



NORTHWEST HILLS NATURAL AREAS PROTECTION PLAN

**INVENTORY, ANALYSIS AND REGULATIONS
for the
PROTECTION OF
WETLANDS, WATER BODIES,
FISH AND WILDLIFE HABITATS,
OPEN SPACE AND NATURAL AREAS**

**Adopted by City Council July 31, 1991
Effective July 31, 1991**

Ordinance No. 164517

**Amended by City Council May 25, 2022
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**Bureau of Planning
Portland, Oregon
March, 1992**

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**Adopted by City Council July 31, 1991
Effective July 31, 1991**

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CHAPTER 1
INTRODUCTION

- PURPOSE •**
- RELATION TO OTHER NATURAL AREA PROJECTS •**
- ORGANIZATION OF THE PLAN •**

Purpose

The *Northwest Hills Natural Areas Protection Plan* provides the inventory, analysis, and recommendations for protection of significant natural resources located on the eastern slope of Portland's Northwest Hills. The project study area covers 6,000 acres stretching west from N.W. St. Helens Road and the Willamette Greenway up to N.W. Skyline Boulevard, and north from the Willamette Heights area to the Portland city limits near N.W. Newberry Road (see Map 1).

This document is one of several natural resource plans developed by the City of Portland to comply with Oregon Land Conservation and Development Commission (LCDC) Statewide Planning Goal 5 post-acknowledgement requirements. State Goal 5 requires all jurisdictions in Oregon "to conserve open space and protect natural and scenic resources." The purposes of this document are: (1) to identify and evaluate the location, quantity, and quality of natural resources in the Northwest Hills, (2) to evaluate the economic, social, environmental and energy (ESEE) consequences of allowing, limiting or prohibiting land uses which conflict with identified resources, and (3) to develop a program to protect significant resources.

Relation to Other Natural Resource Projects

The *Northwest Hills Natural Areas Protection Plan* is one of a series of plans to protect significant natural resources in five major resource areas within the City of Portland. These five areas are: Columbia Corridor, Willamette River Greenway, Johnson Creek Basin, East Portland Buttes and Uplands, and the West Hills. To date, resource protection plans have been implemented for all areas except the East Portland Buttes and Uplands and the Tualatin Basin (a portion of the West Hills). Planning Commission and City Council hearings on the remaining Goal 5 projects are forthcoming.

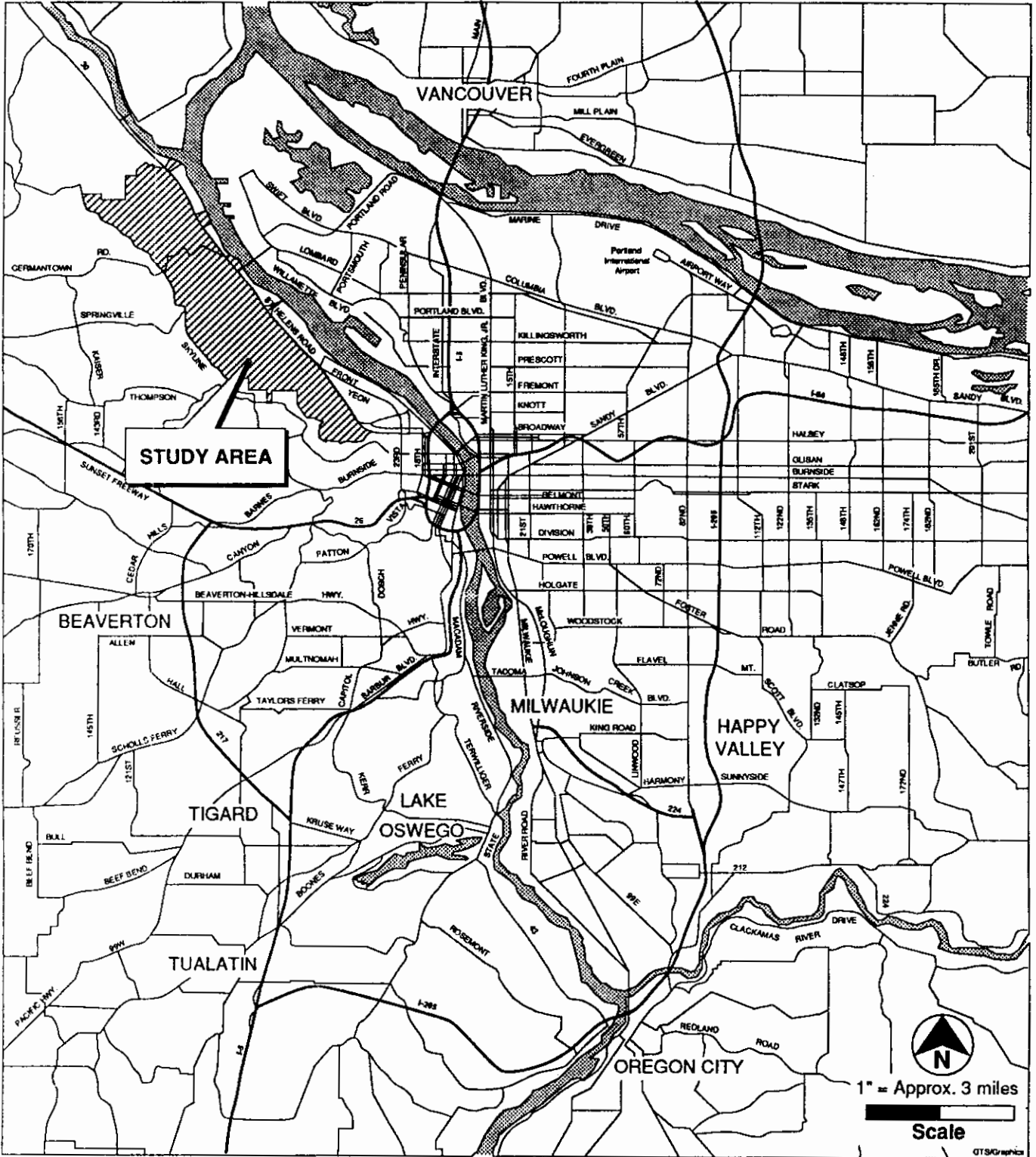
The *Northwest Hills Natural Areas Protection Plan* is integrated with other natural resource projects. The plan area is bounded on all sides by other resource planning areas: the *Willamette Greenway Plan* (1987) to the east, the *Balch Creek Watershed Protection Plan* (1991) to the south, the *Skyline-Tualatin Plan* (ongoing) to the west, and a Wildlife Corridor Study undertaken by Multnomah County to the north. Other applicable projects (and their sponsors) include an inventory of West Multnomah streams (Multnomah County Soil Conservation Service) and the Metropolitan Urban Greenspaces Program (Metro), a project aimed at inventorying and protecting greenspaces within the four-county metropolitan region.

Organization of the Plan

The *Northwest Hills Natural Areas Protection Plan* is organized into nine general areas or chapters:

- (1) Introduction
- (2) Summary of City Council actions
- (3) Background
- (4) Policy framework
- (5) Areawide inventory of natural resources
- (6) General analysis of ESEE consequences
- (7) Site-specific inventory and analysis
- (8) Protection measures
- (9) Adopting ordinance
- (10) Bibliography

Adopted zoning for the Northwest Hills is contained in the city's Official Zoning Maps. These maps and other reference materials (e.g., Statewide Planning Goal 5, Goal 5 Administrative Rule and the Portland Zoning Code) are available at the Portland Permit Center.



NORTHWEST HILLS
 Natural Area Protection Plan

VICINITY MAP

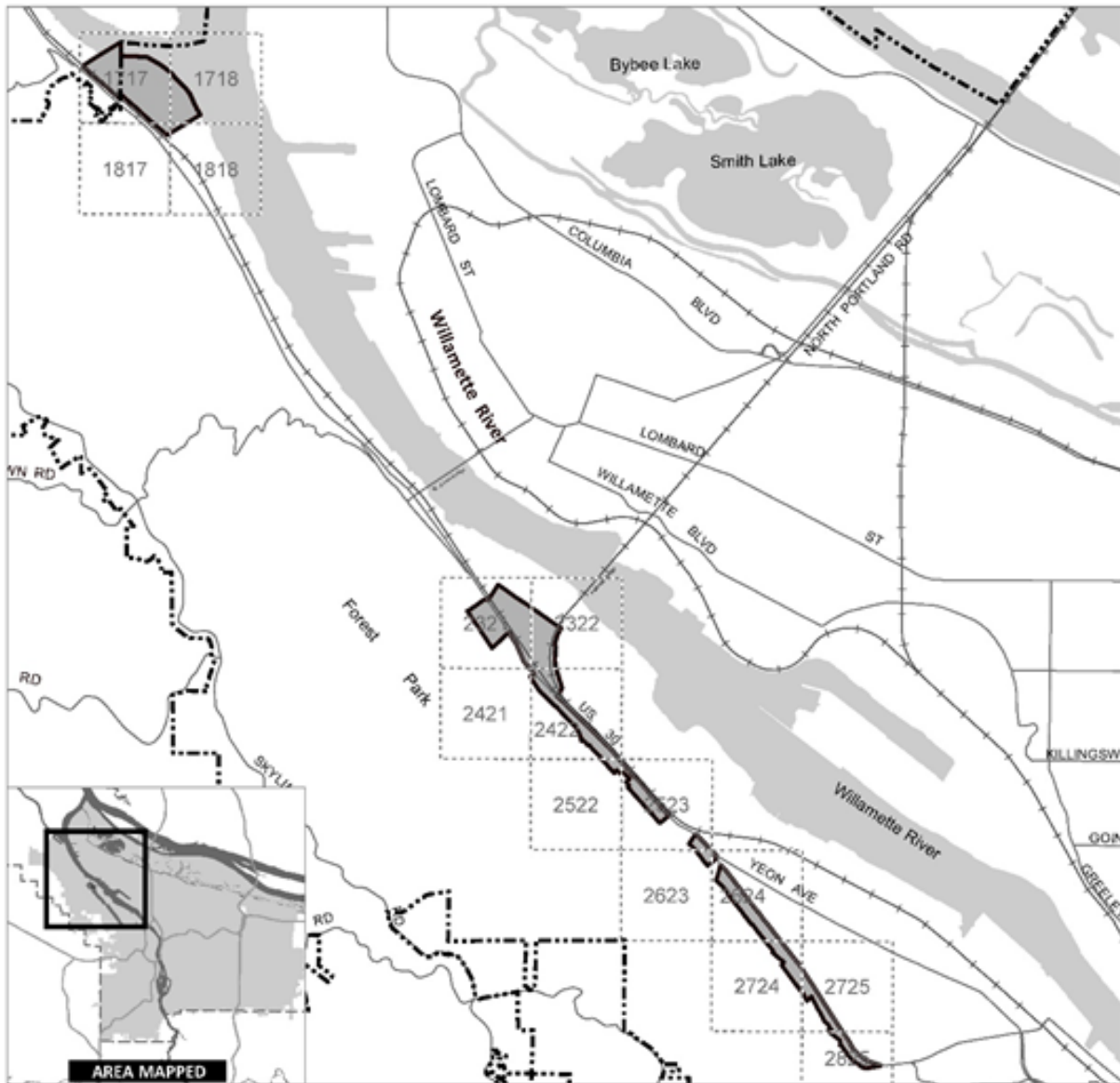
Map
1

The Northwest Hills Natural Areas Protection Plan has been amended. The chapters that applied to all resource sites that were included in the original plan have been deleted from this volume except for portions of resources sites 87, 88, 90, and 94 that have industrial zoning. The deleted chapters and non-industrial portions of resource sites 87, 88, 90, and 94 are now covered by Volume 2 Part A1 and Volume 2 Part A2 - Northwest Hills Natural Resource Inventory and Protection Decisions of the Environmental Overlay Zone Map Correction Project. Map 430-5 shows the locations where the resource inventories and ESEE decisions of this document still apply.

Northwest Hills Natural Areas Protection Plan Area

Map 430-5

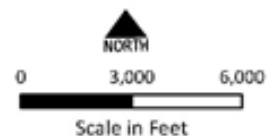
Map Revised Xxxxx X, 202X



----- City Boundary

■ Plan Area

Map Note: Small numbers within boxes represent Portland quarter section index



Bureau of Planning and Sustainability
Portland, Oregon

CHAPTER 2
SUMMARY OF CITY COUNCIL ACTIONS

This brief chapter summarizes the implementation measures for the *Northwest Hills Natural Areas Protection Plan*. These measures and adopted Zoning Code language are presented in more detail in Chapter 8.

On July 31, 1991, City Council adopted Ordinance No. 164517 which authorized the following actions:

- **Adoption of the *Northwest Hills Natural Areas Protection Plan* report** including the Goal 5 inventory, analysis and recommendations;
- **Amendments to Portland’s Comprehensive Plan Goals and Policies** to refer to the *Northwest Hills Natural Areas Protection Plan*;
- **Adoption of the *Northwest Hills Natural Areas Protection Plan* Policies and Objectives** as the policy document for the area;
- **Amendments to Title 33, Planning and Zoning, and Title 34, Subdivisions and Partitioning Regulations**, to implement the *Northwest Hills Natural Areas Protection Plan* and create the Skyline Plan District;
- **Amendments to Comprehensive Plan map designations and Official Zoning Maps** to apply the environmental zones, change base zones and correct Open Space mapping errors;
- **Adoption of an exception to Statewide Planning Goal 4, Forest Lands**, to meet Federal Clean Water Act requirements and comply with Statewide Planning Goal 6, Air, Water and Land Resources Quality;
- **Repeal of Water Feature designations** from the Northwest Hills planning area;
- **Repeal of Scenic Resources zoning map designation** from areas receiving an environmental overlay zone; and
- **Repeal of Temporary Prohibition on Forest Disturbance** from the Northwest Hills planning area.

CHAPTER 3
BACKGROUND

- INTRODUCTION •**
- AREA HISTORY •**
- PAST PLANNING EFFORTS •**
- PUBLIC SERVICES AND FACILITIES •**
- SUMMARY •**

Introduction

Since the first settlements evolved along the Willamette River at the base of the hillside, the Northwest Hills have been, and continue to be, an area of public interest. This section reviews the history and past planning efforts in the area, and describes the system of public services and facilities which serve residents.

Area History

Human settlement of the area began 10,000 years ago. The Chinook tribes lived in the Lower Columbia region which included the Tualatin Mountain (Portland West Hills) as it was known to the Native Americans (Hummel et al. 1983).

The Chinook tribes consisted of approximately 12 smaller tribes including the Clatsop, Multnomah, Clackamas and Waso. The various tribes were distinguished from one another by dialect and in some cases cultural differences. The base of Chinookan social organization was large, permanent and independent villages linked together by trade and marriage alliances. Social organization was also stratified by wealth and heredity.

The Portland area, located adjacent to the confluence of the Columbia and Willamette Rivers, was one of the most densely populated in Oregon during this period. The rivers were rich in salmon and important for the tribes' trade network. Travel was accomplished by canoe. Nearby Sauvies Island provided abundant roots and edible plants such as wapato, a staple food for local tribes.

In the early 1800s, pioneer farmers of the Tualatin Valley Plains constructed trails across the ridge to bring their wheat and produce to the settlements along the Willamette River, notably Linnton, Springville, and Portland. These trails included what later became known as Germantown, Springville, Cornell and Newberry Roads.

In the 1850s, the Federal government deeded much of the Tualatin Mountain land to settlers under the Donation Land Claims Act. The more level land along the ridge and base of the hillside was soon transformed into farm and residential uses. Development of the steeper, landslide-prone hillsides progressed more slowly until the construction in 1915 of Hillside Drive (now known as Leif Erikson Drive). The road meandered in and out of ravines along the mountain's eastern slope, eventually connecting N.W. Thurman Street with Germantown Road. Several large subdivisions were platted along the scenic drive in anticipation of a major land boom following the Lewis and Clark Exposition. The steep terrain of the hillside, however, made building

and road construction difficult. Also, the high cost of road construction prompted substantial protest on the part of many land owners who refused to pay the assessments. Ultimately, much of the land was forfeited to the City of Portland and to Multnomah County and has since remained in public ownership (Munger 1960).

Past Planning Efforts

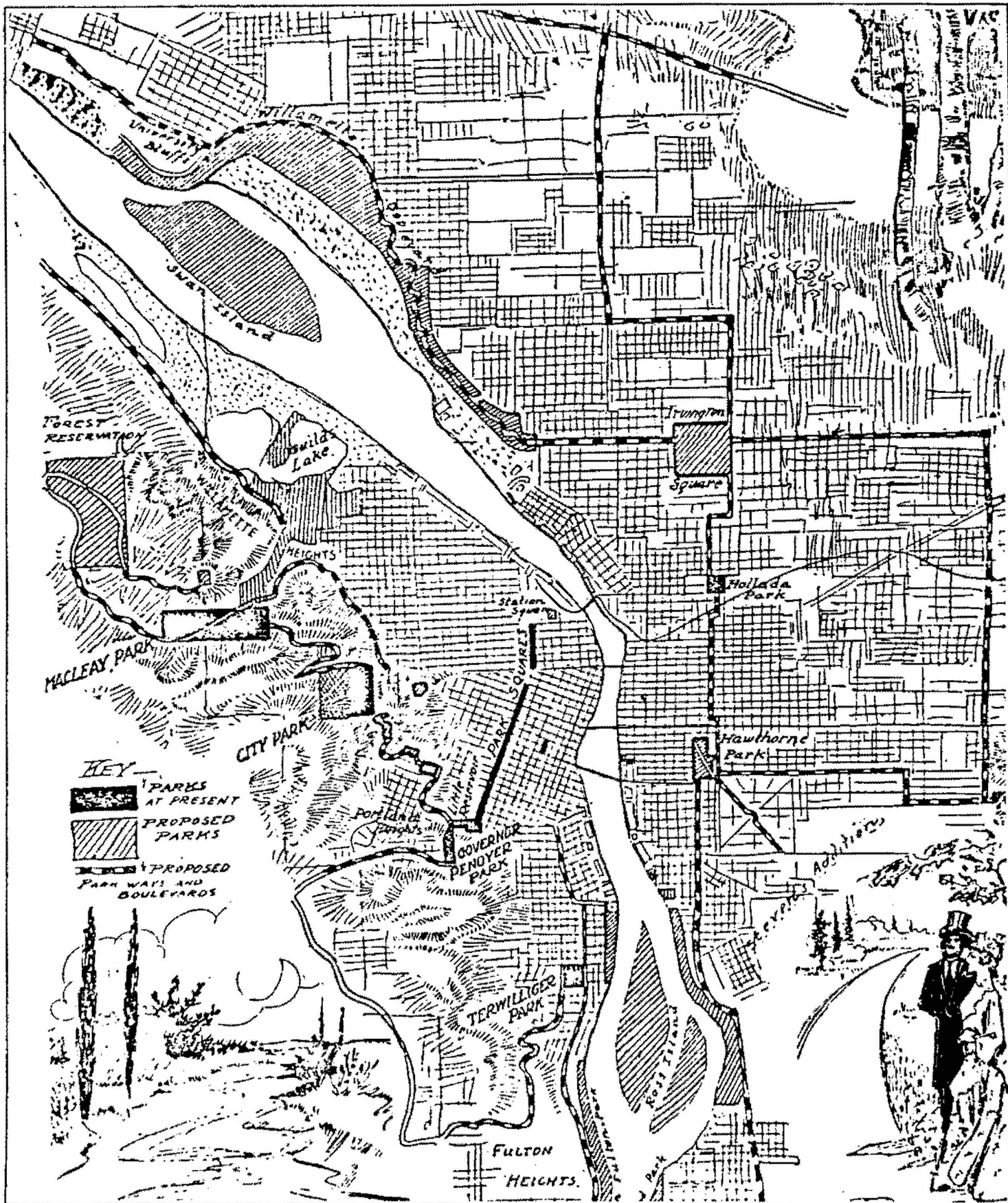
Early planning efforts for the Northwest Hills date back to the turn of the century when the Municipal Park Commission retained the Olmsted Brothers landscape architecture firm to conduct a city planning study for Portland. The Olmsted Brothers' 1903 report proposed a connected system of parks and open spaces around Portland, known today as the "40-Mile Loop" (see Map 2). Referring to the Northwest Hills area, the Olmsteds wrote:

"There are a succession of ravines and spurs covered with remarkably beautiful primeval woods....It is true that some people look upon such woods merely as a troublesome encumbrance standing in the way of more profitable use of the land, but future generations will not feel so and will bless the men who were wise enough to get such woods preserved. Future generations, however, will be likely to appreciate the wild beauty and the grandeur of the tall fir trees in this forest park...its deep, shady ravines and bold view-commanding spurs, far more than do the majority of the citizens of today, many of whom are familiar with similar original woods. But such primeval woods will become as rare about Portland as they now are about Boston. If these woods are preserved, they will surely come to be regarded as marvelously beautiful." (Olmsted 1903)

The Olmsteds concluded, "No use to which this tract of land could be put would begin to be as sensible or as profitable to the city as that of making it a public park or reservation..." (Olmsted 1903:41)

Years later city planners E.H. Bennett and Robert Moses, in developing their own proposals for Portland, echoed the recommendations of the Olmsted Plan. In his campaign for the establishment of a wooded parkway along the West Hills, Bennett emphasized in his "Greater Portland Plan" of 1912 that "the great woodland areas [of Europe] are the life giving elements of the city." Thirty years later, Moses presented a similar argument in his "Portland Improvement" report: "the wooded hillsides west of the city are as important to Portland as the Palisades of the Hudson are to the city of New York."

Responding to repeated calls for the adoption of the park proposal, the City Club in 1944 appointed a committee to study the land use alternatives and make recommendations to the Club. The committee's report strongly



NORTHWEST HILLS

Natural Area Protection Plan

OLMSTED PLAN FOR
PORTLAND'S PARKS,
PARKWAYS AND
BOULEVARDS

Map
2

supported the creation of large, forested municipal park "for the benefit of the community." Two years later, after an extensive publicity effort on the part of the newly formed Forest Park Committee of Fifty, the City Planning Commission adopted a report prepared by its Park Committee recommending creation of the park. The dedication ceremony for the 4200-acre "Forest Park" was held on September 25, 1948.

Several of the objectives of Forest Park, as identified by the original City Club committee, are still applicable today. These include:

- 1) Provide facilities that will afford extensive nearby outdoor recreation for the citizens and attract tourists;
- 2) Beautify the environs of Portland;
- 3) Provide food, cover and a sanctuary for wildlife;
- 4) Provide a site on which youth and other groups may carry on educational projects; and
- 5) Protect the forest and exposed contiguous areas from fire, the slopes from excessive erosion, and the roads and lands below from rock, dirt and other materials washed from the slopes.

Since the work of the Olmsteds, several planning projects have been undertaken in an effort to balance development with protection of natural areas in the Northwest Hills. The following discussion examines each effort individually.

Forest Park Management Plan

In November 1976, the City Council passed Resolution No. 31779, adopting *A Management Plan for Forest Park*. The plan's stated major purpose is "to provide an undisturbed, natural forest and park environment for the quiet recreational enjoyment of the people of the City of Portland." The City Council resolved to minimize the overt, man-made management and development of the area, and to adopt an approach stressing conservation and preservation of the naturalness of the resource.

The management plan for Forest Park recognized the inseparable interrelationships between all of the elements of the forest community (plants, animals, water, air and man) and accounts for these elements in planning and execution.

