

TECHNICAL REPORT 3
POTENTIAL UGB EXPANSION AREA ANALYSIS
NATURAL RESOURCES INVENTORY

FOR POTENTIAL EXPANSION AREAS (SUBAREAS)
OUTSIDE THE WOODBURN URBAN GROWTH BOUNDARY

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INTRODUCTION

The City of Woodburn may need to expand its UGB to meet long-term population and employment growth needs. This technical report addresses Task 5 of the City of Woodburn's revised Periodic Review Work Program and evaluates natural resource areas within the potential urban growth boundary study area. Technical Report 2.B addresses public facilities and transportation efficiency issues as they apply to the UGB study area.

This work was funded in part by an Land Conservation and Development Commission (LCDC) periodic review grant. To address Task 5 of this grant, the City contracted with Winterbrook Planning to prepare an inventory of potential expansion areas outside the UGB (see Study Area, below). This inventory considers the area (acreage) and distribution (by subarea) of:

- Goal 3 agricultural soils (Class I-IV soils, including high value farm land),
- Goal 5 natural resource areas (wetlands, stream corridors and wildlife habitat),
- Goal 7 hazard areas (floodplains), and
- Goal 2 exception areas (built and committed to non-resource uses).

This information will be useful in address Statewide Planning Goal 14 "locational factors" (Factors 5 – ESEE consequences, 6 – agricultural land preservation, and 7 – agricultural land compatibility) in assessing the relative values of each of eight subareas at the edge of the existing UGB. The inventory also is directly relevant to the Goal 2, Part II exceptions process (OAR Chapter 660, Division 04) and in establishing priorities for UGB expansion as set forth in ORS 197.298.

To address Statewide Planning Goal 2 (exceptions process), 3 (Agricultural Lands) and 14 (Locational Factors 6 and 7), Winterbrook focused first on agricultural soil classifications. Figure 1 shows area and distribution of Class I, II, III and IV soils for each subarea. Table 4 summarizes the results of this GIS analysis in tabular format.

To address Statewide Planning Goal 5 (Natural Resources), Goal 7 (Natural Hazards) and Goal 14 (Factor 5, economic, social, environmental and energy consequences), Winterbrook inventoried wetlands, stream corridors, floodplains, and wildlife habitat (for special status species) within the study area. This inventory determines the location, quantity and quality of Goal 5 resources (wetlands, streams, and habitats) and Goal 7 resources (floodplains) within each subarea, to provide a factual basis for the evaluation of Urban Growth Alternatives.

Finally, to determine the area of buildable land for each subarea outside the UGB, Winterbrook applied the same methods used within the Woodburn growth boundary. (See Technical Memorandum 1 - Buildable Lands Inventory (2002).) Goal 5 and 7 resources are considered constrained lands and are removed from the mapping of Goal 3 agricultural land resources. A fifth of an acre is removed for each single-family residence in rural residential areas. For partially developed land, industrial and commercial acreage is removed based on actual development area.

Table 1. Goal 3, 5 and 7 – Constrained Land Summary

Subarea	Size (acres)	Goal 5 (Natural Resources)			Goal 7 Floodplains	Total Unconstrained	Goal 3 (Agricultural Lands) ²				Developed ³ Exception Areas	Buildable Lands ⁴
		Vetlands	Streams	Species			Class I	II	III	IV		
1. Northwest	655	54.37	96.24	W/in streams	16.89	107.32	4	320	73	30	54.92	394.21
2. North	675	34.44	62.47	W/in streams	40.62	68.31	29	432	83	62	0	485.35
3. Northeast	330	6.93	14.95	W/in streams	0	15.12		135	27	10	57.84	205.63
4. East	343	3.20	18.49	W/in streams	0	19.22		296	14	12	0	259.02
5. Southeast	431	0	6.15	W/in streams	0	6.15		355	46	24	0	339.88
6. South	191	15.30	15.34	W/in streams	11.38	16.14		147	2	12	5.69	135.34
7. Southwest	506	0.87	0	0	0	0.87		361	124	19	0	404.18
8. West	755	4.43	14.09	W/in streams	0.26	14.41	40	567	52	81	0	592.47
Total Area	3886	119.54	227.73	227.73	69.15	247.54	73	2613	421	250	118.45	2816.08
% of Study Area	100%	3.1%	5.9%	5.9%	1.8%	6.4%	1.9%	67.2%	10.8%	6.4%	3%	72.5%

1. Adjusted for overlapping resource coverages.
2. Excludes Goal 5 and 7 constrained lands and exception areas.
3. Approximately 40% of exception areas are developed.
4. Land area less constrained and developed exception lands, less 20% (for roads and infrastructure); rights-of-way not excluded (data not yet available).

STUDY AREA AND SUBAREAS

The study area covers 3,886 acres and is comprised entirely of Class I through Class IV soils. Approximately 97 percent of non-exception area lands are classified as high value farmland. Exception areas total 296 acres and are located primarily in Subareas 1 and 3. Constrained Goal 5 and 7 resource lands total 248 acres and are located primarily along the Senecal and Mill Creek corridors, in Subareas 1 and 2, primarily on Class III and IV agricultural soils. Thus, the subareas with the lower quality agricultural soils tend to have the highest quality Goal 5 and 7 resource sites.

The study area is approximately one-half mile wide located outside of the existing UGB (see Figure 1). It was extended in certain locations to include clear boundaries (e.g., roads), contiguous exception areas, and whole tax lots (where practical).

The study area is divided into eight subareas based on transportation considerations (subareas usually comprise multiple transportation analysis zones or TAZs) and drainage basins. Major roads and railways form the primary divisions between the planning subareas. The subareas range in size from 191 to 755 acres, and have a combined size of 3,886 acres – or about six square miles. The subareas are ordered in a clockwise manner, beginning in the northwest portion of the study area with Subarea 1 (SA-1) and ending with Subarea 8 (SA-8) in the southwest portion. The location and size of each subarea is summarized in Table 2.

