbanized habitats as part of a collective effort to preserve the region's biodiversity.

In general, the results are consistent with, but more detailed and geographically comprehensive than, previous efforts to prioritize wildlife habitat within the region. Because the region has both highly developed urban areas and relatively undisturbed landscapes, much of the

highest value habitats fall outside the region's urban growth boundaries. However, more than 19,400 acres of regional high-priority lands occur within and around the region's cities.

Reliable, region-wide information for some important habitats such as oak woodlands, prairie, rare species and high-quality forests, was not available. For now, their inclusion in planning efforts will continue to require expert knowledge. It's also important to note that the model addressed biodiversity, not culturally or visually significant landscapes. Future efforts of The Intertwine Alliance will address these important issues.

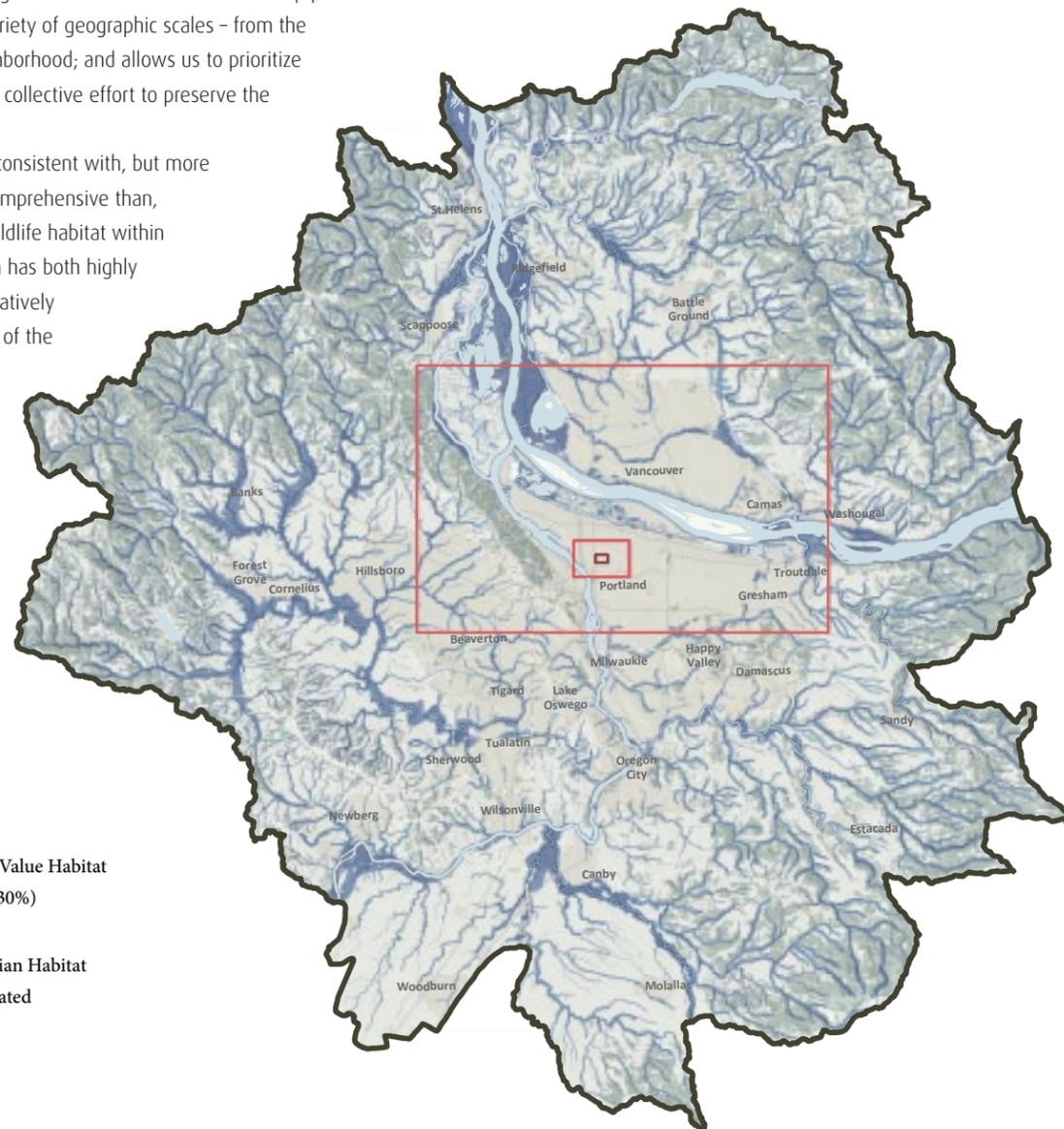


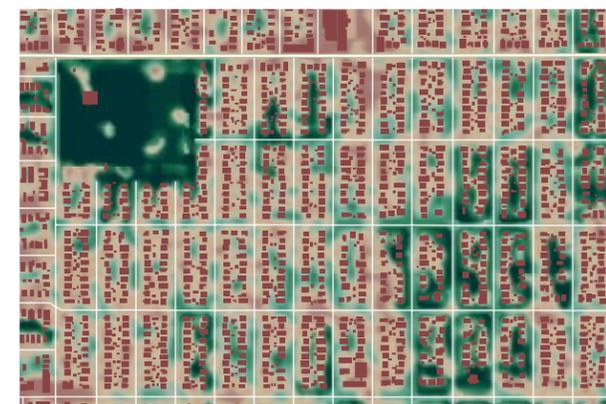
FIGURE 1-2
Understanding Conditions at Multiple Scales



Regional 1"=6.3 MILES, OR 33,333 FEET



Local 1"=0.85 MILES, OR 4,500 FEET



Neighborhood 1"=0.19 MILES, OR 1,000 FEET



An important benefit of our approach is the flexibility to analyze data at any scale, from the 3,000-square-mile region to the local neighborhood. The following examples represent patterns of land cover and relative conservation value as one zooms in from the regional to the neighborhood scale.

Regional

At the regional geographic scale, most small, local habitats are not apparent. Only the most prominent features stand out, such as rivers and large forest blocks. The highest scoring areas reflect habitats that have significant conservation value within the 3,000-square-mile region. Most highly fragmented urban habitats are not represented at this scale even though these areas are critical to regional biodiversity.

Local

At this intermediate scale, finer habitat patterns are more apparent while regional elements are still prominent. In this example, blocks of habitat barely visible at the regional scale become more dominant. For example, patterns of street tree density within east Portland become recognizable as a potential regional planning element. Opportunities to create ecological connections between regional sites are suggested. Only the highest scoring areas at this scale are likely to have regional significance.