The management objectives addressed the following elements:

- Recreation (trails, sanitation facilities, users, volunteers and measurements of use);
- Wildlife (habitat needs, protective measures and interpretative and tour program);

- Forest (plant species, recreational and educational enhancement, and forest product removal);
- Protection (from fire, vandalism, and insects and disease), education (public awareness and volunteer opportunities);
- Land management (update acquisition policy and boundary and implement that policy);
- Financial (revenues available for Forest Park); and
- General management (volunteers, review of conflicting uses, Leif Erikson Drive, herbicides as last resort, annual work program, review and update every five years, and city staff support).

Northwest Hills Study

In November 1985, the City Council passed Ordinance No. 158017, adopting the land use and administrative recommendations set forth in the *Northwest Hills Study*. The recommendations were crafted to guide development of the Northwest Hills area, establish city Comprehensive Plan map designations and zoning for annexed property within the study area and amend the Comprehensive Plan map designations and zoning for certain properties within the Study Area.

The City Council had previously directed the Bureau of Planning to undertake a land use study of the Northwest Hills. The purpose of the study was to determine appropriate land use densities and patterns in the Study Area in light of the city's and other public agencies' ability to provide adequate urban services to support land development.

Upon presentation of the study findings, the City Council directed the Bureau to zone portions of the study area for farm and forest uses, develop standards for sites with hazardous slope conditions or unique features and develop specific conditions for new subdivisions and Planned Unit Developments.

Interim Resource Protection Zone

In an effort to protect resources before the completion of the city's Goal 5 resource protection plans, the City Council adopted Ordinance No. 163697, adding the Interim Resource Protection Zone to Title 33, Planning and Zoning. The zone, effective January 1, 1991, provides interim protection for natural and scenic resources until they can be reviewed as part of the Goal 5 update process. Upon implementation of the *Northwest Hills Natural Areas Protection Plan*, the Interim Resource Protection Zone and water feature designations shown on the zoning maps were removed from the plan area and replaced by appropriate protection measures.

Balch Creek Watershed Protection Plan

In January 1991, the City Council passed Ordinance No. 163770, adopting the *Balch Creek Watershed Protection Plan*. The plan was completed to fulfill part of the city's State Planning Goal 5 requirements. The purpose of the plan is to protect the natural resources of the Balch Creek Watershed. This plan covers the area south of and adjacent to the *Northwest Hills Natural Areas Protection Plan* boundary.

Scenic Resources Protection Plan

In March 1991, as part of the city's Goal 5 scenic resource protection work, the City Council adopted the *Scenic Resources Protection Plan*. The plan protects scenic views, sites and corridors in Portland. Chapter 4 of this report contains a discussion of the relationship between the *Scenic Resources Protection Plan* and the *Northwest Hills Natural Areas Protection Plan*.

Public Services and Facilities

The *Northwest Hills Natural Areas Protection Plan* is served by the City of Portland and special districts. The following is a brief discussion the city's service and facilities responsibilities in the study area.

Water Facilities

Most of the study area is served by public water facilities. Private wells are also common in the Northwest Hills. Potable water is provided via water mains situated primarily along Skyline Boulevard and St. Helens Road. The St. Helens Road line provides water to the upland areas of the Linnton neighborhood.

The water lines along Skyline Boulevard are 16" mains. The St. Helens Road lines are 12" mains. There are also three secondary water lines. These lines provide adequate water capacity. All secondary water lines are 6" pipes which provide low capacity. There are no significant shortages of water line capacity for existing development. There are also no planned improvements or expansions to any of the lines.

Sewer and Storm Drainage Facilities

Most of the study area is served by private septic systems. The eastern portion of the study area along St. Helens Road is served by a 21" interceptor sewer line which provides adequate service to the developed industrial and low lying residential areas. Secondary sewers feeding the St. Helens main are 4 and 8 inch pipes with low capacity. Parts of the Linnton neighborhood on the west side of St. Helens Road are served by these secondary lines. The sewer system does not presently serve other sites within the study area.

The storm drainage system within the study area relies heavily upon the area's natural drainageways, roadside ditches, culverts and open channels to collect and transport stormwater. No planned improvements to the sewer and storm drainage systems are scheduled.

Transportation: Streets, Pedestrian Ways and Bicycle Routes

St. Helens Road and Skyline Boulevard are the two primary roads in the study area. St. Helens Road is classified in the *Arterial Streets Classification Policy* as a neighborhood collector and major city traffic street which is intended to provide for concentrated transit service and to serve as a distributor of traffic to the local street system. It also provides express and limited transit service. St. Helens Road is classified as a boulevard under Portland's street beautification policy which encourages boulevard landscaping. Skyline Boulevard acts as a neighborhood collector and minor transit street that receives traffic from nearby local service streets.

The remaining streets and roads in the study area are local service streets. These streets have a variety of surface conditions including areas of paved, gravel and dirt surfaces. These roads provide very limited capacity. There are no planned improvements to streets in the study area, except as a result of private development.

Wildwood Trail is designated as a major pedestrian way. A pedestrian way is intended to be a link which connects major neighborhood activity centers and recreational areas. The pedestrian ways may also serve as recreational trails.

St. Helens Road, Skyline Boulevard and Bridge Avenue are classified as major bicycle routes. Bicycle routes are intended to establish and encourage safe, convenient, and pleasant routes for cycling within neighborhoods and districts, longer distance commuting, recreational trips and access to public transit. Intersections of a bicycle route with all rights-of-way are intended to minimize conflicts and provide safe bicycle crossings.

Parks and Recreation

The Bureau of Parks and Recreation maintains the park land and trails in the study area. This responsibility includes Forest Park and three smaller parks: Linnton, Clark-Wilson and Holman.

Planning, Zoning, Building and Subdivision Control

The city Bureau of Planning is responsible for land use permits and reviews, zoning code administration, plan development and implementation, reviewing development plans and land divisions for compliance with the Comprehensive Plan and regulating design of new developments. The Planning Bureau will implement the *Northwest Hills Natural Areas*

Protection Plan and utilize it to evaluate development proposals in the Northwest Hills.

Police, Fire and Emergency Services

Police protection is provided by the Bureau of Police. The Bureau of Fire and Emergency Service (BOFES) is responsible for fire fighting and providing emergency services. The portion of study area above Saltzman Road is served by North Precinct. The portion south of Saltzman Road is served by Central Precinct. Fire Station #3 serves the entire study area.

Summary

The *Northwest Hills Natural Areas Protection Plan* is the latest project undertaken for this part of the city. Past planning emphasized preservation of the park for public use and protection of the forest and the wildlife that reside in it. These elements are present in this plan as are measures to balance preservation with current and future development.

CHAPTER 4
POLICY FRAMEWORK

INTRODUCTION •

STATE •

LOCAL •

REGIONAL •

FEDERAL •

SUMMARY •

Introduction

This chapter presents the policy framework which supports and guides development and implementation of the *Northwest Hills Natural Areas Protection Plan*. This discussion focuses on coordination with legislation from the federal to the local level.

State

Statewide Land Use Planning

Oregon's statewide land use planning program was established under Senate Bill 100, adopted by the Legislature in 1973, and included in the Oregon Revised Statutes (ORS) as Chapter 197. This legislation created the Land Conservation and Development Commission (LCDC) and gave it the authority to adopt mandatory Statewide Planning Goals. These goals provide the framework for Oregon's cities and counties to prepare comprehensive plans. There are nineteen Statewide Planning Goals, fifteen of which apply to the Northwest Hills.

After local adoption, comprehensive plans are submitted to the LCDC for review to ensure consistency with the Statewide Planning Goals. Portland's Comprehensive Plan was adopted by City Council in 1980, effective January 1, 1981, and was acknowledged by LCDC in May 1981.

Periodic Review

In 1981, the Legislature amended ORS 197 to require periodic review by the State of acknowledged comprehensive plans. As stated in ORS 197.640(1), the purpose of periodic review is to ensure that each local government's acknowledged comprehensive plan and land use regulations are in compliance with the Statewide Planning Goals and coordinated with the plans and programs of state agencies. Under state law, new Statewide Planning Goals or rules, adopted since a comprehensive plan was acknowledged must be addressed in the Periodic Review. In the fall of 1981, subsequent to acknowledgement of Portland's Plan, the Land Conservation and Development Commission (LCDC) adopted administrative rule, OAR 660, Division 16: Requirements and Application Procedures for Complying with Statewide Goal 5. The steps which a jurisdiction must go through in order to comply with Goal 5 include:

- Inventory resource sites;
- Identify conflicting uses;
- Analyze the economic, social, environmental and energy (ESEE) consequences of resource protection; and
- Determine the level of protection required for the resource.

The *Northwest Hills Natural Areas Protection Plan* updates the city's Comprehensive Plan inventory and analysis of wetlands, water bodies, open spaces, and wildlife habitat areas in the Northwest Hills, and addresses the new administrative rule requirements.

Statewide Planning Goal 5 and the Administrative Rule

Statewide Planning Goal 5 requires cities and counties "to conserve open space and protect natural and scenic resources." The Goal 5 Administrative Rule requires the following resource evaluation and protection process:

The inventory is done first and includes the location, quantity and quality of the resources present. If a resource 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, the local government must commit itself to obtaining the necessary data and performing the analysis in the future. At the conclusion of this process, all remaining sites must be included in the inventory and are subject to the remaining steps in the Goal 5 process.

The next step in this process includes the identification of conflicts with protection of inventoried resources. This is done primarily by examining the uses allowed in broad zoning categories. A conflicting use, according to the Goal 5 Administrative Rule, is one which, if allowed, could negatively impact the resource. These impacts are considered in analyzing the economic, social, environmental and energy (ESEE) consequences.

If there are no conflicting uses for an identified resource, the jurisdiction must adopt policies and regulations to ensure that the resource is preserved. Where conflicting uses are identified, the ESEE consequences must be determined. The impacts on both the resource and on the conflicting use must be considered, as must other applicable Statewide Planning Goals. The ESEE analysis is adequate if it provides a jurisdiction with reasons why decisions are made regarding specific resources.

Other Statewide Planning Goals

There are nineteen Statewide Planning Goals. Fifteen apply to the Northwest Hills study area. Some of these goals establish a decision making process, such as Goal 1, Citizen Involvement, and Goal 2, Land Use Planning. These procedures were applied during the preparation, review and presentation of this protection plan.

Other Statewide Planning Goals address specific topics. Examples include Goal 9, Economy of the State, Goal 10, Housing, and Goal 14, Urbanization. Uses addressed by these goals were identified as conflicting with natural resource protection and required analysis under the Goal 5 Administrative

Rule. This protection plan incorporates the requirements of these goals with the ESEE analyses.

The Willamette River Greenway Goal, Statewide Goal 15, applies to three sites within the study area which are adjacent to or in the Greenway. Statewide Goals 16, 17, 18 and 19 address only coastal and ocean resources and therefore do not apply to Portland.

Local

The City of Portland Comprehensive Plan

The purpose of the city's Comprehensive Plan is to provide a coordinated set of guidelines for decision-making to guide future growth and development of the city. The Comprehensive Plan is implemented through land use and public facilities policies; the Comprehensive Plan map; and the city's regulations for development and redevelopment, including the Zoning Code. The *Northwest Hills Natural Areas Protection Plan's* policies, objectives and recommendations are intended to be consistent with and update the Comprehensive Plan Goals and Policies.

Portland Comprehensive Plan Goal 8 - Environment

The purpose of Portland's Environment Goal is to "maintain and improve the quality of Portland's air, water and land resources and protect neighborhoods and business centers from detrimental noise pollution." The policies and objectives of this goal generally meet or exceed the requirements of the Statewide Planning Goal 5. The City Council, city administrators and city hearings officers make all decisions affecting the use of land in conformance with the policies of Portland's Comprehensive Plan. Since state approval in 1981, conformance with the Plan also means conformance with the Statewide Planning Goals.

Ordinances adopted through 1991 added new Comprehensive Plan Goal 8 policies committing the city to regulate development in groundwater areas, drainage ways, natural areas, scenic areas, wetlands, riparian areas, water bodies, uplands, wildlife habitats, aggregate sites and in areas affected by noise and radio frequency emissions. These ordinances also established new Goal 8 objectives, which commit the city to:

- Control hazardous substances;
- Conserve aquifers, drainage ways, wetlands, water bodies, riparian areas and fish and wildlife habitat;
- Prioritize properties for public acquisition;
- Coordinate city regulations with the regulations of state, federal and other affected local governments;
- Avoid harm to natural resources;

- Mitigate unavoidable harm to protected natural resources;
- Maintain vegetative cover;
- Improve water quality; and
- Prevent soil erosion and stormwater flooding.

Portland Comprehensive Plan Goal 4 - Housing

The City of Portland is responsible for providing certain housing densities to meet its proportionate share of housing opportunities within the metropolitan area. Lands excluded from the housing goal consist of areas located within a floodway or 100-year flood plain, where land hazards are present, and in areas zoned Residential Farm/Forest (RF). Most of the land in the Northwest Hills study area has significant landslide potential or is zoned RF and therefore is excluded.

Other Portland Comprehensive Plan Goals

There are nine Portland Comprehensive Plan goals in addition to Goals 8 (Environment) and 10 (Housing). These goals address urban development, neighborhoods, economic development, transportation, energy, citizen involvement, metropolitan coordination, plan review and administration, and public facilities. As with the Statewide Planning Goals, required procedures are addressed in the preparation, review and presentation of this Protection Plan.

Scenic Resources

City Council adopted the *Scenic Resources Protection Plan* on March 20, 1991. The plan is intended to protect specific scenic views, sites and corridors in compliance with Statewide Planning Goal 5. The plan consists of policy language, zoning regulations and maps that direct and regulate actions so that designated scenic resources are protected and enhanced for future generations.

The *Scenic Resource Protection Plan* identifies four specific scenic corridors that are located within the boundaries of the *Northwest Hills Natural Areas Protection Plan*. These designated scenic corridors are N.W. 53rd Drive, N.W. Skyline Boulevard, N.W. Germantown Road and Leif Erikson Drive.

A scenic corridor is defined as a linear scenic resource that may include streets, bikeways, trails, or waterways (rivers, creeks, sloughs) through parks, natural areas, or urban areas. The scenic corridor designation is intended to preserve and enhance the scenic character along corridors, and where possible, scenic vistas from corridors. This is accomplished by limiting the length of buildings, preventing development in side setbacks, screening mechanical equipment, restricting signs and preserving trees.

When an environmental zone is applied at the location of a designated scenic resource, the environmental review must include consideration of the scenic

qualities of the resource as identified in the ESEE analysis for the *Scenic Resources Protection Plan*. The analysis of the *Scenic Resources Protection Plan* is incorporated by reference and is not repeated in the ESEE analysis in this report. Scenic value was only one factor weighed in the Bureau of Planning's decisions to recommend environmental protection for sites in the Northwest Hills.

Bureau of Buildings

The Bureau of Buildings, Plumbing Division, administers on-site septic systems requirements. Since most of the Northwest Hills study area is not served by public sewer, most development in the area requires the use of on-site systems. Septic system requirements include a maximum 30 percent slope, adequate percolation, and generally over one-half acre of land (with less than 30 percent slope and adequate soils). The Bureau of Buildings also oversees geotechnical regulations for the city. Development on lands of severe landslide potential, for example, requires a geotechnical survey.

Bureau of Environmental Services

The Bureau of Environmental Services, in cooperation with state and federal agencies, is analyzing water quality as part of the Tualatin Basin Water Quality Management Plan. Currently, all development within the basin, which lies west of the planning area for the most part, must employ erosion control guidelines set out in *Erosion Control Plans Technical Guidance Handbook*.

Regional

The Metropolitan Greenspaces Project is a regional study aimed at identifying and protecting natural areas within the Metropolitan Service District (METRO). The project's study area is the Portland Metropolitan Area, and includes the Northwest Hills. The program is a cooperative effort with cities, counties, special districts, nonprofit environmental and conservation organizations and citizens. The goal is to establish a regional system of natural areas, parks and open spaces which are connected by trails and greenways.

In addition to the Greenspaces program, METRO is developing a plan to implement the Urban Growth Goals and Objectives (METRO, 1990). Proposed Goal 2 "Natural Environment of the Region" states:

"Preservation, use and modification of the natural environment of the region shall occur so as to maintain and enhance environmental quality while striving for the wise use and preservation of a broad range of natural resources."

Proposed Objective 7 Natural Areas, requires local governments to acquire and/or manage (1) open spaces to provide passive and active recreational opportunities, and (2) a system of regionally interconnected habitat which support wildlife. Policies 7.1 through 7.3 require local governments to accomplish several tasks to meet this objective. The development and implementation of the *Northwest Hills Natural Areas Protection Plan* partially addresses the following policies:

7.1 Open Space Assessment: This policy calls for local governments to establish quantifiable targets for setting aside certain amounts and types of open space. The site inventories include data on land set aside for open space.

7.2 Corridor Systems: This policy calls for the development of interconnected recreational and wildlife corridor systems within the metropolitan region. The *Northwest Hills Natural Areas Protection Plan* will assist with achieving this objective through the preservation of natural areas where passive recreational opportunities exist. The individual site inventories included in the Protection Plan will also aid in the development of recreational and wildlife corridors.

7.3 Wildlife Inventory: This policy requires a detailed biological inventory of the region to be maintained to establish an accurate baseline of native wildlife populations. The Wildlife Habitat Assessments and Site Inventory Summaries (see Chapter 7) of this Protection Plan provide new data for the regional inventory.

Federal

The Federal Clean Water Act applies primarily to water resources in the Northwest Hills. The Act's primary objective is to maintain and restore physical, chemical, and biological integrity of the nation's waters, including wetlands. Another objective of the Act is "to maintain a balanced indigenous population of species." The objectives of the *Northwest Hills Natural Areas Protection Plan* are consistent with these objectives.

Permitting Agencies

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 wetlands and water bodies:

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. The term "waters" 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. Again, "waters" includes wetlands as defined above.

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.

Summary

This chapter examined the policy framework within which the *Northwest Hills Natural Areas Protection Plan* is developed and implemented. This framework includes compliance with Statewide Planning and Portland Comprehensive Plan Goals. Coordination with regional and federal agencies occurs during implementation.

CHAPTER 5
AREAWIDE INVENTORY OF NATURAL RESOURCES

- INTRODUCTION •**
- RESOURCE FUNCTIONS AND VALUES •**
- GEOLOGY •**
- SOILS •**
- TOPOGRAPHY AND SLOPES •**
- GROUNDWATER •**
- SURFACE WATER •**
- AQUATIC ENVIRONMENT •**
- VEGETATION •**
- WILDLIFE •**
- MINERAL AND AGGREGATE RESOURCES •**
- SUMMARY •**

Introduction

This chapter presents the general inventory of natural resources of the Northwest Hills. The chapter begins with geologic resources and generally proceeds from the ground up; that is, from bedrock to soil, ground to surface waters, and then to vegetation and wildlife. Each resource subsection begins with a summary of inventory method and principle reference materials, and then presents an overview of resource characteristics including an overview of resource location, quality and quantity.

Historic, scenic, educational and recreational resources are examined together with site-specific natural resources in the Site-Specific Inventory and Analysis chapter of this report. Wildlife habitat assessment field inventories and lists of both flora and fauna occurring in the Northwest Hills are on file at Bureau of Planning offices.

Resource Functions and Values

The Northwest Hills forest protects and conserves important resources such as watersheds and soils. Forest vegetation moderates the effects of winds and storms, stabilizes and enriches the soil, and slows runoff from precipitation, thereby minimizing erosion and allowing the forest floor to filter out sediments and nutrients as the water soaks down into groundwater reserves or passes into streams. By decreasing runoff and increasing groundwater infiltration, the forest protects downstream neighborhoods from flooding. Also, by stabilizing the soil and reducing runoff and erosion, the forest protects the community from landslides and other land hazards.

By protecting watershed resources in this manner, the forest also protects habitat for terrestrial and aquatic organisms. The different layers of tree tops, branches, trunks, shrubs and plants on the forest floor provide breeding, feeding and refuge areas for many species of insects, birds and mammals. The forest canopy helps to maintain stream flows, filter out potential pollutants and moderate stream temperatures, thereby sustaining viable habitat for fish, amphibians and aquatic organisms as well as providing an important upland water source for terrestrial wildlife. Also, by filtering out water pollutants, the forest maintains good quality drinking water for local residents who use wells. The ability of these diverse and interdependent elements of the forest community to function properly is an important measure of the general health and vitality of the local environment. A healthy forest ecosystem is crucial to the forest's value as a scenic, recreational and educational resource, and to its continued contribution to Portland's high quality of life.

The forest provides additional values which accrue to local landowners and broader segments of society. The dense, coniferous and deciduous forest acts

as a buffer from the sights and sounds of the large urban metropolis. The forest mutes the noise of highways and nearby industrial activities and absorbs some air pollutants caused by auto and industrial emissions. The forest also moderates climate extremes. The microclimate of the forest, created in part by the shade of the vegetation and the transpiration of water from the leaves, keeps surrounding air at an even temperature. The forest thus acts as a natural "air conditioner" for adjacent residential areas, cooling the air during the day and warming it at night.

Natural resources described in this section all interact with one another and are interdependent elements of a complex natural system. Resources described in the following subsections, though reviewed individually, should be understood as interconnected strands of a complex ecological web.

Geology

Information on the geologic history of the Northwest Hills was compiled from three principle sources: *Forest Park: One City's Wilderness* (Houle 1988), *Portland's Changing Landscape* (Price 1987), and *Portland Physiographic Inventory* (Redfern 1976). Data on depth, thickness and water-bearing characteristics of geologic units is presented in Table 1 and Table 2.

Portland has been the site of a series of spectacular geologic events dating back 22 million years. These events have included some of the largest lava and water floods on the face of the earth (Price 1987).

The major events leading to the formation of the Portland Hills (Tualatin Mountains) began sixteen million years ago during the Miocene period. Volcanic fissures far to the east of Portland began discharging hundreds of cubic miles of molten lava which flowed through an ancient Columbia River Gorge, flooding the Willamette River Basin region. The solidified lava, know today as Columbia River Basalt, covered the Scappoose Formation, a siltstone and shale deposit which had formed 22 million years ago when the Portland area was submerged under marine waters. Today, after millions of years of weathering, the basalt measures roughly 700 feet in depth below the West Hills (Houle 1988).

Geologic disturbances continued through the late Miocene period, when the present-day Cascade and Coast Ranges were formed. At the same time, a large upheaval of Portland's basalt base created the Tualatin Mountain ridge and simultaneously formed the Portland and Tualatin valleys. The valley floors settled over the course of several million years until, in the Pliocene period, their basins breached, forming eddies in the Columbia River into which large quantities of quartzite and granite river rock were deposited. Today these

deposits, known as the Troutdale Formation, cover the original basalt layer along the lower half of the West Hills and provide an excellent aquifer (Price 1987).