Table 2. Study Subarea Location and Size

Subarea	Location/boundaries	Size (acres)
SA-1. Northwest	Bounded to the east by Interstate 5 and the UGB, west by Oregon Electric Railway, south by Highway 214 (Newberg Hwy.), and north by a line approx. 1,000 feet north of and parallel to Crosby Road.	655
SA-2. North	Bounded to the west by Interstate 5, east by Union Pacific Railway and N. Front Street, south by the UGB, and north by a line approx. 1,000 feet north of and parallel to Crosby Road.	675
SA-3. Northeast	Bounded to the west by Union Pacific Railway and the UGB, east by the MacLaren School for Boys, north by Dimmick Road NE, and south by Highway 211 (Estacada Hwy).	330
SA-4. East	Bounded to the west by the UGB and Cooley Road, east by properties within ½ mile of the UGB (Pudding River plateau, reservoir), north by Dimmick Road NE, and south by Highway 214.	343
SA-5. Southeast	Bounded to the west by Highway 99E (Pacific Hwy) and the UGB, east by properties within ½mile of the UGB (Pudding River plateau), north by Highway 214, and south by Geschwill Lane NE.	431
SA-6. South	Bounded to the east by Highway 99E (Pacific Hwy), west by Southern Pacific Railroad, north by the UGB, and south by Belle Passe Road.	191
SA-7. Southwest	Bounded to the east by Southern Pacific Railroad, west by Interstate 5, north by the UGB, and south by Belle Passe Road (extension).	506
SA-8. West	Bounded to the east by Interstate 5 and the UGB, west by Oregon Electric Railway, north by Highway 214 (Newberg Hwy.), and south by property south of Parr Road NE.	755
	TOTAL	3886

EXISTING LAND USE

Land uses within the study area are dominated by agriculture, primarily row crops with occasional nursery production, vineyards and pastures. Older residential areas are scattered throughout the study area, particularly near Senecal Creek (SA-1) to the northwest and areas to the northeast and east (SA-3 and SA-4). One significant institutional use, the MacLaren School of Boys, is located in SA-3. Open space uses include a golf course (SA-2) and a cemetery (SA-6).

DEFINITIONS

Agricultural Land – Land outside of acknowledged urban growth boundaries and acknowledged exception areas for Goal 3 or 4, that:

- a) Is classified by the U.S. Natural Resources Conservation Service (NRCS) as predominantly Class I-IV soils in Western Oregon and I-VI soils in Eastern Oregon;
- b) In other soil classes that is suitable for farm use as defined in ORS 215.203(2)(a), taking into consideration soil fertility; suitability for grazing; climatic conditions; existing and future availability of water for farm irrigation purposes; existing land use patterns; technological and energy inputs required; and accepted farming practices; and
- c) Is necessary to permit farm practices to be undertaken on adjacent or nearby agricultural lands.

Exception Area – an area no longer subject to the requirements of Goal 3 or 4 because the area is the subject of a site specific exception acknowledged pursuant to ORS 197.732 and OAR chapter 660, division 4. Within the Woodburn study area, this land includes areas zoned Acreage Residential (AR) and Public (P).

Floodplain – a stream or river valley apart from the channel that is inundated only in a flood event, attenuating the flood discharge. The 100-year floodplain shows the flood with a 100-year recurrence interval.

Special Status Species – a plant and animal species that is a federal listed, proposed, or candidate species; federal “species of concern”; or State of Oregon listed, proposed, or sensitive species.

Stream (Riparian) Corridor – an area along a river, lake, or stream which includes the water areas, fish habitat, wetlands, and adjacent riparian areas that mark the transition from an aquatic ecosystem to a terrestrial ecosystem.

Wetland – an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

INVENTORY METHODS

Review of Existing Information

A review of existing literature, maps, and other source materials was conducted to identify wetlands, stream corridors, floodplains, and special status species, or site characteristics indicative of these resources, within the study area. The document review included the following sources of information:

City of Woodburn and Marion County GIS data

- Study area (with subareas)
- City of Woodburn UGB
- Parcels
- Zoning
- Streets
- Streams
- LWI Wetlands
- Public parks and open space

Local Sources

- *City of Woodburn Local Wetland Inventory and Riparian Assessment*. Shapiro and Associates, January 5, 2000.
- *City of Woodburn Comprehensive Plan*. City of Woodburn Planning Department, October 1999 (amended).
- City of Woodburn Street/Address map. City of Woodburn Public Works Department, Engineering Division, January 10, 2002.
- *Official Zoning Map of the City of Woodburn, Oregon*. City of Woodburn, July 1, 2002 (last revision). (Includes Significant Wetlands and other wetlands.)
- Ortho photographs (color, April 7, 2000; scale: 1" = 100')
- Planimetrics (horiz. datum NAD 83(91); Or. State Plan North zone, intl. ft.; vert. datum NGVD 29, 1947 adj.)
- Topography (photo date 4/7/00; scale: 1" = 100'; contour interval: 2') (part of Planimetrics).

Other Sources

- Federal Emergency Management Act (FEMA) floodplain maps
- *Marion County Hydric Soils List*. U.S.D.A. Natural Resource Conservation Service (NRCS), 04/21/1999. (Includes hydric soils and soils with hydric inclusions).
- Oregon Department of Forestry and Oregon Department of Fish and Wildlife stream classification and fish-bearing stream maps
- Oregon Division of State Lands, wetland determination files (Woodburn area)
- Oregon Natural Heritage Program (ORNHP) species data. (Database search conducted October 18, 2002 included one-mile buffer from City Limits.)
- *Rare, Threatened and Endangered Plants and Animals of Oregon*. Oregon Natural Heritage Program, February 2001.
- *Soil Survey of Marion County Area, Oregon*. U.S.D.A. Soil Conservation Service, 1972. (Includes 1963 aerial photographs).