Neighborhood

At the local scale, the neighborhood, features that appear less significant at the regional scale are apparent. Habitats barely or not recognizable at larger scales, such as local parks, creeks, vegetated hillsides, or tree patches can be woven into a meaningful framework and incorporated into local habitat conservation planning, neighborhood by neighborhood.

KEY FACTS: “Publicly Owned Land”

- 13 percent of the region’s land base is in public ownership.
- 22 percent of the land classified as forest patches is publicly owned.
- 27 percent of the land classified as interior forest habitat is publicly owned.
- 28 percent of the land classified as natural land cover is publicly owned.

Of the 28 percent of the region’s natural land cover in public ownership, significant acreage is owned and managed by the states of Oregon and Washington, U.S. Bureau of Land Management, U.S. Forest Service, and U.S. Fish and Wildlife Service. Key owners of natural land within urban areas include Vancouver-Clark Parks, Metro, and the cities of Portland, Gresham and Hillsboro. Many other jurisdictions and several nonprofit organizations also own and manage natural habitats (Appendix C). These lands are managed for a variety of purposes, including commercial forest production, nature based recreation, and species and habitat conservation.

The level of natural area protection is not the same across watersheds. Although protection equality at the watershed scale is not an important goal, it is important that land protection priorities be considered at multiple scales, and that the most important lands at each scale be identified and protected. This *Biodiversity Guide* can provide important information for such prioritizations.

Appendix C describes the portfolios of the region’s major public land managers and their management approaches (see also Figure A-6).

FOR MORE INFORMATION

Final Report on Land Cover Mapping Methods, Map Zones 2 and 7, PNW ReGAP

E.B. Grossmann, J.S. Kagan, J.A. Ohmann, H. May, M.J. Gregory, C. Tobalske. 2008. Institute for Natural Resources, Oregon State University, Corvallis, OR.

“Actual Vegetation Layer”

D.M. Stoms. 1994. *A Handbook for Gap Analysis*.

“Assessing Land Cover Map Accuracy for Gap Analysis”

D. Stoms, F. Davis, C. Cogan, and K. Cassidy. 1994. *A Handbook for Gap Analysis*.

How Can My Watershed Address Help Me Find USGS Data? (And What Is a HUC?)

http://nwis.waterdata.usgs.gov/tutorial/huc_def.html