INVENTORY AND ANALYSIS OF WETLANDS, WATER BODIES AND WILDLIFE HABITAT AREAS FOR THE COLUMBIA CORRIDOR

INDUSTRIAL/ENVIRONMENTAL MAPPING PROJECT

Bureau of Planning
City of Portland
Adopted By City Council April 20, 1989
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INTRODUCTION
PURPOSE

This is the second of four documents produced for the Columbia Corridor Industrial/Environmental Mapping Project. It provides the inventory, analysis, and recommendations for protection of significant natural resources. The first, Proposed Industrial Mapping and Annexation Rezoning for the Columbia Corridor, includes recommendations for application of the City's new industrial zones. Recommendations from these two publications are reflected in detailed mapping on quarter section and full section Multnomah County Assessor's Maps contained in the third, Proposed Mapping for the Columbia Corridor. The fourth is the Appendix to the Inventory and Analysis of Wetlands, Water Bodies, and Wildlife Habitat Areas, which contains information that may be of benefit to more clearly understand the purpose and process of the natural resources portion of the project.

This document of wetlands, water bodies, and wildlife habitats for the Columbia Corridor is one of several natural resource publications to be completed within the coming months for the City of Portland in conjunction with the City's Comprehensive Plan update and to comply with LCDC Statewide Planning Goal 5. The purposes of this document are to: (1) identify, describe, and evaluate the location, quantity, and quality of wildlife, wetland and water body resources within the City's Urban Services Boundary (2) evaluate the economic, social, environmental, and energy consequences of preserving, protecting, or otherwise developing the resource site, and (3) recommend application of protective measures on these resource sites where, from the local perspective, it is in the public interest to do so.

This document covers all of the Columbia Slough and vicinity within the City of Portland Urban Services Boundary. The Columbia Corridor represents one of the five major areas containing significant natural resources identified by the City. The remaining areas, which are or will be compiled in separate documents, are: Johnson Creek, West Hills/Forest Park, Willamette Greenway, and miscellaneous East Portland sites within the City's Urban Services Boundary. A map on the following page identifies the general boundaries of the five areas.
LEGEND

1. COLUMBIA CORRIDOR - Includes the Columbia Slough, Smith and Bybee Lakes, and other associated drainage-ways, lakes and ponds.

2. CENTRAL EAST PORTLAND - Includes isolated buttes, parks, cemeteries, and one detention pond.

3. JOHNSON CREEK CORRIDOR - Includes Johnson Creek, associated wetlands, and abutting uplands

4. WEST HILLS CORRIDOR - Includes city parks, drainageways, and areas of major vegetation

5. WILLAMETTE RIVER GREENWAY - Contained in the "1986 Willamette River Greenway Update Study" (Not included in this report)
The Columbia Corridor is a natural geographic unit generally containing similar geologic and biological characteristics throughout its length. Functional values of the individual inventory sites, and plant and wildlife expected to be found, are also generally similar. Additionally, interspersion, or the proximity and interaction of one natural area to other adjacent areas, can be expected to be high. These factors allow the area to be treated as a single district or unit. It is the largest and most diverse unit inventoried in the City's Urban Services Boundary. Natural resource areas and water features in the Columbia Corridor were identified and inventoried in the area generally bounded by N.E. 185th Avenue on the east, the City Urban Services Boundary along the Columbia River on the north, the Columbia/Willamette confluence to the west, and N.E. Sandy and Columbia Boulevards along the south.

The Columbia Corridor represents a portion of the historic floodplain of the Columbia River extending 20 miles eastward from the Willamette River to the Sandy River. Its history has been determined primarily by flooding and subsequent human response. The Columbia Slough has changed beyond recognition since Portland was incorporated in 1851 (see Appendix F for historical documentation). In its natural state the floodplain was unstable, changing yearly with new silt deposits, carved basins, and channels created by the Columbia River. A network of lakes, waterways and wetlands spread over the entire area. It was thickly forested along shores and low-lying areas, but was also made up of expanses of wetland prairie and oak savannah bordered by riparian gallery forest. It supported populations of waterfowl, elk, deer, river otter, and smaller mammals. All but elk continue to be found in the area.

After 1850, the Donation Land Claim Act drew increasing numbers of settlers from the east, and the area changed radically as settlers adapted it to their purposes. Most wetland and water areas were highly modified to accommodate agricultural activity and, more recently, urban development. Today, there are a few remnants left of the once-common vegetation pattern, but they are now under pressure for development to more intense land uses. However, these areas still provide important wetland functions such as ponding areas and drainageways for stormwater runoff, recharge areas for groundwater, filtering systems to trap pollutants, and sediment trapping to increase the quality of associated wildlife habitat.

The Columbia Corridor Natural Resources Management Unit within the City of Portland can be subdivided into five geographically distinct subareas for purposes of this inventory, although functionally they represent one area. The first is Rivergate, extending east from the mouth of the Willamette River to N Portland Road, including portions of the Columbia
LEGEND

1. Rivergate / Terminal 4
2. Hayden / Tomahawk Islands
3. Western Columbia Corridor
4. Central Columbia Corridor
5. Columbia South Shore
Slough that receive direct tidal influence. The next subarea is the West Columbia Corridor, located east of Rivergate and along the Lower Columbia Slough, terminating at about N.E. 21st Avenue. North of this, surrounded by the Oregon Slough and main channel of the Columbia River, is the Hayden/Tomahawk Island subarea. The fourth subarea, Central Columbia Corridor, lies east of the West Columbia Corridor and extends to N.E. 82nd Avenue. East of this, extending to N.E. 185th Avenue, is the Columbia South Shore, which includes the newly created urban renewal district that received City Comprehensive Plan designation and zoning in April 1987. Inventories, analyses, and mapping for all five subareas are contained in this document.

1. Rivergate

The Rivergate subarea of this management unit is defined by N. Portland Road to the east, Kelley Point Park to the west, the Columbia River to the north, and N. Columbia Boulevard to the south. One of the most diverse patterns of land use found in Portland occurs here. The land supports sites of heavy industry, major transportation corridors, and facilities for rail, highway, and marine freight. Additionally there are high and low density residential developments, agricultural areas, parks, and waterways. Several of the larger and higher ranking natural resource sites in Portland are also found here.

Such widely differing uses are to be expected. The western end of this subarea is at the Willamette-Columbia Slough-Columbia River confluence, a site of great natural and human importance (for a more detailed history, refer to Appendix K). It and the Central Columbia Corridor, which comprise those portions of the Columbia Slough which remain under direct tidal influence, stretch more than seven miles east along the Columbia River. This is where water, plants, fish, and wildlife from the Columbia and Willamette Basins have been mixing for millenia. As a tributary to the Columbia River, the Willamette River is surpassed only by the Snake River in water volume and basin size.

2. Hayden/Tomahawk Islands

These two islands are located directly north of the Rivergate and West Columbia Corridor subareas, surrounded by the Columbia River. Motor vehicle access is only by the I-5 freeway, limiting the potential for urban development. The restriction results in large natural areas with little human intrusion in the center of Portland's harbor and major marine shipping facilities. In addition to size, the proximity to other high-quality natural areas results in a complex of diverse resource character and function that is able to support a broad variety of vegetation and animal life.
3. Western Columbia Corridor

The Western Columbia Corridor subarea, extending eastward from N. Portland Road to the Peninsula Drainage Canal at about N.E. 21st Avenue, forms another geographic subarea. Because it is bisected in a north-south direction by the I-5 freeway, and has both Marine Drive and Columbia Blvd. crossing in an east-west direction, motor vehicle access is excellent. As a result, the remaining natural resource sites are often smaller and more isolated than others elsewhere in the Columbia Corridor and are surrounded by conflicting land uses and activities. There are some remaining areas, however, such as the heron rookery at Site 48, and Site 43, an area of numerous and unusual bird sightings, which indicate both the importance of the remaining natural resource areas for wildlife habitat and the ability of wildlife to tolerate urban development under certain circumstances.

4. Central Columbia Corridor

The Central Columbia Corridor subarea is defined by Highway 205 to the east, Peninsula Drainage Canal to the west, and on the north and south by the Columbia River and Columbia Boulevard, respectively. Included within this subarea are airport, industrial, residential, and recreational land uses. Portland International Airport, owned by the Port of Portland, comprises an estimated 50 percent of the subarea.

Although the total landmass of these ten natural resource sites within the West Multnomah Drainage District subarea is relatively small, these sites, both individually and collectively, are important to wildlife. Conservation of the natural resources is fundamental to maintenance of natural values occurring in the subarea and throughout the Columbia Corridor. The airport complex contains large expanses of grassland which were not inventoried as part of the Statewide Planning Goal 5 process; however, they provide some habitat for wildlife. These large open spaces provide habitat for small mammals and song birds. Hawks, owls, and falcons are frequently seen over these areas, hunting for and feeding upon the small mammals of these grasslands. They are present in spite of efforts by the Port of Portland to reduce airplane operation hazards through bird control. A Burrowing Owl (Athene cunicularia), very rarely seen west of the Cascades, was observed during a March 1986 visit to a recently-filled site within the airport complex.

Sites 35 and 36, a grass/shrub wetland and a wetland forest, immediately adjacent to one another, ranked highest in the subarea with respective wildlife habitat ratings of 91 and 92 points. This 65-acre site is unique within Portland; there are few wetlands of this size and type remaining. The structural diversity of these two combined sites (high interspersion with one another, as well as with other adjacent wetlands and the Columbia River) and very limited human use makes this wetland complex very good quality habitat for a wide variety of wildlife species.
Sites 36 and 37 are each greater than 50 acres. The combination of large size and high quality of these two sites is unusual within Portland's Urban Services Boundary. While sites 36 and 37 each ranked very high as independent units, some wildlife species found at these sites are dependent upon multiple site interspersion. Red-tailed Hawks (Buteo jamaicensis), commonly seen on field visits to these two wetlands, are a good example of animals which depend on multiple sites. These raptors perch in the tall cottonwoods of the forest and hunt for small mammals over adjacent grass/shrubland below.

5. Columbia South Shore

The Columbia South Shore is a low lying area with little topographic relief, generally bounded by the Columbia River on the north, N.E. 185th Avenue on the east, N.E. Sandy Blvd. on the south, and N.E. 82nd Avenue on the west. Total area is approximately 2,800 acres.

The area's character is primarily agricultural and open space, although industrial uses are also present. In the 1970's, the regional Urban Growth Boundary was extended to include the entire Columbia South Shore for the purpose of industrial development. Properties have been annexed to the City of Portland, service needs have been identified, and an urban renewal district has been established to coordinate provision of urban services to the area and promote development of the area as a major industrial district for the City and region. An extensive rezoning effort was completed in 1987 for this subarea, based on information contained in this document. To protect identified significant natural resources on an interim basis, an SEC (Significant Environmental Concern) overlay zone was applied. However, this does not provide the full level of resource protection required by Statewide Planning Goal 5. Application of the E' zone will correct this deficiency.
STATEWIDE PLANNING GOAL 5 AND ADMINISTRATIVE RULE

The Oregon Statewide Land Use Planning Goal 5 requires all local jurisdictions "to conserve open space and protect natural and scenic resources" (for the complete LCDC Goal and related Administrative Rule, refer to Appendix D). When the Portland Comprehensive Plan was adopted in 1980 there was little guidance as to how this would be accomplished. The City implemented the Goal 5 requirements through a variety of land use mechanisms. In 1981 LCDC adopted a Goal 5 Administrative Rule detailing the process for local jurisdictions to inventory, evaluate, and protect listed resources. Based on a process established by this Rule, the City had inadequate resource inventories and land use controls to protect identified resources. Changes, including the material contained in this document and the environmental regulations adopted by the City in June 1988, are being made to bring the City into compliance with the new Goal 5 requirements.

The LCDC Administrative Rule establishes a number of steps which a jurisdiction must go through in order to comply with Goal 5. The location, quantity, and quality of natural resources must be inventoried. Location of a resource must include a map or description of the boundaries of the resource site, and be as accurate as available information will allow. Resource quantity requires consideration of the relative abundance of the resource. Quality of a resource is determined by comparing the site with other sites of the same resource category.

If a resource site is not important, it may be excluded from further consideration for purposes of local land use planning, even though state and federal regulations may apply. If information is not available or is inadequate to determine the importance of the resource site, the local government must commit itself to obtaining the necessary data and performing the analysis in the future. All other sites must be included in the inventory and are subject to the analysis of economic, social, environmental, and energy consequences (ESEE analysis). State and federal regulations continue to apply regardless of any local actions.

The purpose of the ESEE analysis is to determine the importance of a resource relative to the importance of the site for other potential conflicting land uses and activities. If no potential conflicting uses are identified for a given site, the resource must be preserved through land use measures. If there are potential conflicting uses, the economic, social, environmental, and energy impacts on both the resource and conflicting land uses, must be determined through the formal ESEE analysis. Possible actions to be considered are: (1) protecting the natural resource completely, (2) allowing the conflicting use completely, or (3) a combination of the two. A list of
specific economic, social, environmental, and energy considerations is not provided in the state regulations because of the unique circumstances surrounding each site.

Once consequences of these possible actions are determined, the jurisdiction must decide on the degree to which resources in each identified site are to be protected. Until recently, Portland had no land use zone to protect sensitive natural areas, and relied primarily on Water Features regulations for selected water bodies and wetlands. An SEC (Significant Environmental Concern) overlay zone similar to that of Multnomah County was adopted in 1986 as a temporary measure until the new regulations could be developed. Its purpose was to conserve important natural resources in areas recently annexed to the City, such as the Columbia South Shore, although it does not provide the full level of resource protection required by Statewide Planning Goal 5. Environmental regulations, including Comprehensive Plan policies and objectives, and a new Environmental Concern Zone, were adopted by the City in June 1988, and provide the level of natural resource protection necessary for Goal 5 compliance for wetlands, water bodies, fish and wildlife habitat areas, and ecologically and scientifically significant areas. Other land use controls in place or being prepared address remaining Goal 5 resources.

The City of Portland is now going through its periodic review process, to examine its land use regulations for compliance with statutes and administrative rules which have been developed by the State since Comprehensive Plan adoption.

In summary, LCDC Goal 5 and its administrative rule provide a process to identify and inventory open spaces, scenic and historic areas, and natural resources, compare the values of the resource to the values of the land for conflicting activities and development, and make a decision as to if it is in the public interest to protect the resource site, allow conflicting uses fully, or limit conflicting uses. Decisions on similar resources may vary between jurisdictions, or even within a jurisdiction, based on location, values of the resource, or values of the conflicting uses. The natural resource inventory, analysis, and mapping contained in this document are designed to meet LCDC Goal 5 requirements.
OTHER STATEWIDE PLANNING GOALS

In addition to Statewide Planning Goal Number 5, there are 14 other goals which apply either directly or indirectly to decisions on natural resource protection. Procedural ones, such as Goal 1, Citizen Involvement, and Goal 2, Land Use Planning, are taken into consideration during the preparation and presentation of the mapping recommendations and support documents. Those dealing with specific land uses or activities, including Goal 9, Economy of the State, Goal 10, Housing, and Goal 14, Urbanization, are incorporated into the analysis of economic, social, environmental, and energy consequences (ESEE analysis). All applicable statewide goals were taken into consideration during the mapping process.
REPORT FORMAT

This document contains the inventory, analysis, and proposed Environmental Concern Zone mapping for wetland, water body, and fish and wildlife natural resources in the Columbia Corridor. There are five major sections: (1) introduction, (2) resource inventory, (3) ESEE analysis, (4) mapping recommendations, and (5) appendix. The second, third, and fourth sections each contain an introduction briefly describing the process or methodology used and other information pertinent to understanding the material. The appendix contains other material which may be helpful in understanding the study.

It should be emphasized that descriptions of methodology for data gathering, analysis, and summation throughout the report are provided for information and general description only. Field notes are on file at the City for individuals wishing to review data in greater detail. Other information sources and methods of analysis which provide a more complete description of a resource site may be available. Where these have been called to the attention of the City, they have been incorporated into this document either by summary or reference.
INVENTORY
INVENTORY PROCESS

General

The inventory for the wildlife and wetland segments of the Statewide Planning Goal 5 update requires three tasks: identifying sites, selecting a methodology for data collection, and determining the format for presentation of the information. The method chosen for each task will be explained further in this section.

Two major points are emphasized both here and throughout this document. The first is that few similiar inventory processes have been undertaken by any local jurisdiction. Second, the inventory is only one of three major steps in the LCDC Goal 5 process. The inventory identifies and evaluates natural resource areas for those elements which make them valuable as existing or potential wildlife, water body, and wetland areas. The next step, the Economic, Social, Environmental, and Energy Analysis (ESEE) compares these values with those of alternative development, and suggests a direction in the land use planning process which will further the public interest. The final step is the formulation or application of implementation measures to conserve or preserve important resources.

Site Selection

The entire city has the potential to provide wildlife habitat to varying degrees. However, because of both the impracticality of conducting a total inventory of all properties, and the understanding that this type inventory was not the intent of Statewide Planning Goal 5, only areas with a high probability of containing valuable natural features, located within the City's Urban Services Boundary, were selected. The Urban Services Boundary was chosen for inventory purposes instead of the present city limits, because it represents the ultimate incorporated limits of the City of Portland. Landowners of unincorporated areas which have been inventoried will benefit by being aware of any potential Statewide Planning Goal 5-related issues, and can make a more informed decision on the cost-effectiveness and timing of development than if they were forced to consider the results of a future inventory and evaluation.

Because of the great number of variables involved in identifying wildlife habitat inventory areas, a number of methods were applied and the results were reviewed several times before being accepted. A technical advisory committee consisting of wildlife experts, conservation groups, private industry, and public agencies suggested the initial list of areas. Aerial photos were reviewed to find additional major areas of vegetation. Parks and public lands were also included initially. Finally, local wildlife literature was consulted, and various City agencies and special interest groups were contacted.
Brief site visits to all areas on the list were conducted by field biologists hired for the inventory process, and the list was modified to reflect their observations. The resulting list was again reviewed by the technical advisory committee for completeness prior to the commencement of scheduled, detailed field work. As an additional review mechanism, letters were sent to neighborhood associations and special interest groups informing them of the study and asking if there were any additional sites which should be included. Responses were received from several groups. In all, 101 natural areas and water bodies were identified and inventoried.

Natural resource sites are, where appropriate, delineated as contiguous units. However, interspersion (proximity and interaction) of inventoried sites with one another, and with urban development, is of major significance. Many animals depend on more than one site. They may use forested areas for nesting, open areas for foraging, and streams or lakes for water. These may be physically separated (for some bird species, for example), or connected by a corridor of water or vegetation which allows animals to pass from site to site while remaining protected. Exact interrelationships between animal populations and these natural areas remain largely undocumented and unknown. When considering land use changes at any of these sites, effects on flora and fauna of other nearby sites should be examined.

The inventory for the Columbia South Shore (east of N.E. 82nd Avenue) was accepted by the Portland Planning Commission and the City Council during the Columbia South Shore rezoning project completed in early 1987. A public review draft for the remainder of the Columbia Corridor (west of N.E. 82nd Avenue) was completed and released for public comment in summer of 1987. Comments and information received are incorporated into this document.

**Inventory Methodology**

The natural resource sites were evaluated by biologists Michael Jennings and Esther Lev. Field notes, as well as habitat rating sheets, were completed, and are on file in the Planning Bureau offices. Information was collected on the vegetation and wildlife of each area. A narrative description, including parameters on the weather, topography, vegetation, wildlife, habitat function, human use, and management potential, was completed for each site. A standard inventory form for field notes (see Appendix E for an example and explanation) was used at each site.

Sites were also rated numerically for wildlife habitat value. A standard rating sheet originally developed by the City of Beaverton, a number of state and federal agencies, and the Audubon Society of Portland was used. The same rating system was also used by the City of Portland for the inventory of natural areas along the Willamette River as part of the Willamette River Greenway study.
The rating included evaluation of the presence and availability of water, food, and cover for wildlife. Values for human and physical disturbance, interspersion with other natural areas, and the scenic, educational, and unique or rare occurrence of plant and animal species were also assigned. The numerical rating sheet was designed for use on sites containing wetlands or water bodies, and a different, modified rating form, excluding wetland parameters, was developed for use on the other sites. The total number of possible points on both wetland and upland sheets was 114. Scores given by field biologists for all sites within the city ranged from a low of six to a high of 106, with the vast majority lying in the 30-80 point range. The citywide distribution of the scores is illustrated in the bar chart (histogram) included in this section. For more information, including limitations on its use, please refer to Appendix E.

**RANGE OF WILDLIFE HABITAT SCORES FOR ALL SITES INVENTORIED**

Dark= All sites within the Columbia South Shore and Columbia Corridor
Light= All other sites

![Graph showing distribution of habitat scores for individual sites](image)

Smith and Bybee Lakes and West Hayden Island, the two highest ranking sites within Portland's Urban Services Boundary, as well as some of the lowest ranking sites, are in the Columbia Corridor Natural Resources Management Unit, with scores for wildlife habitat ranging from 17 to 106 points. Because of their complex biological nature, high quality wildlife habitat, and large size, Smith and Bybee Lakes and West Hayden Island were addressed in somewhat more detail than other smaller, less complex sites (see Appendices K, L and M). Five field visits were made to the Smith and Bybee Lakes area and two to West Hayden Island.