- U.S.D.A. Natural Resource Conservation Service. Farm Service Agency photomaps for the Woodburn area.
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory maps. Woodburn, St. Paul, and Silverton, Oregon quadrangles. 1981.
- U.S. Geological Survey (USGS) 7.5 minute topographic maps. Woodburn, St. Paul, and Silverton, Oregon quadrangles. 1981.
- Other agency data (e.g., Marion County, Oregon Department of Fish and Wildlife, Oregon Division of State Lands, Natural Resources Conservation Service)

This information was used as the basis for preparing a natural resource base map showing existing and potential wetland, stream, floodplain, and special status species habitats. Where data gaps existed, or where field verification was deemed necessary, a field inventory was conducted as described below.

Several public agencies were contacted as part of this review. These agencies included:

- City of Woodburn (Planning and Public Works);
- Marion County;
- Marion Soil and Water Conservation District;
- Natural Resources Conservation Service (NRCS);
- Oregon Department of Fish and Wildlife (ODFW);
- Oregon Department of Forestry (DOF);
- Oregon Division of State Lands (DSL); and
- The Oregon Natural Heritage Information Center (ORNHIC).

Field Inventory

Winterbrook conducted field studies and recorded observations of natural resources on October 16 and November [TBD], 2002. Wetlands, stream corridors, floodplains, and habitats with potential use by special status species were noted. Data from field notes, analysis of aerial photos and other maps, and information gathered from public agencies were used to complete the natural resources assessment.

A reconnaissance-level field survey was completed using an off-site methodology following DSL guidelines. Wetland, stream corridors, floodplains, and sensitive species habitats were viewed from nearby public rights-of-way, parks and open spaces, and other public lands. Natural resource base maps and data compiled in the information review phase were field checked from nearby public vantage points. For example, areas exhibiting wetland indicators such as wetland hydrology¹ or dominant hydrophytic vegetation² were noted. Off-site surveys

¹ Indicators of wetland hydrology include visual observation of ponding or soil saturation, historic records of flooding, visual evidence of previous water inundation such as dry algae on bare soil or water marks on soils or leaves, sediment deposition and drainage patterns.

² The wetland indicator status of the dominant species within each vegetative strata (e.g., herb, shrub, tree) is used to determine if the plant community may be characterized as hydrophytic and can thereby meet the wetland vegetation criterion.

are based on off-site viewing, interpretation based on photo signatures of adjacent wetlands (e.g., the City’s LWI wetlands), review of topography and soils data, and other information noted above. In areas where wetlands, stream corridors, floodplains, and special status species were determined to be present, the locations were documented on field maps and new information was digitized as polygon or point data on natural resource maps (see Figure 2).

Using data from existing species records and consultations with resource agency personnel, special status species with potential to occur within the study area were also evaluated. Field staff recorded observations of the availability of suitable habitat for species of special interest during the field surveys; however, a formal sensitive species survey was not completed. It should be emphasized that field surveys were conducted “off-site” and therefore focused on habitats visible from public lands, roads, and rights-of-way. It should also be noted that field surveys were conducted during the dormant season; they were not conducted during optimal warm weather survey times, when most plant or wildlife species can be more easily detected within the study area.

FINDINGS

This section describes the results of the review of existing information and field surveys conducted during October and November, 2002.

Goal 3 Resources: Agricultural Lands

Data on agricultural land classes and soils was obtained from U.S. Department of Agriculture, Natural Resources Conservation Service. Soils within the study area are composed of two primary associations, Amity silt loam and Woodburn silt loam. Both of these soils are found throughout the study area except along stream corridors and in wet areas. These soils are designated capability Class II by the Natural Resources Conservation Service. The stream corridors and wet areas generally contain poorly-drained “hydric” soils, most commonly Bashaw clay, Dayton silt loam, Concord silt loam, and Labish silty clay loam (see discussion of soils under Wetlands, below). Bashaw clay and Dayton silt loam are Class IV soils; Concord and Labish are Class III soils. Only 75 acres, or less than 2 percent of the study area, is composed of Class I soils. These soils are distributed adjacent to the Senecal and Mill Creek corridors in Subareas 1, 2 and 8.

Table 3 summarizes the soil types found within the study area, their capability unit class, and whether or not they are designated as high value farmland.

Table 3. Soil Characteristics

Map Unit Name	Map Symbol	Capability unit	High value farmland
AMITY SILT LOAM	Am	IIw-2	Yes
BASHAW CLAY	Ba	IVw-2	Yes
CONCORD SILT LOAM	Co	IIIw-2	Yes
DAYTON SILT LOAM	Da	IVw-1	Yes
LABISH SILTY CLAY LOAM	La	IIIw-2	No

Map Unit Name	Map Symbol	Capability unit	High value farmland
TERRACE ESCARPMENTS	Te	IVe-2	No
WAPATO SILTY CLAY LOAM	Wc	IIIw-2	No
WILLAMETTE SILT LOAM, 0 TO 3 PERCENT SLOPES	W1A	I-1	Yes
WOODBURN SILT LOAM, 0 TO 3 PERCENT SLOPES	WuA	IIw-1	Yes
WOODBURN SILT LOAM, 0 TO 3 PERCENT SLOPES	WuC	IIe-1	Yes
WOODBURN SILT LOAM, 12 TO 20 PERCENT SLOPES	WuD	IIIe-1	Yes

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 04/21/1999.