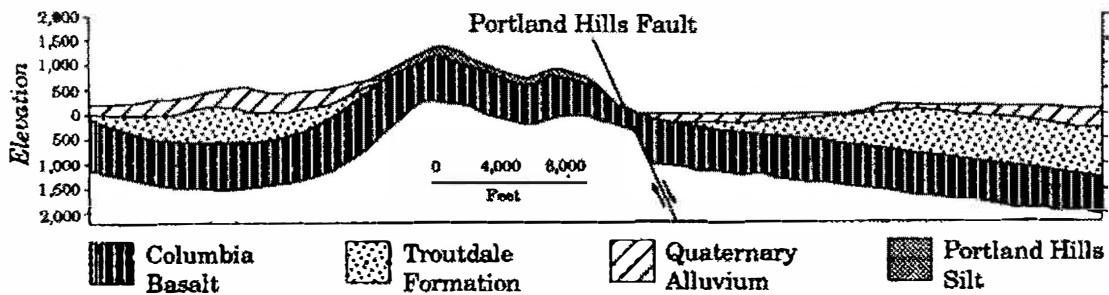
Later in the Pliocene period, the West Hills became volcanically active. Small volcanoes along the Tualatin Mountain ridge began erupting Boring Lava, evident today in the form of a grey basalt found at several sites along the West Hills.

The last major activity affecting the Northwest Hills area was the deposition of up to 100 feet of Portland Hills Silt at elevations above 600 feet. This silt was eroded from the Columbia River flood plain, carried down the gorge, and finally wind-deposited on the West Hills. In the more recent geological past, silt and sand (alluvium) deposits formed along the Willamette River flood plain. The different layers of geologic units in the Northwest Hills are illustrated in Figure 1. Also shown in the Figure 1 is the inferred location of the Portland Hills Fault line.

The presence of Portland Hills Silt along the Tualatin Mountains has important implications for land use and development. The silt becomes very unstable when wet and the potential for slope failure is particularly high after winter rains have saturated the soil. Landslides, mud slides, and slumps are common on steep areas in the West Hills. These slope failures, often associated with logging and building activities, have substantially altered the face of the hillside over the last century.

Figure 1

Geologic Cross-Section of the Northwest Hills



(After Balsillie and Benson, 1971, p. 116)

Soils

Soils in Northwest Hills belong to the Goble-Wauld series as identified in the Multnomah County Soil Survey (Soil Conservation Service 1983). This soil group is comprised predominantly of silt and gravel loams high in volcanic ash weathered from the parent material, Columbia River Basalt (see Map 3).

Approximately 75 percent of the study area is made up of Goble soils. The soil is dark, greyish brown silt loam to a depth of about 14 inches, below which a silty clay loam mixes with silt loam forming a yellowish brown, mottled fragipan at a depth of 30 to 48 inches. This fragipan is a hard, brittle soil layer with low permeability: a hardpan that impedes percolation of groundwater causing a thin groundwater table to develop, perched above the regional water table.¹ The fragipan restricts rooting depth for plants to 30 to 48 inches. The Goble silt loams have severe limitations for building site development and sanitary facilities.² According to the Soil Conservation Service (SCS), this means: "Soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, major soil reclamation, special designs, or intensive maintenance is required." (SCS 1983:98)

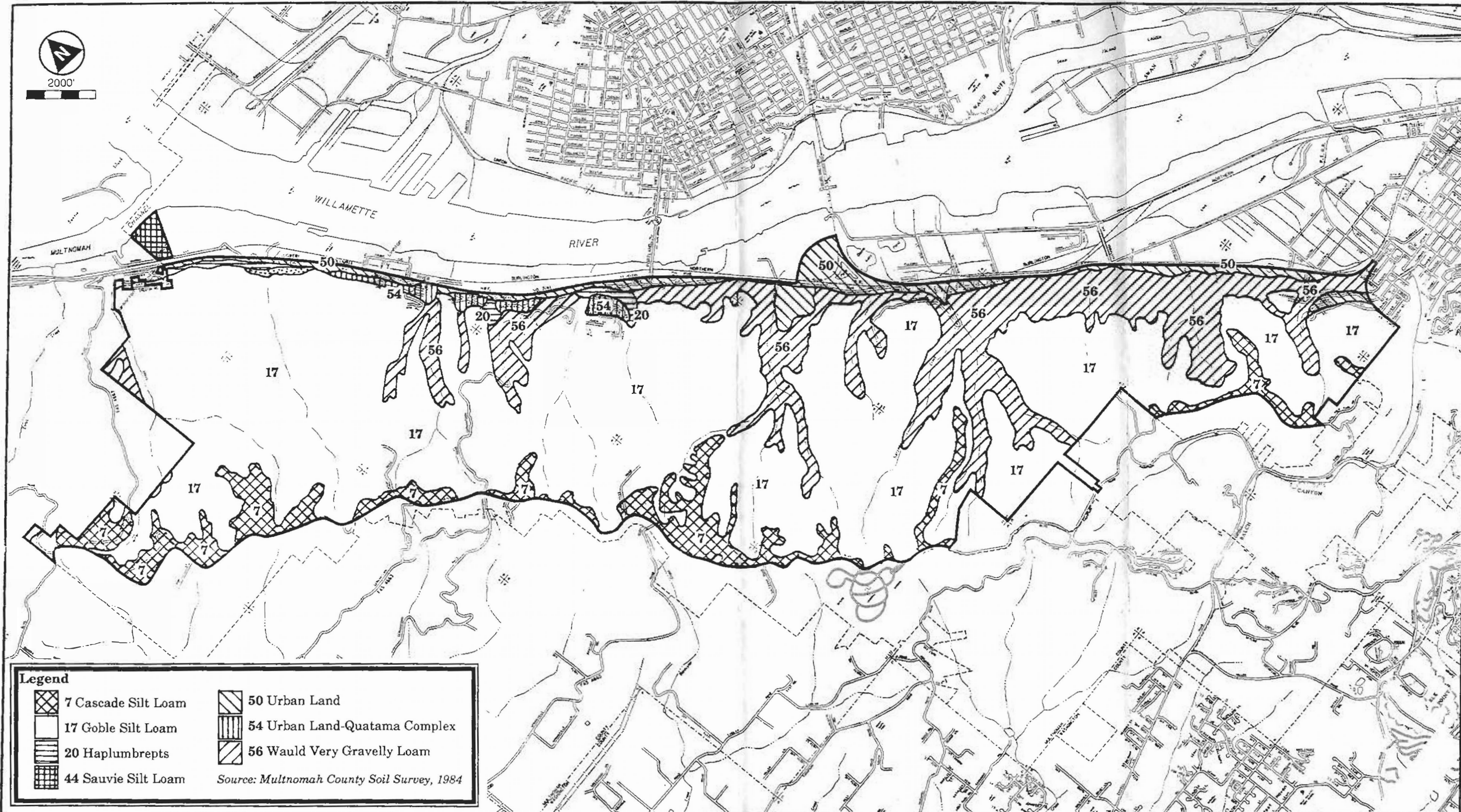
The Wauld soils are made up of gravelly loams and commonly occur on steep slopes along the larger drainages in the planning area. The top six inches of the soil are dark brown gravelly loam. Below the surface layer is a gravelly clay loam 24 inches thick, which overlies basalt bedrock at a depth of 30 inches. Soil permeability is moderate and effective rooting depth is 20 to 40 inches. The Wauld soils also have severe limitations for building site development and sanitary facilities.

The soils along the broad, rolling slopes of the Tualatin Mountain ridge are classified as Cascade silt loam, an associate of the Goble-Wauld soils. The soil's top layer is a dark brown silt loam which overlies a dark brown, mottled, silt loam fragipan at a depth of 20 to 30 inches. Permeability is slow and effective rooting depth is limited by the fragipan layer.








The Willamette River lowlands are dominated by silty alluvium deposits and are largely urbanized (i.e., covered by structures, paved, or otherwise altered). Sauvie silt loam occurs at the north end of the study area, near the mouth of the Multnomah Channel. The Sauvie soils are hydric and are subject to frequent flooding between the months of December and June. During May and June, the water table is within 12 inches of the soil surface. This area is identified in the National Wetlands Inventory as palustrine wetlands of varying classes: emergent, scrub/shrub and forested wetlands.

¹ Perched water tables in the West Hills normally develop during the fall, winter and spring seasons.

² Public sewers only serve properties along St. Helens Road; most areas rely on on-site septic systems.



Legend

 7 Cascade Silt Loam	 50 Urban Land
 17 Goble Silt Loam	 54 Urban Land-Quatama Complex
 20 Haplumbrepts	 56 Wauld Very Gravelly Loam
 44 Sauvie Silt Loam	

Source: Multnomah County Soil Survey, 1984



NORTHWEST HILLS

Natural Area Protection Plan

SOILS

Map
3

Topography and Slopes

The eastern face of the Tualatin Mountain range is highly dissected by creeks (and creek channels) flowing northeast to the Willamette River. The lowland area between the Willamette River and St. Helens Road is flat with elevations ranging from 30 to 40 feet mean sea level (msl). Climbing southwest from St. Helens Road, the hillside slopes become steep before leveling off near the ridgetop along Skyline Boulevard. Elevations range between 900 and 1,180 feet msl along the crest of the Tualatin Mountains.

The principle creeks and secondary ridges descend from the main Tualatin Mountain ridge northeast to the Willamette River lowlands, creating a marked dichotomy between northwest- and southeast-facing slopes which can reach a gradient of 50 percent or more locally.

A physiographic inventory of Portland (Redfern 1976) classified slopes in excess of 30 percent as generally having "severe landslide potential."³ Between 90 and 95 percent of the upland slopes within the study area exceed 30 percent. Slopes of only 15 percent have been known to fail in the West Hills, particularly during the saturated soil conditions in mid-winter (Redfern 1976). In determining areas with "severe landslide potential," Redfern included slopes of less than 30 percent which had a history of failures (e.g., major slumps and landslides). Map 4 depicts the topography of the Northwest Hills. Map 5 illustrates three categories of slopes: 0 to 15 percent, 15 to 30 percent, and slopes greater than 30 percent.

Groundwater⁴

Information of groundwater resources was compiled from U.S. Geological Survey (USGS) publications, Multnomah County Soil Conservation Service (SCS), and the *Portland Physiographic Inventory* (Redfern 1976). Water-bearing characteristics of geologic units are shown in Table 1. Groundwater resource data for the Tualatin Mountains and the Willamette River Flood plain are presented in Table 2.

Tualatin Mountains

The regional groundwater table in the Northwest Hills area rises in elevation from the valley floor, but at less of a gradient than the ground surface.

³ Other factors such as soil type, shear strength, drainage and landslide history were also considered. In the 1987 Vacant Land Study these slopes were regarded as hazards and removed from the land area used in determining housing potential.

⁴ Groundwater is a "non-site-specific" resource as noted in the Goal 5 Administrative Rule. It is important to remember that it is a complex natural system interconnected and interrelated with other parts of the Columbia-Willamette watershed ecosystem.

Oregon Water Resources Board (OWRB) well logs show that wells tend to be deeper at higher elevations and at locations closer to the city. Well logs for the Northwest Hills area indicate that the depth to the water table typically ranges between 200 and 500 feet; however, along the ridge in the southern portion of the site (Section 23, 1N, 1W), well depths range between 540 and 960 feet.

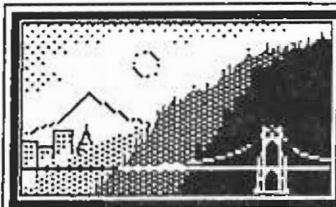
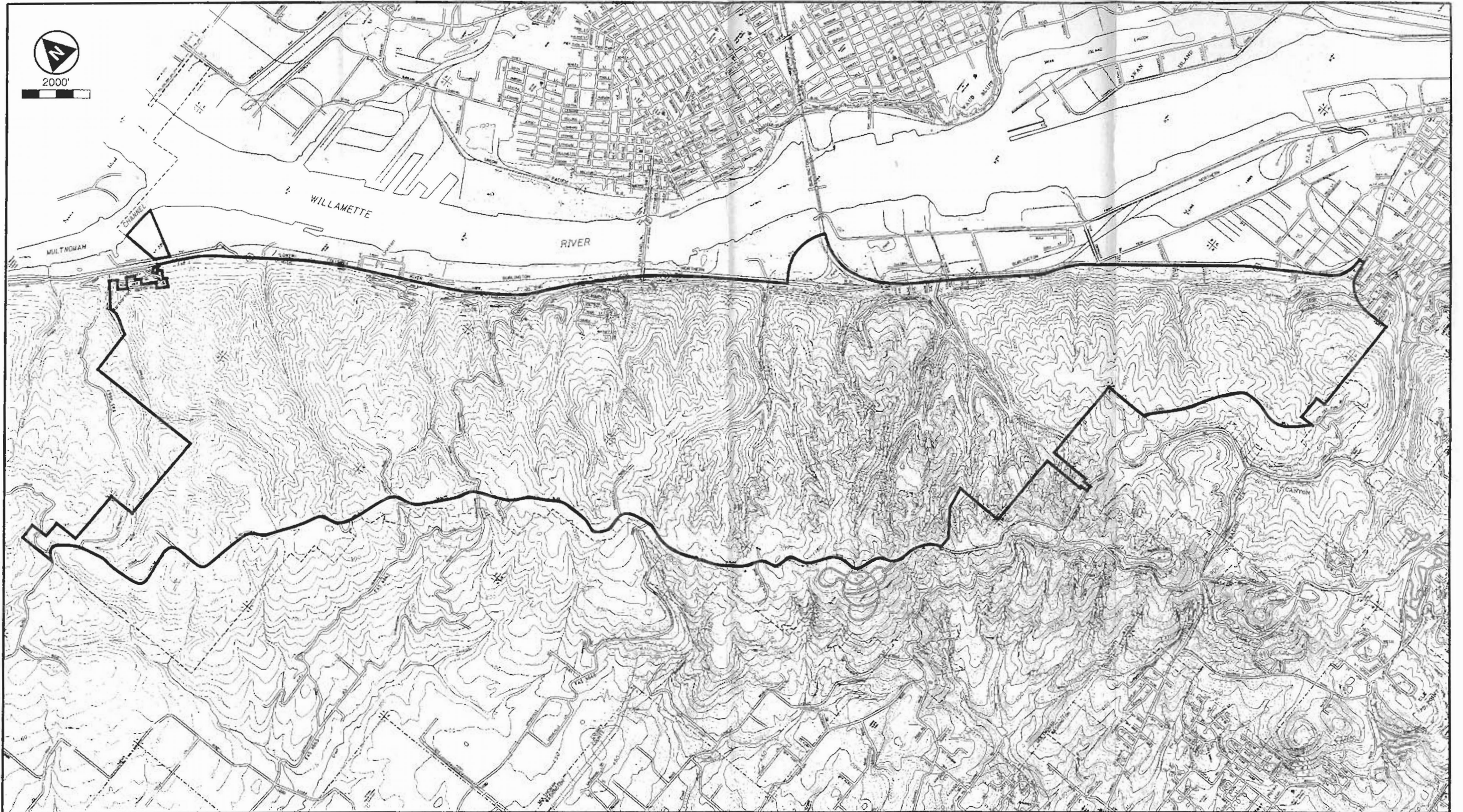
Residences and farms use groundwater in the Tualatin Mountains (Redfern 1976). The OWRB has records of over 50 wells in the upland portion of the study area. Extensive use of groundwater reserves can result in a draw down of the water table. This, in turn, can impact watershed resources and aquatic life, particularly during the summer months when creek flow levels are largely dependent on groundwater contributions at the same time that farm and residential groundwater use are typically at their peaks.

Also, as water is withdrawn, materials making up the groundwater aquifer may become compacted resulting in a loss of storage capacity and subsidence of the land surface. Land subsidence may cause structural damage to buildings, roads, bridges, buried cables and well casings. A decline in groundwater levels also results in higher pumping lifts and lower well yields, both of which result in higher pumping costs.

As noted in the discussion on soils, the Cascade-Goble silt loams on the Tualatin Mountains develop a fragipan layer that impedes the downward movement of groundwater. The fragipan layer occurs between 2.5 and 4.5 feet below ground. Above the fragipan, a shallow, "perched" groundwater table develops, particularly during the rainy winter months. Shallow groundwater can create natural hazards, particularly when tapped or daylighted by road or building cuts. It can precipitate landslides and cause soil creep, with potentially serious consequences for development. Groundwater is also susceptible to pollution from a variety of sources: septic drain field effluent, pesticides, herbicides, fertilizers, solid waste leachate, and runoff from parking lots and other impervious surfaces. Groundwater can pass these pollutants into local creeks and degrade aquatic habitat. The migration of saline water from marine sediments below the Columbia River Basalt can also threaten groundwater quality (U. S. Geologic Survey 1984).

Northern Willamette River Flood Plain

Data on water quality is limited for this lowlying industrial area (see Table 1). Groundwater is used by some businesses for heating and cooling systems and then injected back into the ground. Water that is returned to the ground via injection wells is usually warmer (as much as 30°F to 40°F) than groundwater temperatures and may cause thermal pollution problems locally. Potential impacts of land uses in the Northwest Hills on groundwater quality and quantity are discussed further in Chapter 6 of this report.



NORTHWEST HILLS
Natural Area Protection Plan

TOPOGRAPHY

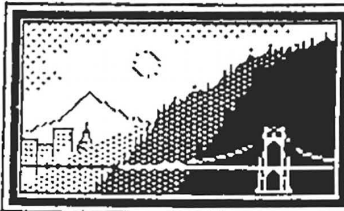
Map
4

TABLE 1: Water-bearing Characteristics of Geologic Units
 (Adapted from Hogenson 1962)

Rock Unit	Type of Material	Area(s) of Occurrence	Water-bearing Character
Columbia River Basalt	Dark basalt in accordantly layered flows that range from about 10 to 150 ft. thick.	Throughout (at depth), exposed in and near creek beds.	Permeable zones at contacts between some flow layers yield moderate to large amounts of water to wells that penetrate the basalt below the regional water table, and lesser amounts of perched ground water to wells and springs above the regional water table.
Troutdale Formation	Unconsolidated and partly consolidated gravel, sand, silt, and clay, commonly in the form of well-indurated sandy conglomerate.	At lower elevations in West Hills; overlain by quaternary alluvium.	Layers of loose sand gravel below the regional water table yield moderate to large amounts of water to wells and springs; similar beds above the regional water table yield smaller, less dependable supplies of perched ground water.
Alluvium	Principally silt and clay.	Willamette River flood plain.	Yields only small amounts of water to wells.
Younger Alluvium	Gravel, sand, silt, and clay, rudely stratified. Mostly well sorted beneath the flood plains of larger rivers; less sorted near smaller streams.	Flood plains of perennial streams.	Layers of well-sorted gravel and sand yield large amounts of water to wells; less sorted and finer materials yield smaller amounts.

TABLE 2: Groundwater Resource Data
(after Redfern 1976)

Area	Principal water yielding formation	Depth to top of formation	Formation thickness	Range of yield	Recharge	Water quality problems/notes
Northwest Hills -uplands-	Portland Hills Silt	0 feet	0-150 feet	low	<ul style="list-style-type: none"> • infiltration 	<p><u>Quality:</u> no data</p> <p><u>Potential problem:</u></p> <ul style="list-style-type: none"> • septic drainfield pollution
	Boring Lava	0-80 feet	0-350 feet	low	<ul style="list-style-type: none"> • infiltration • migration from Portland Hills Silt 	<p><u>Quality:</u> no data</p> <p><u>Potential problem:</u></p> <ul style="list-style-type: none"> • septic drainfield pollution • overuse (locally)
	Troutdale Formation	0-400 feet	180 to over 500 feet	low to moderate	<ul style="list-style-type: none"> • infiltration • migration 	<p><u>Quality:</u></p> <ul style="list-style-type: none"> • moderately hard • water only in thin beds
	Columbia River Basalt	0-150 feet	430 to over 1,000 feet	low to high • usually 2 to 300 gal./min.	<ul style="list-style-type: none"> • infiltration • stream infiltration • migration from neighboring formations 	<p><u>Quality:</u></p> <ul style="list-style-type: none"> • moderately hard to hard • high chloride <p><u>Potential problem:</u></p> <ul style="list-style-type: none"> • saline contamination from underlying formation



NORTHWEST HILLS
Natural Area Protection Plan

SLOPE ANALYSIS

Map
5

TABLE 2: Groundwater Resource Data (continued)

Area	Principal water yielding formation	Depth to top of formation	Formation thickness	Range of yield	Recharge	Water quality problems/notes
Northern Willamette River Floodplain	Alluvium	0 feet (often covered with fill)	0-130 feet (thin towards the south)	usually low to moderate (insufficient data)	<ul style="list-style-type: none"> • infiltration • migration from Willamette River • migration from terraces 	<p><u>Quality:</u></p> <ul style="list-style-type: none"> • low yield in fine grained top layer • moderate to high yield from irregularly occurring basal gravels and sands <p><u>Potential problem:</u></p> <ul style="list-style-type: none"> • easily contaminated
	Troutdale Formation	105-127 feet (based on two wells)	no data	usually moderate to high (insufficient data)	<ul style="list-style-type: none"> • infiltration • migration from Willamette River • migration from terraces 	insufficient data

Surface Water

Surface water resources within the study area were identified using USGS topographic and National Wetlands Inventory maps, aerial photos, and field reconnaissance. The "Portland Storm Drainage Study" (BSE 1982) was consulted for information on drainage systems and flood history. Drainage basin areas were calculated using a planimeter.

Creeks and Wetlands

There are approximately 25 miles of perennial and intermittent creeks within the project study area. All but one of the creeks drain east/northeast into the Willamette River; Miller Creek drains into the Multnomah Channel near the channel's juncture with the Willamette (see Map 6). The largest three of the creeks, Saltzman, Doane and Miller, have drainage areas of 972, 770 and 763 acres, respectively.