The site inventory sheets contained in this document represent a summary of this information, as well as technical and other data collected from additional sources. It needs to be emphasized that, in order to obtain a full and accurate description of inventory material collected by the City, the field notes, scoring sheet, and other information in the Bureau of Planning files must be examined. Neither the scoring sheets nor any other single piece of datum can provide a full site description by itself. Sites are arranged by natural area and by subarea (if any), with a description of common characteristics, history, and merit.
INTRODUCTION TO SITE INVENTORY SUMMARY

The site inventory portion of this document describes individual sites within the Columbia Corridor Natural Area Management Unit. It is a summary of field work and of information from other sources, and represents the best data available to the City at the time. The purpose of this inventory is to provide sufficient information for the City to conduct the ESEE analysis necessary for Goal 5 compliance. As other information on individual sites becomes available, it should be incorporated into the appropriate section of the report and taken into consideration in future land use decisions. The inventory is general, and the reader is directed to field sheets and other information, on file at the Planning Bureau, for more detailed information. A summary table of general site characteristics and values is shown on the following page, and provides a general overall comparison of sites to one another.

Resource values listed in the summary table are those generally identified in wetland literature and by wetland experts as being major benefits of wetland areas. Information is general, and in some instances indicates only the significant presence or absence of a value. More detailed information from elsewhere in this report, other publications, or further site studies are needed to quantify or establish a hierarchy of values among sites.

Groundwater values are based on the presence of surface water in relatively large quantities or over large areas for moderately long periods of time, and the ability of it to percolate to the groundwater aquifer due to the absence of known shallow bedrock or large impervious soil layers. The presence of a river, slough, or drainageway in, or abutting, a site, determines the presence of drainage values.

Flood control values include the ability of the site to retain water or reduce flood levels through runoff desynchronization, as well as its location relative to the 100-year flood boundary, as designated by the most recent Federal Emergency Management Agency maps (January 3, 1986 or October 19, 1982). Erosion control values are based on the general presence of vegetation along the shoreline at normal water levels, while pollution and nutrient retention values are based on vegetation throughout the site.

Fish habitat values are a generalization of information obtained from discussions with the Oregon Department of Fish and Wildlife and a number of studies by the U.S. Army Corps of Engineers, Portland General Electric Company, and others about various sites. Wildlife habitat values are discussed in the Methodology section of the report, and in greater detail in Appendix E. Recreation values are the presence or potential for various active and passive recreational activities, including ease of access, based on information obtained from the Portland Bureau of Parks and Recreation.
Site numbers were assigned for all inventoried areas throughout the City. Because this document only deals with the Columbia Corridor, many numbers are omitted (for example, Sites 1-21 are not included). They will be included in future inventory and analysis documents covering the specific geographic areas in which they are located.

Extreme caution must be exercised in the use of this table. The values of sites are often related to unique locational, hydrologic, or biological characteristics, and increasing the value of a characteristic at one site may not equal or offset a corresponding decrease at another.
## SUMMARY OF WETLAND, WATER BODY, AND WILDLIFE HABITAT RESOURCE VALUES FOR INVENTORY SITES IN THE COLUMBIA CORRIDOR

<table>
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<tr>
<th>SITE NO.</th>
<th>SIZE (AC)</th>
<th>Groundwater Exchange/Discharge</th>
<th>Drainage</th>
<th>Flood Storage, Deposition, Sedimentation, Erosion, Control, Nutrient Retention, Removal</th>
<th>Pollution, Sediment Trapping</th>
<th>Fish Habitat</th>
<th>Wildlife Habitat**</th>
<th>Potential Recreation</th>
<th>Visual Aesthetics</th>
<th>Uniqueness</th>
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* Approximate average of the inventoried site, which may not correspond with tax lots.
** Refer to page 10 of this report for an explanation of the Wildlife Habitat score.
*** N/A= Not Applicable
COLUMBIA CORRIDOR:
RIVERGATE - TERMINAL 4
& HAYDEN/TOMAHAWK ISLAND

INVENTORYED NATURAL RESOURCE SITES

SEPTEMBER 1988

BUREAU OF PLANNING

CITY OF PORTLAND
INVENTORY SUMMARIES
FOR
INDIVIDUAL NATURAL RESOURCE SITES
SITE 22

LOCATION: Tax Lot 22, Sec. 19, 1N 3E
1/4 Section 2548

1 inch = 1000 feet
SITE 22

NEIGHBORHOOD: Columbia South Shore
ZONING *: FF(sec)
COMPREHENSIVE PLAN: Farm and Forest
APPROXIMATE SIZE: 10 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Riverine, Littoral, Forested, Broad-leaf
Deciduous, Seasonally Flooded
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This is the only forested riparian stretch within the Columbia South Shore area. Dominant vegetation is mature cottonwood and willow. The cottonwoods are commonly about 50 inches DBH (diameter breast height). There are few snags, although some of the older trees have cavities. The forest provides roosting, perching, and nesting habitat for raptors, woodpeckers, and songbirds. Shade from trees overhanging the river provide food and cover for wildlife. This riparian forest's proximity to the Columbia River, Government and Lemon Islands, and the wetland forests directly south of Marine Drive makes the interspersion value with other natural areas high.

WILDLIFE HABITAT INVENTORY SCORE: 76
SITE 23

LOCATION: Tax Lot 22, Sec. 19, 1N 3E
1/4 Sections 2548, 2648
SITE 23

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2(sec)
COMPREHENSIVE PLAN: Mixed Employment
APPROXIMATE SIZE: 61 Acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Forested, Broad-leaf Deciduous, all water regimes Permanently through Intermediately Flooded
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This wetland forest is a remnant vegetation community of the once-common Columbia Slough vegetation, which makes it unique as a natural area. The forest is in mid-seral stage with cottonwoods dominant; ash, willow, and hawthorne are common. The main slough, several blind sloughs, adjacent grasslands, and shrublands give this wetland forest a high structural diversity, attracting many different species of wildlife. The forest provides food, cover, perch, and roost sites for raptors, woodpeckers, and songbirds. A pair of northern harriers were observed courting at this site. Yellow-breasted Chats, an uncommon bird to the Portland area, was observed at this site the previous summer. Wood Duck and Red-tailed Hawk also nest here. This area does not receive extensive human use due to access limitations, which enhances its value for wildlife.

Management of the area to allow natural vegetative processes to continue should be considered. Preservation of this outstanding example of the Columbia South Shore's natural history would significantly enhance the natural flora and fauna of the City.

WILDLIFE HABITAT INVENTORY SCORE: 90
SITE 24

LOCATION: Tax Lots 20, 27, Sec.19, 1N 3E
1/4 Section 2548

1 inch = 1000 feet
SITE 24

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2(sec), GI-2(sr)
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 17 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private, Multnomah Drainage District

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Scrub-shrub, Broad-leaf Deciduous, Seasonally Flooded

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is almost entirely blackberries, with occasional reedcanary grass and teasel. Ten to 15 Lombardy poplars, and ten to 15 young cottonwood trees are also present. Adjacent sites indicate that it once was a forested wetland. Blackberries provide limited food, perch, and cover for some songbirds, reptiles, and small mammals.

WILDLIFE HABITAT INVENTORY SCORE: 44
SITE 25

LOCATION: Tax Lots 21, 34, 35, Sec.19, 1N 3E
1/4 Section 2647

1 inch = 1000 feet
SITE 25

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2N(sec), GI-2(sec)
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 36 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Emergent, Seasonally Flooded
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This large, open wetland grassland with adjacent forest/shrub edge and extremely limited human access has very high natural quality. The site is dominated by reedcanary grass with occasional teasel, cattail, willow, and blackberry along the margins. Patches of water foxtail occur in areas of slight depression. A shallow eutrophic ditch bisects the grassland in an east-west direction. The slight topographic variations directly influence the vegetation diversity of this site.

This grassland probably supports a large population of small mammals. A considerable number of runways and burrows were observed during field visits. Interspersion of trees and shrubs along the ditch and grassland edges provide roost, perch, and nesting habitat for raptors. From these perch sites raptors can feed on small mammals of the grasslands. This is the only location where northern harrier nesting was found within the entire Goal 5 Inventory area. According to Joe Pesek of the Oregon Department of Fish and Wildlife, this may be the only known nesting site of northern harriers within Portland's Urban Service Boundary. These harriers nest on the ground in sparse, shrubby, open grasslands or marshes. Minimal human disturbance during nesting is critical to nesting success. Two pairs of northern harriers were observed nesting in this area. It is unusual for two pairs of harriers to tolerate one another at such close proximity. However, perhaps due to lack of suitable habitat and area of minimal disturbance, situations like this are possible.

Grassland wetlands of this type are unusual in the Columbia South Shore area, and are important to wildlife, as well as the scenic and aesthetic qualities of the area.

WILDLIFE HABITAT INVENTORY SCORE: 71
SITE 26

LOCATION: Tax Lots 1, 8, 19, 21, 22, 32, 33, 34, 35, 37, 40, and 46, Sec.19, 1N 3E
1/4 Sections 2547, 2647, 2648

1 inch = 1000 feet
SITE 26

NEIGHBORHOOD: Columbia South Shore
ZONING*: GI-2N(sr), GI-2(sr), GI-2N(sec), GI-2(sec), Sub-Area Designation
COMPREHENSIVE PLAN: Industrial Sanctuary, Mixed Employment
APPROXIMATE SIZE: 120 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private, City of Portland
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Forested, Broad-leaf Deciduous-Coniferous, Seasonally Flooded

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: The forest is a 60-year-old stand of cottonwood and ash with blackberry understory. The area north of the east-west railroad tracks appears to have been historically a cedar bottom. Presence of springs is evident by vegetational changes; cedar, maple, alder, salmonberry, and ferns.

This large wetland forest provides food, roosting, perching, and nesting sites for passerine, woodpecker, and raptor species. Some large cavities observed in oak trees are probably used by woodpeckers. A pair of wood ducks was observed using standing water within the forested swamp as well as the nearby sloughs. It is likely that they may be nesting in a tree cavity within this forest.

Human recreational use of this site is limited by thick blackberries and several Water Bureau pump sites with gates. Minimal human presence enhances the value of this site for wildlife use. There are few wetland forest areas within the Portland Urban Service Boundary area of this size that have not been developed or cleared, making this type of habitat unusual on a local level.

Since the last field visit to the site in March 1986, part of the northeast portion of the area has been altered. Some of the grassland and forest vegetation has been removed, and the site plowed under to be planted in strawberries, according to workers at the site. If cultivation of the area were ceased and the area allowed to return to native vegetation, first wetland grasses, and eventually forest, would grow.

WILDLIFE HABITAT INVENTORY SCORE: 73
SITE 27

LOCATION: Tax Lots 4, 33, 36, 37, 43, 50, 78, 82, and 118,
Sec. 24, 1N 2E
1/4 Sections 2545, 2645
SITE 27

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2(sr), GI-2(sec)
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 25 acres
DATE OF INVENTORY: March, August 1986
OWNERSHIP: Private

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Emergent, Seasonally Flooded
Palustrine, Scrub-shrub, Broad-leaf
Deciduous, Seasonally Flooded

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site, approximately 25 acres in size, is generally a flat floodplain with a pond (about 20x100 feet), wet depressions, some fill, and ditches, located south of the Columbia Slough. The southern part appears to have been cleared within the last ten years, and has now regrown with willow, which averages two-to-four inches DBH. Canopy closure in this area ranges from 100% in some areas to a scattered occurrence of perhaps 20%. The pond is located in the southwest corner of the site, and contains floating and emergent vegetation such as cattail, reed canarygrass, sedge, rush, willow, algae, and smartweed. Salamander, frogs, and bullfrog tadpoles were observed during the inventory visit in March.

Northwest of the young willow area is a rush/sedge meadow. It appears not to have been disturbed in recent times, and exhibits good natural wetland character, although being somewhat weedy around its perimeter. Vegetation is dominated by a mix of rush species and Columbia Sedge. The absence of reed canarygrass is notable. Some blackberry is present, especially at disturbed margins.

North of the meadow, in the northeast corner of the site, is a small stand of mature Pacific willows and cottonwoods. The western edge of this community is defined by a ditch of north-south orientation, perpendicular to the Columbia Slough (northern border of the site). This ditch contained standing water in August and vegetation was dominated by duckweed, with cattail and reed canarygrass at the edges.
This site functions as an "island" of habitat among industrial facilities, and is valuable largely because locally "it is the only place around." The southern portion has been degraded and is now in the early stages of regrowth. The pond is a very significant feature, and both the rush/sedge habitat and mature willow/cottonwood stand are also important.

Two visits were made: in March and again in August. The first was confined to the southern area, containing the young willow regrowth and pond. A second visit, resulting in a re-evaluation and new score, was made after it was discovered that the contiguous meadow and mature tree stand had not been inventoried.

**WILDLIFE HABITAT INVENTORY SCORE: 74**
LOCATION: Tax Lots 6, 11, 12, 14, 20-23, 30, and 31, Sivers Industrial Park, Sec.15, 1N 2E
1/4 Sections 2442, 2443
SITE 28

NEIGHBORHOOD: Columbia South Shore
ZONING *: GE-2LN(sr), GI-2LN(sr), GE-2LN(sec), GI-2LN(sec), Sub-Area
Designation
COMPREHENSIVE PLAN: IndustrialSanctuary, Mixed Employment
APPROXIMATE SIZE: 97 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols
represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Emergent, Seasonally Flooded
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is predominantly cultivated
grass surrounded by industrial and commercial development. The area is
savannah-like with occasional cottonwood, oak, and ash at wide spacing.
There are no snags but some of the large oaks have cavities used by wildlife.
The large open-growth form oaks are remnants of the pre-settlement period
when much of the area was in an oak savannah grassland.

The open grass area has very limited habitat function due to mowing and
cultivation of grasses. Great Horned Owls, American Kestrels, and
Northern Flickers, all cavity nesting birds, have been observed on this site,
suggesting their use of local tree cavities for nesting and roosting.

The park-like structure of this site lends itself to recreational use.
Industrial development of this site could be compatible with some on-site
enhancement. Landscaping with natural vegetation around areas with
standing water could enhance the wildlife and scenic value of the site.

WILDLIFE HABITAT INVENTORY SCORE: 30
SITE 29

LOCATION: Tax Lots 11, 14, 20, 23, and 30, Sec.15, 1N 2E
1/4 Section 2442
SITE 29

NEIGHBORHOOD: Columbia South Shore
ZONING *: GE-2LN(sec), GI-2LN(sr)
COMPREHENSIVE PLAN: Industrial Sanctuary, Mixed Employment
APPROXIMATE SIZE: 12 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Forested, Broad-leaf Deciduous, Seasonally Flooded
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is an extremely scenic "island" of native wetland forest amongst industrial development. The forest canopy is dominated by 50-60 year-old ash and cottonwood, with hawthorne and alder common. The understory is primarily snowberry and blackberry. Forest soils were saturated March 26, 1986, the time of the site visit.

The forest provides high quality cover, food, and water for songbirds, amphibians, and mammals. The island nature of this forest makes it an especially important refuge for wildlife. The site has potential for osprey roosting, perching, feeding, and nesting due to the forest character and its proximity to the Columbia River.

The site could have been managed as open space with interpretive trails. This would be compatible management with preliminary plans for a hotel development adjacent to the lake. However, the forest has been cleared and the entire site degraded since the site visit and evaluation in March 1986.

WILDLIFE HABITAT INVENTORY SCORE: 76
SITE 30

LOCATION: Lots 3 and 4, Block 1, and Lot 3, Block 3, Flood Oaks
1/4 Section 2542
SITE 30

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2L(sr)
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 15 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION: Upland, Forested Deciduous

OBSERVATIONS AND COMMENTS: Although this site received a low rating, the stand of 20 mature oak trees is very significant, and should be noted and considered for preservation. The site itself is dominated by blackberries, grasses, and oaks. With the exception of the oaks the site has been cleared within the past ten years and grown back to blackberries. Core samples of some of these oaks showed them to be at least 200 years old. These ages are in agreement with Franklin and Dyrness (1973) and Thilenius (1968) who hypothesize that although most Garry Oak closed-canopy forests in the Willamette Valley originated since 1850, scattered large open-growth forms of the tree have been found to average 237 years in age. These large oaks are remnants from a time when this site was in oak savannah.

Primary habitat function of its site is probably use of the many cavities in the mature oaks by owls, falcons, and woodpeckers. The grass and blackberry provide habitat for songbirds, small mammals, and reptiles.

The value of this stand of mature oaks and the specific type of nesting structure cannot be overstated.

WILDLIFE HABITAT INVENTORY SCORE: 43
SITE 31

LOCATION: Tax Lots 1 and 22, Sec.19, 1N 3E
1/4 Section 2648

1 inch = 1000 feet
SITE 31

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2(sr)
COMPREHENSIVE PLAN: Mixed Employment
APPROXIMATE SIZE: 17 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Emergent, Seasonally Flooded
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is entirely vegetated with reed canarygrass. There are irrigation ditches along the edges and agricultural fields adjacent on all sides. The land has been left fallow; hence the presence of reed canarygrass, a wetland plant. The reed canarygrass has been grazed by cattle.

Some food, perch, roost, and nest habitat for songbirds, small mammals, and snakes is provided by the dense reed canarygrass but is probably limited due to the presence of cattle. Most of the site was covered by standing water at the time of the site visit.

WILDLIFE HABITAT INVENTORY SCORE: 26
SITE 32

LOCATION: Ackley's River Farms, Sec.9, 1N 2E
1/4 Section 2341

1 inch = 1000 feet
SITE 32

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2LN(sec)
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 10 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Port of Portland
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: 
Palustrine, Emergent, Persistent/
Nonpersistent, Permanently and Seasonally
Flooded

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This forest of about 5.5 acres is adjacent to Portland International Airport. Forty to 50 year-old cottonwood and ash are the dominant trees; blackberry the dominant shrub, with willow and dogwood common. The trees have been topped at 40-50 feet to accommodate airplane traffic. There are a few snags present, but more commonly large cavities were observed in senile cottonwoods and ash. A stagnant slough remnant exists along the western edge of the forest. The percent of emergent vegetation to open water was about 25-75% at the time of the visit, but the percentage of emergent vegetation may increase as the season progresses. Soils were saturated on March 27th. The site is surrounded by cultivated and mown grasses.

Structural diversity of this site is high; the combination of the mature forest, shrub understory, water body, and adjacent grass fields enhance natural values. The combination of the water body adjacent to forest edge provides a multiple function for food, roost, perch, and nesting activities of waterfowl, shorebirds, songbirds, woodpecker, and raptor species. Nesting activities among songbirds was prominent during the field visit. Invertbrate and reptile production is also probably high. The site probably receives little visitation by humans or domestic animals as it is isolated by roads and airport facilities. Lack of human visitation in conjunction with the site’s close proximity to the Columbia River, Government Island, and the small forest to the east (site 29) make this forest good quality habitat for wildlife. Topping of the trees and allowing the forest to follow natural vegetative processes, rather than cutting them down, enhances the area for wildlife habitat.

WILDLIFE HABITAT INVENTORY SCORE: 65
SITE 33

LOCATION: Tax Lots 47, 49, and 56, Sec.16, 1N 2E
1/4 Section 2339, 2340
SITE 33

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2LN
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 8 acres
DATE OF INVENTORY: March 1986
OWNERSHIP: Port of Portland
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Palustrine, Forested
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This wetland forested site is dominated by cottonwood and willow. Understory vegetation is entirely absent due to recent bulldozing activity for drainage control. Snags are present and large nest quality cavities in cottonwood trees are common. Fifteen percent of the site is standing water, emergent vegetation is absent due to drainage control work. Agricultural lands surround the site on all sides. The value of this forest for wildlife at the time the field work was done was extremely limited due to the state of disturbance. The forest does, however, probably offer roost, perch, and nesting for some raptors, woodpeckers, and songbirds. A Short-eared Owl (Asio flammeus) was observed during the field visit. Open water provides feeding and resting area for some waterfowl. The site could be enhanced for wildlife by allowing natural vegetative processes to continue.

WILDLIFE HABITAT INVENTORY SCORE: 39
SITE 34

LOCATION: Tax Lot 6, Sec.16, 1N 2E
1/4 Section 2440
SITE 34

NEIGHBORHOOD: Columbia South Shore
ZONING *: GI-2LN(sec), GI-2L(sec)
COMPREHENSIVE PLAN: Industrial Sanctuary
APPROXIMATE SIZE: 11 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION **: Lacustrine
Palustrine, Forested
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site includes Johnson Lake, the adjacent wetland forest, and slough channel to the north. The forest is dominated by 20-70 year-old cottonwoods with willow, elderberry, and blackberry at the lake's littoral. The cottonwood stand is gallery in nature. Snags are common. The slough channel to the north is bordered by dense trees and shrubs. There is about five percent emergent vegetation along the open water at Johnson Lake.