Exceptions Areas

The study area contains three exception areas. To the northwest (Subarea 1) is a 137-acre exception area along Butteville Road north of Highway 219 (Newberg Road). This area is zoned Acreage Residential (AR) and includes single-family housing and some agricultural (nursery) uses. To the northeast in Subarea 3 is the MacLaren School for Boys east of Highway 99E. This 145-acre exception area includes a small area of housing and is zoned Acreage Residential (AR) and Public (P). To the south (Subarea 6) is a 14-acre exception area comprised of single-family housing and farm uses along Highway 99E. These lands are zoned AR and P.

Summary

Tables 4.a and 4.b show the area (in acres) and percentages of soil categories within each planning subarea. As noted previously, most (76%) of non-exception lands are composed of Amity and Woodburn Class II soils. There are 75 acres (2%) of Class I soils, 485 acres (14%) of Class III soils, and 310 acres (9%) of Class IV soils. A total of 3,493 acres (97%) non-exception area lands within the study area are classified as high value farmland.

Table 4.a. Agricultural Soil Classes by Subarea

Subarea	Size (acres)	Exception areas	Class I	Class II	Class III	Class IV	High Value Farmland
1. Northwest	655	137	5	342	111	59	518
2. North	675		30	463	101	81	613
3. Northeast	330	145		149	28	10	184
4. East	343			310	15	16	325
5. Southeast	431			357	46	28	416
6. South	191	14		156	5	16	177
7. Southwest	506			362	124	19	506
8. West	755		40	578	55	81	754
Total Area	3886	296	75	2717	485	310	3493

Table 4.b. Percentage Agricultural Soil Classes by Subarea

Subarea	Resource Land* (acres)	Class I	Class II	Class III	Class IV	High Value Farmland
1. Northwest	518	1.0%	66.0%	21.4%	11.4%	100.0%
2. North	675	4.4%	68.6%	15.0%	12.0%	90.8%
3. Northeast	185	0.0%	80.5%	15.1%	5.4%	99.5%
4. East	343	0.0%	90.4%	4.4%	4.7%	94.8%
5. Southeast	431	0.0%	82.8%	10.7%	6.5%	96.5%
6. South	177	0.0%	88.1%	2.8%	9.0%	100.0%
7. Southwest	506	0.0%	71.5%	24.5%	3.8%	100.0%
8. West	755	5.3%	76.6%	7.3%	10.7%	99.9%
Total	3590	2.1%	75.7%	13.5%	8.6%	97.3%

* Resource land is non-exception land within each subarea.

Goal 5 and 7 Resources: Wetlands, Stream Corridors, Wildlife Habitat and Floodplains

Information Review and Agency Contacts

This section summarizes Winterbrook’s review of source materials identified in the Methods section and our contacts with resource agencies.

Wetlands

Local Wetland Inventory

In 2000, the City of Woodburn completed a local wetlands inventory (LWI) and riparian assessment within the UGB. Both “significant” and “other” (non-significant) wetlands are identified on the City’s Zoning Map. Several of these wetlands extend to and potentially beyond the UGB line, particularly in the north and west sections of the City. Wetlands that may extend outside the UGB into the present study area were examined using available aerial photographs and mapping and were field checked where possible. LWI wetlands also served as a reference for map interpretation: the City’s 2000 ortho-photographs were examined for evidence of LWI wetland signatures and hydric soil mapping was compared with LWI mapping to identify potential wetlands within the study area.

National Wetland Inventory

National Wetland Inventory (NWI) maps identify several palustrine emergent and palustrine forested within the study area. These wetlands are located primarily along stream corridors. A few man-made (excavated) open water wetlands are also identified in the northern and southern sub areas. NWI mapping is generally known to include a degree of error with respect to estimating wetland presence and size, especially in forested areas. Where possible, field

verification of NWI wetlands from nearby vantage points was conducted. NWI wetlands for each planning subarea are discussed further below.

Hydric Soils

The Natural Resources and Conservation Service (NRCS) has defined hydric soils as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions, where oxygen is effectively absent from the environment, in the upper part of the soil profile. Hydric soils are indicative of wetlands.

Table 5 provides a list of hydric soils and soils with hydric inclusions within the study area, and indicates the local landform and capability class for each hydric soil type.

Table 5. Hydric Soil Characteristics

Map Unit Name	Map Symbol	Hydric?	Hydric Inclusion	Local landform	Capability unit
AMITY SILT LOAM	Am	No	Yes, Concord	terrace	IIw-2
BASHAW CLAY	Ba	Yes	N/a	flood plain	IVw-2
CONCORD SILT LOAM	Co	Yes	Yes, Dayton	terrace	IIIw-2
DAYTON SILT LOAM	Da	Yes	Yes, Concord	terrace	IVw-1
LABISH SILTY CLAY LOAM	La	Yes	Yes, Wapato, Semiahmoo	relict lakebed	IIIw-2
WAPATO SILTY CLAY LOAM	Wc	Yes	N/a	flood plain	IIIw-2
WOODBURN SILT LOAM, 0 TO 3 PERCENT SLOPES	WuA	No	Yes, southwest poorly drained soils	terrace	IIw-1
WOODBURN SILT LOAM, 0 TO 3 PERCENT SLOPES	WuC	No	Yes, poorly drained soils	terrace	Ile-1
WOODBURN SILT LOAM, 12 TO 20 PERCENT SLOPES	WuD	No	Yes, poorly drained soils	terrace	IIIe-1

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 04/21/1999.

Marion Soil and Water Conservation District / NRCS

Winterbrook contacted Monte Graham at the Marion Soil and Water Conservation District to obtain information on wetlands documented on Farm Service Agency photomaps within the planning area. Winterbrook reviewed copies of photomaps showing wetland areas. Wetlands were mapped along stream channels, including Senecal and Mill Creeks, with larger wetlands found to the east along the Pudding River floodplain.