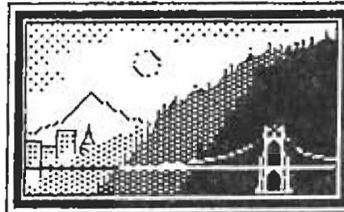
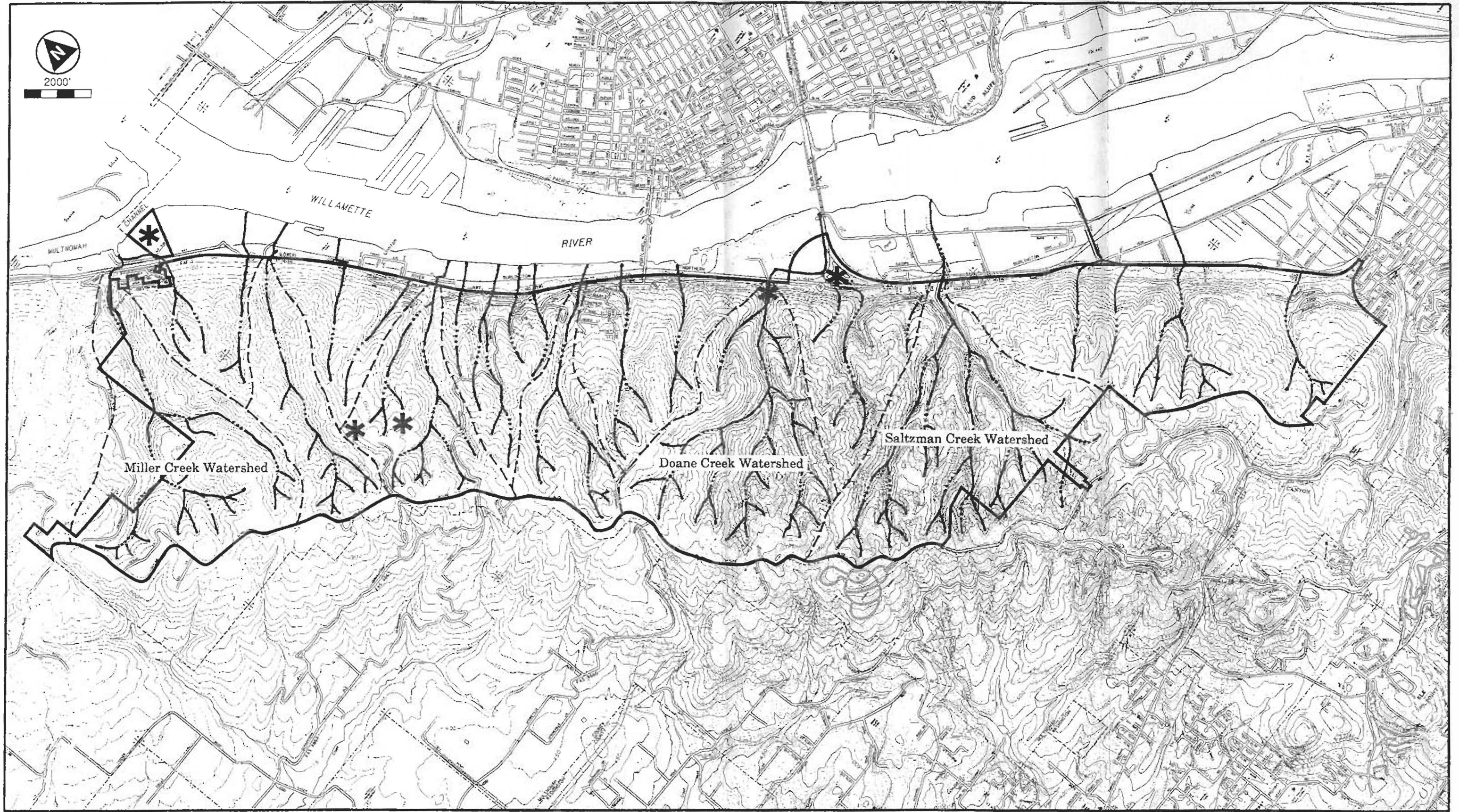
The National Wetlands Inventory (NWI) classifies most of these creeks as intermittent riverine systems; portions of Saltzman, Doane and Miller Creeks however are classified as upper perennial (high gradient, fast water velocity, year round flow). As described earlier, all the creek channels have steep to moderately steep gradients which result in high flow velocities and a relatively large capacity for sediment transport and erosion.

Associated with the creeks are several palustrine wetlands formed principally as a result of mining and roadway excavations, beaver damming activity, and natural depressions in the uplands and along the Willamette River flood plain. The NWI mapping identifies a large forested wetlands and smaller emergent and scrub/shrub wetlands near the juncture of the Multnomah Channel and the Willamette. Four miles south, a remnant of Doane Lake (the lake was bisected by railway embankments) is also identified as a palustrine wetlands. Three additional palustrine wetlands were identified through field reconnaissance: an emergent and scrub/shrub wetland at the abandoned Rivergate quarry site on St. Helens Road (see Mineral and Aggregate Resources below) and two small emergent and forested wetlands near the Newton Road parking lot off of Skyline Boulevard.

Drainage System

Surface water drainage between the crest the Tualatin Mountains and St. Helens Road is primarily through natural channels. Small sewers located in the Linnton area are exceptions. Most of the creeks pass through culverts under St. Helens Road and the Burlington Northern Railroad and from there enter natural channels, ditches, concrete flumes or sewers, or a combination of these systems before flowing into the Willamette River.

Most recorded flood events in the plan area have occurred along St. Helens Road. Flooding of Doane and Saltzman Creeks, and near N.W. 35th and N.W. 105th Avenues occurs on a regular, if not annual, basis.



NORTHWEST HILLS
Natural Area Protection Plan

Legend

- Principle Drainage Basins
- ...- Upper Perennial and Intermittent Creeks
- * Wetlands

SURFACE WATER

Map
6

Aquatic Environment

Data on aquatic habitat resources were gathered on field visits between February, 1990, and January, 1991. On August 9, 1990, two biologists assisted Planning Bureau staff with a survey of aquatic habitats in several creeks within the study area. On August 15, a fisheries biologist from the Oregon Department of Fish and Wildlife (ODFW) and planning staff conducted fish sampling surveys in Saltzman and Miller Creeks using a backpack electro-fisher. Additional data was collected from relevant published sources.

Aquatic Habitat

The palustrine wetlands at the mouth of the Multnomah Channel support an abundance of aquatic and terrestrial fauna (see Site 105 inventory in this Protection Plan, and Unit 4.2A of the *Willamette Greenway Plan* inventory). The Greenway Plan identified and protected the habitat resources at the site. Other wetland sites were not sampled for fish.

Most of the creeks and creek tributaries flowing through the study area are cool, well-shaded, and well-aerated freestone aquatic systems. Miller and Saltzman Creeks, and at least three smaller unnamed creeks, were found to have persistent flows during August, 1990, after 40 days without measurable rainfall. Of the creeks with persistent flow, Miller was found to support the greatest variety of aquatic life. The data on aquatic habitat resources for Miller Creek is summarized below for illustrative purposes; other creeks within the study area are discussed later in this report.

Miller Creek

Miller Creek is located along the northernmost boundary of the study area (see Map 6). The creek and its major tributaries total approximately 3.1 miles in length and drain an area of 763 acres, of which approximately 591 acres are included within the Portland city limits. The creek headwaters are located near Skyline Boulevard, between Newton and Newberry Roads. The headwaters feed two main tributaries of the creek which merge near the center of the basin and ultimately drain into the Multnomah Channel at Fred's Marina, near the channel's juncture with the Willamette River. Three field visits were made to the Miller Creek basin during low-flow conditions in August, 1990. The creek was found to support several fish, amphibian and macroinvertebrate species.

Fish

Coho salmon⁵ (*Oncorhynchus kisutch*), sea-run cutthroat trout (*Oncorhynchus clarki*), and short head cottid (*Cottus confusus*) were identified in Miller Creek on August 15, 1990. Six coho (65 mm to 100 mm in length), twelve cutthroat (75 mm to 170 mm), and four cottids (55 mm to 80 mm) were found, as well as one unidentified salmonid (believed to be coho).⁷

Multnomah Channel has previously been identified as an important migratory route for coho salmon and cutthroat trout, though no prior evidence of salmonid spawning activities in Miller Creek existed.

Amphibians

Five amphibian species were observed along Miller Creek. Seven red-legged frogs (*Rana aurora*) were identified on a short walk along the lower creek in August 1990. Another red-legged individual was found on an earlier visit. Spotted frog (*Rana pretiosa*) was identified further upstream. Spotted frog is listed as a threatened species and red-legged frog as a sensitive species. The western toad, northwestern garter snake and several pacific giant salamanders ranging in size from 92 mm to 122 mm were also found along the creek.

Macroinvertebrates and Crustaceans

Macroinvertebrate populations were observed to be fairly abundant in the Miller Creek system. The creek supports a variety of stoneflies, mayflies and caddisflies as evidenced by casings found on rocks throughout the creek. Other aquatic insects such as water striders are prolific in the creek. Crawfish are present in several of the perennial and intermittent pools surveyed.

Water Quality and Habitat Characteristics

Data collected in lower Miller Creek indicates that water quality is good and that the potential for salmonid spawning in the creek is high. The presence of fish, amphibians and macroinvertebrates in Miller Creek are signs of good water quality. The creek banks are generally stable, though undercutting and erosion are evident at at least one site on the south bank. The banks are generally well-vegetated, with shade along the creek west of St. Helens Boulevard averaging 70 percent. The substrate is composed of 35 percent gravel (up to 6" diameter rock), 60 percent cobble (6"-3' dia.), and 5 percent boulders ($\geq 3'$ dia.).

A study of the creek, prepared by Dr. Poracsky and two students in the Portland State University Geography Department, noted that "erosion, where

⁵ Coho is a candidate for listing under the Endangered Species Act (ESA). A petition was filed with the National Marine Fisheries Service (NMFS) on May 30, 1990 requesting determination of status of coho salmon under the ESA. On September 28, NMFS accepted the petition.

⁶ *Oncorhynchus* is the current genus name; previously, *Salmo* was given as the genus.

⁷ In August, 1991, both coho and steelhead were identified in a follow-up survey below St. Helens Road.

A study of the creek, prepared by Dr. Poracsky and two students in the Portland State University Geography Department, noted that "erosion, where it occurs, is that associated with streams of this nature in steep-sided canyons." (Poracsky et al. 1990:87) The study further noted that the pristine character of the creek, which was found to be in the best condition of the nine local creeks studied, was due largely to the lack of easy public access to the basin.

Only slight variations were found in water temperature readings taken on different days, different times of day, and at different sites in the creek. Vegetative cover over the creek ranged between 5 and 90 percent. Water temperatures were recorded between 58°F and 62°F, while air temperatures ranged from 66°F to 82°F. Salmonids need low water temperatures: preferred coho salmon temperatures range between 53.2°F and 58.3°F, while preferred temperatures for cutthroat are between 49.1°F and 55.2°F.

Water flow was low (12-16 gallons/minute) in mid-August, following 40 days without measurable rainfall. As noted previously, only the lower reaches of the creek had surface flow. Several seeps were identified adjacent to the creek, helping to maintain flow during the 40-day drought.

Habitat types in Miller Creek include riffles and pools. Spawning-size gravels are present at several points along the creek, typically in riffles (one salmonid was observed constructing a redd (nest) in a gravel riffle). The large wetland area adjacent to the Miller Creek outfall into the Multnomah Channel provides a potential out-of-channel rearing area for salmonid fry (salmonids can grow up to six times faster in these areas than in the main channel).

The gradient of the creek channel is moderate, averaging 6 percent, with lower gradients at lower elevations. Opportunities for cover within the channel are good (a result of exposed root masses, overhanging vegetation, woody debris, and boulders). Evidence of food to support both fish fry and adults is present in the creek. Salmonid fry feed on plankton and aquatic insect larvae which are found in the creek. Invertebrates, amphibians and other fish provide food sources for larger salmon and trout.

Fish migration clearly is occurring in the Miller Creek/Multnomah Channel system: fish were identified above, below, and within the culvert passing under St. Helens Road and the Burlington Northern Railroad. However, the large, 4' x 5' flat-bottomed culvert poses a potential obstacle to fish migration between upstream spawning beds and the Multnomah Channel. Also, the lower end of the culvert has a two-foot drop to the pool below. As a short-term remediation measure, ODFW staff proposed stepping up the elevation of the pool with a series of jump pools and staggering baffles on the floor of the culvert to concentrate water flow. Long-term restoration efforts, proposed

by planning staff, include the removal of portions of the road and railway embankments and construction of a bridge across the creek.⁸

Conclusion

Data collected in Miller Creek during low-flow conditions in August 1990 indicate that the creek supports a variety of aquatic life. The lack of major barriers to migration, good water quality and temperature conditions, and the presence of spawning gravels, when combined with the findings of salmonids and other aquatic species strongly suggest that Miller Creek provides spawning habitat for coho salmon and cutthroat trout.⁹ Crystal Springs Creek in Southeast Portland is the only other spawning ground for both coho and cutthroat within Portland.

Vegetation

Information of plant communities, successional patterns and general vegetation resources was compiled from several sources. Data on vegetation types, distribution and resource values was gathered through aerial photo-interpretation and on-site reconnaissance. Field surveys were conducted throughout the study area between February, 1990, and January, 1991. Current scientific literature on the subject was consulted during this time, with primary sources including *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness 1973), *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973), "Forest Park--One City's Wilderness: Its Wildlife and Habitat Interrelationships" (Houle 1982), and "Portland Bureau of Planning Goal Five Study: West Hills" (Lev 1986).

Community Characteristics

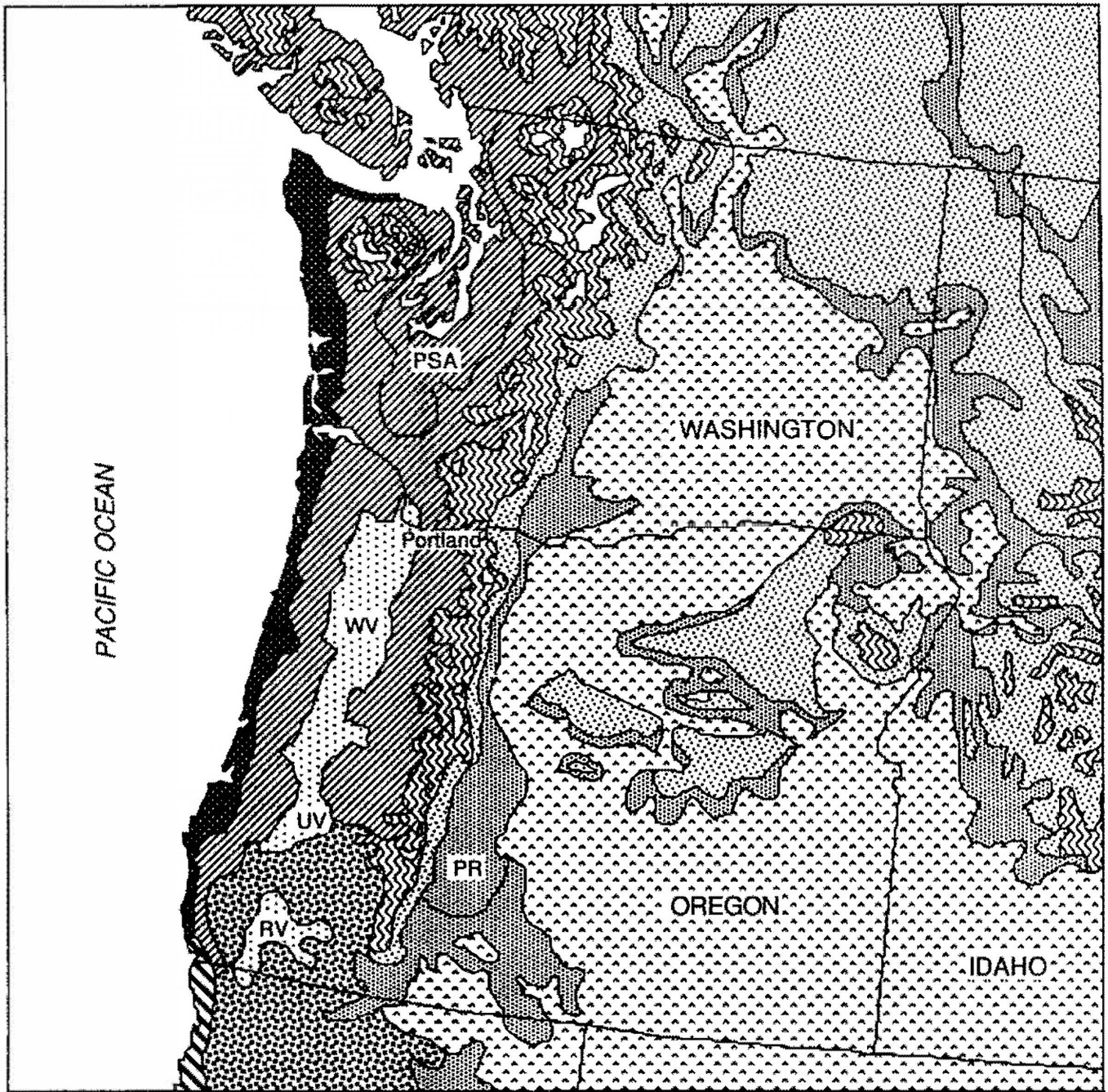
The eastern slopes of the Tualatin Mountains are clothed by coniferous forest of the *Tsuga heterophylla* (western hemlock) vegetation zone.¹⁰ This zone extends throughout the wet, mild, maritime climate of British Columbia, western Washington and Oregon (see Map 7). A vegetation zone, as defined by Franklin and Dyrness (1973), delineates a region of essentially uniform macroclimatic conditions with similar moisture and temperature gradients where one plant association predominates. The lowlands immediately adjacent to the forest are part of the more prairie-like Willamette Valley Zone.¹¹ Emergent, scrub-shrub and forested wetland plant communities

⁸ St. Helens Road is already bridging part of this area.











⁹ Evidence of steelhead spawning was found in the August, 1991 survey.

¹⁰ Evidence of historic vegetation types is presented in Houle (1982) and Munger (1960).

¹¹ Differences in vegetation composition of the lowlands and uplands are pronounced; Douglas fir, for instance, a prominent component of the upland forest, is uncommon on the lowlands, where red alder, cottonwood, and willow species predominate. Because of the relatively small lowland area included in this study, inventories of lowland vegetation are presented in the Site Inventory Summaries section of Chapter 7 of this report.



LEGEND - Vegetation Zones of the Pacific Northwest

 Sitka Spruce	 Redwood	 Grand Fir/Douglas Fir
 Western Hemlock (PSA) - Puget Sound Area	 Mixed Conifer/ Mixed Evergreen	 Steppe Regions
 Interior Valleys of Western Oregon (WV) - Willamette Valley (UV) - Umqua Valley (RV) - Rogue Valley	 Subalpine	 Timberline/Alpine
	 Yellow Pine (PR) - Pumice Region	

GTS/Orngma

NORTHWEST HILLS
Natural Area Protection Plan

**PACIFIC NORTHWEST
VEGETATION
ZONES**

Map
7

reside along some of the creeks and in the palustrine wetlands that occur within the study area.

Western hemlock and western red cedar (*Thuja plicata*) are considered climax species within the Western Hemlock Zone based on their potential as dominants. The subclimax Douglas fir (*Pseudotsuga menziesii*), however, tends to dominate large areas within this region. Historically, Douglas fir has dominated forest regeneration over much of the zone in the last 150 years (Munger 1930, 1940).

While virtually all of the plants characteristic to the Western Hemlock Zone occur in the Tualatin Mountain forests, two less common hardwood species, bigleaf maple and red alder, have become widely established as a result of repeated disturbance to the natural vegetation caused by intensive logging and brush fires. Over time, these events have depleted nutrients from the soil. The depletion of nutrients, coupled with the depletion of mycorrhizal fungi which help to process nutrients for plant uptake and are particularly important to conifers, has given the hardwoods an edge over the firs, cedars and hemlocks. Pioneer species such as red alder, a species common only in riparian areas under natural conditions, quickly colonize these disturbed areas and are now widely established on the upland slopes.¹² Thus, past disturbances have strongly influenced the composition of the plant communities in the Northwest Hills.

The *Tsuga heterophylla*/*Polystichum munitum* (western hemlock/sword fern) association generally characterizes the herb-rich community found in the Northwest Hills forests.¹³ Overstory species of this association typically include Douglas fir, western red cedar and western hemlock. The understory is dominated by a lush growth of herb species including sword fern, wild ginger, inside-out flower, Oregon oxalis, trillium, Smith's fairybells and deerfern. Shrubs occurring in the understory include red huckleberry, Oregon grape, trailing blackberry, Wood's rose and salmonberry (Franklin and Dyrness 1973:58).

While factors such as soils, slope aspect, moisture and topography have an important influence on plant associations within the Northwest Hills forest, the composition and distribution of most forest types can most clearly be traced to past logging activities and fires. Logging of the forests began with the

¹² Red alder helps to heal degraded land by replenishing the soil with nutrients: they can provide 40-150 kg/ha of nitrogen per year. Alders also colonize sites that are plagued by laminated root rot and facilitate regeneration of the pre-existing plant community. Recent studies have shown that alders serve as hosts to mycorrhizal fungi, the same fungi which colonize Douglas fir roots, process nutrients and enable the trees to grow (Norse 1990).

¹³ Related West Hills plant associations include *Tsuga heterophylla*/*Berberis nervosa*/*Polystichum munitum*, *Tsuga heterophylla*/*Athyrium filix-femina*, *Tsuga heterophylla*/*Tiarella trifoliata*, *Tsuga heterophylla*/*Holodiscus discolor*, and *Tsuga heterophylla*/*Gaultheria shallon*.

arrival of the settlers in the 1840s and 1850s and continued into the 1950s. Repeated fires in the area were also recorded during this time. The last major fire, in August of 1951, burned some 1,200 acres of what had only three years earlier been dedicated as "Forest Park."

Forest Succession

Early observations of Portland's Tualatin Mountains point to the dynamic pattern of successional stages active within the forest community over the past two centuries. The predominantly old growth coniferous forest that William Clark, of Lewis and Clark, recorded in 1806 has been transformed through logging and fire into a younger, mixed hardwood/coniferous forest (Munger 1960). Despite these disturbances, signs of a returning Western Hemlock climax forest community are widely apparent. A significant portion of the forest (over 60 percent) is presently composed of later seral vegetation stages, where young to mid-aged conifers rise above the maturing hardwood canopy (Houle 1982).

Thus, the forest types occurring in the Northwest Hills can be seen as a sequence of successional stages of forest regeneration following logging and fire. These stages closely parallel those of the Western Hemlock Zone as described by Franklin and Dyrness (1973) and Hall (1980). Six distinct successional stages are evident within the study area; their patchwork distribution reflects the location, degree and chronology of past disturbances (see Map 8).

Houle (1982) describes the stages of the West Hills forest succession as: *grass-forb*, *shrub*, *hardwood with young conifer*, *hardwood topped by conifer*, *mid-aged conifer* and *old growth* vegetation types (see Figure 2 below). One additional vegetation type, *mature hardwood*, is also recognized but is not related to the Western Hemlock Zone successional sequence. This type, making up ten percent of the study area, typically occurs in moist to wet areas at lower elevations although occasionally it is found on dryer, upland sites. The distinguishing characteristics of the *mature hardwood* type are the dense stands of bigleaf maple and red alder and the near absence of conifers.



Figure 2. Stages of Northwest Hills forest succession

The *grass-forb* stage is comprised of low, herbaceous plants such as fireweed, bracken fern and Canadian thistle which initially colonize an area after

removal of vegetation. This stage (two percent of the study area) lasts approximately two to five years and occurs along firelanes, power-line rights-of-way and in open fields along the crest of the hills and in lowland areas.

The early seral *shrub* stage often develops as a thicket of such species as thimbleberry, salmonberry, blackberry, red huckleberry, salal and Indian plum. This stage (5.5 percent of the study area) typically lasts between three and ten years, but will persist as long as 30 years in the absence of conifer regeneration.

The *hardwood with young conifer* stage is a young, vigorous broadleaf forest predominantly made up of red alder and big-leaf maple, though often includes bitter cherry, black cottonwood and juvenile Douglas fir. Understory species include sword fern, Oregon grape and red elderberry. This young, second growth forest usually occurs ten to 35 years following a disturbance and covers approximately 20 percent of the study area.

The fourth stage of succession, *conifer topping hardwood*, is still a vigorous, though now mixed, hardwood and conifer forest. While the alders and maples approach 100 feet in height during this stage, conifers, primarily Douglas fir, break through the hardwood canopy and grow to heights of 180 feet or more. Characteristic conifer species also include young western red cedar and western hemlock. This mixed stage of second growth forest follows 30 to 80 years after disturbance and is the most widely distributed vegetation type within the study area, covering approximately 38 percent.