The diversity of Johnson Lake, wetland forest, slough channel, and adjacent agricultural land makes this a very good-quality area for many different wildlife species. In winter, with such close proximity to flooded agricultural fields, this lake and slough channel provide an important resting area for waterfowl. The water bodies also provide fish habitat. Vegetation overhanging the bank provide quality habitat for some reptile, amphibian, and invertebrate species. Floating logs provide excellent turtle "haulout." The combination of cottonwood forest adjacent to water bodies may produce insect hatches, and make this site good summertime habitat for warblers and flycatchers.

Snags with cavities which are adjacent to the water make this a high-quality site for cavity nesting birds. For example, a nesting pair of Wood Ducks was observed diving from a tree cavity to the water. The forested slough channel provides food, perch, and nesting habitat for songbirds, woodpeckers, kingfishers, small mammals, reptiles, and amphibians. Although adjacent to industrial, commercial, and residential development, the site receives little human use, due to limited access. Lack of human use is a major factor in the value of this natural area to wildlife.
The present owner should be commended for maintenance of natural values at this site. Continued management by maintaining natural processes and minimizing human access would be ideal.

A deteriorating fibreglass oil containment boom was observed at the east end of Johnson Lake. The boom extended from the lakeshore into the lake, around a culvert exit, and back to the shore. The culvert area appeared to drain from I-205, directly east of the lake. The area within the boom was covered with oil, perhaps from a highway spill. The boom is inadequate to protect the lake from any quantity of oil discharge. The oil should be removed from the lake and a separate sump should be installed to contain fluids discharging from the culvert.

WILDLIFE HABITAT INVENTORY SCORE: 66
SITE 35

LOCATION: Tax Lot 75, Sec. 12, 1N 1E
1/4 Section 2234

1 inch = 1000 feet
SITE 35

NEIGHBORHOOD: East Columbia Corridor
ZONING *: M2(l,n)
COMPREHENSIVE PLAN: General Manufacturing
APPROXIMATE SIZE: 35 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Private
* The lower case symbols in parentheses represent overlay zones. All
upper case symbols represent base zones. See Appendix B for a description
of each zone.

CLASSIFICATION **: Palustrine Forest
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This wetland forest is bordered by
Broadmoor Golf Course on the south and west. To the north is a slough
channel and immediately adjacent to the channel is a 50-acre
juncus/willow wetland (Site 36). Stormwater runoff from the south drains
through this site toward the drainageway. The forest is dominated by alder
and cottonwood estimated to be 40 to 50 years old. There is a dense
understory of blackberry, willow, hawthorn, and rose. There are sporadic
open pockets of standing water throughout the forest, vegetated by yellow
flag iris, water hemlock, angelica, and an aquatic saxifrage; all of which
are wetland plant indicator species. The area seems to be drier than the
adjacent wetland as evidenced by the presence and health of the alder.

The forest provides food, roost, perch, and nesting for song birds,
woodpeckers, and some raptors. Wet spots provide habitat for insect
hatches, a good source of food for nesting warblers, swallows, and other
insectivorous birds. Signs of deer and coyote were observed throughout the
forest. Slough banks provide potential burrowing and slough access for
beaver and nutria.

The interspersion with other adjacent natural areas is high. The forest
receives little human use except for an occasional golfer in search of a ball,
and a garbage dump in a grass clearing which appeared to be established
by the golf course. No public right of way passes near the site, so access by
the general public is difficult.

The wetland lies generally parallel to the drainageway along its northern
border, and is completely within the 100-year flood boundary. During
periods of flooding, water is able to expand beyond the drainage channel
boundaries and into the wetland. Water flow velocities will decrease due to
the larger cross-sectional area of the water and presence of vegetation,
allowing sediment to drop out.

WILDLIFE HABITAT INVENTORY SCORE: 91
SITE 36

LOCATION: Tax Lot 75, Sec. 12, 1N 1E
1/4 Section 2234
SITE 36

NEIGHBORHOOD: East Columbia Corridor
ZONING*: M2(l,n)
COMPREHENSIVE PLAN: General Manufacturing
APPROXIMATE SIZE: 72 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine Scrub/Shrub
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This approximately 50-acre juncus/willow wetland is unusual within Portland. There are few similar wetlands of this size remaining. The wetland is surrounded by a slough to the south, golf course to the east, agricultural land to the north, and industrial development to the west. Soils were saturated and there were six inches of standing water at the site on a field visit of June 18, 1986. Dominant vegetation is rushes and willow; some alder occur along the slough. Reed canarygrass, sedge and bulrush are common along the northern half of the site. Clumps of willow occur through the middle section. Other wetland plant indicator species are found throughout the area. There appears to be a drainage connection between this site and the slough remnant to the north by a swale extending northward from the northwest corner. Drainage across the site is from the north toward the drainageway which separates it from Site 35.

This large wetland area provides food, roost, perch, and nesting sites for song birds, waterfowl, woodpeckers, raptors, and shorebirds. During an April field visit, common yellowthroats and savannah sparrows were observed building nests. Observations of Virginia rail and common snipe were made in this wetland; they probably feed on small mammals that live in the Juncus (rush)/reed canarygrass.

Interspecies with other natural areas is high because of the adjacent wetland forest, and the close proximity of other small wetlands and the Columbia River.

Human access is limited by fences, water and blackberries. No roads or public rights of way are adjacent to the site, although it abuts a golf course open to the public. Seven mules were observed grazing on the drier portions of this wetland.
The wetland lies generally parallel to the drainageway along its southern border, and is within the 100-year flood boundary. During periods of flooding, water is able to expand beyond the drainage channel boundaries and into the wetland. Water flow velocities will decrease due to the larger cross-sectional area of the water and presence of vegetation, allowing sediment to drop out.

WILDLIFE HABITAT INVENTORY SCORE: 92
SITE 37

LOCATION: Tax Lot 69, 74, Sec. 12, 1N 1E
1/4 Section 2134
SITE 37

NEIGHBORHOOD: East Columbia Corridor
ZONING*: M3(l,n)
COMPREHENSIVE PLAN: Light Manufacturing
APPROXIMATE SIZE: 50 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Port of Portland

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent, Persistent
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This approximately 50-acre juncus wetland is unusual within Portland's Urban Service Boundary, as it is not drained. A few years earlier it was used by the Port of Portland as a sand stockpile and dredge spoils area for construction activities at Portland International Airport. The dominant vegetation is Juncus (rushes). Reed canarygrass, sedge, and foxtail are common. Seasonally, there are pockets of standing water containing emergent vegetation. A small perennial pond at the south end of the site is surrounded by a line of 40 to 50 year-old cottonwoods. The rushes have been grazed by cattle with unknown frequency.

This site provides winter and summer cover for Canada geese and a variety of duck species, which is a potential hazard for airport activities occurring immediately to the north and east. The area seems to be a staging place for waterfowl and probably for shorebirds. Over 300 Canada geese were flushed during one March site visit. Although nests were not specifically observed, it is suspected from behavior, time of year, and numbers of paired geese that this site may be one of the few non-island nesting sites for Canada geese within the urban area. Rushes and grasses provide food, cover, and nesting for seed-eating songbirds, as well as for small mammals. Savannah sparrows were observed building nests in April 1986.

The site is adjacent to an airport runway and other drained pasture land. Interspersion with nearby natural areas is high, due to its close proximity to other wetlands (Sites 35 and 36), and the Columbia River. According to the Port of Portland, this site has been used as a sand stockpile and dredge spoils area for many years. Much of the sand was removed for airport construction activities and has only recently fallen into the present undrained condition. The Port plans to drain this site as part of the ongoing maintenance and bird management program at the airport.

Portions of this site are within the 100-year flood boundary. Without a drainageway through the site, floodwaters draining into it from higher
surrounding land will pond on site, eventually evaporating or percolating into the ground.

WILDLIFE HABITAT INVENTORY SCORE: 55
SITE 38

LOCATION: Tax Lot 74, Sec. 12, 1N 1E
1/4 Section 2134

1 inch = 1000 feet
SITE 38

NEIGHBORHOOD: East Columbia Corridor
ZONING*: M3(l,n)
COMPREHENSIVE PLAN: Light Manufacturing
APPROXIMATE SIZE: 7 acres
INVENTORY DATE: March 1986
OWNERSHIP: Port of Portland
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine/Forest
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This small forest remnant is dominated by 30 year-old cottonwood and ash, with dogwood and hawthorn common. There is almost complete absence of understory vegetation (evidence of compacted soil) due to cattle grazing. The soils are saturated seasonally, and much of the site is within the 100-year flood boundary. There is a slough on the east side of the site which probably retains water year-round. Portions of the slough banks are dominated by dense patches of blackberries.

The forest is probably used by woodpeckers and song birds for foraging, roosting, perching, and nesting. It also may be used by raptors, crows, and jays as a perch and roost site. Small mammal production is probably limited, due to lack of herb and shrub growth. The slough remnant may be used on a limited basis by waterfowl.

Cattle grazing is the most apparent detriment to the natural condition of this forest. Tree growth and forest character have been retained.

WILDLIFE HABITAT INVENTORY SCORE: 35
SITE 39

LOCATION: Tax Lot 104, Sec. 17, 1N 1E
1/4 Section 2338

1 inch = 1000 feet
SITE 39

NEIGHBORHOOD: East Columbia Corridor
ZONING*: UF-20(cs, sec), FF, UF-20(cs)
COMPREHENSIVE PLAN:
APPROXIMATE SIZE: 4 acres
INVENTORY DATE: APRIL 1986
OWNERSHIP:
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine Forest
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This swamp is a small, high quality island refuge surrounded by industrial/commercial development and a golf course. Mature 6 to 16 inch Diameter at Breast Height (D.B.H.) willow dominate the swamp, with cottonwood and flowering dogwood present. Willows are growing in standing water.

This type of environment provides excellent foraging, nesting, perching, and roosting habitat for warblers, flycatchers, woodpeckers, reptiles, and amphibians. Duck and kingfisher nesting is probable. This site appears to attract a great diversity of bird species.

The site is situated between two sloughs, with portions in the 100-year flood boundary. As flood waters rise and flow over the lower wetland elevations, velocity is reduced due to the presence of vegetation and greater cross-sectional area, allowing sediment to precipitate.

WILDLIFE HABITAT INVENTORY SCORE: 66
SITE 40

LOCATION: Tax Lot 8, 11, 95, 108, 182, 109, Sec. 17, 1N 1E
1/4 Section 2337
Tax Lot 4, 5, 55, Sec. 17, 1N, 1E
1/4 Section 2338
SITE 40

NEIGHBORHOOD: East Columbia Corridor
ZONING*: GM(sec), GM, GM(n) UF-2-(cs), FF
COMPREHENSIVE PLAN:
APPROXIMATE SIZE: 22 acres
INVENTORY DATE: April 1986
OWNERSHIP:
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Forested, Broad-leaf Deciduous, Seasonally Flooded.
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is a forested peninsula defined by two sloughs, one being lake-like and the other forested and eutrophic. Portions of the site are within the 100-year flood boundary. Forest vegetation is dominated by 30 year-old cottonwood with a dense snowberry, blackberry, and red-osier dogwood understory. Several large cottonwood snags are present. The lake-like slough is approximately 800 feet-wide with very little vegetation at the littoral. The banks are mostly five to ten feet above the water, overhung with blackberry, willow, and cottonwood. About 500 feet of the southern bank have been filled into the slough with row crops and commercial activity to the water's edge. The northern slough is forested and brushy to the edge, with small logs and tree stems overhanging the water.

The structural diversity of the site is high. The open water provides resting, staging, and cover for resident and migrating waterfowl; deeper water provides foraging for diving and predatory waterfowl. The peninsula, isolated by the sloughs and dense understory vegetation, provides food, roost, perch, cover, and nesting for song birds, woodpeckers, raptors, and small mammals. The water body/forest edge is of great value to wildlife.

There is extensive human activity in areas adjacent to the peninsula, but very little actual human use of the site. This is a significant feature. An automobile junkyard is located on a filled portion of the north slough confluence with the south slough. Oil was observed leaching from the junkyard into the slough, affecting water quality.

WILDLIFE HABITAT INVENTORY SCORE: 72
SITE 41

LOCATION: Tax Lot 55, 95, Sec. 17, 1N 2E
1/4 Section 2337
SITE 41

NEIGHBORHOOD: Central Columbia Corridor
ZONING*: GM, GM(sec, n)
COMPREHENSIVE PLAN:
APPROXIMATE SIZE: 3 acres
INVENTORY DATE: April 1986
OWNERSHIP: Private

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This small, rapidly disappearing site is a pond and a marsh surrounded by new fill material. The observed site is estimated at one-tenth the size of the area shown on a 1983 aerial photo. The pond has emergent and floating pond weed, duckweed, cattail, and Juncus (rushes) growing along the edges of the water. Cottonwood, willow, blackberry, and reed canarygrass are common around the pond.

The pond probably has good invertebrate production; creating food for swallows, nighthawks, flycatchers, and bats. It also may function as habitat for frogs, snakes, lizards, and turtles.

WILDLIFE HABITAT INVENTORY SCORE: 50
SITE 42

LOCATION: Tax Lot 17, 18, 23, Sec. 11, 1N 1E, 1/4 Section 2232
Tax Lot 54, 55 - 61 of Sunderland Acres, Sec. 12, 1N 1E, 1/4 Section 2133
Tax Lot 21-30, 40, 41, 2 of lots 1-10 of Golf Acres, Sec. 11, 1N 1E
1/4 Section 2132
Tax Lot 57, Sec. 2, 1N 1E, 1/4 Section 2032
Tax Lot 2, 9, 11, Sec. 1, 1N 1E, 1/4 Section 2033
SITE 42

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: M3(l), M2(l,n), (OS)FF(l), (OS)FF(l,n), M2(l), R-20(l,n), R-20(l), and FF(M2)(l)
COMPREHENSIVE PLAN: Low Density SF, Farm & Forest, General Mfg., Light Mfg., and Open Space
APPROXIMATE SIZE: 26 acres
INVENTORY DATE: April 1986
OWNERSHIP: Private, Port of Portland, Drainage District
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Unconsolidated Bottom, Mud/Organic, Permanently Flooded.

Palustrine, Emergent Wetland, Persistent/Nonpersistent, Permanently and Semipermanently Flooded.

Palustrine, Scrub-Shrub/Forested Wetland, Broad-leaved Deciduous, Semipermanently and Seasonally Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is a 1.5 mile-long isolated slough segment. Surface drainage into this site is limited, as it is surrounded by levees of the Multnomah and Penninsula Drainage Districts. The Port of Portland and Multnomah Drainage District No. 1 are investigating the possibility of increasing flood storage of the district through more efficient utilization of this water body. Inundation of additional lands due to flooding is minimal, due to the steep slopes of the levees. It has limited human access and good quality water.

Forest, shrub, and grass mix along the water edge and up the dike banks. Western pond turtles were observed here. The area also provides good kingfisher habitat, and wind shelter for waterfowl off the Columbia River. Snags are present in and above the water. Extensive signs of beaver were observed.

Currently, livestock use the slough for watering, and also use riparian shrubs and trees for loafing. As a result, riparian vegetation is degraded in places, soil is compacted and eroding.

WILDLIFE HABITAT INVENTORY SCORE: 79
SITE 43

LOCATION: Tax Lots 9, 10, 11, 14, 15, 17, 18, Golf Acres, Sec. 11, 1N 1E
1/4 Section 2132
Tax Lots 36, 46, 48, 45, 88, 97, and Lots 9,10,11,12 of North Union Acres,
Sec. 11, 1N 1E
1/4 Section 2131
SITE 43

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: R-2(l,n), FF(R10)(l), R-20(l), M2(l), M3(l)
COMPREHENSIVE PLAN: General Mfg., Light Mfg.,
APPROXIMATE SIZE: 164 acres
INVENTORY DATE: April 1986
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent Wetland, Seasonally Flooded, Diked, Partially Drained, Farmed.
** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: The site consists mostly of row-crop fields, with some permanent pasture containing about five acres of rush (Juncus sp.). Ditch banks and fence-rows dominated by blackberry and reed canarygrass, with teasel, lupine, and horsetail are common.

This site's most significant wildlife function is during fall, winter, and spring when much of it is inundated. Shallow standing open water is used by large numbers of migrating and wintering waterfowl and shorebirds for resting, feeding, staging, and courtship. This kind of waterfowl habitat, which is only used during certain times of the year, is diminishing in piecemeal fashion throughout the western flyway. This is a critical factor in rapidly declining waterfowl populations.

A major portion of the site is within the 100-year flood boundary, and acts as a ponding area for stormwater runoff. This provides an area of reduced water velocity, thereby allowing sediment precipitation. Drainageways cross the site to a drainage district pump station, located along its southern boundary.

Gertz Road and 13th Avenue provide easy access.

Since the inventory was conducted, filling to above the 100-year flood elevation and development has occurred on much of the property in accordance with an approved subdivision and related land use approvals.

WILDLIFE HABITAT INVENTORY SCORE: 51
SITE 44

LOCATION: Tax Lot 11, 12, 28, 31, 40, 52, 56, 63, Blks. 1, 2, Meadows Add., Sec. 2, 1N 1E 1/4 Section 2031
Lots 4 - 7 of The Willows, Sec. 2, 1N 1E 1/4 Section 2030
SITE 44

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: M2(l), FF(R1.0)(l), R10(l), M3(l)
COMPREHENSIVE PLAN: Low Density Single Family Residential, General Manufacturing, Open Space, Light Manufacturing
APPROXIMATE SIZE: 105 acres
DATE OF INVENTORY: May 1986
OWNERSHIP: Private

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent Wetland, Persistent, Seasonally Flooded/Saturated, Diked, Partially Drained.

Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally Flooded/Saturated, Diked, Partially Drained.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site is a mosaic pattern of reed canarygrass and blackberry patches with cottonwood-dominated galleries along ditches and watercourses. Drainageways pass through the site, allowing ponding of stormwater and sediment trapping to occur. Occasional thickets of elderberry, maple and alder are present. Teasel is common with thistle and blue bindweed.

This is an expansive open space, with portions in the 100-year flood boundary. Part is owned by the Portland School District, and used as an arboretedum for educational purposes. Access points are from bordering roads, as well as Meadow Road, which bisects the site.

The grassland and shrub patches are valuable to small mammals, reptiles and amphibians. Gallery forests provide important perch, roost, and nest habitat for many bird species; perhaps, especially for raptors that can hunt the grasslands from these vantage points. Copses serve a multitude of wildlife purposes, possibly including cover for coyotes.

This site seems to be used infrequently by equestrians, although many horses are kept in the vicinity. Use by dogs and cats is probably common, and humans may occasionally walk through the open grasslands.

Vegetation is not very diverse, but the site has good structure--forest galleries border open grass/shrub lands (though permanent, open, ponded water is lacking). The most prominent feature here is simply open space.

WILDLIFE HABITAT INVENTORY SCORE: 42
LOCATION: Tax Lot 2, 3, Sec. 3, 1N 1E
1/4 Section 2029
SITE 45

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: M3(l)
COMPREHENSIVE PLAN: Light Mfg.
APPROXIMATE SIZE: 16 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Private
  * The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent Wetland, Persistent, Seasonally Flooded/Saturated.

  Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally Flooded/Saturated.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This wetland has been cleared and leveled in recent years, and is now in the early stage of recovery. Bare weedy ground exists at its margins. The site is dominated by cattail, young willow, young cottonwood, rushes, reed canarygrass, and yellow-flag iris. Thistle, blue bindweed, clover, vetch, and scotch broom are present at margins.

Red-winged blackbirds and pigeons appeared to be nesting here and a killdeer scrape was found.

There is considerable commercial and industrial development in the vicinity. Also, intensive human recreational use of Delta Park could influence wildlife use of the site. A new road passes within 100 feet of the site. This wetland is probably a small example of the dominant natural system before development. It could recover if allowed to do so.

The site is within the 100-year flood boundary, but has no direct drainageway connection. It receives some stormwater runoff from immediately-surrounding lands, which then either evaporate or percolate into the ground.

WILDLIFE HABITAT INVENTORY SCORE: 17
SITE 46

LOCATION: Tax Lot 60, 74, 110, 117, 127, 162, 226, Sec. 31N 1E
1/4 Section 1930

1 inch = 1000 feet
SITE 46

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: C2(1.n), C2(l)
COMPREHENSIVE PLAN: General Commercial
APPROXIMATE SIZE: 12 acres
DATE OF INVENTORY: April 1986

OWNERSHIP:
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent Wetland, Persistent/Nonpersistent, Permanently/Seasonally Flooded.