More than 85 percent of the wetland types identified within the study area were classified as “Prior Converted Cropland.” Prior converted cropland is land that was drained, filled, or manipulated prior to December 23, 1985; was cropped prior to that date; was not abandoned; and does not meet Farmed Wetland criteria. Prior Converted Cropland is not subject to wetland conservation regulations unless it reverts to wetland as a result of abandonment. “Farmed Wetland” is an area that was manipulated and planted prior to December 23, 1985, but still meets wetland criteria. These wetlands may be farmed and maintained in the same manner as long as they are not abandoned. Several Farmed Wetlands are noted on agricultural sites within the study area.

Many of the Prior Converted Croplands and Farmed Wetlands within the study area are tilled to eliminate hydrology. These lands are typically located within areas of poorly-drained, hydric soils that could be expected to revert to wetlands without regular maintenance of drainage systems. As noted previously, all lands with hydric soils are designated as Class III or IV soils. Several areas of Prior Converted Croplands that appear through photo-interpretation or field surveys to meet wetland criteria (but are still farmed) were identified as Farmed Wetlands on the natural resource maps.

Division of State Lands

Winterbrook contacted Ed Emrick and Heather Howard at the Division of State Lands (DSL) to discuss the state's available wetland determination data for the Woodburn area. Copies of wetland determination files were received from DSL. Of the eight determinations identified by DSL, five were located inside UGB and three were within the planning area. Only one of the three determinations in the planning area contained jurisdictional wetlands. These wetlands are located at the Tukwila Golf Course site in the northern part of the study area near Crosby Road. Since this determination was more than five years old (and hence DSL's delineation "concurrence" has elapsed), a field check was conducted.

Significance Criteria

Wetlands are considered significant for the purposes of this study if they: 1) provide high quality fish or wildlife habitat, water quality, or hydrologic control functions; 2) contain rare plant communities or federal or state-listed species; or 3) have a surface water connection to a salmonid-bearing stream.

Stream Corridors

With one minor exception, the study area is contained within the Molalla-Pudding River watershed.³ The Pudding River and its small tributaries define the eastern edge of the study area. The river is the western arm of the large Molalla-Pudding system, a low-gradient, sinuous river system with a large floodplain and a drainage area of 204 square miles. The 62-mile river originates in the low elevation Waldo Hills east of Salem and flows through open fields and farmland before joining the Willamette River east of Wilsonville.⁴

³ A few acres of land along the Oregon Electric Railway in the northwest corner of the study area drain to Case Creek, which is part of the Champoeg Creek watershed that flows through the French Prairie region.

⁴ The lower reaches of Pudding River (including Woodburn) are listed as water quality limited by the state (DEQ). High temperatures, low dissolved oxygen saturation and high fecal coliform bacteria counts exist seasonally in the Pudding River. Levels of DDT exceeded standards in the lower river (at Aurora) during 1994 surveys.

Two principal stream corridors, Senecal Creek and Mill Creek, flow through the study area. Both streams are tributaries to the Pudding River. Both streams also are designated as fish-bearing streams by the Oregon Department of Forestry and Oregon Department of Fish and Wildlife.

Senecal Creek

Senecal Creek, a perennial stream, flows south to north through the western part of the study area (SA-1 and SA-8). East Senecal Creek joins Senecal Creek (mainstem) south of Crosby Road; the stream joins Mill Creek one mile south of Aurora before discharging to the Pudding River. The Senecal Creek and East Senecal Creek corridors are comprised of large Douglas fir and Oregon white oak along the upper banks, with Oregon ash and reed canarygrass dominated wetlands along the stream channel. The streamside wetlands and floodplain areas are quite expansive, particularly in the northern reach of Senecal Creek, with widths of up to 300 feet. The stream corridor width varies from approximately 100 feet (in SA-8) to 500 feet (SA-1). The streamside wetlands and floodplain areas, combined with the vegetated banks and ravines, generally provide high water quality and wildlife habitat functions.

Mill Creek

Mill Creek flows north to south through Woodburn and discharges into the Pudding River just north of Aurora. Due to its path through the center of Woodburn, the stream has a different character than Senecal Creek. As noted in the City's Comprehensive Plan, Mill Creek within the City "has been channelized and offers little opportunity for fish and wildlife habitat." Outside of the City within the study area, the stream corridor is generally wider and the channel less manipulated but streamside vegetation and habitat functions remain limited. Some reaches of the stream are in fair to moderate condition, with high functioning floodplains and sparsely vegetated banks composed of Douglas fir, Oregon ash, black cottonwood, and willows. Reed canarygrass is the dominant cover in wetlands along the stream channel. The streamside wetlands and floodplain areas average approximately 100 feet. The stream corridor width varies from approximately 200 feet (in SA-6) to 300 feet (SA-2).

Accompanying the main stream corridors are several small tributaries which characteristically begin as wide swales of gentle slope (often on farmland) and become well defined channels and ravines near the principal streams.

Significance Criteria

Stream corridors are considered significant for the purposes of this study if they: 1) provide high quality fish or wildlife habitat, water quality, thermal regulation, or flood management functions; 2) contain special status species; or 3) contain a perennial fish-bearing stream.

Habitat for Special Status Species

Winterbrook requested and received information from the Oregon Natural Heritage Information Center (ORNHIC) and the Oregon Department of Fish and Wildlife (ODFW) on special status

species and their documented or potential occurrence within the study area.⁵ Special status species for the purposes of this review include a federal listed, proposed, or candidate species; federal “species of concern”; or State of Oregon listed, proposed, or sensitive species.