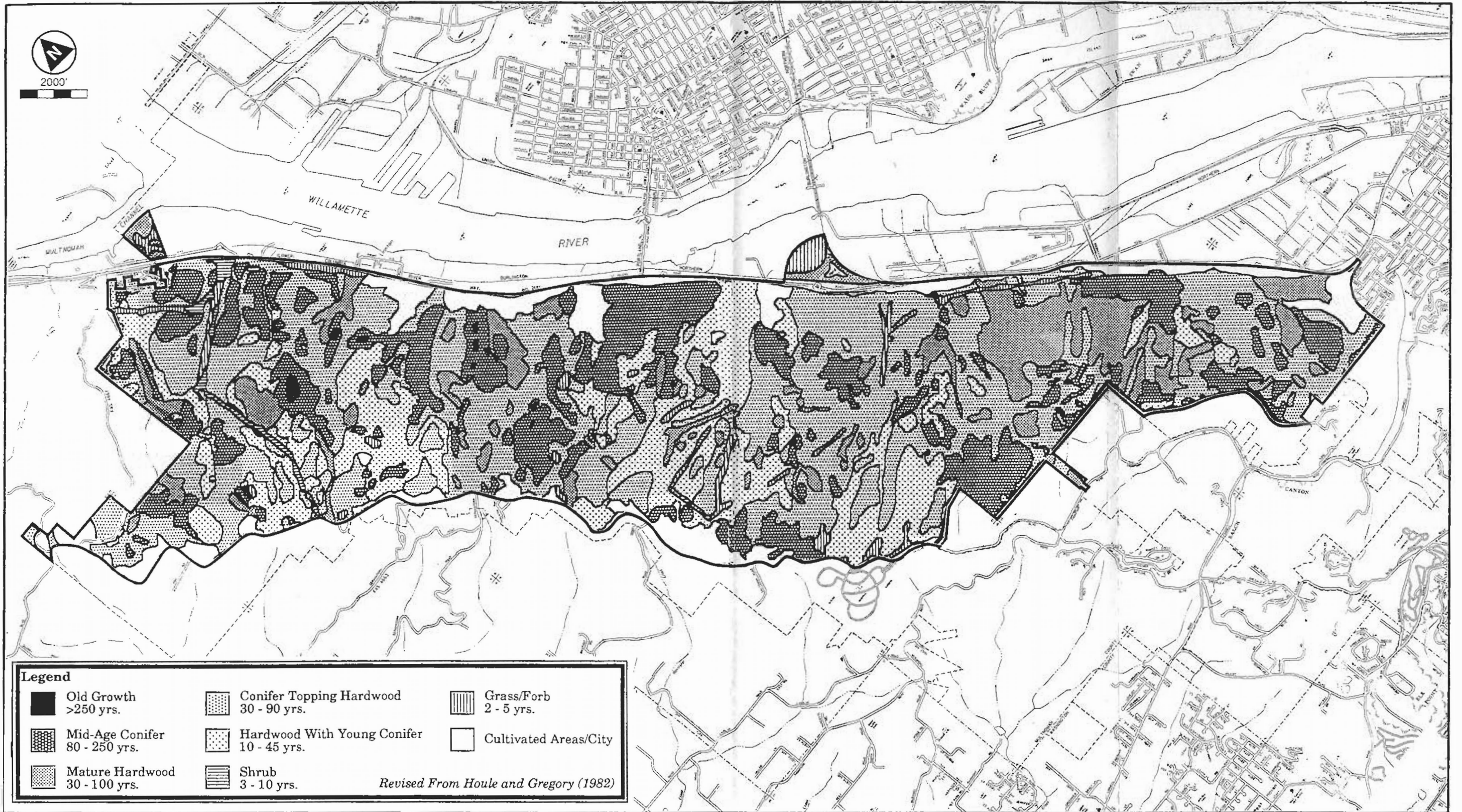
The next successional stage, *mid-aged conifer*, occupies approximately 23 percent of the study area and is dominated by Douglas fir. Young, shade-tolerant western hemlock, western red cedar and pacific yew are gradually making their way up through the understory, while some of the older hardwoods such as alder and cherry are beginning to fall to the forest floor. Sword fern, salal, Oregon grape, red huckleberry and vine maple thrive as the older trees begin to fall. Eighty to 250 years have passed since the last major disturbance.

If the forest is left undisturbed following the *mid-aged conifer* stage, it progresses into an old growth forest community. The *old growth* stage is self-perpetuating and will continue indefinitely unless fire, logging or other disturbance sets back the forest to an earlier stage of succession. Though western hemlock and western red cedar are climax species, long-lived seral species can remain a component of the community for several hundred years. Remnant old growth stands in the Northwest Hills, for example, are dominated by Douglas fir.

In addition to large trees of 250 or more years of age, the old growth stage is characterized by the presence of large snags and downed logs in various stages



2000'



NORTHWEST HILLS

Natural Area Protection Plan

VEGETATION
TYPES

Map
8

of decay. Old growth stands within the study area are rare; remnant stands occur in small isolated pockets, three to twelve acres in size, near Germantown, Newton and Newberry Roads. These old growth stands make up 0.5 percent of the study area.

Special Features

The Tualatin Mountain forest is home to several special or unique flora features. The following discussion illustrates some of these features, others are described later in the report in connection with wildlife, scenic and educational resources.

As noted above, remnant stands of ancient forest can still be found in Portland's Northwest Hills. Douglas fir trees up to 90 inches in diameter, 200 feet in height and over 300 years in age are rare in urban settings. Other important features of ancient forests can be found in the Northwest Hills: large snags, downed logs and mature climax tree species such as western hemlock, western red cedar and pacific yew.

Several species have special merit for other reasons. The pacific yew (*Taxus brevifolia*), for example, is an exceptionally slow growing climax tree species most abundant in ancient forests of the Pacific Northwest. In recent years, a cancer-fighting substance known as "taxol" was discovered in the bark of the yew. Taxol has proven effective in fighting ovarian cancer¹⁴ and early results indicate that the substance may also prove effective for treating leukemia and colon, lung, mammary, prostrate and pancreatic cancers (Wood 1990, Norse 1990). In September, 1990, a petition was filed with the U. S. Fish and Wildlife Service to list the pacific yew as a threatened species under the Endangered Species Act.

Though virtually all of the forest clothing the Northwest Hills is second growth, a substantial proportion of it is mature enough to support rare saprophytic orchids such as the phantom orchid (*Eburophyton austiniiae*), fairy slipper (*Calypso bulbosa*), rattlesnake-plantain (*Goodyera oblongifolia*), and three coral root species (*Corallorhiza maculata*, *C. striata* and *C. mertensiana*).

The western wahoo (*Euonymus occidentalis*) inhabits moist, creekside habitats in the Northwest Hills. The wahoo was placed on the "1976 Provisional List of Rare and Endangered Plants in Oregon." Its populations have now substantially recovered.

The forest as a whole represents a unique urban amenity. The West Hills provide a fine example of the Pacific Northwest's western hemlock forest community, unique among all temperate forests in the world (Waring and

¹⁴ Ovarian cancer kills 12,400 women annually in the United States (High Country News 11/19/90).

Franklin 1979).¹⁵ A large forested peninsula reaches into the center of Portland providing a biological link to the natural areas of the Coast Range (see Map 9). Located within this peninsula is one of the country's largest city parks: Forest Park. In addition to its value as a recreational, educational and scenic resource (discussed later in this report), the forested hills help to define Portland as a place and contribute to the identity of the region.

Wildlife

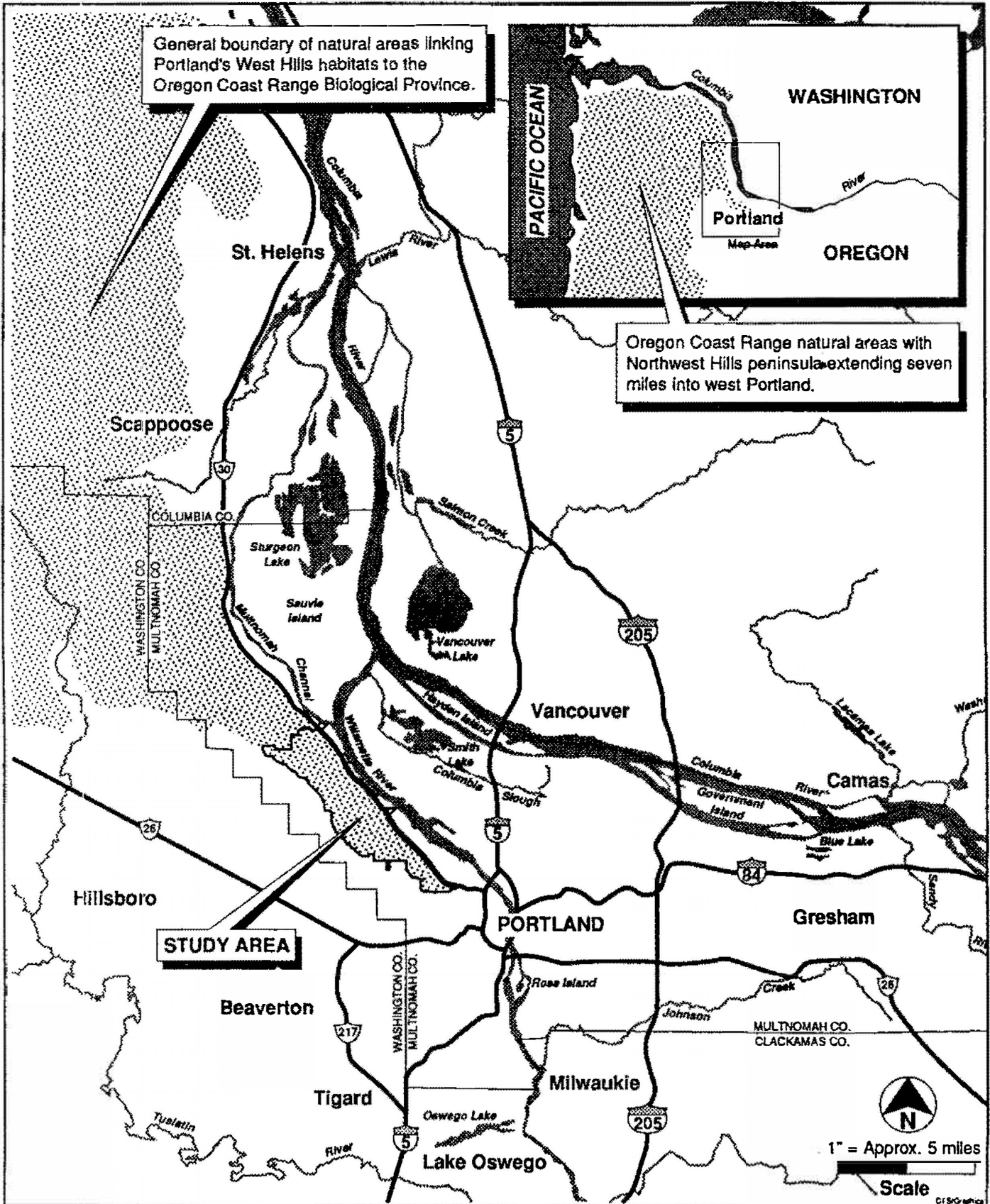
This section provides a general overview of wildlife habitats and wildlife use of the Northwest Hills; more detailed information is contained in Chapter 7 and in the completed Wildlife Habitat Assessment (WHA) survey forms on file at Bureau of Planning offices. Wildlife resources were inventoried using WHA forms developed by a team of local biologists. Field surveys were conducted throughout the study area between March, 1990 and February, 1991. Resource experts and current scientific literature on the subject were consulted during this time, with primary sources including "Forest Park--One City's Wilderness: Its Wildlife and Habitat Interrelationships" (Houle 1982), "Portland Bureau of Planning Goal Five Study: West Hills" (Lev 1986) and *Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington* (USDA Forest Service 1985). Information on rare, threatened and endangered species was obtained from resource agencies. Lists of species of the Northwest Hills are contained in Appendix F of the Recommended Draft Report.

Wildlife/Habitat Interrelationships

Wildlife use different portions of the Northwest Hills forest habitat to complete different portions of their life cycle such as mating, feeding and denning. The vegetative structure of the habitat (e.g., downed logs, snags, herb, shrub and tree layers) is a key factor in determining the distribution and abundance of wildlife (Thomas 1979). Each stage of forest succession in the Northwest Hills¹⁶ has its own specific structure. Wildlife species have known preferences for structural components found in distinct successional stages and use these vegetative types to meet all or part of their life cycle requirements (Maser and Thomas 1978, Harris 1984). Northwest Hills wildlife habitats are shown on Map 10. This map is based on information on vegetation types and surface water features which are described in previous sections of this chapter.

¹⁵ The western hemlock forest of the Pacific Northwest has the greatest biomass accumulation of any plant community in the temperate zone and in it are found the largest and (usually) longest lived species of conifers within the zone.

¹⁶ See Vegetation section of this chapter.



NORTHWEST HILLS
 Natural Area Protection Plan

**NATURAL AREAS
 (CONTEXT) MAP**

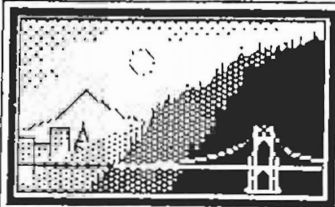
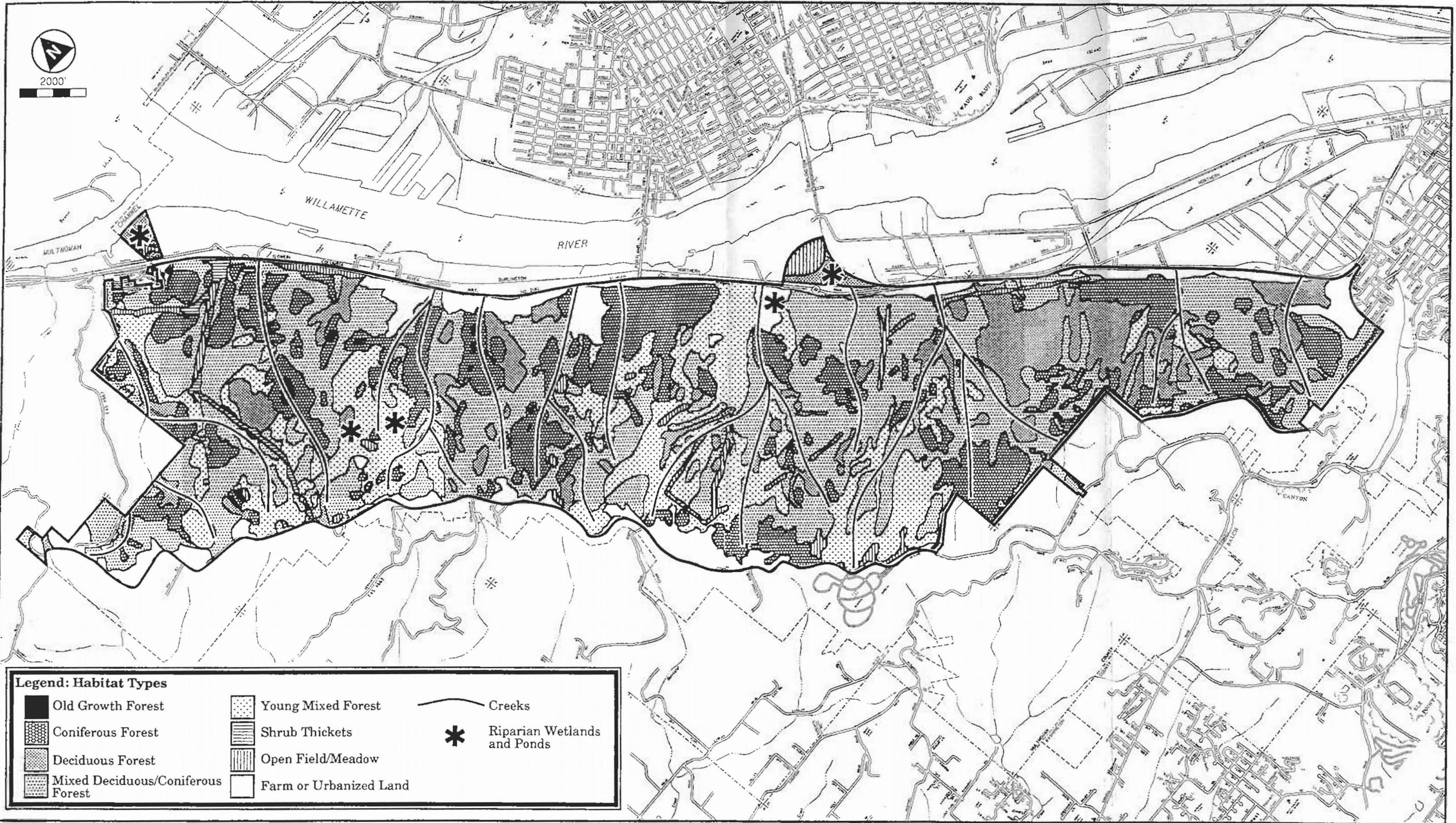
Wildlife Use of the Northwest Hills

A broad range of terrestrial vertebrates use the forested riparian and upland habitats found in the Northwest Hills. At least eight different kinds of salamanders use the creekside habitat and moist uplands, where they feed on insects and other invertebrates such as slugs, and are prey to other amphibians (frogs), reptiles (snakes), birds (hawks), and mammals (weasels, raccoons). These local salamanders are dependent on a moist forested environment and cool water of good quality. The rare Cope's giant salamander is listed as a sensitive species in Oregon.

Five frog species are also dependent on the moist forested environment found in the Northwest Hills. These species feed on salamanders, insects and other invertebrates and are prey to many local snakes, birds and mammals. Significantly, both spotted and red-legged frogs have been identified along several of the creeks. These species are listed as threatened and sensitive, respectively. The presence of these native amphibians is of further significance because of the decline of amphibian populations worldwide due in part to predation (e.g., by bullfrogs) and to ultra-violet radiation. The spotted frog, for example, is believed to be close to extinction in Oregon (Lev 1986).

Several species of snakes and lizards are also found in the area. Undeveloped forest areas provide good breeding grounds for these non-poisonous, beneficial reptiles, serving as a source of replenishment to developed areas. Snakes are also an important source of food for birds of prey and carnivorous mammals. The study area is on the western edge of the northwestern fence lizard's range. This species and the northern alligator lizard are likely to be found in woodlands and open places in the area.

Over 80 species of birds have been identified in the study area. Many of these species are year-round residents of the Northwest Hills forest. The mature conifer, conifer topping hardwood and old growth stages of the forest described in the previous section support the highest populations of breeding birds. The greater diversity of species in the later successional stages is generally due to the greater vegetation complexity found there. At least two sightings of adult bald eagles have been made in the study area. Other birds of prey include accipiter hawks such as Cooper's hawk and sharp-shinned hawk which rely on tall conifers for nest sites. Several nocturnal avian predators including screech, saw-whet and northern pygmy owls also occur in the Northwest Hills. These owls are cavity-nesters that rely on snags with holes excavated by pileated woodpeckers or flickers. The pileated woodpecker is an important indicator species for the retention of a complete community of hole nesting birds and small mammals (McClelland 1979). Most of these cavity-nesters are beneficial insectivores which help to control insect populations in the area; similarly, the birds of prey noted above help to control rodent populations. The pileated woodpecker, and the saw-whet and



NORTHWEST HILLS

Natural Area Protection Plan

**WILDLIFE
HABITATS**

Map
10

pygmy owls are all listed as sensitive species in Oregon. The Lewis woodpecker is uncommon and is considered threatened in Oregon.

Wildlife biologists and forest managers often use the presence or absence of one or more "indicator species" to predict whether an area of habitat is suitable for a variety of species having similar habitat requirements (USDA Forest Service 1985). Several species serve as indicators of the health of the Northwest Hills ecosystem. The pileated woodpecker is one such species; other indicator species in the Northwest Hills are sharp-shinned hawk, Roosevelt elk, white-footed vole and red-legged frog.

Several migratory bird species, which typically nest at higher elevations or further north, use the Northwest Hills forest as an over-wintering ground due in part to the area's mild climate. Still other species, which migrate from Central and South America, use the forest as a stop-over and resting place on their journey along the Pacific Flyway. These birds (e.g., flycatchers, warblers, vireos, etc.) use prominent geographic landforms such as the western terminus of the Columbia Gorge and the confluence of the Willamette and Columbia Rivers to orient themselves when migrating. Many of these species are "forest-interior" birds that only use large forested areas, and the Northwest Hills provides the largest forest near the river confluence.

As many as 62 mammal species use the Northwest Hills forest habitat. These species include northern flying squirrel, Townsend's chipmunk, blacktailed deer, mountain beaver, bobcat, coyote and long tailed weasel. Tracks and droppings of black bear and cougar have also been observed in recent years. Many of the species found in the area are also found in the natural areas of the Oregon Coast Range. In addition to its habitat functions, the forested hills extend northwest from Portland toward the coast and serve as a travel corridor for wildlife, facilitating the seasonal and longer term dispersal of individuals, thus maintaining genetic and biological diversity.

Mineral and Aggregate Resources

Mineral and aggregate resources in the Portland metropolitan area are identified in the 1988 *Mineral and Aggregate Resources Inventory* (MARI). This document, together with amendments to the Comprehensive Plan Policies and Zoning Code adopted in 1982, satisfies Statewide Planning Goal 5 requirements for mineral and aggregate resources.

Based on information collected from the State Department of Geology and Mineral Industries and the 1980 Inventory of Aggregate Resources, two potential aggregate sites were identified near St. Helens Road, in the Northwest Hills project study area. Site 10 is located within Forest Park adjacent to an identified sensitive stream area. The MARI Report notes that

“the site, zoned [Farm and Forest], is inappropriate for commercial exploitation.” Site 11 (Rivergate), also owned by the city, is located on St. Helens Road and was closed in 1980 “because of conflicts with potential redevelopment of the surrounding area.” Part of this site has since been added to Forest Park.

The MARI Report concludes that these sites “have not been active in recent years, nor are there plans to reactivate them, and it is doubtful that they would be allowed to reactivate and expand because of the conflicting uses....Available information does not show them as valuable resource sites” (Addendum).

Summary

The Northwest Hills are made up of a three-dimensional, integrated and evolving system of natural resources. The geologic history of the Northwest Hills can be traced back over 22 million years and includes a dramatic sequence of major flood events. Geologic formations store the area’s groundwater and form the parent material for the soils covering the Northwest Hills. The balanced relationship between the area’s geologic formations, soils and groundwater features is protected by the extensive canopy cover and root system of the forest which shelters and stabilizes the hillside slopes. Activities which disturb this fragile relationship can substantially degrade resource values by causing landslides, flooding, erosion and sedimentation. Groundwater and precipitation feed the many creeks which drain the eastern slopes of the Northwest Hills. These creeks provide habitat for fish, amphibians and other aquatic organisms and, in turn, a source of food and water for terrestrial wildlife. The mosaic of Northwest Hills forest types provides a range of habitat for a diverse population of indigenous wildlife. These interacting, interdependent elements play vital roles in protecting the balance, health and vitality of the Northwest Hills forest and watershed ecosystem.

CHAPTER 6

GENERAL ANALYSIS OF ECONOMIC, SOCIAL, ENVIRONMENTAL AND ENERGY CONSEQUENCES OF RESOURCE PROTECTION

INTRODUCTION •

COMPATIBLE USES •

CONFLICTING USES •

ECONOMIC CONSEQUENCES •

SOCIAL CONSEQUENCES •

ENVIRONMENTAL CONSEQUENCES •

ENERGY CONSEQUENCES •

APPLICABLE STATEWIDE PLANNING GOALS •

SUMMARY •

Introduction

This section analyzes the land use consequences of protecting Northwest Hills¹⁷ natural resources or allowing these resources to be diminished or lost. Statewide Planning Goal 5 states that “programs shall be provided that will 1) insure open space, 2) protect scenic and historic areas and natural resources for future generations, and 3) promote healthy and visually attractive environments in harmony with the natural landscape character.” According to Oregon Administrative Rules (OAR), the next step after inventory of natural resources in the Goal 5 process is identification of potential land use conflicts with inventoried resources. This is done primarily by examining the uses allowed in broad zoning categories. A conflicting use is one which, if allowed, could negatively impact the resource. These impacts are considered in analyzing the economic, social, environmental and energy (ESEE) consequences of protecting the resource fully, allowing the conflicting use fully, or allowing the conflicting use with conditions which would lessen the adverse impacts.