Palustrine, Scrub-Shrub/Forested, Broad-leaf Deciduous, Seasonally Flooded/Saturated.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: Floating and emergent vegetation is extensive within the slough channel. Duckweed, algae, Potomageton, reed canarygrass, cattail, yellow-flag iris, sedges and rushes are common. The bank canopy is dominated by a gallery of approximately 50 year-old cottonwood and ash. There are some four to five meter mature Pacific willows in standing water; some are snags. Water surface is shaded by overhanging trees and shrubs. Shrub canopy is dominated by willow, blackberry, snowberry, and elderberry. Banks are steep with some recent filling along the north bank.

A considerable diversity of song birds (goldfinch, finch, warbler, sparrow, swallow, blackbird) was found here. The habitat has a high quality structure, but is impacted by continual human activities. Heavy traffic from Marine Drive is immediately adjacent, but somewhat screened by the gallery of trees. The vicinity is mostly single-family residential, with the back yards of some terminating along the bank. This appears to be good pond turtle habitat. According to the Audubon Society of Portland, a Tricolored Blackbird colony existed here for at least three years. However, no observations have been reported since 1985, when they were seen feeding but not nesting.

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The slough is within the 100-year flood boundary, and collects stormwater from lands between Marine Drive and Bridgeton Road, carrying it to the drainage district pump station to the south, adjacent to Site 43. Direct access is from N. Gantenbein Ave., as well as Marine Drive at the eastern end of the site.

Winter roosting for Black-crowned Night Heron was reported along the upper reach of this drainageway, immediately east and accross from N.E. Marine Drive.

**WILDLIFE HABITAT INVENTORY SCORE:** 55
SITE 47

LOCATION: Tax Lot 12, 13, 14, Sec. 4, 1N 1E
1/4 Section 1927
SITE 47

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: (OS)FF(l)
COMPREHENSIVE PLAN: Open Space
APPROXIMATE SIZE: 12 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Portland Parks and Recreation

Peninsula Drainage District 2

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent Wetland, Persistent/Nonpersistent, Permanently and Seasonally Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: Floating vegetation is seemingly absent, perhaps due to either time of year or adjacent golf course use of herbicides. Emergent vegetation at littoral is dominated by a mix of reed canarygrass, rushes, bindweed, and cattail. The western and southern shores are part of the golf course, with mowed grass along the banks. There are some cottonwoods overhanging banks along the eastern shore, along with a scenic parking and viewing area. It appears that people park here and view the lake and its waterfowl. There is a sizable marsh along the northwestern shore, dominated by cattail, which grades into the marsh of Site No. 48.

At the time of the field visit, large numbers of insects were hatching from the lake, and swallow foraging was intensive. The site may also be used by bats for insect foraging. Many different species of ducks and grebes were observed using the lake for feeding, cover, resting, staging, breeding, nesting, or brooding. A population of red-winged blackbirds was also observed nesting. The only known breeding and nesting occurrence of ruddy ducks within Portland's Urban Services Boundary is Force Lake.

Force Lake appears to be an example of compatible recreation and wildlife resource uses.

This site, along with the entire Peninsula Drainage District No.1, is within the 100-year flood boundary. During normal flood events, it acts as a reservoir for flood waters and reduces flow velocities. This allows sediment trapping.

WILDLIFE HABITAT INVENTORY SCORE: 57
SITE 48

LOCATION: Tax Lot 15, Sec 33, 2N 1E
1/4 Section 1827
Tax Lot 12, Sec 4, 1N 1E
1/4 Section 1927

1 inch = 1000 feet
SITE 48

NEIGHBORHOOD:  East Columbia (West Columbia Corridor)
ZONING*:  (OS)FF(I), M1(I)
COMPREHENSIVE PLAN:  Heavy manufacturing
APPROXIMATE SIZE:  50 acres
DATE OF INVENTORY:  May 1986
OWNERSHIP:  Private, Portland Park Bureau
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**:  Palustrine, Emergent Wetland, Persistent, Seasonally Flooded and Saturated, Diked, Partially Drained

Palustrine, Emergent Wetland, Persistent, Permanently Flooded, Diked, Partially Drained

Palustrine, Forested, Broad-leaf Deciduous, Seasonally Flooded and Saturated, Diked, Partially Drained

Palustrine, Scrub Shrub, Broad-leaf Deciduous, Seasonally Saturated, Diked, Drained

Lacustrine, Littoral, Unconsolidated Bottom, Mud/Organic, Drainage Ditch and Open Bodies

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS:  This inventory site is approximately 50 acres in size. Because an alternative route for Marine Drive is located along its southern boundary, more resource information is available than with most other sites inventoried. This description is a summary of information gathered by the Planning Bureau for this inventory and from the Marine Drive Draft Environmental Impact Statement produced in 1986 by the Federal Highway Administration, Oregon Department of Transportation, and City of Portland, the Conceptual Mitigation Analysis for Impacts on Natural Resources Along the Proposed Marine Drive Route, prepared for Crown Zellerbach Corporation by Beak Consultants Inc. in 1987, and additional materials presented to the Planning Bureau by Beak Consultants Inc. and the Audubon Society of Portland during the fall of 1987. For more detailed information, the reader is referred to these documents.
The inventory site abuts the Delta Park golf course and is near other large wetland and wildlife habitat areas such as Smith and Bybee Lakes, west Hayden Island, Mud Slough, and Columbia Slough. Interspersion with the other natural areas is high. The land generally slopes upward in a northerly direction from a drainageway along the southern portion of the site to an elevation of about 20 feet mean sea level. Fill in areas north of the drainageway has raised land elevations resulting in drier soil condition (Beak), although no land use approvals for the fill have been given by the City. Drainage is maintained by a system of interlinking ponds and ditches draining by gravity from Force Lake in a southeast-to-northwest direction through the site and then south to a pump station at the outlet of Mud Slough (Site 50). As with all areas in Peninsula Drainage District No.1, water level is maintained during normal periods by the pump station at seven feet mean sea level. The site is completely within the 100-year flood boundary. Stormwater flow velocities through the site are reduced by vegetation, allowing sediment precipitation. The water table is high (within 12 inches of the ground surface), soil permeability is low (clay occurs at 5-to-7 feet), and seepage occurs in localized depressed areas (Beak).

There is a large variety and diversity of vegetation within the site; 18 to 20 dominant types are present (Beak). A classic Columbia Slough forest natural community is located at the west end of the site, dominated by cottonwood estimated by Planning Bureau biologists to be 40-to-60 years old. Ash is subdominant, and willow, hawthorn, big-leaf maple, alder, and serviceberry are also present. Another forested area, consisting largely of willow and cottonwood, is located on the eastern portion of the site. Herbs are seemingly absent at the forest interior. The two forested areas have saplings establishing; one has willow colonizing into a sedge community and the other has cottonwoods establishing on a fill area (Beak). Forested wetlands account for about 15 acres of the site (Beak).

Shrub wetlands are dominated by elderberry, wild rose, snowberry, spirea, and blackberry, with snowberry appearing to be the most common species observed when inventoried. Blackberry dominates over five acres of the site, and is encroaching into areas of elderberry and wild rose (Beak).

Emergent wetlands are diverse and complex, with micro-topographic variations. Rush, sedges, bullrush, and cattail are dominant vegetation in undisturbed wetlands, while reed canarygrass, bittersweet nightshade, Queen Anne's lace, grass, teasel, nettle, and blackberry dominate the more disturbed areas. Occasional elderberry and clumps of spirea are also present. Thistle, dock teasel, and water foxtail were found as colonizing vegetation on a dredge spoils bank. Herbs occur along the slough edge, including bleeding heart, arnica, bedstraw, sedges, and mosses.
Due to its physical characteristics and interspersion with other natural areas, and in spite of surrounding human activities, this site has high value for wildlife. Habitat is diverse, with both swamp and marsh characteristics. Invertebrates are present, making it a foraging ground for bird and mammal insectivores. Reptiles and amphibians provide food for herons, raptors, and mustellids (mink, skunk and weasel).

A major function of the forested portion is to provide structure and cover for a heron rookery of an estimated 20 to 25 nests. The activity is unusual in our urban area, being one of only two sites in the Portland Urban Services Boundary. The area which contains the heronry is designated as a Resource Category I by the U.S. Fish and Wildlife Service as part of the federal EIS process for the proposed Marine Drive, although the great blue heron is not considered rare, threatened, or endangered on either the state or federal level.

Great horned owl and red-tailed hawk nests are present. The forested areas also provide perch, roost, and nesting habitat for other owls and hawks, crows, warblers, jays, bushtit, flycatchers, nuthatches, kinglets, finches, sparrows, and other avian species.

The adjacent open wetland also provides habitat for reptiles, amphibians, birds, and mammals. Red-winged blackbirds are common, as are wrens, sparrows, and swallows. The brush rabbit population provides food for coyotes. California quail utilize the forest edge ecotone, foraging in grasslands and roosting in trees and shrubs. The site and Force Lake, abutting on the southeastern corner, are used by migrating and wintering waterfowl populations. The density and diversity of plants and animals found here is high.

Human use of the site is varied, limited primarily to the golf course fringe, although a transient camp is located in the eastern forested area. Under controlled and guided circumstances, the Audubon Society of Portland views the heron rookery and many other birds.

Overall, it is a high quality site for wildlife viewing, scientific research, and environmental education. Access to, and viewing of the site is excellent, without actually having to enter the site and disturb it. Adjacent golf course activity to the south, and railroad use to the north and west, appear compatible with existing conditions.

WILDLIFE HABITAT INVENTORY SCORE: 88
SITE 49

LOCATION: Tax Lot 35, Sec. 5, 1N 1E
1/4 Section 2025
Tax Lots 6, 8, 19, 24, 26, 27, 29, 36, 38, 39, 40, 51, 54, Sec. 5 1N 1E
1/4 Section 2026
SITE 49

NEIGHBORHOOD: East Columbia (West Columbia Corridor)

ZONING: M1

COMPREHENSIVE PLAN: Heavy Manufacturing

APPROXIMATE SIZE: 12 acres

DATE OF INVENTORY: April 1986

OWNERSHIP: Private, Peninsula Drainage District 2

CLASSIFICATION**: Palustrine, Forested Wetland, Broad-leaf Deciduous, Seasonally Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: Tree canopy at this island site is dominated by estimated 30 year-old cottonwood; some ash, occasional alder, mature willow, and hawthorn. Shrub canopy is dominated by mix of blackberry, willow, snowberry and elderberry. Herb layer is dominated by reed canarygrass, horsetail, and nettle. Forest litter is absent, indicating flooding. Some 10-inch diameter-at-breast-height (D.B.H.) snags are present.

These islands show little evidence of human disturbance. Their island nature provides "safe banks" and refuge for many birds and mammals, such as heron, raptors, beaver, mink, weasel, and possibly otter. Interspersion with the Smith and Bybee Lakes complex and Peninsula Drainage District No. 1 area is good.

The islands are located in the main channel of the Columbia Slough, and are totally within the 100-year flood boundary. Flood waters which pass through this site will be slowed by the topography and vegetation, allowing sediment removal.

Although inaccessible except by boat, this site can be viewed from surrounding property, particularly the levee at Delta Park (Site 50) to the north.

WILDLIFE HABITAT INVENTORY SCORE: 67
SITE 50

LOCATION: Tax Lot 12, Sec. 4, 1N 1E
1/4 Section 2028
Tax Lot 52, Sec. 5, 1N 1E
1/4 Section 1926

1 inch = 1000 feet
SITE 50

NEIGHBORHOOD: East Columbia (West Columbia Corridor)
ZONING*: (OS)FF, (OS)FF(I)
COMPREHENSIVE PLAN: Open Space
APPROXIMATE SIZE: 365 acres
DATE OF INVENTORY: May 1986
OWNERSHIP: Private, Peninsula Drainage District
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Unconsolidated Bottom, Mud/Organic, Permanently Flooded.

Palustrine, Emergent Wetland, Persistent, Seasonally Flooded and Saturated.

Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally Flooded and Saturated.

Palustrine, Forested, Broad-leaf Deciduous, Seasonally Flooded and Saturated.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This site contains part of West Delta Park, including land-extensive uses such as a golf course and auto race track. It is immediately north of the Columbia Slough, the major drainageway for the Columbia Corridor. Even though protected by levees and railroad fill, the site is located entirely within the 100-year flood boundary. Ponding of stormwater in lower swales, as well as water bodies (identified as Water Features 35-38) allows sediment trapping. Drainage from the northern portion of the drainage district passes through the site to a pump station, which pumps stormwater into the Columbia Slough.

Vegetation is mostly reed canarygrass, much of which is mown. Gallery forests exist along the sloughs. Some areas are very weedy from disturbance. Slough banks are generally overhung with a mix of blackberry and willow. Flowering and red-osier dogwood, hawthorn, and ash are common. Rushes are common in shallow water, and in patches at places of saturated soils. Cattail is noticeably absent; some duckweed and smartweed are present.
There are varied habitat functions. Water bodies are important for invertebrate production (insects, clams, crayfish, etc.). The open grassland functions as a foraging ground for waterfowl, raptors, small mammals, and coyotes. Gallery forests are roost/nest habitat for song birds. The littoral zones are important to beaver, shorebirds and fish.

Human use is extensive, and primarily related to the raceway. Some fishing and nature viewing occurs now. Dense crowds are probably confined generally to the raceway, though it is assumed that human visitation is common to the entire site. Frequency of human use is probably of a seasonal nature and most intense during weekends. This is an example of intensive recreational use of an area which still allows maintenance of natural values.

**WILDLIFE HABITAT INVENTORY SCORE:** 75
SITE 51

LOCATION: Block 24, Rivergate Industrial District
1/4 Section
SITE 51

NEIGHBORHOOD: North Portland (Rivergate-Terminal 4)
ZONING*: M1, M1(wi)
COMPREHENSIVE PLAN:
APPROXIMATE SIZE: 60 acres
DATE OF INVENTORY: May 1986
OWNERSHIP: Port of Portland
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Unconsolidated Bottom, Mud/Organic, Permanently Flooded.

Palustrine, Emergent Wetland, Persistent, Semipermanently and Seasonally Flooded.

Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Semipermanently/Seasonally Flooded and Saturated.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: The site is located on a historic Columbia-Willamette floodplain, next to the Columbia Slough. Most of it is within the 100-year flood boundary, and functions as a stormwater drainageway and sediment trap for surrounding industrial lands. A cattail and rush marsh exists on the east side of the railroad tracks. Some unvegetated sand banks go down to the water's edge. West of the railroad track is a large area of willow and spirea in standing water. Willow snags are present and suggest changes in site hydrology in recent years.

The site has been affected by proximity of the railroad, substation, and major roads, but does not seem to be frequented by humans on a continuous basis. The site is large, and its interspersion with other natural areas is very good.

Beaver have been live-trapped and moved to Smith and Bybee Lakes in order to clean drainage culverts.

WILDLIFE HABITAT INVENTORY SCORE: 79
SITE 52

LOCATION: Kelley Point Park Sections 23 and 24, 2N 1W, or Lot 3, Block 19, Rivergate Industrial District
1/4 Section 1321
SITE 52

NEIGHBORHOOD: North Portland (Rivergate-Terminal 4)
ZONING*: (OS)FF(1, wsr)
COMPREHENSIVE PLAN: Open Space
APPROXIMATE SIZE: 97 acres
DATE OF INVENTORY: May 1986
OWNERSHIP: Public
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Riverine, Lower Perennial, Unconsolidated Shore, Permanently and Seasonally Flooded.

   Palustrine, Forested Wetland, Broad-leaf Deciduous, Intermittently Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This 97-acre city park is located at the confluence of the Willamette and Columbia Rivers, and the mouth of the Columbia Slough. The north, west, and southern edges are located in the 100-year flood boundary. Some sediment trapping of stormwater runoff can be expected, although this value is probably minor compared to the total water volumes passing by the site in all water courses. Interspersion with other nearby sites is good, primarily through waterways and associated riparian corridors.

The tree canopy is dominated by cottonwood, with some small patches of park-maintained mown lawn. Cottonwoods seem to be about 30 to 50 years-old. Ash, hawthorn, willow, and oak are present. The shrub canopy is extensive, with perhaps 90% closure, and is dominated by snowberry. Blackberry, elderberry, willow, and serviceberry are also present. Herbs are scant in the forest, but arnica, angelica, bedstraw, orchardgrass, Kentucky bluegrass, and a brome grass species are present at forest edge. Litter is considerable in the forest interior, indicating a lack of frequent flooding and disturbance in recent times. Few snags are present.

The cottonwood/snowberry association is an impressive representation of this once widespread natural community. Substantial sandy beaches existed between the forest edge and river littoral at the time of the field visit. The water regime is influenced by the operating schedules and tidal fluctuations of the Columbia Basin dams.

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The site is used extensively as an urban park. Intensity of human visitation varies seasonally. Dogs roam the site intermittently. The Columbia-Willamette confluence is of great natural and human historic importance, being a significant geographic land and water form and value to migrating birds and fish. Alterations to the land and water features within the greater vicinity of this site can effect animal populations which frequent the park.

WILDLIFE HABITAT INVENTORY SCORE: 59
SITE 53

LOCATION: Tax Lot 22, 26, 24, 25, 7 (KGW), Sec 41N 1E
1/4 Section 1928
Tax Lot 5, Sec 33, 2N 1E
1/4 Section 1828
SITE 53

NEIGHBORHOOD: East Columbia (Central Columbia Corridor)
ZONING*: M3(l)
COMPREHENSIVE PLAN: Light Mfg.
APPROXIMATE SIZE: 82 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Private, Peninsula Drainage District 2
* The lower case symbols represent overlay zones. All upper case symbols
represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Palustrine, Emergent Wetland, Persistent,
Seasonally Flooded, Diked, Partly Drained.

Palustrine, Scrub-Shrub, Broad-leaf
Deciduous, Seasonally Flooded, Diked,
Partly Drained.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This is a relatively large wetland
inhabited by plant species which indicate recent ground disturbance. Reed
canarygrass occurs in low lying areas, and teasel, blackberry, and nettle at
somewhat higher spots, although the entire site is somewhat flat. There is
a small gallery of estimated 30 year-old cottonwood at the west end of the
site.

The site supports populations of small mammals and reptiles, which are
hunted by raptors. The site is fenced, thus restricting entrance of large
wild and domestic mammals. Some ground and shrub nesting birds may
benefit from this exclusion. Structural diversity is limited, and vegetation
is almost entirely European-introduced species.

The site provides stormwater ponding for nearby property which is at
higher elevations, and a drainageway bisects it in a north-south direction.
All portions of the site are within the 100-year flood boundary.

Force Ave. and Broadacre Rd. pass by the site, providing public viewing
without trespass.

WILDLIFE HABITAT INVENTORY SCORE: 24
SITE 54

LOCATION: Tax Lot 1, Sec 19, 2N, 1E 1/4 Section 1323
Tax Lot 2, 4, 3, 8, 1 (Bonneville Power Adm.), Sec 29, 2N, 1E
1/4 Section 1525
Tax Lot 1, 2, Sec 28, 2N, 1E 1/4 Section 1527
Tax Lot 1, 44, Sec 33, 2N, 1E, 1/4 Section 1727
Tax Lot 1, Sec 31, 2N, 1E
Tax Lot 2, Sec 30, 2N, 1E 1/4 Section 1523
SITE 54

**NEIGHBORHOOD:** West Hayden Island (Hayden/Tomahawk Islands)

**ZONING**: MUF20(sec)

**COMPREHENSIVE PLAN:**

**APPROXIMATE SIZE:** 738 acres

**DATE OF INVENTORY:** April 1986

**OWNERSHIP:** Private

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

**CLASSIFICATION**:

Riverine, Lower Perennial/Tidal, Unconsolidated Shore, Sand, Permanently Flooded.

Riverine, Lower Perennial/Tidal, Unconsolidated Shore, Sand, Seasonally Flooded.

Lacustrine, Littoral, Unconsolidated Bottom, Permanently Flooded.

Lacustrine, Littoral, Emergent Wetland, Persistent, Semipermanently and Seasonally Flooded.

Palustrine, Emergent Wetland, Persistent, Seasonally Flooded.

Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.

Palustrine, Forested, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.

** In addition, uplands may be present.

**OBSERVATIONS AND COMMENTS:** Largely due to its geography, size, and vegetation, West Hayden Island is a significant natural area within Portland's Urban Services Boundary. This inventory site is the western portion of a major island located in the Columbia River immediately upstream from its confluence with the Willamette, between the cities of Portland, Oregon and Vancouver, Washington. Much of the river adjacent to this site serves as part of the harbor for the ports of Portland and Vancouver, and represents the furthest distance upstream that ocean-going ships can easily navigate. West Hayden Island is roughly 760 acres
in size, second only to the Smith and Bybee Lakes area for inventoried sites in the Columbia Corridor. Surface soils are a variety of silt loams and sands, occurring either naturally or as a result of dredge spoils deposition. The groundwater table is seasonally high and areas are subject to periodic flooding. Natural vegetation patterns are generally characteristic of the lower Columbia River islands, with a variety of wetlands, meadows, and mature ash/cottonwood forests. Overall, West Hayden Island is an area of large structural diversity and provides both present and potential wildlife habitat of high quality within an urban center.