Winterbrook contacted Cliff Alton at the ORNHIC to request a database search for documented occurrences of special status species. Four species records were found in the area, including three plant records (one for peacock larkspur and two for thin-leaved peavine) and an invertebrate (Oregon giant earthworm). Additional data on listed fish species was also provided (Alton 2002; ORNHIC 2002).

Winterbrook contacted ODFW Habitat Biologist Jim Grimes (North Willamette District) and Assistant Wildlife Biologist Will High (Salem Field Office) for information on special status fish and wildlife species within the study area. Winterbrook reviewed a joint ODFW/DLCD letter (Knight and Wheaton 2002) regarding updated inventories of fish and wildlife, and associated data and background reports.

Using data from existing species records and consultations with resource agency personnel, special status species with potential to occur within the study area were evaluated. Observations of the availability of suitable habitat were recorded during the field investigation; however, a formal sensitive species survey was not completed.

The following table identifies the federal and state status of the species and their known or potential presence within the study area. The table contains “plants,” “wildlife” and “fish” categories, and is organized alphabetically by common name. Appendix A provides a brief review of the habitat and life cycle requirements of each species and a discussion of their potential occurrence within the study area.

Table 6. Special Status Species

Common Name	Scientific Name	Federal Status	State Status	Occurrence
Plants				
peacock larkspur	<i>Delphinium pavonaceum</i>	SoC	LE	P – ORNHIC historic record approx. 5 miles north of study area (SA-1, SA-2)
thin-leaved peavine	<i>Lathyrus holochlorus</i>	SoC	-	Y – 2 ORNHIC historic records within Woodburn; one at SA-4
Wildlife				
bald eagle	<i>Haliaeetus leucocephalus</i>	T	T	P – successful nesting at Jackson Bend (Willamette); juveniles could be pioneering into Woodburn area
fringed myotis	<i>Myotis thysanodes</i>	SoC	SV	P – bridges, barns, brush piles

⁵ ORNHIC provided information on special status species and their documented occurrence within the study area and a one-half mile buffer around the study area.

Common Name	Scientific Name	Federal Status	State Status	Occurrence
little willow flycatcher	<i>Empidonax traillii brewsteri</i>	SoC	SV	P – shrub thickets (stream corridors)
long-eared myotis	<i>Myotis evotis</i>	SoC	SU	P – bridges, barns, brush piles
long-legged myotis	<i>Myotis volans</i>	SoC	SU	P – bridges, barns, brush piles
northern red-legged frog	<i>Rana aurora aurora</i>	SoC	SU	P – ponds and stream corridors
northwestern pond turtle	<i>Clemmys marmorata marmorata</i>	SoC	SC	Y – reported (by ODFW) in Woodburn pond (east of I-5 by SA-2); potential in other pond habitats
olive-sided flycatcher	<i>Contopus cooperi</i>	SoC	SV	P – conifer forest, stream corridors
Oregon giant earthworm	<i>Driloleirus (=Megascolides) macelfreshi</i>	SoC	-	P – ORNHIC record approx. 5 miles north of study area (SA-1, SA-2)
Pacific western big-eared bat	<i>Corynorhinus townsendii townsendii</i>	SoC	SC	P – bridges, barns, brush piles
painted turtle	<i>Chrysemys picta belli</i>	-	SC	P – pond habitats incl. Woodburn pond (east of I-5 by SA-2)
Fish				
Chinook salmon, Upper Willamette River ESU, spring run	<i>Oncorhynchus tshawytscha</i>	T	-	P – occurs in Pudding River
Coastal cutthroat trout (Southwestern Washington/Columbia River ESU)	<i>Oncorhynchus clarki clarki</i>	PT	SC	Y – Senecal Creek, also in Pudding River system
Coho salmon (Lower Columbia River/Southwest Washington ESU)	<i>Oncorhynchus kisutch</i>	C	SC	P – occurs in Pudding River
Steelhead, Lower Columbia River ESU, spring run	<i>Oncorhynchus mykiss</i>	T	SU	P – occurs in Pudding River

Key:

ESU: Evolutionarily Significant Unit (a unique group of Pacific salmon, steelhead, or sea-run cutthroat trout)

Federal Status: T=Threatened, P=Proposed, C=Candidate, SoC= Species of Concern

State Status: E=Endangered, T=Threatened, SC= Sensitive-Critical, SV=Sensitive-Vulnerable, SU=Sensitive-Undetermined Status, C=Candidate for listing

Occurrence: P=Potential occurrence based on assessment of habitat and range; Y=Recorded within the planning area; N=No recent records and not expected based on habitat and range.

Significance Criteria

Habitat is considered significant for the purposes of this study if it: 1) supports special status species; or 2) is identified by ODFW as habitat for a wildlife species of concern and/or as a habitat of concern.

Floodplains

The source of floodplain data was the Federal Emergency Management Act (FEMA) floodplain maps for the Woodburn area, as reflected in the City's GIS data layer (floodplain theme).

Floodplains within the study area were limited to the two primary stream corridors, Senecal and Mill Creeks. Hence only four subareas contain floodplains: Subarea 1 (17 acres), Subarea 2 (41 acres), Subarea 6 (11 acres), and Subarea 8 (<1 acre).

Under Goal 7, natural hazards are defined to include floods and thus all floodplains are considered significant for the purposes of this analysis.

SUBAREA SUMMARIES

The following section summarizes the location, quantity and quality of natural resources within individual planning subareas. The subareas range in size from 191 to 755 acres, and have a combined size of 3,886 acres.

Subarea 1

Subarea 1 is 655 acres in size and located in the northwest portion of the study area (Figure 1). This site is bounded to the east by Interstate 5 and the UGB, west by Oregon Electric Railway, south by Highway 214 (Newberg Hwy.), and north by a line approx. 1,000 feet north of and parallel to Crosby Road.