If there are no conflicting uses for an identified resource, OAR requires the jurisdiction to adopt policies and regulations to ensure that the resource is preserved. Where conflicting uses are identified, the ESEE consequences must be determined. Impacts on both the resource and conflicting use must be considered. Other applicable Statewide Planning Goals are also considered in the discussion of impacts. The ESEE analysis is adequate for purposes of meeting OAR standards if it provides a jurisdiction with reasons why decisions are made regarding the protection of specific resources.

Oregon Administrative Rules lay out the steps to be followed in complying with Goal 5, but provides little direction in determining what factors should be considered as having potential economic, social, environmental or energy consequences. This lack of guidance is because relevant ESEE factors vary greatly, depending on the type of resource that is being evaluated and potential conflicting uses that are allowed.

The following section describes land uses and activities permitted by existing zoning. Uses which are compatible with resource protection are described first. An analysis of the general consequences to both the resource and existing or potential land uses in the Northwest Hills which may result from resource protection follows. Additional site-specific impacts are discussed in the next chapter which summarizes individual resource sites and their values. It is the combination of these general and individual site consequences which is used to arrive at the conclusions in this plan regarding the level of resource protection for resource sites, and the Northwest Hills forest ecosystem as a whole.

¹⁷ Here and in the following text, “Northwest Hills” refers to the Northwest Hills planning area.

Compatible Uses

Compatible uses are those that can be conducted in a manner which would not result in resource degradation. Three uses allowed by present zoning are compatible with every resource in the Northwest Hills. These uses are the following:

- 1) Aesthetic enjoyment of natural areas from existing roads and trails;
- 2) Educational use of natural areas by individuals and groups; and
- 3) Low intensity recreation on established trails or roads, such as walking, running and nature observation.

Conflicting Uses

Conflicting uses are those uses which are incompatible with natural resource protection but allowed by present City of Portland zoning. The following ten uses pose conflicts with identified resources as allowed under existing zoning: housing, commercial businesses, industrial developments, agriculture, forestry, landscaping, intensive/consumptive recreation, developed open space, public facilities and utilities, and automobile traffic. These uses and their impacts on natural resources are described in the Environmental Consequences section of this chapter.

Economic Consequences

In general, the economic consequences of protection of a resource will involve a comparison of the value of the resource to the economic impact to the local jurisdiction and the region if the land were used for development permitted by zoning. Economic factors considered in this analysis include the impacts on property values and development potential; impacts on the city's business climate and on corporate relocation; impacts on the tax base; impacts on tourism and convention-related activities; impact on infrastructure costs; recreational impacts; and impacts on farm and forest uses.

Property Values and Development Potential

Property values are largely determined by demand. Market demand, in turn, is a product of many factors, including development potential and aesthetics, character and desirability of a property and surrounding neighborhood.

In simplistic terms, development potential can be looked at as how much development can be placed on a property. Protecting natural resources may reduce development potential if the development cannot be redistributed elsewhere on site through such mechanisms as clustering or planned unit development. All zones except for IG1, IG2 and IH (General and Heavy

Industrial) have floor area ratios or unit density limits which allow transfers or redistribution to take place on site, unless entire properties are precluded from development. Development potential on General and Heavy Industrial properties is related to land area, so reduction in area directly available for development represents a loss in development potential. However, in the Northwest Hills planning area industrial zoned land is located at the base of a steep hillside along St. Helens Road. This hillside poses significant development constraints for many of these properties and use of entire sites may not be feasible or economic for individual sites.

Industrial needs for the City of Portland and Portland Metropolitan Area have been described in detail in the *Inventory and Analysis of Wetlands, Water Bodies and Wildlife Habitat Areas for the Columbia Corridor*, adopted by the City of Portland in April 1989 (pages 127-134). It concludes that the need for industrial land in the metropolitan area by the year 2005 is about 5,192 acres. About 19,070 acres of vacant suitable land exist within the metropolitan urban growth boundary, 10,483 of these are vacant and uncommitted with no constraints. This provides a market ratio of over 2:1 for the estimated need for presently unconstrained land, and a ratio of almost 4:1 for all vacant industrial land. In addition, there are about 9,700 acres of vacant industrial land within Multnomah County and, according to the 1989 publication by the Bureau of Planning, *1987 Vacant Land Report*, 5,731 acres of vacant industrial land within the City of Portland (page 30).

Aesthetics, character and amenity value are more intrinsic values, and are difficult to quantify. They represent amenity values that increase demand, and therefore land prices, in a particular area. Districts in Portland acknowledged as desirable and commanding higher average residential dwelling prices than the average citywide (Eastmoreland, Alameda, Overlook, the West Hills, etc.) all have natural resources as major amenities (e.g., street trees, parks and open spaces, creeks). Protection of these amenities can result in increased property values over areas having no natural resource amenities. Even in industrial areas such as the Koll Business Center in Beaverton, natural resource amenities have been integrated into the development in such a way as to increase its desirability, and therefore value.

Numerous studies have illustrated the positive effects on property values resulting from parks and natural area protection:

- In a Philadelphia study property values were shown to decrease proportionally with distance from open space: the 1,294 acre Pennypack Park accounted for 33 percent of the land value at a 40 foot distance, 9 percent of the value at 1,000 feet and only 4.2 percent at 2,500 feet.¹⁸

¹⁸ T. R. Hammer, et al. "The effect of a Large Urban Park on Real Estate Values," *Journal of American Planning Association* 40 (1974): pp. 274-277.

- A study of property values near greenbelts in Boulder, Colorado showed that housing prices declined an average \$4.20 for each foot a house was located away from a greenbelt. The study concluded that, other factors held constant, the average value of property adjacent to the greenbelt would be 32 percent higher than those 3,200 feet away.¹⁹
- The Boise River Greenbelt in Idaho was shown to be directly responsible for property improvements which raised the appraised value of properties within the Greenbelt to over \$200 million. Property values of undeveloped land were \$26,000 to \$34,000 per acre near the Greenbelt versus \$10,000 to \$17,000 elsewhere.²⁰
- Another study suggests that properties adjacent to protected woods have a faster selling time. Hunters Brook, a 142-unit cluster development set aside 97 acres of pine forest to be protected in common open space. Care was taken to preserve the rural character of the setting and to encourage a herd of deer and hundreds of birds to remain. Homes were found to be easier to sell because of their proximity to the protected woods.²¹

Protecting resources fully would not necessarily have an adverse impact on Portland's ability to meet its Comprehensive Plan housing obligations, since lands within the city's Residential Farm/Forest zone and within flood and landslide hazard areas are excluded from calculations of needed land. However, precluding development under all conditions would reduce opportunities for choice in the market place, possibly driving up housing costs throughout the metropolitan area due to unmet demand.

Tax Base

Tax base to local jurisdictions is directly related to market value of land. As property values fluctuate, property taxes vary in direct proportion. One exception to this rule is the case of special tax assessments. Some West Hills property owners currently have such assessments for open space, farm or forest deferral. As suggested in the previous section, market values of both land and improvements are likely to increase as a consequence of resource protection. The assessed value of improvements will normally follow this change in market value. For those properties which do not already have special assessments, however, land assessments may not be significantly affected or may be reduced depending on the development implications of resource protection.

¹⁹ Mark Correll et al. "The Effects of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space." Land Economics, May 1978.

²⁰ John D. Cooper, Director of Parks, Boise, Idaho 1989.

²¹ "Cluster Builders' New Enticement: Adjacent Woods." New York Times, May 8, 1987.

Business Climate and Corporate Relocation

According to corporate real estate executives, "quality of life" issues are now as important as cost when choosing new office or factory locations.²² A location which will help attract and retain key personnel was cited as the most important factor in choosing new office locations and the fifth most important in choosing manufacturing locations.²³ The Joint Economic Committee of the U.S. Congress reports that a city's quality of life is more important than purely business-related factors when it comes to attracting new businesses, particularly in the high-tech and service industries.²⁴

Recently, Portland was ranked the third-best city in the United States to locate a business by the 1990 Cushman & Wakefield Monitor, an annual nationwide survey of 400 chief executive officers on economic and business-related issues. According to Thomas Usher, Cushman and Wakefield senior vice president, quality of life was a key factor in Portland's high popularity. The extensive scenic and recreational opportunities provided in the Northwest Hills contribute to Portland's high quality of life and to the city's attractiveness as a place to do business.

Tourism and Convention-Related Impacts

While Forest Park may not attract the same number of tourists as other parks such as Washington Park and the Japanese Gardens, the Northwest Hills (which includes Forest Park) is a major anchor in the overall network of open spaces and natural areas in Portland which help define the city's character as an integrated urban and natural environment. Protection of these scenic and natural resources provides a unique opportunity within the city limits for sightseeing or recreation and adds to Portland's appeal to tourists.

Environment-related conferences often use Portland because of easily-accessed natural resources within the city limits. The 1990 Country in the City Symposium, attracting international participants, used the Willamette River and Johnson, Fanno and Balch Creeks as field sites for conference sessions.

Dollar expenditures on tourism and convention-type activities are difficult to identify. However, in 1988, Defenders of Wildlife conducted a survey of Oregon households on the economic impact of nongame wildlife and concluded that an average household expenditure of about \$348 was attributed to travel and over \$600 to photography and optical equipment directly related to wildlife enjoyment. Tourist or convention-related

²² San Francisco Chronicle, June 8, 1989.

²³ *Ibid.*

²⁴ Fact Sheet: Sign Control and Economic Development, Scenic America, Washington, D.C. November-December 1987.

activities related to these expenditures could occur in the city within protected natural resource areas.

In summary, natural resources within the City of Portland can provide a local destination for tourists or a reason for locating a conference or convention in the city. This, in turn, can bring significant money into the local economy.

Infrastructure and Land Hazards

Flood levels and landslide hazards can be reduced or managed through the protection of natural resources and open space. Resource protection can reduce threats to public health and safety caused by flooding and landslides. Storm drainage infrastructure costs can be minimized by allowing open spaces to provide flood retention and detention, and aquifer recharge. Road and public utility repair costs resulting from landslide damages can be reduced through resource protection.

Development in landslide-prone areas requires more expensive solutions for initial construction, as well as increased maintenance costs. By clustering development away from steep slopes and natural drainages, reduced expenditures for construction and maintenance of infrastructure can result, lessening demand on tax dollars for these services.

Recreation

Retaining and enhancing recreational opportunities through resource protection can also have a significant impact on local business sales. According to a 1988 survey conducted for the Defenders of Wildlife, Oregon households spent an average of over \$8,600 annually on recreation activities related to nongame wildlife.²⁵ Of these expenditures, over \$2,300 (photographic and optical equipment, bird seed, clothing, magazines and books, landscaping for wildlife, boats, etc.) could be used on wildlife-related activities in Portland, and \$1,100 (same as above except for boats) in the Northwest Hills. Similar studies have also illustrated a positive economic impact on local businesses as a result of expenditures on recreation activities.

A telephone survey of Portland Area retailers was conducted in February, 1991, to determine start-up costs for recreational activities (bicycling, hiking, birding and horseback riding) which occur in the Northwest Hills. The results of the survey are presented in Table 3.

²⁵ "Nongame Wildlife Assessment Survey." Defenders of Wildlife, 1988.

**Table 3
Recreational Start-up Costs***

Bicycling		
Components	Low-end costs	Mid-range
Bicycle	\$200	\$600
Helmet	\$30	\$50
Lock	\$10	\$30
Bicycle rack	-	\$25
Bicycle pack	-	\$50
Water bottle	-	\$10
Shoes	-	\$60
Clothing	-	\$50
Car rack	-	\$150
TOTAL	\$240	\$1025

Hiking		
Components	Low-end costs	Mid-range
Shoes/Boots	\$45	\$120
Socks	\$5	\$10
Day pack	\$20	\$40
Water bottle	\$5	\$5
TOTAL	\$75	\$175

Birding		
Components	Low-end costs	Mid-range
Binoculars	\$50	\$500
Spotting scope	-	\$200
Field guide	\$10	\$50
Camera, lens, etc.	-	\$1,000
TOTAL	\$60	\$1,750

Horseback Riding		
Components	Low-end costs	Mid-range
Lessons	\$250	\$250
Hard hat	\$40	\$60
Boots	\$25	\$200
Crop	\$5	\$15
Horse	-	\$1,000
Tack	-	\$500
Boarding (annual)	-	\$1,800
TOTAL	\$320	\$3,825

* Investment costs may be considerably higher for quality-conscious buyers. The dashes (-) represent components that generally are not necessary "low-end" expenditures.

Forest Uses

Resource protection can have positive economic impacts as a result of some forest uses (e.g., recreation, wildlife observation, open space and watershed protection) and can have negative impacts on forestry activities. Commercial forestry operations and wood lot practices are economic activities permitted in the Residential Farm/Forest zone. Approximately 90 percent of the timber resources in the Northwest Hills are located on city park land. Current land use trends in the Northwest Hills indicate that commercial forestry operations are not planned for approximately 600 of a potential 700 acres of timber outside of park land. This land is planned for low density residential use. Most of the recent land division proposals include large areas of land set aside in open space; small wood lot practices, however, would be feasible on some of the proposed lots. Though much of the remaining 100 acres of uncommitted land is younger forest (20 to 50 years of age), commercial timber operations are feasible and could be negatively impacted by resource protection. Estimates of timber values range between \$30 and \$38 per acre per year of stand age (see Chapter 7).

Farm Uses

Under present zoning, agricultural opportunities are limited to areas along Skyline Boulevard. Crop production presently occurs at several sites along Skyline. Other food cultivation occurs on home garden plots. Steep slopes make some of these areas uneconomic for agriculture, although some of the forested slopes could be cleared and used for grazing. In some areas, small lot sizes also constrain opportunities for commercial agricultural activities. Resource protection will not have negative economic impacts on existing agricultural operations but may affect opportunities for new or expanded uses.

Summary

Protection of natural resources will have both positive and negative economic impacts. Positive impacts include retention and increase of natural amenities, which increase property values, bolster the tax base, attract tourists, conferences, business and industry, result in more efficient use of public services and utilities and increase recreation opportunities and expenditures.

Potential negative impacts are high in industrial zones, where development potential is limited more by land area than floor-area ratios or number of units per acre. However, relatively few acres of land are affected and full build-out of industrial land in the Northwest Hills is neither feasible nor economic due to physical site constraints. While there are potential positive economic impacts on residential development, potential negative impacts can also be significant, particularly if development cannot be redistributed elsewhere on the site. Negative impacts on agriculture are limited to new or expanded activities. Impacts on commercial forestry potential is limited to approximately 100 acres due to current trends toward residential

development. Impacts on residential, industrial, forestry and other uses are analyzed on a site-by-site basis in Chapter 7.

Social Consequences

Social consequences considered in this analysis include impacts on recreation and environmental education opportunities; impacts on historic, cultural and aesthetic values; regional identity and local landscape character; impacts on incompatible land uses; impacts on housing and education; and health, safety and welfare impacts.

Recreation and Environmental Education Opportunities

Forest Park is a unique recreational and educational resource for Portland Metropolitan area residents. According to the Bureau of Parks and Recreation and other sources, Forest Park is the largest forested municipal park in the country. What makes this resource exceptional is that it offers urban residents a wilderness park-like experience virtually within walking distance of the center of Portland. The park provides an opportunity for Portland-area students and residents to learn about and experience a western Oregon coniferous forest ecosystem, with an abundance and diversity of native plants and wildlife similar to that found in the forests of the Oregon Coast Range. Unique features within the park include the largest remnant stand of old growth in the city and a stream that supports native runs of both coho salmon and cutthroat trout.

Forest Park contains a network of over 60 miles of recreation trails including the 26-mile Wildwood Trail. The Wildwood Trail is the largest completed section of the 40-Mile Loop which was originally proposed by the Olmsted Brothers in 1903 as a system of parks and open spaces around Portland connected by a recreation trail. The Parks Bureau has plans to extend the Wildwood Trail to Newberry Road at the northern boundary of Forest Park. This planned extension will bring the trail to the Portland city limits and is expected to be completed in 1992.

Several years ago, the Oregon State Parks and Recreation Division proposed a coast trail from Portland to the Oregon Coast as part of its statewide plan. This trail would be an extension of the Wildwood Trail. Though initial public interest in the proposal waned, it has received renewed attention as a key feature of a proposal to create a "Greenway to the Pacific," linking Portland with the Pacific Coast.

Protection of Northwest Hills forest and open space resources will retain and increase the recreational and educational values of Forest Park. Ecological management will insure that most of the park will remain undisturbed and its forests allowed to mature into an old growth condition which will

enhance the urban wilderness experience of park users. Retention and increase in abundance and diversity of native wildlife will mean greater aesthetic pleasure and educational benefits for area residents, and can interest and entice citizens to do things to enrich the environment. Recreational and educational values will increase over time and will be preserved for the enjoyment of future generations.

Historic, Cultural and Aesthetic Values

Many residents in the Northwest Hills have chosen to live in the area because of the presence of resources such as the extensive forest and open space, the numerous birds and other wildlife, and the rural or semi rural atmosphere provided by these resources. Nowhere else in the city are these resources as pronounced or abundant: one can still find phantom and calypso orchids flourishing on the forest floor, hear the screech owl and the drumming of the pileated woodpecker reverberating through the forest, or observe the annual migration of birds as they fly through and above the forest. The Northwest Hills forest is an irreplaceable link between natural and urban processes, and provides an important historic and educational resource. Protection of natural resources would preserve these resource values and maintain the unique character of the Northwest Hills.

Stone age campsites, pioneer trails, old homesteads and other historic and cultural resources will be retained through resource protection. These resources are identified in the site summaries found in Chapter 7 of this report.

Without resource protection, these historic, cultural and aesthetic values may be diminished or lost. Development which degrades or destroys natural resources of the Northwest Hills would reduce the intrinsic heritage and scenic value of the area.

Regional Identity

The forested Northwest Hills form a backdrop to the city, helping to define Portland as a place and contributing to the identity of the region. The prominent hills lend a "country in the city" character to the area and provide a strong sense of orientation by forming a physical and psychological edge to the northwestern boundary of Portland.

Continuation and enhancement of natural resources will add to the image of Northwest Portland neighborhoods and the identity of the Portland region, while their destruction would result in loss of identity, and therefore uniqueness, character and value.

Screening and Buffering of Incompatible Uses

Natural resources act as an edge to different land uses, separating and buffering them from each other both visually and physically. Protection of

natural resources allows for incompatible land uses to locate more closely with less potential for conflicts, while their removal would either require major changes in land uses to resolve issues in incompatibility, or the creation of artificial buffers, many of which simply duplicate elements found in natural resource buffers.

Housing and Education

The increased residential development potential under present zoning and Comprehensive Plan designations would have a positive effect on housing and a positive effect on education by enhancing the school district tax base. Short-term employment would increase in the construction trade and home service industries.

Protection of natural resources will have negative effects on housing and education if the development cannot be redistributed elsewhere on site through such mechanisms as clustering or planned unit development. All zones except for industrial zones, where housing is not permitted, allow such transfers or redistribution of development to take place on site. Clustering of development can also reduce police and fire response times. Only where entire properties are precluded from development, or where residential densities are reduced through zone changes, would resource protection have significant adverse impacts on housing and education.

Health, Safety and Welfare

Protection of natural resources located on steeply-sloped hillsides will protect the general public from possible disasters caused by landslides and floods. This reduces potential demand on disaster relief agencies and bureaus (and subsequent demand on tax dollars), as well as individual expenses for replacement of destroyed property and treatment for injury. Retention of the abundance and diversity of native wildlife will also control and reduce populations of disease-carrying pests such as rats.

Summary

Protection of natural resources in the Northwest Hills will result in generally positive benefits in terms of continued and enhanced recreation and environmental education opportunities; preserved historic, cultural and aesthetic qualities; increased sense of place, uniqueness and character; increased protection from incompatible land uses; protection from disasters, and decreased disaster relief costs. Housing and education values will diminish only where resource protection reduces or eliminates opportunities for residential development.

Environmental Consequences

Natural resource functions and values were outlined in Chapter 5. This section provides further information on resource values and analyzes the impact of general human activity on these values. Impacts of individual conflicting uses are analyzed at the end of the section.

Overview of Water Resources and Impacts

The Northwest Hills forest protects watershed values. Forest vegetation, wetlands, creeks and drainageways act as filters, cleansing water and maintaining water quality within the watershed. Soils, humus and organic matter on the forest floor filter and absorb surface water runoff, which recharges groundwater reservoirs and reduces erosion caused by surface runoff. Groundwater discharge, in the form of springs and seeps, supplies water to creeks and wetlands and helps sustain surface waters during low flow periods. Wetlands, water bodies and adjacent flood plains provide flood storage and desynchronization, reducing overall flood levels. Vegetation traps sediment from surface runoff, provides soil anchoring, and absorbs certain hazardous chemicals and heavy metals, thereby reducing water pollution and turbidity. Vegetation also dissipates erosive forces of surface runoff, allowing deposition of suspended solids and increasing bank stabilization, which both increase water quality. Protection of these resources maintains the physical, chemical and biological integrity of the Northwest Hills forest and watershed ecosystem.

The construction of buildings and impervious surfaces and other human activities which disturb or remove natural resources such as forest vegetation and soils can affect watershed resources in the following ways:

- *Increases in erosion, sedimentation and landslides.*
 - The unstable soils and steep slopes of the Northwest Hills become highly susceptible to erosion, slumping and failure when forest cover is removed and when cuts and fills are made for roads and buildings.
 - These activities can result in threats to public health and safety, and can degrade wildlife habitat and increase sediment transport, creekbed siltation and degradation or loss of fish spawning grounds.
- *Decreases in creek flows during dry months.*
 - Reduced forest cover and increased impervious surfaces will reduce groundwater recharge and lower the volume of water in creeks contributed by groundwater during low flow periods.
 - This may alter stream characteristics by causing portions of affected creeks to dry up earlier in the season, removing a local source of water and moisture essential to the survival of fish, amphibians and aquatic organisms, and preventing salmonids from reaching spawning grounds.

- *Increases in peak runoffs.*
 - Increased impervious surfaces will increase surface runoff, reduce vegetative detention functions and compact soils, resulting in increased peak flows.
 - Increased peak flows will increase erosion, bank undercutting, creekside landslides, sediment transport, siltation of spawning beds and flooding.
- *Increases in creek temperature.*
 - Heated runoff from roads, roofs and compacted soils combined with reduced vegetative cover will raise summer water temperatures.
 - Water temperatures in the high 60°s and 70°s can be lethal to salmonids and are likely to reduce fish runs (ideal temperatures for salmonids are in the mid-50s); high water temperatures can also degrade habitat for amphibians and other aquatic organisms.
- *Increases in water pollution.*
 - Septic drain fields can contaminate ground and surface waters;
 - Pesticides, herbicides and fertilizers applied to agricultural crops or landscaped areas can pollute groundwater and nearby creeks.
 - Contaminants from commercial, industrial, and other urban uses can degrade surface and groundwater quality.
 - Leaks (oil, gas, tar, antifreeze, etc.) from autos and farm equipment, heating and cooling systems, and roofs also degrade water quality.
 - Dirt and mud eroded from cultivated land or deposited from autos and farm equipment can drain into nearby creeks and contribute to sedimentation.