In addition to its wildlife value in and of itself, Hayden Island is adjacent to West Delta Park and the Smith and Bybee Lakes area, both of which scored very high in the habitat inventory (ranking sixth and first out of 34 inventory sites in the Columbia Corridor area, compared to second for West Hayden Island). Although data are presently not available, it is possible that interspersion between these sites is high, particularly for larger mammals and a number of birds seeking protected areas for breeding or foraging.

According to the U.S. Army Corps of Engineers, about 154 acres of the site have been identified as wetlands. However, wetlands determination used in the City's inventory was the system devised by the U.S. Fish and Wildlife Service, described in the publication *Classification of Wetlands and Deep Water Habitats*. Results from the two systems can differ.

Two trips were made for inventory purposes; the first in the Spring, and the second in the Fall. At the time of the first observation, some barges were tied off to dolphins along the north shore. Cattle were grazing in some areas. Fill operations were in progress in a wetland area west of the power transmission lines. No other human uses were observed. During the second visit, cattle grazing was still present, as was dredge disposal activity along the north shore and a sewage sludge disposal operation.

Portland General Electric Company (PGE), a major property owner, is now in the process of preparing a development plan for its portion of the inventory site, and has completed an environmental impact statement (EIS) on proposed fill and eventual conversion to a deepwater port facility of the eastern portion of the site. They are presently working with a number of local, state, and federal agencies and special interest groups to adequately address concerns on adverse environmental impacts. In response to these environmental concerns, an interagency committee was formed to develop and implement quantitative habitat evaluation procedures (HEP) that would document the value of various habitats on West Hayden Island. Results from the HEP study were published in October 1985. These data provided the basis for impact assessment of the various development alternatives in the EIS, and provide baseline information for the development of a proposed mitigation plan. The HEP committee has initiated the mitigation planning process, the results of which must be
approved as a condition of a fill permit by the U.S. Army Corps of Engineers. Information contained in the EIS was used to augment staff observations and data collected from other sources.

It should be noted that this inventory is not intended to replace the EIS prepared for the PGE-owned property. Instead it will be used by the City to augment the EIS data for Goal 5 purposes, assess the western end of the island as a whole regardless of property ownership, and provide continuity of inventory methodology between this and other wetland and wildlife habitat sites. For more detailed information on the PGE-owned property, the reader is referred to the EIS. A more detailed description of the site inventory for the entire west end of Hayden Island, is contained in "West Hayden Island, An Overview," Appendix L.

WILDLIFE HABITAT INVENTORY SCORE: 99
SITE 55

LOCATION: Tax Lot 1, Sec 25, 2N, 1W 1/4 Section 1621
Tax Lot 5, 2, 3, Sec 31 2N, 1E, 1/4 Section 1723
Tax Lot 30, Sec 36, 2N, 1W, 1/4 Section 1722
Tax Lot 1, Sec 31, 2N, 1W, 1/4 Section 1822
Tax Lot 6, Sec 31, 2N, 1E, 1/4 Section 1823
Tax Lot 10, 9, 55, 56, Sec 5, 1W, 1E, 1/4 Section 1925
Tax Lot 45, Sec 32, 2N, 1E, 1/4 Section 1825
Tax Lot 14, Sec 32, 2N, 1E, 1/4 Section 1725
Tax Lot 16, Sec 32, 2N, 1E, 1/4 Section 1826
SITE 55

NEIGHBORHOOD: Smith and Bybee Lakes (Rivergate-Terminal 4)
ZONING*: M1(I), (OS)FF(I), M2
COMPREHENSIVE PLAN: Open Space, Light Ind., Heavy Ind.
APPROXIMATE SIZE: 1867 acres
DATE OF INVENTORY: April 1986
OWNERSHIP: Private, Public
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Riverine, Tidal, Unconsolidated Bottom, Mud, Permanently Flooded.

Riverine, Tidal, Unconsolidated Bottom, Mud Semipermanently Flooded.

Riverine, Lower Perennial, Unconsolidated Bottom, Mud/Organic, Permanently Flooded.

Lacustrine, Littoral, Unconsolidated Bottom, Mud/Organic, Permanently Flooded.

Lacustrine, Littoral, Emergent Wetland, Nonpersistent (plants), Permanently Flooded.

Palustrine, Aquatic Bed, Algal, Rooted and Floating, Vascular (plants), Permanent and Semipermanently Flooded.

Palustrine, Emergent Wetland, Nonpersistent (plants), Permanent and Semipermanently Flooded.

Palustrine, Emergent Wetland, Persistent (plants), Seasonally and Intermittently Flooded.

Palustrine, Scrub-Shrub Wetland, Broadleafed, Deciduous, Permanently and Semipermanently Flooded.
Palustrine, Scrub-Shrub Wetland, Dead, Permanently and Semipermanently Flooded.

Palustrine, Forested Wetland, Broad-leafed Deciduous, Permanently, Semipermanently and Intermittently Flooded.

** In addition, uplands may be present.

**OBSERVATIONS AND COMMENTS:** Smith and Bybee Lakes is the most complex and unique natural area within Portland's Urban Growth Boundary. It is about 2,000 acres of a type of habitat which was formerly widespread throughout the lower Columbia River riparian area. Almost all of the site is within the 100-year flood boundary. Even though this site scored the highest on the Wildlife Habitat Inventory of all sites inventoried, there is still potential for further enhancement.

Two major soil types occur here; Rafter and Sauvie Silt Loam. The site is relatively flat, and small changes in hydrology affect large areas. Water volume of the main body of water is now determined by the recently (1982) installed water control structure. Water may flow into the lake system from the north slough, but cannot flow from the lake system back into the slough unless lake water level exceeds the top of the water control structure. Groundwater movement may be a significant hydrologic factor, but is not well understood. The St. John's landfill, water control structure, and various dikes and fill material are the three most significant human influences on this habitat complex.

Extensive amounts of edge habitat (ecotone) is found at this wetland, and is one of the site's most significant and basic natural resources for wildlife. Many questions regarding its natural history and human influences remain unanswered. Detailed research is being conducted by Fishman Environmental Services. Studies have been completed and draft reports are available from the Port of Portland.

For further discussion and descriptions, and a map of wetland systems and vegetation found at Smith and Bybee Lakes, based on the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States, see Appendix K.

**WILDLIFE HABITAT INVENTORY SCORE:** 106
SITE 70

NEIGHBORHOOD: Hayden/Tomahawk Island
ZONING*: UF10
COMPREHENSIVE PLAN:
APPROXIMATE SIZE: 20 acres
DATE OF INVENTORY: September 1988
OWNERSHIP: Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Riverine, Lower Perennial/Tidal,
Unconsolidated Shore, Sand, Permanently Flooded.

Riverine, Lower Perennial/Tidal,
Unconsolidated Shore, Sand, Seasonally Flooded.

Palustrine, Emergent Wetland, Persistent,
Seasonally Flooded.

Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.

Palustrine, Forested, Broad-leaf Deciduous,
Seasonally and Intermittently Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This is a relatively undisturbed portion of Tomahawk Island, representative of the undeveloped islands along this portion of the Columbia River. It contains a high structural diversity with species common to the Portland area. Trees on the upland portions are primarily cottonwood, with willow dominating the lower elevations.

A small spring is located on the northern portion of the site, emerging at the upland edge of the beach and flows south in a shallow channel to the Columbia River.

WILDLIFE HABITAT INVENTORY SCORE: 73
SITE 71, continued

NEIGHBORHOOD: Kenton, East Columbia (West, Central Columbia Corridor)

ZONING*: M1, M2(l,n), C2, C2(l,n), R10(l,n)

COMPREHENSIVE PLAN: Industrial, Commercial, Residential

DATE OF INVENTORY: September 1988

OWNERSHIP: Private, Port of Portland, State of Oregon

* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix E for a description of each zone.

CLASSIFICATION**:
- Riverine, Lower Perennial/Tidal,
  Unconsolidated Shore, Sand, Permanently Flooded.
- Palustrine, Emergent Wetland, Persistent,
  Seasonally Flooded.
- Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.
- Palustrine, Forested, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This is a highly disturbed, largely developed portion of the Columbia River. Levees maintained by the drainage districts, which extend along the length of the site, must be kept clear of large trees and protected from erosion. This results in vegetation that is primarily grasses and shrubs, with occasional small groves of trees.

Open recreational activities, including launching ramps, beaches, and bicycle paths are the predominant activity along the eastern portion. Commercial and industrial activities including moorages, and residential development are in the central and western sections of the site.

WILDLIFE HABITAT INVENTORY SCORE: 18
SITE 72

NEIGHBORHOOD: Rivergate
ZONING*: M1
COMPREHENSIVE PLAN: Industrial
APPROXIMATE SIZE:
DATE OF INVENTORY: September 1988
OWNERSHIP: Port of Portland, Private
* The lower case symbols represent overlay zones. All upper case symbols represent base zones. See Appendix B for a description of each zone.

CLASSIFICATION**: Riverine, Lower Perennial/Tidal,
Unconsolidated Shore, Sand, Permanently Flooded.

Riverine, Lower Perennial/Tidal,
Unconsolidated Shore, Sand, Seasonally Flooded.

Palustrine, Scrub-Shrub, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.

Palustrine, Forested, Broad-leaf Deciduous, Seasonally and Intermittently Flooded.

** In addition, uplands may be present.

OBSERVATIONS AND COMMENTS: This is a good quality riparian strip, the west portion being formed by what appears to be the regrowth of trees cut when the Rivergate Industrial Area was filled in the 1970's. Large cottonwoods are located primarily at the east end on lands which were not cleared for filling, while willows are most abundant along the edge of the fill. A narrow beach extends along most of the length of the site, providing good access to all portions. Access to the site is difficult, however, which accounts for the low human disturbance observed.

Much value of the site is in proximity to other natural resource areas such as Smith and Bybee Lakes, Hayden Island, Kelley Point Park, and West Delta Park. It is also an important visual element, softening the transition between the River and heavy industrial development upland.

WILDLIFE HABITAT INVENTORY SCORE: 65
COLUMBIA CORRIDOR WATER FEATURES

As the field work for the Goal 5 inventory of Natural Areas progressed, it became clear that some water features substantially affected by urban development would not qualify as specific Natural Area sites. However, most water bodies are a natural element, though perhaps now urbanized and lacking other components such as native plants and animals. If managed properly, many water bodies could be enhanced for wildlife use. It was recognized that a separate accounting of all surface water resources found within each Management Unit would be of value. In some cases, water features described are part of a larger Natural Area site, and were inventoried as such. The reader is referred to that particular site report for a complete description. Locations of identified Water Features can be found on maps following this narrative. Feature descriptions and field notes are available at the City of Portland Bureau of Planning. Comparative numerical rankings are presented in the table contained in this section.

Factors which limit wildlife use of Portland’s surface water resources are directly related to the various kinds and extent of present and past human land use. Urban development competes with wildlife for surface water resources by altering hydrology and by altering water qualities for which some species have become specifically adapted.

The primary purpose of the remaining Columbia Slough system is to provide a drainage network for rainwater and groundwater for the Columbia River flood plain area now largely diked or filled and for uplands to the south. Slough channel cleaning and maintenance disrupts fish habitat, including food supply, cover, and water quality. It limits the variety of habitat, and therefore the species of fish which can be supported. Columbia Corridor area sloughs, lakes, and ponds provide habitat for a variety of common game and non-game fish species. Habitat is generally limited due to the low flow character of the water bodies, which results in seasonal stagnation and algal bloom. Some water bodies are isolated from surrounding streams and rivers by the diking system, so migratory fish are not present. However, anadromous fish have been found in Smith and Bybee Lakes, and in the portion of the Columbia Slough which is still connected directly to the Willamette River.

If slough maintenance procedures were modified to enhance fish habitat, stormwater drainage may be compromised. There would then be a potential for a raising of periodic stormwater ponding levels and a corresponding reduction in land available for future urban development.
TABLE OF WATER FEATURES INVENTORYED, AND
RELATIVE SCORING OF WILDLIFE HABITAT
Refer to maps on pages 114-117 for locations

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>From N.E. 185th Ave. to Site 25</td>
<td>77</td>
</tr>
<tr>
<td>2.</td>
<td>From Site 25 west to N.E. 158th Ave.</td>
<td>73</td>
</tr>
<tr>
<td>3.</td>
<td>From WF Nos. 1, 2 north to &quot;Four Corners&quot;</td>
<td>67</td>
</tr>
<tr>
<td>4.</td>
<td>Drainage Dist. pump station south to &quot;Four Corners&quot;</td>
<td>68-69</td>
</tr>
<tr>
<td>5.</td>
<td>North slough west from &quot;Four Corners&quot;</td>
<td>70</td>
</tr>
<tr>
<td>6.</td>
<td>N.E. 158th Ave. west ~1500 feet</td>
<td>35</td>
</tr>
<tr>
<td>7.</td>
<td>South slough west of Well No.9</td>
<td>26</td>
</tr>
<tr>
<td>8.</td>
<td>North slough remnant, N.E. 136th to 122nd Aves.</td>
<td>34</td>
</tr>
<tr>
<td>9.</td>
<td>Slough remnants, Ainsworth Circle</td>
<td>17</td>
</tr>
<tr>
<td>10.</td>
<td>West from Honda warehouse ~1000 feet</td>
<td>23</td>
</tr>
<tr>
<td>11.</td>
<td>Whiting Lake</td>
<td>52</td>
</tr>
<tr>
<td>12.</td>
<td>South slough, N.E. 136th Ave. to Whittaker Way</td>
<td>Filled</td>
</tr>
<tr>
<td>13.</td>
<td>South slough from N.E. Whittaker Way to ~115th Ave.</td>
<td>45</td>
</tr>
<tr>
<td>14.</td>
<td>N.E.115th Ave. north of Marx St.</td>
<td>59</td>
</tr>
<tr>
<td>15.</td>
<td>From ~N.E. 112th Ave. to I-205</td>
<td>50</td>
</tr>
<tr>
<td>16.</td>
<td>Whiting Forest slough (refer to Site 29, no independent rating)</td>
<td>76</td>
</tr>
<tr>
<td>17.</td>
<td>North slough from N.E. 148th Ave., to both east and west</td>
<td>38</td>
</tr>
<tr>
<td>18.</td>
<td>Johnson Lake (refer to Site 34, no independent rating)</td>
<td>66</td>
</tr>
<tr>
<td>19.</td>
<td>Slough north of Johnson Lake (refer to Johnson Lake for more information)</td>
<td>67</td>
</tr>
<tr>
<td>20.</td>
<td>South slough from N.E. 92nd Ave. to Holman St.</td>
<td>22</td>
</tr>
<tr>
<td>21.</td>
<td>South slough from N.E. Holman St. to the business park</td>
<td>56</td>
</tr>
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</table>
## WATER FEATURES TABLE (continued)

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Business park complex east of Alderwood</td>
<td>31</td>
</tr>
<tr>
<td>23</td>
<td>Alderwood slough complex (see Site 40)</td>
<td>72</td>
</tr>
<tr>
<td>24</td>
<td>South slough from 63rd to confluence at 42nd</td>
<td>51</td>
</tr>
<tr>
<td>25</td>
<td>Two lakes between 57th+ and 47th, south of slough</td>
<td>46</td>
</tr>
<tr>
<td>26</td>
<td>North slough reach, along Cornfoot Road</td>
<td>32</td>
</tr>
<tr>
<td>27</td>
<td>North and south sloughs, 42nd to 33rd</td>
<td>24</td>
</tr>
<tr>
<td>28</td>
<td>North and south sloughs, 33rd to Peninsula Slough</td>
<td>32</td>
</tr>
<tr>
<td>29</td>
<td>Peninsula Slough (see Site 42)</td>
<td>79</td>
</tr>
<tr>
<td>30</td>
<td>Slough from Peninsula Slough to I-5</td>
<td>32</td>
</tr>
<tr>
<td>31</td>
<td>Slough between Bridgeton Rd. and Marine Dr. (see Site 46)</td>
<td>55</td>
</tr>
<tr>
<td>32</td>
<td>South segment at north end of East Delta Park</td>
<td>38</td>
</tr>
<tr>
<td>33</td>
<td>Slough segment adjacent to I-5</td>
<td>30</td>
</tr>
<tr>
<td>34</td>
<td>From GI Joe's to Vancouver Way</td>
<td>26</td>
</tr>
<tr>
<td>35</td>
<td>Lake at PIR (see Site 50)</td>
<td>75*</td>
</tr>
<tr>
<td>36</td>
<td>Mud slough (see Site 50)</td>
<td>75*</td>
</tr>
<tr>
<td>37</td>
<td>Slough north of PIR</td>
<td>75*</td>
</tr>
<tr>
<td>38</td>
<td>West Delta Park golf course ponds</td>
<td>21</td>
</tr>
<tr>
<td>39</td>
<td>Force Lake (see Site 47)</td>
<td>57*</td>
</tr>
<tr>
<td>40</td>
<td>Kelly Point</td>
<td>75</td>
</tr>
<tr>
<td>41</td>
<td>Smith and Bybee Lakes</td>
<td>106*</td>
</tr>
</tbody>
</table>

* Site scores from site inventories. Refer to Site Inventory noted for detailed description.
ANALYSIS OF ECONOMIC, SOCIAL, ENVIRONMENTAL, AND ENERGY CONSEQUENCES
GENERAL

Introduction

This section reviews and analyzes the economic, social, environmental, and energy consequences of protecting identified natural resources in the Columbia Corridor, or allowing conflicting land uses and activities to replace them. The analysis provides a balancing mechanism to measure the importance of identified natural resources relative to the need of the land for other urban uses and activities. It incorporates applicable findings, conclusions, policies, and objectives of other relevant land use goals. The result is an analysis taking into consideration all aspects of urban development for lands containing natural resources.

Report Format

The general format of the ESEE analysis is largely governed by Statewide Planning Goal 5 and applicable administrative rules (refer to Appendix D for LCDC Goal 5 and the Administrative Rule). However, specific elements to be considered are not identified, but are left up to the discretion of the local jurisdiction. Extensive discussion has taken place both in the public information portion and in the public hearings before the Planning Commission and City Council during the rezoning study of the Columbia South Shore, completed in 1987. The format used was developed by Portland after review of the City of Beaverton's and Lane County's ESEE documents which had been developed several years before, and through input by property owners, special interest groups, individuals, and the Technical Advisory Committee working on this project prior to and during the public workshop and hearing process of the rezoning study. The format was accepted and adopted by the City, and accepted by the Department of Land Conservation and Development. Therefore, it will be used in this analysis. Applicable information which has come to the attention of the Planning Bureau since that time has also been incorporated into the analysis.

Some elements within the analysis are common to the entire Columbia Corridor and may be described in overall terms to avoid repetition when evaluating each specific resource. Analyses of the economic, social, environmental, and energy consequences for each resource present in the Columbia Corridor are found in later portions of this section, along with recommended measures for resolution of conflicts between potential uses. Individual site descriptions do, however, incorporate information on overall as well as site-specific conflicting uses and economic impacts where applicable.
Area Wide Description

The Columbia Corridor is a low lying area with little topographic relief, extending over 15 miles from the confluence of the Willamette and Columbia Rivers eastward to N.E. 185th Avenue, south of the Columbia River. Historically it has functioned as a flood plain, but has been filled and diked to the point where it is protected from most high water conditions and is available for urban development. It is in transition from non-urban to urban uses which has been slowed by development constraints including flooding, poor drainage, and soils of low load-bearing capacity. Many open space, scenic and historic, and natural resources exist throughout the area, which may cause potential conflicts with future urbanization.

The Columbia Corridor is between Portland and Vancouver, providing good access to respective residential areas and existing labor pools. The Corridor functions as a gateway to Portland from Washington and is also a scenic connection to the Columbia Gorge National Scenic Area. Beaches and open spaces along the rivers in less developed areas allow both public and private access to these water bodies. A series of sloughs and wetlands remain in the the area, providing the primary means of stormwater drainage for the area. Along with the rivers, the sloughs are the major wetland, water body, and wildlife habitat areas within the corridor.

The Columbia Corridor is well located for urban development. It is adjacent to two navigable waterways and the western end is part of the main Portland Harbor for deep draft shipping. Two north-south freeways, I-5 and I-205, cross the district, while I-84 parallels the southern boundary between approximately N.E. 102nd and 185th Avenues. This freeway system provides convenient access to the other urban portions of the Portland/Vancouver metropolitan area. A main rail line to Portland from the east parallels the southern border of the corridor, and a north-south railroad, which crosses the Columbia River, separates the Rivergate Subarea from the West Columbia Corridor. Portland International Airport is in the Central Columbia Corridor Subarea, providing national and international air transport service for Portland.

Land uses and activities are primarily land-extensive, with large areas devoted to industry, transportation, recreation, agriculture, and open space. A smaller percentage is residential and an increasing amount is devoted to commercial development. In the 1970's the regional Urban Growth Boundary was extended to include the entire Columbia Corridor, primarily for the purpose of industrial development. Properties have been annexed to the City of Portland, service needs have been identified, and an urban renewal district has been established in the Columbia South Shore to coordinate provision of urban services and promote development of the area as a major industrial district for the City and region.