Agricultural and Exceptions Lands Summary

Subarea 1 contains a 137-acre exception area along Butteville Road north of Highway 219 (Newberg Road). This area is zoned Acreage Residential (AR) and includes single-family housing and some agricultural (nursery) uses.

Resource (non-exception) lands within the subarea include 5 acres (1%) Class I soils, 342 acres (66%) Class II soils, 111 acres (21%) Class III soils, and 59 acres (11%) Class IV soils. All resource lands within the subarea are designated high value farmland.

Natural Resource Summary

This section summarizes Goal 5 and 7 resource findings for planning subarea 1. Table 7 presents a summary of wetlands, stream corridors, floodplains, and special status species. The table is organized by resource category (type), providing information on the location, quality, and

quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 7. Subarea 1 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-SC-1	Senecal Creek	High – PFO/EM1Y, PFO1W, PEM1Y	35.61
	W-SC-2	East Senecal Creek	High - PFO1W, PEM1Y	12.20
	W-SC*	Pond/lagoon	Low - POWKZx	6.56
Stream Corridors	S-SC Senecal Creek	East of Butteville Rd.	High water quality, fish & wildlife habitat functions	76.67
	S-SC-E East Senecal Creek	East of Woodland Ave.	High water quality, wildlife habitat functions	19.58
Floodplains	F-SC	Senecal Creek, East Senecal Creek	High floodplain functioning	16.89
Special Status Species	Cutthroat trout	Senecal Creek	Moderate to high quality instream and riparian habitat	Within stream channel (above)
	Red-legged frog	Senecal Creek, East Senecal Creek, ponds and wetlands	High quality habitat; potential breeding sites	Within wetlands and stream corridors (above)

* These wetlands do not meet the significance criteria and will not be factored in the subsequent analysis.

Subarea 2

Subarea 2 is 675 acres in size and located in the north portion of the study area (Figure 1). This site is bounded to the west by Interstate 5, east by Union Pacific Railway and N. Front Street, south by the UGB, and north by a line approx. 1,000 feet north of and parallel to Crosby Road.

Agricultural and Exceptions Lands Summary

No exception areas are located in Subarea 2.

Resource lands within the subarea include 30 acres (4%) Class I soils, 463 acres (69%) Class II soils, 101 acres (15%) Class III soils, and 81 acres (12%) Class IV soils. Approximately 613 acres (91%) of resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 8 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 2. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 8. Subarea 2 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-MC-8	Mill Creek	Moderate - PEM1Y	20.28
	W-MC-N	North Mill Creek tributary	Moderate - PFO1Y	5.03
	W-MC-S	South Mill Creek tributary	Moderate - PFO1W, PEM1Y partly filled by golf course	2.86
	W-MC-G (group, incl. MC-26)	Golf Course ponds	Low except for hydro-logic control function (POWKZx)	1.29
	W-MC-F2 (group of farmed wetlands)*	Cropland bet/I-5 and Boones Ferry Road	Low (Farmed)	4.98
Stream Corridors	S-MC Mill Creek	Between Boones Ferry Road and Front Street	Moderate water quality, wildlife habitat functions	62.47
Floodplains	F-MC	Mill Creek	Moderate to high floodplain functioning	40.62
Special Status Species	Western pond turtle	Pond east of I-5 near Hovenden Lane; potential at other ponds	Moderate to high quality habitat	Within pond
	Painted turtle	Potential in pond east of I-5, other ponds	Moderate to high quality habitat	Within pond
	Red-legged frog	Potential in ponds and along stream corridor	Low to moderate quality habitat	Within wetlands and stream corridors

* These wetlands do not meet the significance criteria and will not be factored in the subsequent analysis.

Subarea 3

Subarea 3 is 330 acres in size and located in the southeast portion of the study area (Figure 1). This site is bounded to the west by Union Pacific Railway and the UGB, east by the MacLaren School for Boys, north by Dimmick Road NE, and south by Highway 211 (Estacada Hwy).

Agricultural and Exceptions Lands Summary

Subarea 3 contains a 145-acre exception area which includes a small area of housing and a portion of the MacLaren School for Boys east of Highway 99E. This area is zoned Acreage Residential (AR) and Public (P).

Resource (non-exception) lands within the subarea include no Class I soils, 149 acres (81%) Class II soils, 28 acres (15%) Class III soils, and 10 acres (5%) Class IV soils. All but one acre of resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 9 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 3. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 9. Subarea 3 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-MC-19	Mill Creek tributary east of Front Street	Low to Moderate - PFO1Y, PEM1Y	4.18
	W-MC-P	Pond east of Front Street	Moderate except for hydro-logic control function (POWKZx)	1.91
	W-MC-F3 (farmed wetlands)*	Cropland east of Front Street	Low (Farmed)	0.85
Stream Corridors	S-MC Mill Creek tributary	Between Front Street and Hwy. 99E	Low to moderate water quality, habitat functions	14.90
	S-PR Pudding River tributaries	Southeast of MacLaren School	Moderate to high water quality, fish and wildlife habitat functions	0.04
Floodplains	N/A			0
Special Status Species	Western pond turtle	Potential in pond east of Front Street	Moderate quality habitat	Within ponds
	Painted turtle	Potential in pond east of Front Street	Moderate quality habitat	Within ponds
	Red-legged frog	Potential in ponds and along stream corridors	Low to moderate quality habitat	Within wetlands and stream corridors

* These wetlands do not meet the significance criteria and will not be factored in the subsequent analysis.

Subarea 4

Subarea 4 is 343 acres in size and located in the east portion of the study area (Figure 1). This site is bounded to the west by the UGB and Cooley Road, east by properties within ½ mile of the UGB (Pudding River plateau, reservoir), north by Dimmick Road NE, and south by Highway 214.