Overview of Plant and Animal Resources and Impacts

Plants provide food and cover for fish and wildlife. Their roots, bark, foliage, nuts and fruits provide food for a variety of wildlife species. Twigs, leaves and bark are used for nest building and insulation. Large trees, especially snags, are prime perch sites for hawks and owls which feed on small mammals on the ground below. Although plants are at the bottom of the food chain, they are a crucial element of the entire system. Algae in the Northwest Hills creeks is eaten by tiny macro-invertebrates, which are in turn eaten by fish and amphibians, which may be eaten by herons, kingfishers or other birds. On land crickets, beetles and small mammals feed on vegetation, and in turn provide food for raptors and larger mammals.

When vegetation begins to die and decay, it becomes home and food to mites, earthworms, fungi and millipedes which aid in the decomposition process. The older Northwest Hills forest has complex structure with multi-layered canopies, dead and downed logs, large trees and snags. Hollow trees laying on the ground provide cover for rabbits and voles, salamanders and snakes. Tree trunks lying partially submerged in a creek or pond provide cover and

shading for fish, attachment sites for aquatic insects, sunning areas for western pond turtles, snakes and dragonflies.

The vegetative cover and waterways provide travel corridors for the fish and animals. Safe access to and along the waterways is crucial. Habitat diversity and connectivity between the habitats is the key to a healthy ecosystem. Interspersion of the Northwest Hills natural area with surrounding forests and natural areas is critical to its continued viability as habitat for wildlife. The large contiguous forest provides a range of habitat within which wildlife can carry out the different stages of their life cycle. Interspersion provides opportunities for migration and recruitment of wildlife which sustains the flow of genetic material and reduces vulnerability to disease, predation and local extinction.

The following environmental changes and human activities degrade natural resources of the Northwest Hills forest ecosystem:

- Loss of vegetation;
- Replacement of native vegetation with exotic species;
- Escape and encroachment of exotic plants (ivy, holly, etc.) into forest;
- Replacement of native vegetation with lawns;
- Replacement of vegetation with ecologically barren buildings, fences, driveways, parking lots, other impervious surfaces, etc.;
- Reduction of groundwater recharge through impervious surfaces;
- Reduction of the structural diversity of forest plant communities;
- Removal of dead vegetation in all strata (creek, ground, tree canopy);
- Erosion and deterioration of stream banks;
- Litter and garbage in water courses and along trails;
- Presence of domestic cats, dogs and destructive human activity;
- Increasing human population density and noise;
- Leaching of toxic materials, deposition of sewage and industrial waste, leaching of herbicides, pesticides, fertilizers from cultivated landscapes;
- Fences and streets which limit wildlife access and passage; and
- Noise, light and other development impacts which disturb the breeding and predator instincts of terrestrial animals.

Resource protection would have a positive effect on ecologically significant forests, fish and wildlife habitat, riparian areas, streams, wetlands and groundwater resources. Flood storage, desynchronization functions and groundwater recharge and discharge functions would be enhanced. Hazard areas would be avoided and natural heritage values would be protected. Minimum and maximum stream flows would be maintained within suitable ranges. Nutrient trapping and removal functions would be maintained and enhanced. Open space, recreation opportunities and scenic values would be retained. The erosive forces of flooding would also be dissipated and sediment trapping functions would be enhanced. Water purity and water quantity would be maintained and eventually increased.

Environmental Impacts of Conflicting Uses

Human activities alter stream erosion processes, sedimentation patterns, nutrient flows and water quality. They also create changes to drainage patterns, soil chemistry and plant and animal communities. Ten such activities or "conflicting uses" are identified in the Northwest Hills: agriculture, forestry, landscaping, housing, businesses, industry, developed open space, recreation, public facilities and utilities, and traffic. If these uses actually occurred at the intensities allowed by city land use regulations, without mitigating measures to protect resources, they would diminish or destroy identified values of one or more resources in the Northwest Hills. The impacts of each conflicting use on natural resources are analyzed in this section. Where the same impacts are identified for different conflicting uses, the text references the first appearance of the impact analysis and, where appropriate, does not repeat that analysis.

1) Agriculture

Agricultural uses are allowed in the city's Residential Farm/Forest (RF) zone. Clearing of vegetation, plowing of fields, exposing bare soils and other farm practices cause erosion which degrades water quality and can adversely impact aquatic habitat for fish and amphibians.

The conversion of forest to farm land replaces diverse forest plant communities with only a few cultivated species. Forest cover is needed to prevent the synchronization of flood events, to prevent bank erosion and to prevent silting of stream beds. Forest cover is also needed to reduce maximum and increase minimum stream flows to maintain proper levels. Forest leaf mass and decaying organic matter on the forest floor function as a sponge, trapping and absorbing rainwater during wet periods and releasing stored water during drier periods. The removal of cover may cause more frequent and severe flooding of city park land and the Northwest Industrial area. Cover removal may also precipitate landslides which pose threats to public health and safety.

Preparing land for planting or grazing often includes filling of wetland areas and removal of riparian vegetation from stream banks. This increases stormwater runoff and eliminates the purifying effects of vegetation. Vegetation is particularly valuable on farmland because crop raising often involves the use of herbicides, fertilizers and pesticides. Surface runoff from farm land containing these chemicals can degrade habitat and harm aquatic life. These chemicals may also contaminate groundwater, which then passes these pollutants into local creeks and degrades aquatic habitat. Animal fecal contamination occurs as a result of pasture use and has similar environmental effects.

Agriculture also takes irrigation water from streams and wells. Extensive use of groundwater can result in draw down of the water table, which in turn can reduce creek flows. Adequate water flow levels are needed to support fish, amphibians and aquatic organisms. Reduced water flows can also reduce or eliminate sources of water for terrestrial animals.

Farm use normally does not diminish open space, but can degrade scenic areas and reduce recreational opportunities by limiting access. Removal of forest cover destroys native vegetation; some of the plant species and forest plant communities found in the Northwest Hills are rare to Portland. Removal of forest cover and planting of agricultural crops provide opportunities for non-native and intrusive plants to become established in adjacent forest.

Removal of forest cover also denudes or eliminates habitat for many native animals. Lost habitat includes feeding, nesting, perching and roosting places for birds. Forest clearing removes plants which produce edible seeds, berries, nuts, bark, leaves, stems and roots for animals. Forest clearing also removes important structural features of the forest such as multiple layered canopies, dead and downed logs, large trees and snags. These important habitat components are removed when the forest is cleared. Other detrimental impacts include poisoning of wildlife caused by chemicals used on plants and in the soil in agricultural processes, and lights, loud noises and other farm activities which disturb the breeding and predator instincts of animals.

Forest fragmentation caused by the clearing of vegetation for agricultural uses increases the isolation of one habitat area from another. This can impede or form barriers to wildlife migration and can limit the flow of genetic material. As the range of habitat for indigenous wildlife becomes restricted and isolated, opportunities for recruitment from other areas are limited and wildlife populations become vulnerable to disease, predation and local extinction.

2) Forestry

Most common forest culture and harvest practices are allowed in the city's Residential Farm/Forest zone. Because forestry is economically practicable on steeper slopes than farming, harvest practices can cause more erosion than farming. Forestry also uses irrigation water to establish tree plantations. The erosion, sedimentation and water withdrawal effects of tree harvesting can be at least as detrimental to water-related resources as the farm practices described above. The harvest of trees would also lead to increased surface runoff and therefore more frequent and severe flooding of city park land and the residential and industrial areas near St. Helens Road.

Forestry can replace multifunctional forest ecosystems with more simple systems or monoculture tree plantations. Cultured forests and tree

plantations often are less structurally diverse and have less leaf mass than the natural forests they replace. Tree plantations have less ability to prevent the synchronization of flood events, bank erosion and the siltation of stream beds than do natural forests. Stream temperatures and flows can also be more variable in tree plantations.

Monoculture plantations are also more vulnerable to forest diseases and pests than natural forests. The loss of natural forests have the same effects on wildlife and flooding as described in the analysis of agriculture above.

Forestry also involves the use of herbicides, fertilizers and pesticides which may contaminate ground and surface water. Contaminated surface runoff can degrade wildlife habitat and harm aquatic life in nearby creeks.

Forestry does not diminish open space, but degrades scenic areas and diminishes recreational opportunities by limiting or eliminating access. The harvest of trees also fragments, degrades or destroys wildlife habitat. Tree cutting and planting provide opportunities for non-native and intrusive plants to become established in adjacent natural forest. Tree cutting and the storing and transport of logs destroys forest plants. Timber harvest has the same effects on native plants, fish and wildlife as the clearing activities described in the analysis for agriculture. The establishment of tree plantations can provide habitat for species which prefer early successional forests, or benefit from the forests fringes around clearings. However, tree plantations rarely have the plant diversity found in early successional natural forests; hence, the diversity of food and cover resources is limited. Noises and lights caused by forestry activities can further degrade habitat values as described in reference to farm practices.

3) Landscaping

The clearing of native forest and the establishment of lawns and other non-native landscape features is allowed in residential (including RF), commercial, industrial and open space zones. The clearing of forests, whether for homes, businesses or parks has the same effects as clearing done for agriculture or forestry. Like farming and forestry, the maintenance of landscaping often requires the use of irrigation water. The erosion, sedimentation, flooding and water withdrawal effects of clearing forests to establish landscapes are similar to those of the farm and forest practices described above. The impacts of the loss of structural diversity, leaf mass and related habitat components are also analyzed above.

Landscaping does not diminish open space, but can degrade scenic areas and diminish recreational opportunities. The effects of landscaping on fish and wildlife habitat is similar to the effects of forestry described above. Landscape trees, shrubs and groundcover often invade adjoining native forests. English

ivy, holly, laurel and clematis are commonly used in landscaped areas and are particular problems in the Northwest Hills.

Some animals benefit from the proximity of landscaping to forests. These species feed on seeds and berries produced by landscape plants, and while they are not feeding they find protective cover in the forest. This feeding pattern is, however, responsible for the spread of exotic seeds to the forest and the resulting degradation of natural forest habitat.

Urban landscaping rarely involves the re-establishment of multiple layered canopies, dead and downed logs, large trees and snags found in mature native forests. The loss of older forests have the same effects on wildlife and flooding as described for agriculture and forestry above.

The maintenance of landscapes also involves the use of herbicides, fertilizers and pesticides which may contaminate groundwater. Contaminated surface runoff can degrade wildlife habitat and harm aquatic life in nearby creeks.

4) Housing

Homes are allowed in residential and commercial zones. Residential use can have all the landscape effects described above. It also has aggravating effects on stormwater detention and retention, erosion and sedimentation. These effects are most pronounced during construction, but continue afterward. Unstable soils, combined with steep slopes and a shallow, perched water table in the Northwest Hills, are very susceptible to residential construction activities. Excavation and fill for roads or buildings can precipitate landslides and cause erosion. Landslides and erosion can damage or destroy downstream watershed resources and property.

Much of the land in the Northwest Hills where residential uses are allowed is not served by sewers. Septic drain fields can pollute both ground and surface waters.

Impervious surfaces such as streets, sidewalks and roof tops raise runoff time-of-concentration, reduce vegetative detention functions and compact soils. This increases surface water runoff and peak flows. Increased peak flows, in turn, increase erosion, landslides, sediment transport, creekbed siltation and flooding.

Impervious surfaces permit less rainfall to infiltrate the soil, reducing groundwater recharge and lowering volume of water in creeks contributed by groundwater. This may cause neighboring creeks to dry up early in the season, which can damage or destroy habitat for resident amphibians and invertebrates, eliminate a source of water for terrestrial animals and, in the Miller Creek watershed, prevent salmonids from reaching spawning grounds. Heated runoff from impervious surfaces and reduced vegetative cover can

raise water temperatures in nearby creeks and degrade aquatic habitat. Runoff can also carry pollutants into these creeks. Impervious surfaces also interfere with the transfer of air and gases.

Residential development can impair travel routes for terrestrial vertebrates. By creating inhospitable environments, these developments, particularly when in conjunction with large subdivisions, can isolate wildlife or cut off some species from a significant portion of their range. This limits or cuts off the flow of genetic material for these species, and in some cases may lead to local extinction. Roads, traffic and fences can also form barriers to wildlife migration.

Household pets can kill and harass native wildlife. Lighting and evening activities can also disturb wildlife. Residential use can also diminish open space, scenic values and recreational opportunities.

5) Businesses

Businesses are allowed in commercial zones, which are found in two locations within the study area: in Linnton along St. Helens Road, and at the intersection of Skyline and Germantown Roads. Removal of forest cover is allowed in commercial zones and generally has the same effects as described under agriculture above. Agriculture is not allowed as a primary use in the commercial zone along Skyline, and is only allowed as a conditional use along St. Helens Road; in both cases, small lot sizes make agricultural use unfeasible. Residential use is allowed in commercial zones at multifamily densities. Commercial use has all the landscape and residential effects described above, but increased lot coverage allowances compound the problem of impervious surfaces (e.g., reduced water penetration and supply of nutrients to the soil, lower groundwater levels and interference with the transfer of air and gases). Businesses also generate more traffic than residences, and diminish or destroy open space, scenic values and recreational opportunities.

6) Industry

Industrial uses are allowed in the industrial zones located along St. Helens Road. Industrial use has all the landscape and residential effects described above (note that residential use is permitted only as a conditional use in the industrial zones). Increased lot coverage allowances compound the problem of impervious surfaces described above.

Sulphur dioxide, nitrogen oxides and fluorides and fine particles emitted from industrial processes interfere with the normal transpiration and respiration processes of plants. Degradation of the health of plants will, in turn, affect other elements of the forest ecosystem (e.g., wildlife habitat).

Groundwater is used by some industries for heating and cooling systems and then injected back into the ground. Water that is returned to the ground via injection wells is usually much warmer than groundwater temperatures and may cause thermal pollution problems locally. Overuse of groundwater can result in local ground subsidence and a draw down of the water table. This, in turn, can impact watershed resources and aquatic life, particularly during the summer months when creek flow levels are largely dependent on groundwater contributions at the same time that farm and residential groundwater use are typically at their peaks. A decline in the groundwater table also results in higher pumping lifts and lower well yields, both of which result in higher pumping costs.

7) Developed Open Space

Under the new Zoning Code effective January 1, 1991, the Open Space (OS) base zone was applied to land that had an OS Comprehensive Plan designation. Large areas within the Northwest Hills planning area had such an OS designation. This zone applies almost exclusively to city parks, but has also been applied to some residential lots, mistakenly or at the request of the landowner.²⁶ Developed park areas, such as lawns and planted landscape beds, are very limited in the Northwest Hills. These areas have the same effects described for landscaping. Park uses also generate automobile traffic which can pose hazards to wildlife.

The Open Space zone allows activities such as the clearing of vegetation, the creation of impervious surfaces such as parking lots and the building of certain structures. The potential environmental consequences of Open Space uses are therefore similar to those described for residential uses above.

8) Recreation

Trail construction and maintenance practices on steep slopes or near creeks can cause erosion and disturb vegetation. Recreational use of natural areas can degrade wildlife habitat values. Unleashed pets can kill and harass wildlife. Intensive recreation such as cycling, motoring and equestrian sports occur on trails designed for hiking, where they often cause erosion. Camping in public parks, although not allowed by park rules, does occur and degrades natural, recreational and scenic values. Particularly dangerous is the use of camp fires during dry seasons. Illegal trash dumping and littering also occurs in parks. Trash degrades natural, recreational and scenic values. Trash can also pollute water, harm wildlife and provide a seed source for non-native intrusive plants.

9) Public Facilities and Utilities

Construction and maintenance practices for roads, stormwater control structures, sewers, water lines and reservoirs, gas and utility lines have a

²⁶ Chapter 8, Plan Protection Measures, corrects these mistakes.

variety of effects. These practices create cleared corridors which increase wind and light penetration into the forest, which can degrade natural plant and animal communities. These practices can also cause erosion and provide opportunities for the establishment of non-native plant species by disturbing soil and destroying perennial plant species. These practices degrade streams and wetlands and block fish passage.

The establishment and maintenance of roads and utilities often fragment wildlife habitat as described under agricultural impacts above. These activities also increase stormwater runoff, pollute water and reduce forest cover needed to maintain adequate stream flows, clarity, and temperature for aquatic life. Maintenance removes important structural components from forests and removes vegetative cover. This cover is needed to prevent the synchronization of flood events, bank erosion, silting of stream beds, as well as to maintain adequate stream flows.

Sand²⁷ used to keep roads clear of snow and ice and herbicides used to control roadside vegetation can contaminate soils, degrade the health of plants and the animals which feed on them, and degrade the quality of ground and surface waters.

10) Traffic

Traffic can degrade recreational opportunities, scenic values and wildlife habitat. Traffic can also kill and injure wildlife.

Summary

Ten conflicting uses are identified in the Northwest Hills planning area. If these uses occurred at the intensities allowed by city land use regulations, they would have significant detrimental impacts on natural resources of the Northwest Hills.

Energy Consequences

This section provides a general discussion of energy consequences of resource protection. Energy consequences analyzed below include impacts on the heating and cooling of structures and impacts on transportation and infrastructure costs. Promoting and providing examples of development which conserves energy can foster greater interest and greater energy consciousness within the community.

Heating and Cooling of Structures

Resource protection may alter energy consumption for heating and cooling of structures. If resource sites are protected from development, then that

²⁷ Sand also contains salt which can further degrade wildlife and watershed resources.

development, if needed, would have to occur elsewhere. To do this, urban boundaries could be expanded and the same building density and form could be built. This would have no net change on energy consumption for heating and cooling of structures.

However, if it were desirable or necessary to locate the development on or near the same site as the resource, structures could be located closer together outside of the resource area. This could be accomplished through clustering of buildings, which could result in more common wall construction and reduced surface area for a given volume. Heat transfer between indoors and outdoors would be reduced, resulting in an energy savings.

Vegetation provides a tempering effect on climate, both on a macro and micro scale. Trees shade nearby buildings in the summer, reducing energy demands for cooling. Plants also absorb sunlight and transpire during growing seasons, reducing ambient air temperatures. Again, this can reduce energy needs for cooling of nearby development.

Trees and shrubs also act as a wind break during winter. By slowing or diverting winter winds around and over buildings, heat loss from convection is reduced, resulting in lower energy needs.

In summary, energy needs for heating or cooling would generally be positively impacted as a result of resource protection. A positive impact would result from clustering, while a less, but still positive, impact would result from expanding urban boundaries, as development surrounding the resource would continue to benefit from resource vegetation. Energy savings would be realized as a result of the ameliorating effects of resource vegetation on the local climate. The extent of energy savings will depend on many factors, including type of resource protected, proximity of resource to development, structure type, heating source, construction materials, design and activities.

Transportation

Energy expenditures for transportation are related primarily to distance of travel between origin and destination, and mode of transportation available. Both of these variable can be affected by natural resource protection.

Presently, public transportation is not available along Skyline Boulevard but does serve Linnton and other neighborhoods along St. Helens Road. Employment opportunities along Skyline Boulevard are limited to one existing business, one small neighborhood commercial site, and several small farm operations. Major employment and commercial areas (destinations) are located in the industrial area along St. Helens Road and in downtown Portland. If resource protection limited or precluded future residential development in the Northwest Hills, which could not be replaced with

increased densities nearby, impacts on energy consumption for transportation would depend on where the displaced housing would be located and whether residents would need to travel greater distances between home and employment or shopping. If development were allowed to expand beyond present urban boundaries, greater urban sprawl would occur and energy consumption for transportation would increase.

The location of the Northwest Hills urban natural area allows easy access to large populations for recreation, wildlife observation and education purposes. Because this resource is closer to users, less transportation energy is required and a greater range of transportation modes, including bicycling and walking, can be used. Designated bicycle, equestrian and pedestrian trails within Forest Park make these alternative, nonconsumptive forms of transportation more attractive.

In summary, resource protection impacts on transportation energy costs depend upon where needed and potentially displaced housing will relocate. If potential housing units can be located nearby protected resource areas or located closer to employment centers, a net positive benefit from protection would result. If urban boundaries were expanded in areas far from employment, commercial and recreation destinations to compensate for lost needed development opportunities, more energy would be required for commuting. Protection of urban natural areas of high recreational value will also reduce energy costs and encourage energy-efficient modes of transportation.

Infrastructure

Clustering of development outside of natural resource areas in an efficient manner will result in less infrastructure needed to serve sewer, water, transportation and other needs. It can also result in faster fire and police response times and reduce energy costs associated with these services.

Maintaining permeable soils and forest cover reduces peak flood levels and the potential for landslides. Resource protection would therefore reduce energy costs associated with emergency services and infrastructure repair. If development occurs away from flood and landslide hazard areas, fewer hazard control structures would be needed. Energy savings from reduced infrastructure materials and maintenance needs would result.

Summary

Considerable savings of energy can be achieved through natural resource protection, particularly in terms of infrastructure provision and structure heating and cooling. Transportation savings can also be substantial if needed development were located near destination points and energy-efficient travel modes were integrated into the natural resource protection plan.

Applicable Statewide Planning Goals

Oregon Administrative Rules Chapter 660, Division 16, calls for local governments to consider the applicability and requirements of Statewide Planning Goals where appropriate in the ESEE analysis. The applicable Statewide Planning Goals considered here are: 3, Agricultural lands; 4, Forest Lands; 6, Air, Water and Land Resource Quality; 7, Areas Subject to Natural Disasters and Hazards; 8, Recreational Needs; 9, Economic Development; 10, Housing; 11, Public Facilities and Services; 12, Transportation; 13, Energy; Goal 14, Urbanization; and 15, Willamette Greenway. Goal 1, Citizen Involvement, and Goal 2, Land Use Planning, were addressed throughout the plan development process and do not apply to the ESEE analysis. Additional State Goal findings are provided in the Plan's adopting ordinance.

Goal 3 requires local governments to preserve and maintain agricultural lands. Goal 3 applies to those sites which have land zoned for Residential Farm/Forest uses. Existing agricultural use is preserved. New or expanded agricultural uses where environmental zones are applied are subject to an environmental review process where impacts must be controlled and mitigated.

Goal 4 requires conservation of forest lands by maintaining the forest land base and protecting the state's forest economy. This is done by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the leading use on forest land consistent with sound management of soil, air, water and fish and wildlife resources and to provide for recreational opportunities and agriculture. Goal 4 applies to sites where land is zoned for Residential Farm/Forest use. Most of these lands are planned for low density residential use. Small wood lot operations would be feasible on some of the lots. This Protection Plan takes an exception to State Goal 4 and regulates commercial forestry operations in areas where environmental zones are applied.

Goal 6 provides for maintenance and improvement of the quality of the air, water and land resources of the state. The proposed environmental zones will ensure that these resources are maintained, Federal Clean Water Act requirements are met and coordination with permitting agencies occurs.

Goal 7 requires protection of life and property from natural disasters and hazards. Resource protection measures are designed to meet this goal by guiding residential development away from sensitive resource areas subject to landslides and flooding. A Plan policy directly addresses this goal.