More detailed descriptions of the resource sites that have been inventoried can be found in the Inventory Section of this document.
CONFLICTING USES

Areawide Conflicting Uses

The Columbia Corridor contains a wide variety of development, but is generally dominated by commercial, industrial, transportation, agricultural, recreational, and open space land uses and activities on large parcels. Future urbanization which is likely to occur is expected to be primarily industrial, with commercial activity at major access points along the freeway corridors. Both active and passive recreational use will continue throughout the area. This land development pattern is in conformance with the Comprehensive Plan Map. The 40-Mile Loop, a bicycle/pedestrian system, is expected to extend along many of the linear resource areas, while field sports, golf, the Portland International Raceway (PIR), and similar recreational development will be limited generally to existing and immediately adjacent areas. More specific existing and potential development will be discussed in the following subsections which deal with individual sites.

Federal, State, and Other Regulatory Constraints

Federal and state governments, as well as special districts, have jurisdiction over wetland modification. Following is a brief synopsis of the agencies involved, and their roles as they relate to the Columbia Corridor:

Multnomah Drainage District No. 1, and Pininsula Drainage Districts Nos. 1 and 2 - In accordance with ORS 547, a drainage district must provide adequate drainage and flood protection to lands within its boundaries, which includes the Columbia South Shore, Central Columbia Corridor, and West Columbia Corridor. A variety of methods, including levees, drainageways, pumping systems and ponding areas are available.

Oregon Division of State Lands - In accordance with ORS 541.605-541.695 and 541.990, a state permit is required for any activity that proposes filling, removal, or alteration of 50 cubic yards or more of material within the bed or banks of the waters of Oregon. This includes wetlands, defined as those areas that are inundated or saturated by surface or groundwater frequently enough that, under normal circumstances, they would support vegetation typically adapted for life in saturated soil conditions.

U.S. Army Corps of Engineers - The Clean Water Act, primarily through the Section 404 process, requires a permit for the dredge or fill of material into the waters of the United States. The term "waters" includes wetlands, defined as areas inundated or saturated by surface or groundwater frequently enough that, under normal circumstances, they would support vegetation typically adapted for life in saturated soil conditions.
Permits which are proposed for issuance by the Corps of Engineers under the Section 404 process are subject to review by the U.S. Environmental Protection Agency (EPA) and the U.S. Fish and Wildlife Service (USFWS). All three agencies have memorandums of understanding on the Section 404 process, and either the EPA or USFWS can pursue "elevation" of the 404 permit when in disagreement with the Corps over issuance.

**U.S. Environmental Protection Agency** - Under Section 309 of the Clean Water Act, EPA reviews environmental impact statements required for all developments involving federal funding and assessed as having significant impacts on the environment.
AREA-WIDE ECONOMIC CONSEQUENCES

Introduction

The economic consequences of resource protection involve a comparison of the value of the resource to the economic impact to the local jurisdiction and region if the land were used for other types of development. For purposes of simplification and to avoid repetition, general, area-wide economic consequences of limiting potential non-resource-related development within the Columbia South Shore will be discussed in this section. Economic consequences of reducing or eliminating specific Goal 5 resources are contained in each applicable subsection with a brief comparison of costs involved with alternative land use scenarios of preserving, conserving, or allowing the total elimination of the identified resource.

The Columbia Corridor has historically been identified by Portland as an area suitable for industrial development, and continues to be relied upon for future expansion of the City's economic base. The Columbia South Shore was included in the Portland Metropolitan Area Urban Growth Boundary (UGB), annexed to the City of Portland, and designated as an Urban Renewal District primarily for its value as a potential industrial area. Attributes for this type of activity include proximity to the Portland International Airport, access to two interstate freeways (I-205 and I-84), presence of a major rail line, nearby utilities and services, relatively large land parcels conducive to industrial park-type development, and proximity of residential areas and potential labor pools. Likewise, western Hayden Island was included into the UGB because of its potential for industrial use, primarily for marine shipping. Western Hayden Island is the last remaining large undeveloped area in the Portland Urban Services Boundary which abuts the Portland Harbor and has deep-draft shipping capabilities.

Since rezoning the Columbia South Shore in 1987, there have not been any major changes in the basic economic, social, environmental, and energy findings. Therefore, this document will not replace entirely the documents previously adopted by the City, but there are limited changes or modifications to individual findings, conclusions, or inventoried sites within the Columbia South Shore area.
Findings

Following are the major applicable economic findings:

- The Columbia Corridor is about 16,300 acres in size. It is readily divided into five subareas: Rivergate/ Terminal 4, Hayden/Tomahawk Islands, Central Columbia Corridor, East Columbia Corridor, and Columbia South Shore. About 14,300 acres are within the City of Portland.

- The Columbia Corridor contains approximately 5,029 acres of vacant land considered suitable for industrial development. It is estimated that only 1,542 acres are fully serviced and above the flood plain, and 865 acres are partially or unserviced and above the flood plain.\(^1\)

- The Columbia Corridor contains about 3,037 acres of vacant land in parcels of 30 acres or larger and suitable for industrial development. It is the area within the region having the largest supply of uncommitted vacant industrial land in parcels of 30 acres or more (37 percent of the region’s total). Eighty-one acres are committed, 746 acres are uncommitted with no constraints, and 2,200 are uncommitted with constraints. Distribution is as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>Acres Committed</th>
<th>Acres Uncommitted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Constraints</td>
<td>Constraints</td>
</tr>
<tr>
<td>Rivergate/ Terminal 4</td>
<td>0</td>
<td>396</td>
</tr>
<tr>
<td>Hayden/ Tomahawk Is.</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Western Col. Corridor</td>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>Central Col. Corridor</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Columbia So. Shore</td>
<td>51</td>
<td>225</td>
</tr>
<tr>
<td><strong>Total Acres</strong></td>
<td><strong>81</strong></td>
<td><strong>746</strong></td>
</tr>
</tbody>
</table>

2,\(^3\)

- There are about 3,330 acres of vacant land of all parcel sizes presently zoned for industrial use in the Columbia Corridor.

- The industrial market outlook for the Columbia Corridor is for between 480 and 1,070 acres of presently-vacant industrial land to be absorbed by the year 2005, based upon a total of 1,900 acres needed for all of Multnomah County.\(^1\)

- Absorption for commercial, public investments, as well as industrial development within the Columbia Corridor total 689.9 acres, or about 99 acres per year for the seven year period 1982-88.

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Absorption rates for industrial/business park development within the Columbia Corridor are 351 acres, or about 117 acres per year for the 1986-88 time period.

An estimated 610 to 650 acres of the 1,900 acres needed in Multnomah County would be needed for deep-draft shipping facilities. There are presently about 515 acres of vacant industrial waterfront property in Portland, with 200 acres being in Rivergate. It is estimated that western Hayden Island could provide up to 500 additional acres for shipping facilities and 86 acres for associated industrial uses and support services.

In order to allow the market to function properly on a short term basis, sufficient land must be available to allow potential developers a sufficient choice of sites. One "rule of thumb" is that three to five times the amount of land expected to be needed for the next year should be available for sale or lease. Based upon the expected industrial need for all of Multnomah County of 1,900 acres over the next 20 years (95 acres per year absorbed), between 285 and 475 acres should be available within the County at any given time.

Commercial activities for the Columbia Corridor, including retail, hotel, and office uses, are expected to require approximately 160 acres by the year 2005.

Multnomah County contains approximately 9,700 acres of vacant land of all sizes considered suitable for industrial development. About 5,040 acres are in parcels of 30 acres or more, with 316 already committed, 1,241 uncommitted with no constraints, and 3,483 uncommitted with constraints.

Within the Portland Metropolitan Area Urban Growth Boundary there are 19,070 acres of vacant land. Of this, 10,011 acres are in parcels of 30 acres or larger; 1,509 are committed for development, 3,088 are uncommitted with no constraints, and 5,464 are uncommitted but constrained.

It is expected that 298,000 new jobs will locate within the Portland metropolitan area by the year 2005, 46,000 of these are expected to be in the manufacturing sector. Approximately 241,500 of these jobs are expected to locate within the Urban Growth Boundary. An estimated 8,975 acres will be needed to accommodate this growth; 5,192 for industrial and 3,783 for commercial uses.

It is estimated that the Multnomah County proportion of industrial employment for the metropolitan area will become stable after its steady decline over recent years and remain at the 1980 level. The growth in numbers of industrial jobs will result in an increase of an estimated 1,900 acres of industrial development over the next 20 years.
- It is estimated that Multnomah County will accommodate approximately 20 percent of the population growth and 30 percent of the employment growth (both commercial and industrial) expected in the Portland Metropolitan Area by the year 2005. Only about half of these jobs (59,220) and 85 percent of the population increase are expected to occur east of the Willamette River.\textsuperscript{5}

- Major industrial employment increases for the metropolitan area are expected in electronics (3.65 percent average annual growth rate to 2005), transportation equipment (3.07 percent), machinery (2.76 percent), and fabricated metal (2.58 percent).\textsuperscript{5}

- Industrial employment increases in Multnomah County to the year 2005 are expected to be in manufacturing including technology (about 30 percent), warehousing/distribution (23 percent), transportation and utilities (23 percent), and construction and resource activities (23 percent), each accounting for about 23 percent of the total.\textsuperscript{1}

- Warehousing and distribution activities are highly dependent on proximity to major transportation routes, particularly at an intermodal interface and logical break-in-bulk points. These locational opportunities occur in the Columbia Corridor in the Rivergate/Terminal 4 and Hayden Island subdistricts (railroad, deep-draft shipping, and I-5), and the western portion of the Columbia South Shore (airport, I-205 and I-84, and railroad).

- The estimate for total employment within the Columbia South Shore is as much as 28,400. This is equivalent to between 71 and 100 percent of the total new industrial employment expected for all of Multnomah County by the year 2005.\textsuperscript{1,6}

- The City of Portland has identified the Columbia South Shore as an Urban Renewal District as a method to provide urban services.\textsuperscript{6} Implementation may result in the availability of services throughout the entire South Shore. The Urban Renewal Plan may include drainage improvements which could result in a reduction in the area of flood plain.

- Unemployment in the Portland Primary Metropolitan Statistical Area for October 1986 dropped to the lowest level since October 1980. Nonfarm wage and salary employment increases were due to gains in nonmanufacturing activity. This is similar to the national trend, where much of the increase is concentrated in the retail trade and service industries. A large share of these new jobs are of a part-time nature with low pay, resulting in a downward pressure on the general level of income for a large portion of the population. If this continues, the trend will tend to limit consumer spending and relegate a growing share of the population to a relatively low standard of living.\textsuperscript{7}
Unemployment in the Portland Primary Metropolitan Statistical Area in 1987 dropped to the national average. Presently, it is slightly below the national average.

Activity at Portland International Airport has steadily increased. Between 1977 and 1987, passenger rates have increased by 52.2%, mail tonnage by 62.2%, and air freight by 94.3%. This pattern of growth is expected to continue.

Development in the Columbia South Shore Urban Renewal District by the year 2005 is expected to add $195,714,000 to the true cash value of real estate. Tax increment financing, in conjunction with the Urban Renewal District, will be discontinued in fiscal year 2001-2002, allowing the added true cash value to be placed on the tax rolls. This figure represents about 1.5 percent of the true cash value of the City including the addition of the Urban Renewal District development, but less than 20 percent of the Columbia South Shore's private development potential.

Proximity to an international airport, a major rail line, two interstate freeways, and a large residential area and labor pool to the south provide locational advantages for development which are unique in the Portland metropolitan area.

Endnotes

1 LeBlanc and Company, Columbia Corridor: Market Support for Development Through the Year 2005, 1985

2 Except for the Columbia Corridor, constraints to development for purposes of this information include the presence of at least one of the following: no sewer and water lines within 1,000 feet of the site; hazards including flood plain, steep slope, and settlement ponds; sites partitioned into small lots with odd-shaped configurations; annexation, zone change, or comprehensive plan amendment requirements; or property available for lease only rather than for sale. Information on hazards within the Columbia South Shore was not available to METRO at the time of this analysis, so constraints to development in this subarea did not take into account the presence of hazards.

3 METRO, Vacant Industrial Land Inventory and Market Assessment, 1986

4 Portland General Electric Company, Hayden Island, Proposed Amendment to the Multnomah County Comprehensive Plan for the West Hayden Island Area, May 1982

5 METRO, A Regional Population and Employment Forecast to 1990 and 2005, 1985


Analysis and Summary

From an overall and regional perspective, there should be no adverse economic impact from the preservation of any significant Goal 5 resources in the Columbia Corridor. The regional need for industrial land has been estimated to be about 5,192 acres. About 19,070 acres of vacant land suitable for industrial land exist within the Urban Growth Boundary, 10,483 of these are vacant and uncommitted with no constraints. This provides a present market ratio of over 2:1 for the 20-year estimated need for presently-unconstrained land, and a ratio of almost 4:1 for all vacant industrial land.

Industries which are locationally-dependent, however, may face shortages if constraints are not removed from certain lands. An example of a locationally-dependent industry is deep-draft shipping facilities, where 610 to 650 acres will be needed by the year 2000, but only unconstrained 515 acres are presently available in Portland. West Hayden Island has the potential to provide up to 500 additional acres of waterfront industrial land. Without West Hayden Island, the inability of the City to provide the additional 95 to 135 acres (plus a suitable market factor) in the long term would have a major economic impact on Portland.

Lands toward the western end of the Columbia South Shore, particularly at the intersection of I-205 and Airport Way, have excellent access to both the airport and freeway. Likewise, with full extension of Airport Way to N.E. 181st Avenue, the eastern portion of the South Shore will derive locational benefits through improved access. These areas gain value for both commercial and industrial activities which are dependent upon easy access to the transportation network. However, the expected need for commercial land within the entire Columbia Corridor is 160 acres. Only when available land is below this figure (plus a normal market factor for similar available land) will the impact be felt by the market. Therefore, value of the land is primarily for industrial development.

If a regional shortage of unconstrained industrial land does exist, it is for large parcels (greater than 30 acres) which are particularly desirable for new industrial park development. Only 3,038 acres of the 8,502 acres of uncommitted vacant land which exist in large parcels exist are unconstrained. This number represents less than 60 percent of the expected regional industrial need for all industrial land. The Columbia Corridor contains over 35% of the total Metropolitan Area acreage of large parcels, and 40% of the constrained parcels. The amount of available land, the existence or provision of services, and locational benefits could result in the Columbia Corridor capturing the majority of the 1,900 acres of industrial development expected for Multnomah County.

Portions of both constrained and unconstrained land in the Columbia South Shore contain resources subject to the LCDC Goal 5 process. Conservation of any of these resources will result in a reduction of land potentially available for industrial or supportive development. Specific locations of
these lands are discussed in later sections of this report. Except for uses dependent upon transportation and other locational attributes of the South Shore or for uses which need large land parcels, industrial uses have a variety of opportunities to locate elsewhere in the Columbia Corridor.

Property tax impacts from economic development are expected to be large, although the impact felt on property owners throughout the City or other major taxing districts will be small (for example, estimated increase in true cash value of South Shore development by the year 2005 is only about 1.5 percent of the existing true cash value for the entire City). Adverse impacts would only be felt if development could not occur in a particular taxing district due to protection of Goal 5 resources. This would occur if the vacant available land supply for all of Portland fell below the expected need.

Generally, the creation of manufacturing jobs is preferable to nonmanufacturing (such as retail sales). The addition of raw materials or labor to create a product adds value to it. When it is exported from the region, the money which pays for it flows back into the region, increasing the regional wealth. The higher average wages for manufacturing jobs will also allow a continuation or improvement in the general standard of living. Displacement of industrial employment opportunities by a Goal 5 resource has a greater potential adverse economic impact than would the displacement of an equivalent number of commercial jobs.

In summary, adverse economic impact will result when insufficient lands are available for a needed industrial or commercial activity. Given a market factor, 1,545 acres of industrial land (1,070 acres needed and 475 acres for a market factor) and 200 acres of commercial land (160 acres needed and 40 acres for a market factor) will be needed for all of Multnomah County by the year 2005. Of the 9,724 acres of vacant land presently suitable for industrial development within Multnomah County, 1,542 are in the Columbia Corridor and have no constraints. Seven hundred and forty six are 30 acres or larger in size.
AREA-WIDE SOCIAL CONSEQUENCES

The Columbia Corridor represents a major recreational opportunity, since active and passive recreation are two of the largest present land uses. Five golf courses, Portland International Raceway, Portland Meadows, numerous boat moorages and clubs, a public launching ramp, beaches, and the playing fields at Delta Park provide active recreation opportunities for the Portland region. Kelley Point Park, Smith and Bybee Lakes, and portions of the 40 Mile Loop also provide passive recreation opportunities on a more limited, but still significant, scale. Future recreation plans of the City include expansion of the 40 Mile Loop and other bicycle/recreation trails throughout the Columbia Corridor, linking the residential areas of North and Northeast Portland to present and future employment and recreation opportunities.

To support these City-adopted policies and implementation strategies, it is important to support Columbia Corridor development which does not conflict with existing recreational activities and which will encourage future opportunities.
AREA-WIDE ENVIRONMENTAL CONSEQUENCES

Natural resource units within the Columbia Corridor function interdependently to provide a system whose overall value would not be as high if isolated from one another. Before making decisions on the land use potential of individual sites, one must first understand what some of the basic environmental processes of the entire system are. If those processes are of significant value to the City, key elements must be preserved or enhanced through land use protection.

The natural resource areas inventoried in the Columbia Corridor are primarily related to the Columbia Slough, Columbia River, or remnants of the historic river/slough system. Overall, the water features act as drainageways or basins for groundwater and stormwater, reducing flooding in the lowlying areas. It is the largest area of wetlands in the City of Portland.

Biologically, the slough and related areas functions as a wildlife corridor, allowing the passage of birds and animals from outlying areas such as Government Island and the Columbia Gorge on the east, and Sauvie's Island, the Willamette River, and the West Hills on the west, into the metropolitan area. It provides one of the major warm water fish habitat areas in the City, and also provides wetland and upland habitat for a large variety of year-round and migratory birds and animals. It is the only resource in North and Northeast Portland to have all of these values.

There are also significant natural area "islands" along the slough corridor which provide a variety of habitat and, when coupled with the slough and the corridor function, are of very high resource value. Beginning on the west, western Hayden Island, Smith and Bybee Lakes, Kelley Point Park, the sloughs, wetlands, and upland natural areas around and within Portland International Raceway (PIR) and Heron Lakes Golf Course form a system that appears to support large mammals such as deer and coyote, as well as beaver, muskrat, and other water-related species. Birds unusual to urban areas, including the Tricolored Blackbird and Great Blue Heron, nest here.

The center of the Slough System, including the Peninsula Slough, Merrit and Fazio properties, and Riverside, Columbia Edgewater, and Broadmore Golf Courses forms another "island" which provides turtle habitat and is the source of a number of unusual bird sightings, including winter roosting for the Black-crowned Night Heron. At the extreme eastern end of the corridor is the Four Corners area, with a variety of forested and palustrine wetlands and forested uplands, which also provides high value wildlife habitat.
AREA-WIDE ENERGY CONSEQUENCES

The major use of energy in the Columbia Corridor, both at present and expected in the future, is transportation. Since the Corridor is convenient to major transportation routes and is central to the Portland/Vancouver Metropolitan Area, it acts as a major transfer/distribution point. Relocation of certain activities, such as deep-draft shipping or airport-related industries, away from the area would decrease efficiency and increase energy consumption.

Short work trips represent a smaller energy outlay than long worktrips. The Columbia Corridor abuts major residential areas in North and Northeast Portland, allowing efficient and convenient access between jobs and homes. Industrial development of the Columbia Corridor would also provide an increase of jobs within easy bicycling distance, and in some cases within walking distance, of home. The development of a network of bicycle/ pedestrian facilities which augment the motor vehicle routes should reduce energy use.
WATERSHED RESOURCES

The Columbia Corridor is part of a watershed area which includes the historic Columbia River flood plain, now diked and controlled, and upland areas extending southward to roughly E. Burnside Street. Multnomah Drainage District 1 and Peninsula Drainage Districts 1 and 2 have the capacity to stabilize ponding levels given the present amount of urbanization in the watershed area. As further urbanization occurs and more impervious surface is added, runoff will increase, thereby increasing demands on the drainage system. A solution to this potential problem can be addressed in several ways: increase on-site detention to offset the additional impervious surface, increase the water control capacity of the drainage district through ponding and/or pumping capacity, or allow an increase in stormwater ponding levels and protect newly-impacted lands through land-use controls.

The economic consequences of these actions are reflected in a potential loss of jobs, impacts on services and utilities, amenity value, and an impact on the tax base. Any reduction of urbanizable land due to an increase in stormwater ponding level in the Columbia Corridor will result in a decrease in land potentially available for industrial development. This, in turn, means a decrease in a potential for new jobs in the community.