Agricultural and Exceptions Lands Summary

No exception areas are located in Subarea 4.

Resource lands within the subarea include no Class I soils, 310 acres (90%) Class II soils, 15 acres (5%) Class III soils, and 16 acres (5%) Class IV soils. Approximately 325 acres (95%) of resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 10 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 4. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 10. Subarea 4 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-PR	Pudding River tributaries east of Cooley, north of Hwy. 214	Moderate to High - PFO1Y, PEM1Y	2.46
	W-PR-F4 (farmed wetlands)*	Cropland south of Hwy. 211	Low (Farmed)	0.73
Stream Corridors	S-PR Pudding River tributaries	South of Hwy. 211	Moderate to high water quality, fish and wildlife habitat functions	18.48
Floodplains	N/A			0
Special Status Species	Red-legged frog	Potential along stream corridors	Moderate quality habitat	Within wetlands and stream corridors

* These wetlands do not meet the significance criteria and will not be factored in the subsequent analysis.

Subarea 5

Subarea 5 is 431 acres in size and located in the east portion of the study area (Figure 1). This site is bounded to the west by Highway 99E (Pacific Hwy) and the UGB, east by properties within 1/2 mile of the UGB (Pudding River plateau), north by Highway 214, and south by Geschwill Lane NE.

Agricultural and Exceptions Lands Summary

No exception areas are located in Subarea 5.

Resource lands within the subarea include no Class I soils, 357 acres (83%) Class II soils, 46 acres (11%) Class III soils, and 28 acres (6%) Class IV soils. Approximately 416 acres (97%) of resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 11 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 5. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 11. Subarea 5 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	N/A			0
Stream Corridors	S-PR Pudding River tributaries	South of Hwy. 211	Moderate to high water quality, fish and wildlife habitat functions	6.15
Floodplains	N/A			0
Special Status Species	Red-legged frog	Potential along stream corridors	Moderate quality habitat	Within wetlands and stream corridors

Subarea 6

Subarea 6 is 191 acres in size and located in the southeast portion of the study area (Figure 1). This site is bounded to the east by Highway 99E (Pacific Hwy), west by Southern Pacific Railroad, north by the UGB, and south by Belle Passe Road.

Agricultural and Exceptions Lands Summary

Subarea 6 contains a 14-acre exception area comprised of single-family housing and farm uses along Highway 99E. These lands are zoned AR and P.

Resource (non-exception) lands within the subarea include no Class I soils, 156 acres (88%) Class II soils, 5 acres (3%) Class III soils, and 16 acres (9%) Class IV soils. All resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 12 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 6. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 12. Subarea 6 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-MC-1	Mill Creek	Moderate - PEM1Y	10.72
	W-MC-F6 (farmed wetlands)*	Cropland west of Hwy. 99E	Low (Farmed)	4.58
Stream Corridors	S-MC Mill Creek	West of Hwy. 99E	Moderate water quality, wildlife habitat functions	15.34
Floodplains	F-MC	Mill Creek	Moderate to high floodplain functioning	11.38

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Special Status Species	Red-legged frog	Potential along stream corridor	Low to moderate quality habitat	Within wetlands and stream corridors

* These wetlands do not meet the significance criteria and will not be factored in the subsequent analysis.

Subarea 7 - Southeast

Subarea 7 is 506 acres in size and located in the southeast portion of the study area (Figure 1). This site is bounded to the east by Southern Pacific Railroad, west by Interstate 5, north by the UGB, and south by Belle Passe Road (extension).

Agricultural and Exceptions Lands Summary

No exception areas are located in Subarea 7.

Resource lands within the subarea include no Class I soils, 362 acres (71%) Class II soils, 124 acres (25%) Class III soils, and 19 acres (4%) Class IV soils. All resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 13 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 7. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 13. Subarea 7 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-MC-15A	Mill Creek	Moderate - PEM1Yx	0.79
	W-MC-F7 (farmed wetlands)*	Cropland west of Union Pacific Railroad	Low (Farmed)	0.09
Stream Corridors	N/A			0
Floodplains	N/A			0
Special Status Species	N/A			0

* These wetlands do not meet the significance criteria and will not be factored in the subsequent analysis.

Subarea 8 – Northwest

Subarea 8 is 755 acres in size and located in the northwest portion of the study area (Figure 1). This site is bounded to the east by Interstate 5 and the UGB, west by Oregon Electric Railway, north by Highway 214 (Newberg Hwy.), and south by property south of Parr Road NE.

Agricultural and Exceptions Lands Summary

No exception areas are located in Subarea 8.

Resource lands within the subarea include 40 acres (5%) Class I soils, 578 acres (77%) Class II soils, 55 acres (7%) Class III soils, and 81 acres (11%) Class IV soils. All but one acre of resource lands within the subarea are designated high value farmland.

Natural Resource Summary

Table 14 provides a summary of findings for wetlands, stream corridors, floodplains, and special status species within planning subarea 8. The table is organized by resource category (type), providing information on the location, quality, and quantity of each resource within the category, and summarizing the percentage of area affected by natural resource constraints.

Table 14. Subarea 8 Natural Resources

Resource Type	Resource / Code	Location	Quality	Quantity (acres)
Wetlands	W-SC-1	Senecal Creek	Moderate – PFO/EM1Y	4.43
Stream Corridors	S-SC Senecal Creek	East Oregon Electric Railway	Moderate to high water quality, fish & wildlife habitat functions	14.09
Floodplains	F-SC	Senecal Creek, East Senecal Creek	Moderate floodplain functioning	0.26
Special Status Species	Cutthroat trout	Senecal Creek	Moderate quality instream and riparian habitat	Within stream channel
	Red-legged frog	Senecal Creek, wetlands	High quality habitat; potential breeding sites	Within wetlands and stream corridors

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