Services and utilities would be more expensive under any of the three alternatives. On-site retention would result in increased landowner expenses as a property is developed. Ongoing maintenance costs will depend on the type of retention system used. Increased drainage capacity also results in added cost, primarily borne by the property taxpayers of the drainage district. Added costs can be in the form of increased pumping capacity, increased channel and equipment maintenance, or increased land costs for additional ponding capacity.

Depending on how watershed protection measures are implemented, the amenity value of the system could result in increased desirability of the area for industrial location. On-site retention areas could be in the form of landscaped meadows, ponds, or sloughs which reflect the natural environment, creating a character unique to the area. It could help to create a visual "gateway" to the City of Portland and the State of Oregon, as travelers cross the I-5 and I-205 bridges, and show that development and nature can coexist.

Tax base issues are similar to those which will be discussed under the Wetlands, Water Bodies, and Wildlife Habitat Areas section.

Environmental issues include drainage and flooding as well as aesthetics, uniqueness, and water quality. All are discussed under applicable sections elsewhere in this document.
Energy impacts would be primarily energy expenditures from using the drainage district pumps and maintaining whichever flood control measures are chosen.

The Multnomah Drainage District 1 has proposed undertaking development of a drainage master plan, and is now seeking funding support from other agencies, including the City of Portland. Possible outcomes of this study may include additional ponding area, drainageway, or pumping improvements, rerouting of drainageways, and land use or construction regulations designed to reduce stormwater runoff. As this study is completed, recommendations will be reviewed for possible incorporation into the Comprehensive Plan. However, as no commitments have been made at this time, it must be assumed that drainageways and facilities will remain essentially the same for the near future.

It is recommended that environmental protection zone be placed on major sloughs, for the review of proposed development to obtain assurances that adequate access to the drainageways for maintenance and other related functions can be maintained, and that impediments to drainage be prevented. Drainage values are discussed in more detail in the analysis section for wetlands, water bodies, and wildlife habitat areas.
ECOLOGICALLY AND SCIENTIFICALLY SIGNIFICANT RESOURCES

Remnants of both the historic Columbia River floodplain in the form of the Columbia Slough and adjacent wetlands, and the oak savannah of the Willamette Valley, present examples of possible ecologically and scientifically significant areas within the Columbia Corridor. These items are discussed and analyzed in detail under the sections of this report dealing with water bodies, wetlands, and wildlife habitats.
WETLAND, WATER BODY, AND WILDLIFE HABITAT RESOURCES

Introduction

In the past, wetlands have been considered expendable, available for fill and expansion of upland activities ranging from agricultural to urban development. As a result, an estimated 54 percent of all wetlands present in the coterminous United States (lower 48 states) have been lost, primarily through filling or drainage. It has been only recently that wetlands have been identified as areas of high value for stormwater and flood retention, erosion control, groundwater and surface water quality, sediment and pollutant trapping, and wildlife habitat.

Statewide land use planning goals recognize that these wetland and water features are of value and have a legitimate place in the urban as well as non-urban areas. LCDC Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Areas, requires local jurisdictions to inventory wildlife habitat and wetland areas relative to their location, quality, and quantity. This action should result in the determination of the value of the land if left in its natural state or if enhanced as a wetland or wildlife habitat area.

If other allowed land uses conflict with the natural use, the site is subject to an analysis of the economic, social, environmental, and energy consequences of retaining the natural use, allowing the conflicting use, or a combination of the two. This analysis should be able to determine the value of the site for other urban development (housing, commercial or manufacturing areas, etc.), and compare it to the value as a natural area. If no conflicts are identified, the site must be protected. If conflicts are identified, land use controls must be developed which will achieve Goal 5, "To conserve open spaces and protect natural and scenic resources," while at the same time complying with other statewide land use goals.

The purpose of this report is to identify and analyze the economic, social, environmental, and energy consequences of fully protecting the identified wetland areas in the Columbia Corridor, or to allow in whole or in part conflicting commercial and industrial development.

Wetland, Water Body, and Wildlife Habitat Resource Inventory Results

An inventory of wetland, water body, and wildlife habitat sites was undertaken as part of the Goal 5 update process in the Winter and Spring of 1986 for areas within the Columbia Corridor. About 4,900, or 30% of the 16,300 acres in the Columbia Corridor were identified as potential Goal 5 resources and inventoried. About 550 acres were located in the Columbia South Shore, 359 in the Central Columbia Corridor, 1,059 in the West Columbia Corridor, and 2,933 in Rivergate/Terminal 4 and Hayden/
Tomahawk Islands. The map in this section identifies the location of wetland, water body, and wildlife habitat sites which are analyzed in this report. For ease of identification, they have been numbered using the system incorporated in the citywide Goal 5 Update study.

Field sheets and any other observations made for each site are contained in the Goal 5 Update inventory material located at the Bureau of Planning.

Economic, Social, Environmental, and Energy Consequences

Economic Consequences

Amenity Value for Customers, Employees

Wetlands can represent a valuable visual amenity for both customers and employees of a development, providing a pleasant exterior environment and place to enjoy non-working time. Development and district "themes" can take advantage of this natural environment, emphasizing a philosophy of integrating urban development and nature. Landscape requirements in commercial and industrial zones can be met in part through preservation of wetland resources.

Approximately 4,900 of the 16,300 acres contained in the Columbia Corridor have been identified as wetlands, water bodies, or wildlife habitat areas. If filling or other modification is required for development, wetland mitigation may already be required through existing state and federal regulations. The preservation of wetlands can be used as a marketing tool to identify the area as a unique and desirable development opportunity.

Impact on Jobs

The potential loss of industrial and commercial jobs was covered in a previous section of this report. As concluded, adverse employment impacts would occur only if the land supply were unnecessarily reduced below the market demand within the potential market area. The demand was estimated to be 1,545 acres of industrial land and 200 acres of commercial land for the entire Columbia Corridor, only three acres more than the amount of land presently vacant, fully serviced, above the flood plain, and considered suitable for development in the Columbia Corridor alone.

The addition of water bodies, wetlands, or wildlife habitat areas which increase attractiveness to large numbers of birds in close proximity to Portland International Airport may increase bird-control problems, thereby jeopardizing airport safety. By allowing off-site mitigation in areas farther from the runway areas, the hazards associated with birds can be reduced.

The retention of wetlands, water bodies, and natural resource areas can provide job potential through the provision of fishing, bird watching, and other equipment to aid people in taking advantage of the natural resources.
Loss of Revenue

Potential loss of revenue was covered in the general Economics section earlier in this report. As mentioned, revenue loss, both from taxes and income, would only occur if land supply were unnecessarily reduced below the market demand within the potential market area. This figure (for both industrial and commercial development) was estimated to be 1,745 acres total for the Columbia Corridor. Retention of all wetland, water body, and wildlife habitat sites inventoried would only reduce the total land available in just the Columbia South Shore subdistrict to 2,150 acres. This is over 23 percent more than the land needed for all five subdistricts of the Columbia Corridor.

The location of some identified wetlands could result in difficult and awkward development situations if full retention in their present location is required. Usable parcel size may be reduced, thwarting a major reason for encouraging industrial development in the Columbia Corridor – the existence of large tracts of land.

The consolidation of smaller wetland areas into one large area, assuming existing wetland values can be retained, would allow greater flexibility in industrial or commercial development. If developed properly, wetland conservation may, in fact, make the Urban Renewal District more desirable for industrial location due to natural amenities and identity.

Impact on Services and Utility Extensions

Sewer, water, and streets are not presently available in parts of the Columbia Corridor at a level which would allow for full development of lands presently free of wetland, water body, and wildlife habitat constraints. Conservation of natural resources in their present locations and forms may result in inefficient street patterns, as well as in sewer and water lines located in street rights-of-way. This pattern of services may result in increased costs to the landowner during development and increased maintenance costs to the City. Relocation and consolidation of wetlands as part of an area-wide management plan for those areas which cannot be efficiently serviced, but are needed for industrial or commercial development, would allow more efficient use of street frontage for urban activities. Careful relocation of streets and utility lines can also lessen the impact on wetland areas. Services located within resource areas can result in increased costs due to consideration of hydrology, soils, waterproofing of utility lines, special construction techniques, and mitigation or restoration of natural resources.
Stormwater drainage costs must also be considered. To some degree, by their very definition, all wetlands serve as retention or detention areas for water. Their value in this use will vary by their locations, connections to other water bodies, and how surrounding development uses them. Removal of any wetland in the Columbia South Shore Urban Renewal District without equivalent mitigation may result in increased stormwater flows to the Columbia Slough and, therefore, increased drainage costs. These costs would come through channel construction and maintenance, creation of ponding areas, or increased pumping capacity. Costs involved are ongoing and will correlate closely to energy costs. Retention and consolidation of wetlands at points where ponding and drainage efficiency can be retained or enhanced will result in a system which will be energy efficient, reducing overall and ongoing costs, and will have the potential for convenient expansion to accommodate future increased stormwater runoff peaks resulting from continued urbanization.

Alternative Sites Available for Development

Except for the Columbia Corridor, few areas in Multnomah County exist with the potential attributes of large land parcels, deep-draft shipping, and the potential for freeway and airport access, efficient services extension, and proximity to both market and employment pools. Retention of existing wetlands may, in certain cases, reduce the size of potential parcels, thereby losing some of the advantages of the South Shore area in comparison to other areas outside the City of Portland and Multnomah County.

Development Costs

Existing wetlands, water bodies, and wildlife habitat areas are located in a manner which may potentially increase development costs, both in the provision of services (discussed in an earlier section) and construction of the industrial or commercial facility. These costs vary, being largely dependent upon the type of proposed development, distance from desired facilities, and size and type of natural resource involved.

Competitive Advantage or Disadvantage

As discussed previously, wetlands, if located properly, can provide an advantage in marketing of an area through unique identity and amenity values. Improper location can reduce the number and configuration of large parcels potentially available, driving up development costs and, therefore, losing any competitive advantage. Wetlands, in functioning as stormwater detention and retention areas, will increase protection to the area, providing a competitive advantage over areas which are not as well protected.
Existing and Planned Improvements

Portland International Airport Operations

There is a strong need to reduce bird populations in the immediate vicinity of the Portland International Airport for safety reasons. Reported collisions between planes and birds have averaged around 30 events annually in recent years, with damage to planes ranging from large dents in the aircraft fuselages to holes being ripped in the wings.

In response to a Federal Aviation Administration (FAA) directive in the late 1970's, the Port of Portland has instituted a bird-control program. The program includes patrolling the airport property and scaring off flocks or individual birds, removing or controlling vegetation, controlling small animals, and occasionally trapping birds. These activities must be reported to and are reviewed by FAA on a regular basis as part of the overall airport safety program. Continued failure to meet FAA regulations may result in decertification of the airport for certain activities, such as commercial passenger service.

In addition to its own property, the Port of Portland is concerned with new land development in areas within three to five miles of the runways, because of their potential ability to attract large bird populations. The FAA becomes concerned with the creation of any new development which have the potential to attract large numbers of birds within 10,000 feet of the end of airport runways. The western portion of the Columbia South Shore, Central Columbia Corridor, and the eastern half of West Columbia Corridor lie within the three to five mile radius. If natural resources are to be created or enhanced in a manner which would attract large bird populations, they should be located as far away from the airport as is practicable to reduce potential safety problems for aircraft.

Land Use Actions, Subdivision Approvals

Historic Comprehensive Plan and zoning designations for much of the land within the Columbia Corridor have consistently indicated the area as suitable for immediate or future urban development, primarily industrial or commercial in nature. Zone changes, subdivision approvals, and other land use actions have been consistent with this pattern. There has been no subsequent information which would indicate the public need for a shift from this general development pattern. Some approvals, however, were made without consideration of existing wetlands, such as Inventory Site 28, located at Ainsworth Circle. Retention of existing wetlands may jeopardize the usability of platted lots for their intended purposes. Mitigation, either on- or off-site, could allow full development in these instances while, at the same time, retaining wetlands and their related values.
Airport Way

The City of Portland has proposed the construction of an easterly extension of Airport Way, to connect with I-84 at N.E. 181st Avenue. A final environmental assessment has been prepared which discusses wetland impacts and possible mitigation measures. Wetlands at the eastern end of the project (Inventory Sites 22-26) have been identified as high-quality wetlands, and an alternative routing is designed to minimize disruption and adverse impacts. Other wetlands directly impacted by road construction are of lesser value and could be mitigated for. The City has prepared a plan which will protect area wetland values, while allowing the construction of this major industrial arterial.

Marine Drive

In order to provide better road connection between Rivergate and the I-5 freeway, improvements have been proposed for Marine Drive at this location. The route chosen by the City uses the present alignment, so has comparatively low impact on nearby significant natural resources. It does, however, reinforce the commitment to the development of deep-draft shipping facilities at Rivergate, and possibly western Hayden Island.

Urban Renewal District

The City of Portland has recognized the need for additional available industrial land in large parcels through the creation of the Columbia South Shore Urban Renewal District. Its primary purpose is to aid in the provision of services and to overcome other obstacles which are preventing development. Some of the obstacles are wetlands, water bodies, and wildlife habitat areas. These values must be taken into consideration and protected to the level required by state and federal regulations as development occurs.

Urban Growth Boundary

The Portland Metropolitan Area Urban Growth Boundary in the Columbia Corridor was originally established, and subsequently modified, on the basis of need for industrial land. Justification was given at those times which remains valid. Although all the Columbia Corridor does not appear to be necessary for industry over the next 15 to 20 years, the district has certain attributes previously detailed which make it key to Portland’s continued function as a major west coast port.
Social Consequences

Educational, Recreational

Wetlands provide an "outdoor classroom" for viewing wildlife and natural processes. Their value comes largely from quality and accessibility. Urban area wetlands are more easily available to a greater number of people than those in rural areas, so have greater educational and recreational value, all other things being equal. Few high quality wetlands exist in the City of Portland. Inventory sites in the eastern portion of the Columbia South Shore represent the only significant area of palustrine forest and emergent wetlands both in the City Limits, and relatively untouched remnant of the historic Columbia Slough. Few areas are as visually or physically accessible.

The Smith and Bybee Lakes area, in the Rivergate/Terminal 4 subdistrict, represents another educational and recreational opportunity. Due to sheer size (about 2,000 acres), diversity of wetland habitat, and proximity to North Portland, it is a natural resource of great value to Portland. This value is being taken into account in the Smith and Bybee Lakes Management Plan, an implementation plan now being completed with the coordination efforts of the Port of Portland.

Scenic Values

Natural resource areas of the Columbia Corridor provide a scenic background for urban activities in a manner that Portland is famous for; living with nature and incorporating it into the fabric of the City. It should be re-emphasized that the Columbia Corridor spans the I-5 and I-205 Freeways, and acts as a gateway to both the City of Portland and the State of Oregon. An image emphasizing the ability of development and progress to occur with nature provides a positive and lasting impression.

Marine Drive, located along the northern border of the Columbia South Shore, has been identified as a scenic drive, primarily to take advantage of the Columbia River to the north, vistas of the Columbia Gorge and Mt. Hood to the east, and open space activities and natural areas to the south. Natural resource location in a manner allowing visual access to Marine Drive will enhance these scenic qualities.

Environmental Consequences

Drainage and Flood Control

Water bodies and wetlands in the Columbia Corridor provide areas for retention and detention of stormwater flows, as well as drainageways to pumping stations. In addition to acting as a ponding area or location for standing water, wetland soils and vegetation can absorb water, much like a sponge, holding it sometimes at an elevation above the surrounding water.
levels. This water will be gradually released over time, reducing the initial storm runoff peaks. The results will be lower stormwater ponding levels and reduced need in peak pumping capacity for the drainage district.

Surface and Groundwater Quality Control

Wetlands act as natural water purification mechanisms. They remove silt and absorb many pollutants such as waterborne chemicals and nutrients. They also act as recharge areas for groundwater supplies, allowing percolation into various water bearing strata.

Erosion Control

Wetlands reduce erosion by slowing water velocities, either through creating meandering routes or by increasing surface friction with shallow, broad waterways and with vegetation. Additionally, vegetation acts as a protective layer for the more easily moved soils. Because of the generally flat nature of the Columbia Corridor, erosion is generally not a problem.

Wildlife Habitat

Wetlands and riparian habitat can be among the most biologically productive areas. They provide food, water, and shelter for a great variety of birds, small mammals and other kinds of wildlife. They are habitat for at least one-third of the nation’s threatened or endangered species. Many fish species spawn or live in wetlands. The Columbia River serves as the corridor for anadromous fish, adding greatly to the recreational and commercial sectors of the economy. The Columbia Slough acts as a wildlife corridor, connecting major wetland areas, resulting in high interspersion and overall value. Interspersion of the Columbia South Shore wetlands with other non-urban natural areas such as Government Island and the Columbia River Gorge increases the probability of its use by birds and animals not normally found in urban areas. This in turn increases the social and educational values.

Vectors and Pests

Vectors and pests are, for the most part, introduced species, and generally do not survive in a wetland habitat without introduction of foreign matter (junk, trash, car bodies, garbage, etc.).

Uniqueness and Aesthetics

As mentioned elsewhere in this report, the natural resource area located at the eastern end of the Columbia South Shore and the Smith/Bybee Lakes complex represent large resources unique to the City of Portland. They are of high cultural and historic value, and at a location which allows visual, if not physical, accessibility to the public.
Noise

Dense vegetation can be used as a buffer for noise, but is present only in the forested palustrine wetland areas, located largely along the sloughs and the eastern end of the Urban Renewal District. Noise attenuation in other wetland areas is accomplished primarily by distance separating the noise source from the receiver. Separation distance is not dependent upon wetland presence in its present location, although both it and vegetative noise attenuation can be accomplished by consolidation of wetland areas.

Air Quality

Although known for its generally high environmental quality, Portland has been identified as a non-attainment area for several air pollution standards. Among these is suspended particulates, which includes dust from construction, industrial processes, and transportation. Wetlands can help reduce levels of pollutants through trapping or collecting dust particles on leaves of vegetation, to be removed by rain and added to the soil.

Energy Consequences

Transportation

The presence of wetlands will require a greater land area for a given amount of industrial or commercial activity, resulting in greater travel distances between them and a commensurate expense of transportation energy. By consolidating wetlands and locating them in an efficient manner to retain their values, such as incorporation into landscaping requirements or away from transportation nodes, transportation efficiency will be maximized. Additionally, wetlands acting as ponding areas reduce overall stormwater runoff levels, decreasing flooding on other lands which could be otherwise developed. This allows decreased distances between industrial or commercial activities, thereby reducing transportation costs.

The location of urban wetlands allows easier access to large populations for recreation and education purposes. Because the wetlands are closer to users, less transportation energy is required. A greater range of transportation modes, including bicycling and walking, can be used.

Drainage

Wetlands allow stormwater ponding, decreasing peak flows. This in turn reduces peak pumping needs, and allows both a choice of equipment based upon energy efficiency and a reduction in the total energy needed for pumping.
ANALYSIS AND SUMMARY

The Columbia Corridor has long been identified as an area for industrial development. Both in the Multnomah County Comprehensive Plan and, as annexation has occurred, in the Portland Comprehensive Plan, it has been shown as suitable for immediate or future industrial development. There is a long-term need for the types of land which the area has to offer, as is discussed in the Economics Consequences section of this report. It is the only area in the City which has large land parcels, freeway and airport access, and is close to both potential markets and a labor pool. The result is a high value for future urbanization.

About 4,900 acres of the 16,300 acre corridor are identified as natural resource areas, having values ranging from flood and erosion control to water quality, wildlife habitat, aesthetics, and education. For purposes of the analysis of these values, identified natural resource inventory sites will be consolidated into groups which exhibit similar characteristics or functions. Generally, mitigation for alteration of any sites in the Columbia Corridor subdistricts should occur within each district. Wetland benefits, such as stormwater retention, groundwater recharge and filtration, wildlife habitat, and scenic amenities, are to a large degree locational. Values may be lost by wetland relocation in a more distant area.

Individual Sites

**Columbia South Shore**

Water Features and Site 34

This category includes Water Features 1 through 21, the drainageway associated with Site 33, and Johnson Lake (Site 34) and is comprised of areas of primarily open water or drainageways. The primary purpose of these sites is to provide storm and groundwater drainage for the Columbia South Shore portion of the Multnomah Drainage District, as well as upland areas to the south. Retention of this function is critical to the safety and protection of present and future urban development, and should take precedence over any conflicting use. Another important function is that of a wildlife "corridor," connecting wildlife "islands" in the form of wetlands and natural areas along its route. Any wetland creation or modification should take this into consideration and all sites should be protected.

Johnson Lake is the broadest water body in the Columbia South Shore, providing additional high quality habitat for warm water fish and waterfowl. Due to surrounding development and road system, human intrusion and impact is minimal. This resource should receive a high level of protection.
Water Feature 14, a south channel of the Columbia Slough extending west from N.E. 122nd Avenue to its confluence with the main slough at about the extension of N.E. 111th Avenue, is an important wintering area for a number of waterfowl species. Because of the width of the water body and isolation from human impacts in spite of adjacent development, wildlife are protected. Nutrient-laden springs empty into the slough at this point, promoting aquatic plant growth and providing food. A high level of protection is needed.

Wetland Site 34 represents a forested area between two water bodies (Johnson Lake and the Columbia Slough). It is directly associated with these water bodies, providing shading of the water, and nesting/perching sites for various birds. Although close to the airport, it is relatively small in size and well south of the approach zone, and does not pose a significant hazard. No proposals are being made by the City to attract large numbers of new birds. It also provides scenic interest, particularly from I-205, and should be conserved.

Inventory Sites 22, 23, 25, and 26

Known as the Four Corners area, these sites collectively represent a unique and valuable resource to the City of Portland. They are the remaining large and relatively undisturbed remnant of the historic Columbia Slough. Much of the land meets the Corps of Engineers definition for wetlands, and is subject to both state and federal regulations. Structural diversity in addition to size have resulted in a high quality wildlife habitat. In addition, this area serves as a critical ponding area for stormwater runoff, due in part to its location to the drainage district pumping facilities. Being at a distance of about five miles from the PIA runways, wildlife does not have a major adverse effect on airport operations. Because of its size, forest areas, and proximity to Marine Drive, aesthetic value is also high. Upland areas of the northern portion of Site 26 which are currently being farmed between Water Features 2 and 5 are of lower overall wildlife habitat value. This, coupled with direct frontage of the future Airport Way, makes this area more valuable for industrial development, and conservation of the resource is not recommended. The remainder of this natural resource area was identified in the Airport Way Environmental Assessment as a valuable resource, and alignment alternatives were proposed to pass around it. With the exception of portions of Site 26, attempts should be made to conserve the identified resource areas.

Site 24

Although adjacent to the group of inventoried areas discussed previously, this site does not contain wetlands as defined by the Corps of Engineers (although it was inventoried as containing a wetland according to U.S. Fish and Wildlife Service definition). Additionally, wildlife habitat value was considerably lower, due to the lower diversity of vegetation. The average
elevation is well above 20 feet, so the site does not function as a stormwater ponding area. Therefore, the overall value as a wetland or wildlife habitat area is relatively low and conservation is not recommended.

Site 27

This primarily palustrine wetland is directly connected to the Columbia Slough, and is of fairly high overall quality, particularly in the northeast corner. All but the northeast portion has been highly modified, and most vegetation removed. Impact of this area on the uncleared portion appears to be minor, largely due to the level topography. Location to Sandy Boulevard is good, and direct connection to Airport Way through extension of the private road east of the cross-dike is also planned. While flood control, wildlife habitat, vegetation and aesthetic wetland values on the northeast portion should be conserved, the value for industrial development on the remainder appears to outweigh the more marginal resource values.

Site 31

This is a palustrine emergent wetland which has been identified by the Corps of Engineers as subject to federal regulation. However, it is isolated from other nearby inventoried areas and has a relatively low wildlife habitat value. Its location also makes potential industrial or commercial development of the adjacent areas awkward, particularly in light of the recommendation for conservation of Sites 22, 23, 25, and 26. Airport Way will cross a portion of this wetland, in the southwest corner, as it turns from an east-west direction to the south, to connect with I-84 at N.E. 181st Avenue. Retention of this wetland would prevent direct connection of the uplands east and north of the site with the industrial arterial. Alteration would be acceptable.

Sites 28, 29, and 32

These are isolated wetlands which are of moderate or high wildlife habitat value but, because of their locations or previous land use commitments, should be allowed to be altered if wetland values are mitigated. All are close to the PIA runways and approach zone. Site 28 is in an approved and platted subdivision, in which streets have already been constructed. It forms a scenic entrance to the Columbia South Shore, but in doing so compromises development potential on property immediately adjacent to both I-205 and the airport. Wetland values appear to be typical, and not altered drastically for a specific purpose, such as the drainageways and agricultural wetlands. Site 29 is within an area which received development master plan approval in 1987, under the Columbia South Shore Plan District. Sites 28 and 32 appear to contain wetlands subject to federal and state regulations, while 29 probably does not.
Central Columbia Corridor

Sites 35 and 36

These two sites form a very high quality palustrine forested and emergent wetland complex very unusual in the Portland area. It is isolated, so is adversely impacted only by a few animals grazing on the periphery. It also provides ponding capacity for the drainage district. The property owner has twice applied for partial fill of this area, and has both times been denied. Because of its poor access, high quality, and unlikelihood of obtaining federal or state permits, it should be protected to the greatest level, an en designation.

Sites 37 and 38

Site 37 is a very large emergent wetland bordered on the north by Site 38, a forested area. The understory of both is highly modified by grazing cattle. This area is significant because it is one of the largest emergent wetlands in the City, and has attracted large numbers of wintering and possibly nesting Canada Geese and other waterfowl. If the location were further from the airport, protection would be desirable. However, due to its closeness to the runways, it is a potential hazard to airplane operations. Except for drainage purposes, protection of this site is not recommended.

Sites 39 and 40

These are adjacent, relatively protected palustrine forested sites small in size but high in quality. They are adjacent to the Columbia Slough open upland spaces such as Alderwood Golf Course. They provide bank protection along the slough, as well as wildlife habitat for a large variety of birds and animals which use the slough or upland meadows. The land has direct access from N.E. Alderwood Road, but is poorly situated for industrial development. Protection of this resource and its values is recommended.

Site 41

Site 41 has been filled and its resource values destroyed, possibly without proper approvals. No action is recommended.

Water Features

As with the water features in the Columbia South Shore, these act as a primary drainageways for stormwater, and are maintained by the drainage district. Comments in that section also apply here. In addition to those inventoried, drainageways which pass through Sites 37 and 38, 35 and 36, and Riverside Golf Course are recommended for protection, as they drain the northwest portion of this subdistrict.
West Columbia Corridor

Site 42

This site is unusual and important due to its isolation from human intrusion, size of undrained open water, adjacent high quality riparian strip, and logs which help provide habitat for the Western Pond Turtle, an unusual occurrence. Its proximity to other resource areas, both on the north and south ends, add to its function as a north-south wildlife corridor at an intermediate point along the Columbia Slough. Any adverse impacts to this site may reduce the significant wildlife found in the area. Protection should be of the highest level, en designation.

Site 43

This site is in the southeast portion of the West Columbia Corridor subdistrict, close to I-5 and Union Avenue. The City has recently completed the rebuilding of N.E. Gertz Road, to provide convenient access for future industrial development. The sites include some lands which have received land use approvals beyond simply base zoning for conversion to industrial use. The Meritt property, east of N.E. 13th Avenue, and the Jubit property along N.E. Gertz Road, are clear examples. Because of the commitments made by the City (subdivision approval and conditional use approvals for fill), the City has already adopted the policy to allow development to occur. Development should be allowed to continue, with resource protection confined to only drainageways. It is recommended that resource values relating to drainageways be conserved, and that development possible in the underlying zone be allowed on the remainder of Site 43 without further review.

Site 44

This site is in the interior of the West Columbia Corridor subdistrict. Surrounding land use is a mixture of residential, commercial, and industrial. Comprehensive Plan designations and zoning on the site are primarily single family residential and farm and forest, with limited industrial and manufacturing on the western and southern portion. The Gertz Road improvements will provide access to the southern portion of the site. The site contains both wetlands and uplands, providing a variety of significant habitat. Drainageways throughout the site also serve areas to the north, east, and west. Protection of resource values throughout the site is recommended.

Site 45

This site is in a recently-approved industrial subdivision. Since the inventory, it has been regraded and the wetland values destroyed. No protection measures are recommended.
Site 46 and Water Feature 31

This is a high value forested and emergent area associated with a
drainageway for land in the northern portion of the subdistrict. It also
serves as a stormwater retention area, providing ponding capacity for the
drainage district. Winter roosting of Black-crowned Night Heron has been
reported at the eastern end. Protection is recommended.

Sites 47, 48, 49, 50, and 53, and Water Features 35, 36, 37, 38, 39, and 40

These sites comprise the remaining inventoried areas in the West
Columbia Corridor subarea, and cover virtually all the open space between
North Portland Road and N. Denver Ave. Together, they make a complex of
natural resources that provides a variety of habitat, including a Great Blue
Heron rookery (Site 48) and Ruddy Duck wintering (Force Lake, Water
Feature 39). Many species of waterfowl winter, breed, and nest here.
Proximity to Smith and Bybee Lakes is of additional value. All of this
wildlife activity is in spite of human use of Heron Lakes Golf Course and
Portland International Raceway, probably the most heavily used of any of
the natural resource sites inventoried. Much of the area is within the flood
plain, providing ponding capacity for stormwater. Protection of those areas
which are not subject to continual human intrusion (water bodies and
forested areas) and wetlands is recommended. Force Lake, Site 48
immediately north and west, and Site 49 are of particularly high value and
should receive the highest level of protection.

Water Features 32, 33, and 33

These are small forested and emergent wetlands and drainageways
between I-5 and Union Avenue. Largely because of limited size and
isolation, wildlife habitat value is not high. However, they do serve a
critical drainage function and should be conserved largely in that capacity.

Water Features 30 and 40

This is the main channel of the tidal portion of the Columbia Slough,
extending westward from about N.E. 19th Avenue to the Willamette River,
at then west end of the Rivergate/Terminal 4 subdistrict. Its primary
functions include drainage of stormwaters of the entire Columbia Corridor,
warmwater fish habitat, and a wildlife corridor for North and Northeast
Portland. Protection is recommended for its entire length.
Rivergate/Terminal 4 Subdistrict

Site 51

This is a pond and adjacent wetland which receives stormwater from upland portions of the Rivergate area. It then drains east, into the Columbia Slough. It is of value not only for drainage, but also habitat diversity, size, and proximity to other natural resource areas. Since the inventory was completed, portions of the water and banks have been cleared. However, wildlife value remains high. It should be protected.

Site 52

Kelley Point Park is within the Willamette River Greenway, and receives protection under this program. No further action is recommended.

Site 55 and Water Feature 41

The Smith and Bybee Lakes area is the largest, most significant wetland area in the City of Portland, and the largest natural resource inventory area in the Columbia Corridor. It has tremendous habitat value and diversity, and should be protected. Although it exhibits some signs of adverse impacts from surrounding land uses, Bybee Lake and the eastern border is of very high quality and should be protected as much as possible through application of the en designation. Because of the complex nature of the site, a management plan, as is being developed under the coordination efforts of the Port of Portland, may be necessary to adequately protect all resource values.

Hayden/Tomahawk Islands Subdistrict

Site 54

Western Hayden Island is a large, diverse natural resource area which has very high wildlife habitat value. It also has very high value for future urban development, being the only large undeveloped parcel of land in Portland which has access to deep-draft shipping facilities. At least part, if not all, of it will be needed in the future to meet the needs for port facilities. It is in unincorporated Multnomah County, but within the Portland Urban Services Boundary, and therefore identified for future annexation.

Portland General Electric Company, a major property owner, is presently completing an extensive impact analysis and mitigation plan for Multnomah County, and state and federal regulatory agencies, prior to finalizing development plans. Until this is completed, and the property is annexed into the City, it would be premature to form any conclusions and recommendations on resource protection. No action is recommended at this time. Upon annexation, it is recommended that the City review all previous land use analyses and actions prior to making a final recommendation on natural resource protection.
CONFLICT RESOLUTION AND RECOMMENDATIONS

The question appears to be how the Columbia Corridor can support industrial development while at the same time protecting the important natural resources and their values, not if it should be done. Need for vacant industrial and commercial land over the next 20 years does not indicate that important inventoried natural resource areas will have to be removed, although selected modification of them allows the flexibility of development necessary for future technology and development needs. Indiscriminate removal of wetlands, water bodies, and wildlife habitat areas would be detrimental to the public, adversely affecting drainage and stormwater ponding, surface and groundwater quality, erosion control, pollutant and sediment control, as well as scenic and wildlife habitat attributes.

The issue of wetlands may be resolved by retaining those which are, by their location or quality, necessary or desirable for stormwater drainage and ponding, and retention of wildlife habitat values, and by allowing either on- or off-site mitigation for other wetlands which would unnecessarily impede industrial development while, at the same time, provide relatively few wetland benefits. The end result could be consolidation of wetland areas into a few large parcels, allowing greater efficiency of wetland management, while retaining drainage and stormwater control, groundwater quality, pollutant control, wildlife, and educational benefits. Parcels then unimpeded by wetland constraints would become available for industrial development, providing the flexibility necessary for successful marketing. Finally, if some form of mitigation were required prior to development of areas containing less critical wetlands, the property owner would have the option of incorporating wetland features into the project as an open space and amenity feature, using existing permit approval procedures, or taking advantage of an approved off-site mitigation plan.

There are approximately 14,300 acres of the Columbia Corridor which are within the City of Portland. About 73% of these have industrial or manufacturing zoning and Comprehensive Plan designations. Only 10% of these industrial and manufacturing lands contain resources recommended for ec level protection, and 3% for en level protection.

Following is a list of recommendations for wetland treatment within the Columbia Corridor. With the exception of five significant sites, all of the protected natural resource areas may be modified with proper mitigation. However, in each case mitigation, either on- or off-site, must accompany the proposed development so no public detriment will result through
retention of existing values. These recommendations are not designed to create new public benefits, but rather to prevent the degradation of benefits and values now derived from existing wetlands, water bodies, and wildlife habitat areas.

Detailed proposed zoning maps which reflect the recommendations, are contained in a separate document, *Mapping for the Columbia Corridor*.

### Summary of Recommendations

<table>
<thead>
<tr>
<th>Site</th>
<th>Level of Protection</th>
<th>Values to be Protected</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Columbia South Shore Subdistrict</strong></td>
</tr>
<tr>
<td>22</td>
<td>ec</td>
<td>Forested riparian strip along the river bank, below the dike, for erosion control, wildlife habitat, and visual amenity.</td>
</tr>
<tr>
<td>23</td>
<td>en</td>
<td>Forested upland and wetland area for all values identified in the summary table, as well as interspersion with nearby sites.</td>
</tr>
<tr>
<td>23,</td>
<td>ec</td>
<td>Open and scrub/shrub area adjacent to the slough for all values identified in the summary table*, as well as interspersion with nearby sites.</td>
</tr>
<tr>
<td>WF4</td>
<td></td>
<td>Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
</tr>
<tr>
<td>24</td>
<td>none</td>
<td>Palustrine emergent wetland, drainageways, and riparian strips for all values identified in the summary table*, as well as interspersion with nearby sites.</td>
</tr>
<tr>
<td>25</td>
<td>ec</td>
<td>Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
</tr>
<tr>
<td>WF3</td>
<td></td>
<td>For wooded riparian strip associated with Water Feature 1 for all values identified in the summary table*, as well as interspersion with nearby sites.</td>
</tr>
<tr>
<td>26,</td>
<td>en</td>
<td>Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>WF1</td>
<td></td>
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<tr>
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</thead>
<tbody>
<tr>
<td>26, WF2, WF5</td>
<td>ec</td>
<td>Forested riparian strip and wetlands associated with Water Features 4, 5, and 7, and uplands, forested riparian strips, and forested and emergent wetlands associated with Water Feature 1 for all values identified in the summary table*, as well as interspersion with nearby sites. Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
</tr>
<tr>
<td>27</td>
<td>ec</td>
<td>Forested and emergent wetlands and forested riparian strip on the northern portion of the site, adjacent to Water Feature 7 for all values identified in the summary table.*</td>
</tr>
<tr>
<td>28, WF9</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>29, WF10</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>ec</td>
<td>Forested uplands and forested and emergent wetlands for all values identified in the summary table,* recognizing the need to limit tree height and attractiveness for birds, for safe airport operations.</td>
</tr>
<tr>
<td>33</td>
<td>ec</td>
<td>Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
</tr>
<tr>
<td>34, WF18, WF19</td>
<td>en</td>
<td>Johnson Lake and riparian strip to the top of the bank for all values identified in the summary table.* Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
</tr>
</tbody>
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</thead>
<tbody>
<tr>
<td>ec</td>
<td>Other Forested uplands, riparian strip, water bodies, and wetlands for all values identified in the summary table.* Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
<td></td>
</tr>
<tr>
<td>WF6, ec</td>
<td>Forested riparian strip for wildlife habitat, visual amenity. Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
<td></td>
</tr>
<tr>
<td>WF17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WF14 en</td>
<td>Forested and scrub-shrub wetlands, riparian strip for wildlife habitat, particularly wintering waterfowl, visual amenity. Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
<td></td>
</tr>
<tr>
<td>WF7, ec</td>
<td>Forested and scrub-shrub, riparian strip for wildlife habitat, visual amenity. Drainageway functions, including drainage, flood storage, desynchronization, erosion control, sediment trapping, pollution and nutrient retention and removal, and fish habitat.</td>
<td></td>
</tr>
<tr>
<td>WF12, WF13, WF15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WF8 ec</td>
<td>Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal. Functions identified in ADJ4-88.</td>
<td></td>
</tr>
<tr>
<td>WF11, ec</td>
<td>Forested riparian strip for wildlife habitat, visual amenity, erosion control. Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
<td></td>
</tr>
<tr>
<td>WF20</td>
<td></td>
<td></td>
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<tr>
<td>WF21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Columbia Corridor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35, en</td>
<td>Forested and emergent wetlands on the southern portion of the two sites for all values identified in the summary table.* Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal for the drainageway passing through the site in an east-west direction.</td>
<td></td>
</tr>
<tr>
<td>36</td>
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</thead>
<tbody>
<tr>
<td>37, 38</td>
<td>ec</td>
<td>Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal for the drainageway passing through the site in a southeast-northwest direction.</td>
</tr>
<tr>
<td>WF22-28</td>
<td>ec</td>
<td>Forested riparian strip for wildlife habitat, visual amenity, erosion control. Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>39, 40</td>
<td>ec</td>
<td>Forested uplands, riparian strip, water bodies, and wetlands for all values identified in the summary table.*</td>
</tr>
<tr>
<td>41</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>

**West Columbia Corridor**

<table>
<thead>
<tr>
<th>Site</th>
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</tr>
</thead>
<tbody>
<tr>
<td>42, WF29</td>
<td>en</td>
<td>Forested and scrub/shrub uplands, riparian strip, water bodies, and wetlands for all values identified in the summary table,*and for interspersion with other adjacent sites. Water body functions, including fish habitat, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>43</td>
<td>ec</td>
<td>Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal for drainageways west of N.E. 13th Avenue.</td>
</tr>
<tr>
<td>44</td>
<td>ec</td>
<td>Mitigation area for CU on Jubitz property, and areas north for all values identified in the summary table.* Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>45</td>
<td>none</td>
<td></td>
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</thead>
<tbody>
<tr>
<td>46, WF31</td>
<td>ec</td>
<td>Forested and emergent wetlands and riparian strip for all values identified in the summary table.* Protection of the Black-crowned Night Heron roosting area on the eastern end of the water feature. Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>47-50, 53, WF35-39</td>
<td>en</td>
<td>Forested upland and wetland in the western portion of Site 48, for all values identified in the summary table,* but particularly the high wildlife habitat value, including, but not limited to, the heron rookery. Also for interspersion with adjacent sites. Site 49, for forested uplands, all wetlands, and water bodies for all values identified in the summary table,* and for interspersion with adjacent sites.</td>
</tr>
<tr>
<td></td>
<td>ec</td>
<td>Forested uplands, all wetlands, and water bodies for all values identified in the summary table,* and for interspersion with adjacent sites. Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>WF30, WF40</td>
<td>ec</td>
<td>Forested riparian strip for wildlife habitat, visual amenity, erosion control. Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>Rivergate/Terminal 4</td>
<td></td>
<td>Scrub/shrub, emergent, and permanently flooded wetlands for all values identified in the summary table.* Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal.</td>
</tr>
<tr>
<td>52</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>

*The Summary Table is located in the front of the Inventory Section of this report.*
<table>
<thead>
<tr>
<th>Site</th>
<th>Level of Protection</th>
<th>Values to be Protected</th>
</tr>
</thead>
<tbody>
<tr>
<td>55,</td>
<td>en</td>
<td>High quality uplands and wetlands for all of Smith and Bybee Lakes, the Ramsey Lake mitigation area, and the blind slough south of the Columbia Slough containing wapato wetlands for all values identified in the summary WF41 table.* Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal for the same area.</td>
</tr>
<tr>
<td></td>
<td>ec</td>
<td>The remainder of the inventory site for all values identified in the summary table.* Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal for the same area.</td>
</tr>
<tr>
<td>54</td>
<td>none at this time</td>
<td></td>
</tr>
</tbody>
</table>

**Columbia River and Bankline**

|      | ec                  | Riparian strip for wildlife habitat, visual amenity, erosion control. Drainageway functions, including fish habitat, drainage, flood storage, desynchronization, erosion control, sediment trapping, and pollution and nutrient retention and removal for the same area. |

* The Summary Table is located in the front of the Inventory Section of this report.