Goal 8 requires local governments to satisfy the recreational needs of the citizens of the state and visitors, and where appropriate, to provide for the siting of recreational facilities including destination resorts. Protection of natural areas and open space resources will enhance the recreational values of the Northwest Hills. Visitors and tourists will benefit from protection of recreational values.

Goal 9 calls for provision of adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare and prosperity of Oregon's citizens. Resource protection will have positive consequences for real estate values, tourism, recreational activities, corporate relocation and convention-related activities. Resource protection will have negative consequences for limited industrial and residential use which will lose development potential. However, these negative impacts are mitigated through various plan provisions such as the transfer of development rights option.

Goal 10 provides for the housing needs of citizens of the state. Resource protection measures are designed to allow housing construction which includes measures to mitigate impacts on Goal 5 resources. Residential development and resource protection will be balanced; no net housing loss will result.

Goal 11 requires local governments to plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development. Plan regulations require Planned Unit Developments under certain conditions which are designed to protect natural resources. Clustering and/or limiting development will result in reduced need for construction and maintenance of infrastructure.

Goal 12 provides for and encourages a safe, convenient and economic transportation system. Resource protection measures do not prevent the city from meeting its Goal 12 responsibilities. Planned Unit Developments required by plan provisions will allow efficient use of existing transportation facilities.

Goal 13 calls for the conservation of energy. Limiting or prohibiting development near sensitive natural areas results in reduced residential and industrial energy consumption from heating and cooling systems and transportation or infrastructure use. Clustering residential development also results in less energy consumption for construction and promotes use of common wall construction. Protection of significant natural resources close to an urban center encourages use of alternative forms of transportation such as bicycling and walking.

Goal 14 provides for the orderly and efficient transition of rural lands to urban uses. The Plan's resource protection measures allow uses to develop consistent with present Comprehensive Plan Map designations.

Goal 15 requires local governments to protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway. Resource protection measures will be implemented to protect resources along the Greenway.

Summary

Resource protection measures are designed to meet Goal 5 requirements as well as requirements for Goals 3, 4 and 6 through 15. Goals 1 and 2 were addressed throughout the development of the plan. Additional State Goal findings are presented in the adopting ordinance.

Summary

Protection of natural resources will have both positive and negative consequences. In general, the economic, social, environmental and energy benefits of resource protection outweigh the potential costs. Housing and industry face the highest potential economic costs in the form of reduced development potential, but these costs are partially, and in some cases entirely, offset by economic benefits which result from resource protection. The potential economic consequences on housing, industry and other conflicting uses described above are analyzed in further detail in Chapter 7, Site Inventory and Analysis Summaries.

Following the inventory and analysis of Goal 5 natural resources, which continues in the next chapter, a program must be developed to protect these resources. Under Oregon Administrative Rules for LCDC Goal 5 compliance, this program or plan must make one of three decisions for each inventoried resource based on the resource inventory and analysis findings:

1) Allowing the conflicting use fully

This action occurs in areas where the conflicting use, notwithstanding the impact on the resource, is sufficiently important to warrant allowing the uses fully and without restrictions.

2) Limiting conflicting uses in a manner which protects the resource

This action occurs in areas where both the resource and the conflicting uses are important relative to each other, and restrictions are placed on conflicting uses which would protect resource values while at the same time allowing for needed conflicting uses.

3) Protecting the resource fully

This action occurs in areas where the resource, relative to the conflicting use, is sufficiently important that the resource should be protected and all conflicting uses prohibited.

Plan policies and objectives, and regulations needed to protect Goal 5 resources are presented in Chapter 8 of this report.

CHAPTER 7
SITE-SPECIFIC
INVENTORY AND ANALYSIS

- INTRODUCTION •**
- SITE SELECTION •**
- METHODOLOGY •**
- SITE SUMMARY OVERVIEW •**
- RESOURCE SITE INVENTORY AND ANALYSIS SUMMARIES •**

Introduction

The two previous chapters identified general resource components, their importance in the overall forest ecosystem and the general impacts of conflicting uses and of resource protection. This chapter describes how each resource site was selected, inventoried and evaluated. The inventory and analysis of individual sites are then summarized. These summaries provide information on resource location, quality and quantity and on the economic, social, environmental and energy consequences of resource protection. This site-specific information supplements the areawide inventory and analysis of the two preceding chapters. Resources and resource values identified as high and medium in the Conclusion sections of each site are to be protected, while those identified as low do not warrant protection. Some of the terminology used in this chapter is referenced to the areawide discussion (e.g., vegetation types).

Site Selection

In 1986, a citywide inventory of natural resources was conducted by biologists Esther Lev and Michael Jennings. A technical advisory committee consisting of natural resource experts from conservation groups, private industry and public agencies was established to review inventory methodology and inventory areas. Local wildlife literature was consulted, and letters were sent to neighborhood associations, special interest groups and city agencies informing them of the study. With the information compiled by the biologists, technical advisory committee and neighborhood input, inventory sites were then delineated by field biologists and mapped by a cartographer. In 1990 and 1991, detailed field inventories of natural resource areas in the Northwest Hills were conducted.

This chapter summarizes site inventories and analyses for the Northwest Hills. These resource inventories include information on fish and wildlife habitats, plant communities, wetlands, water bodies and open space. Additional information is provided on scenic, recreational, educational, historic and cultural resources.

The Northwest Hills planning area is approximately 6000 acres in size and is divided into smaller inventory and analysis units. Site selection was based primarily on watershed units: the six largest watersheds, which range from 290 to 972 acres in area, form the major divisions of the study area. The twelve sites formed in this manner were then further divided based on similar physiologic or resource characteristics into a total of twenty-four sites. The sites are numbered in a general south-north direction, beginning with the Holman Park/Thurman St. Unit (Site 86) bordering the Balch Creek

watershed and ending with Miller Creek Headwaters--West (Site 109) at the intersection of N.W. Newberry and Skyline Roads (see Map 11).

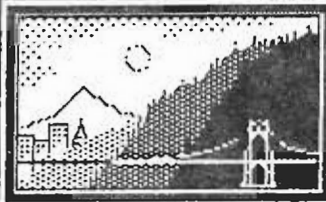
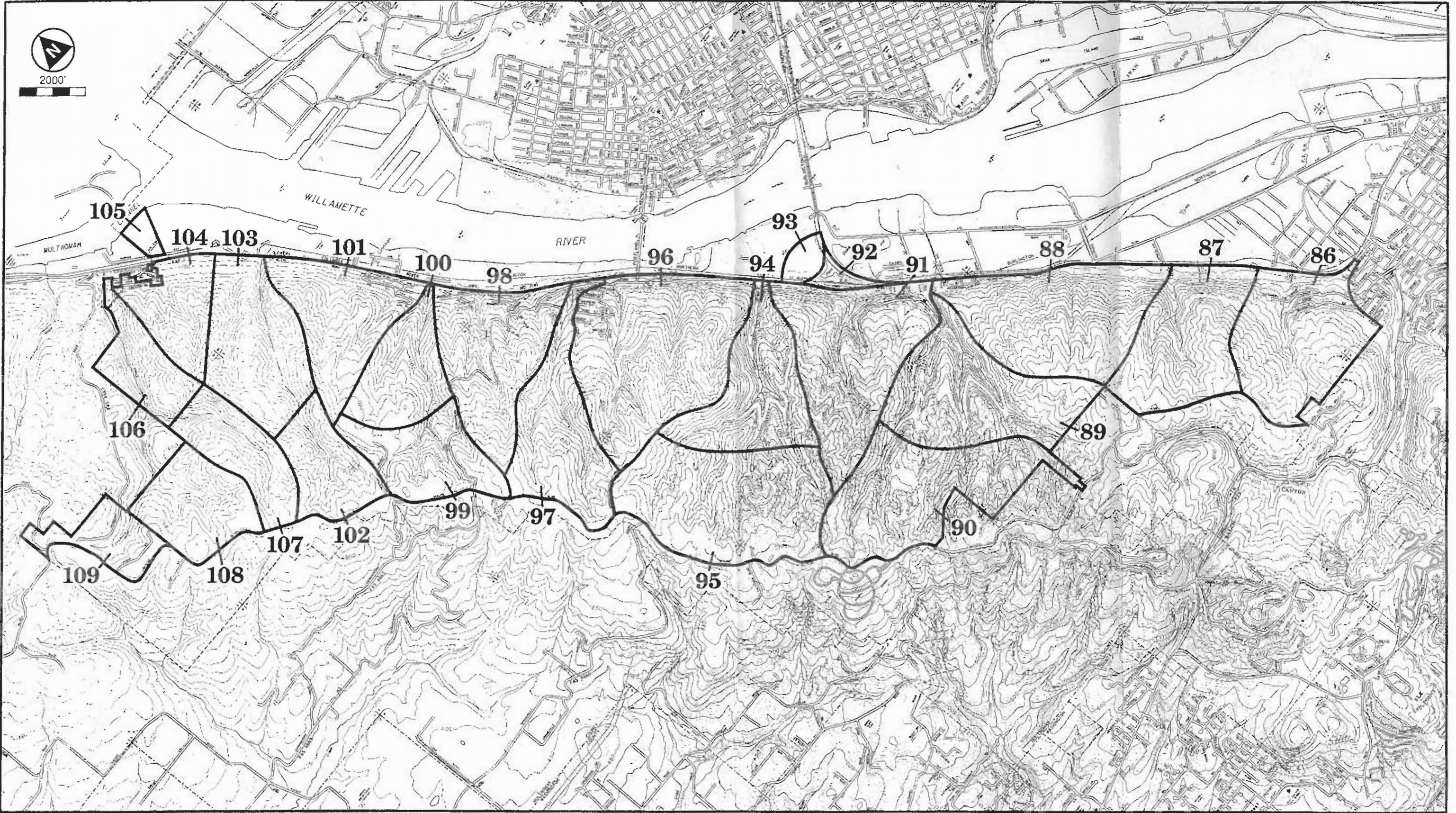
Methodology

Inventories of the watershed-based sites were made along transects chosen to encompass the variation in environmental characteristics (e.g., vegetation, soil, slope and habitat) over the area of concern. At least two field visits were made to each of the sites. Field inventory work was conducted between February, 1990, and February, 1991. Biologists Esther Lev and Maurita Smyth joined planning staff on several site visits. Other sites were previously evaluated by biologists Michael Jennings and Esther Lev in June of 1986, or by naturalist Mike Houck as part of the Willamette Greenway study (1987).

A narrative description of the site, including information on weather, topography, vegetation, wildlife, habitat function, human use and management potential, is completed for each site. Sites are rated numerically for wildlife habitat value using a standard rating sheet originally developed by the City of Beaverton and subsequently modified with input from state and federal agencies and the Audubon Society of Portland. This rating system was previously used by the City of Portland for a resource inventory along the Willamette Greenway, and has been used with minor modifications by Multnomah County and the cities of Gresham, Milwaukie, Eugene, Springfield, Hillsboro and other Oregon jurisdictions in the course of their Goal 5 inventory process.

The habitat assessment process involves the analysis of physical environments for which wildlife have known preferences. The site inventory sheets rate habitat values numerically based on the presence and availability of three basic elements: food, water and cover. Values for human and physical disturbance, interspersions with other natural areas, and unique or rare habitats or plant and animal occurrences are also noted. Scores for all sites within the city range from a low of six to a high of 106, with the vast majority lying in the 30-80 point range. Inventory site scores for the Northwest Hills ranged from a low of 55 to a high of 98.

In summary, the methodology used for determining the location, quantity and quality of identified natural resources is one which provides an acceptable base of information, while allowing augmentation from other sources. It has been used in the same general form with success by other jurisdictions in the state, and has been reviewed by LCDC and found acceptable for Goal 5 compliance.



NORTHWEST HILLS
Natural Area Protection Plan

COMPOSITE
SITE MAP

Map
11

Site Summary Overview

The site summaries in the following section provide information on both resource inventories and ESEE consequence analysis for specific sites. The site inventory summaries contained in this document represent material gathered during field visits, as well as technical and other resource data collected from additional sources. The recommendations of this plan are based on the general analysis of the previous chapter and the site-specific analysis of this chapter.

Several sections of the summaries warrant brief explanation. The "habitat rating" box offers a summary of the individual Wildlife Habitat Assessment (WHA) field sheets on file in Planning Bureau offices. At the top of the box, the site's WHA score and the range of scores for all sites in the study area are indicated. The functional value of the three principle habitat components, water, food and cover, is then summarized with assessments ranging from "low" to "high," based on the following WHA scores for these sections:

	Low	Moderately Low	Medium	Moderately High	High
Water	2 - 7	8 - 12	13 - 18	19 - 24	25 - 30
Food	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24
Cover	0 - 5	6 - 11	12 - 16	17 - 22	23 - 28

The three remaining categories, interspersions, uniqueness and disturbance, are classified in a similar fashion using "low," "medium" and "high." *Uniqueness* is a combination of the site's unique features (habitat type, flora and fauna); *disturbance* is a combination of physical and human disturbance (note: a high score corresponds to a site with "low" disturbance); *interspersions* (with other habitats) is assessed directly from the interspersions score from the WHA form.

	Low	Medium	High
Interspersions	0 - 1	2 - 4	5 - 6
Uniqueness	0 - 3	4 - 8	9 - 12
Disturbance	8 - 6	5 - 3	2 - 0

Second, the "Habitat Classification" section is based, in part, on the National Wetlands Inventory (NWI) classification model. Some of the terms commonly used in this section are defined below.

- Riverine: Related to, formed by, or resembling a river.
- Palustrine: Wetlands dominated by trees, shrubs, persistent emergent herbs, emergent mosses or lichens.

Upper Perennial: One of four subsystems of the Riverine System, where the gradient is high, water velocity is fast and some water flows throughout the year.

In the following site specific ESEE analysis, development potential was calculated using the acreage, zoning, existing development and potential development. For land zoned for residential use, this consisted of calculating the number of housing units which could be constructed on a given lot, taking into account any existing units and lot size. For land zoned for industrial use, this process consisted of calculating the remaining area on a lot which could accommodate expansion of an existing use, given the zoning and current developed area.

In making site specific ESEE comments, several factors were taken into account. These factors include:

- Conflicting uses allowed by zoning;
- Proximity of a conflicting use to inventoried resources;
- Zoning and associated development standards;
- Existing development;
- Developed and vacant lot area;
- Development potential;
- Lot area affected by application of an environmental zone; and
- Presence of unprotected cultural, open space, historic and scenic resources.

The general ESEE analysis in Chapter 6 formed the foundation and source of the site specific comments.

**Resource Site
Inventory and Analysis Summaries**

Resource site 86 has been divided. The portion of the resource site that is zoned for industrial uses has been added to a resource site that is designated as IL5. The natural resource inventory and ESEE decisions that apply to resource site 86: Holman Park/ Thurman St will continue to apply within resource site IL5. All other portions of resource site 86 have been repealed and replaced by the Environmental Overlay Zone Map Correction Project. Non-industrial portions of resource site 86 are now signified as resource site FP28. The natural resource inventory and protection decisions that apply to FP28 can be found in Volume 2 Part A2 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 21-41).

The following natural resource inventory, ESEE analysis, and resource protection decisions on pages 109 through 112 continue to apply to portions of resource site 86 that are now designated as IL5.

Site Size: 272 acres

Location: East of N.W. 53rd Dr., west of St. Helens Rd., north of Balch Creek

Neighborhood: Forest Park and Northwest

Date(s) of Inventory: March 10, 1990, and June 18, 1986

Habitat Classification:

Upland Coniferous/Broadleaf Deciduous Forest

Riverine, Lower Perennial and Intermittent Streambeds

Seasonally Flooded

Types of Resources:

Seasonal and year-round creeks, wildlife habitat, sensitive fauna, forest, open space and groundwater resources.

This site also provides scenic, recreational and historic resources.

Resource Description and Quality:

The vegetation community is a mosaic of three principle types of second growth western hemlock forest: *mid-aged conifer*, *conifer topping hardwood* and *mature hardwood*.²⁸ The forest is structurally diverse and offers variety within each canopy layer. Forest cover provides open space, scenic and recreational resources; serves as habitat for resident and migratory wildlife; and helps to balance the local water regimen. Snags, downed logs and woody debris found at the site are critical structural and functional components of the watershed ecosystem. The rare phantom orchid (*Eburophyton austiniiae*) is found within the forest. Ivy and clematis have spread widely throughout the eastern portion of the site and threaten the health of the local plant community.

Food and cover habitat are of progressively higher quality to the north and to the west of the site. The principle drainage (and water source for local wildlife) passes from south to north through the site. Bird species observed at the site include pileated woodpecker, sharp-shinned hawk, great blue heron and a variety of songbirds. Mammals observed at the site include black-tailed deer, coyote and deer mouse. Red fox was identified a few hundred yards

²⁸ Stages of western hemlock forest succession are described in the Vegetation section of Chapter 5 of this report.

west of the site. Reptiles sited in the area include the northwestern garter snake. This site provides an important link between the Balch Creek ecosystem and the genetic reservoirs to the north. Residential and industrial development to the east limit migration opportunities for wildlife.

Habitat Rating

Wildlife Habitat Score: 86		Range for All Sites: 55 to 98	
Water	:	Medium	
Food	:	Moderately High	
Cover	:	Moderately High	
Interspersion	:	High	
Uniqueness	:	Medium	
Disturbance	:	Medium	

Leif Erikson Drive and Wildwood Trail (part of the regional 40-Mile Loop system) provide well-used passive recreational opportunities. Leif Erikson Drive and NW 53rd Drive are designated as scenic corridors in the city's *Scenic Resources Protection Plan*.

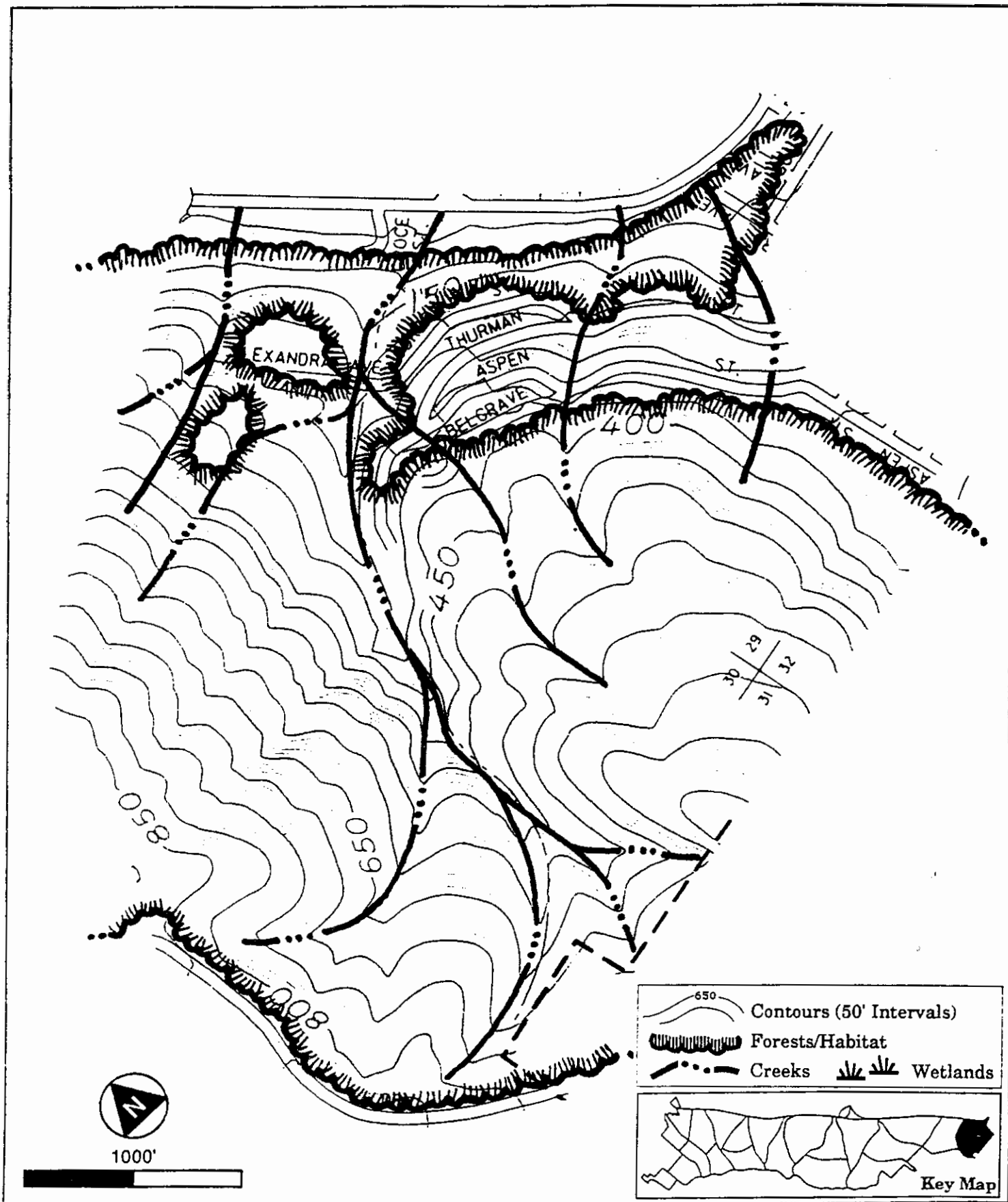
An abandoned sluice traverses this site. The intended purpose of the sluice was to carry soil to fill Guilds Lake.

Quantity of Resources:

This 272-acre site contains a perennial creek with a 210-acre basin. Most of the site is covered with forest, which provides a range of habitat for wildlife. Forest vegetation has been removed in the residential and industrial areas in the eastern portions of the site. At least 95 percent of the creek's drainage basin is retained in forest cover. Approximately 80 percent of the site serves as undeveloped open space.

Conclusion:

The site's principle and secondary drainage, their tributaries and forested uplands are of moderately high significance. Developed residential and industrial areas without drainages are of low to medium significance.



NORTHWEST HILLS
 Natural Area Protection Plan

**Natural Features
 Site Map**

Site-Specific ESEE Comments: Resource Site 86

Conflicting Uses: Residential, Industrial, Landscaping

Consequences of Allowing Conflicting Uses: Residential development disturbs wildlife through interference with migration, removal of forest habitat, possible degradation of local water sources, and interference with and/or degradation of link to Balch Creek ecosystem. Allowing industrial use and development may lead to further removal of forest vegetation, possible pollution of groundwater from industrial use, interference with species migration and degradation of native plant species from industrial emissions. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Resource protection would result in negative consequences if development potential were reduced and could not be replaced elsewhere on site. Existing industrial and residential development would not be affected by resource protection measures. Under the Protection Plan, approximately 15.6 acres of residential and 2.5 acres of industrial land are affected by environmental zones. Residential and industrial development in protected areas would be subject to review. Resource protection measures may limit but will not prohibit development at this site; estimated net change in development potential is zero.

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
R10(R5)	5	0
R10	4	.3
R5	5	.3
R2	1	0
IH	2.5	0

Environmental Consequences: Resource protection would result in positive consequences. These consequences include: protection of site as groundwater recharge area; protection of habitat for native wildlife and habitat interspersions with the Balch Creek ecosystem; and protection of forest and watershed resource values including clean water, air pollution and microclimate amelioration. See Chapter 6, General Analysis of ESEE Consequences.

Energy Consequences: Resource protection would result in positive consequences. Reduction in industrial or residential energy consumption for heating and cooling systems, transportation or infrastructure use would result in energy savings.

Resource site 87 has been divided. The portion of the resource site that is zoned for industrial uses has been added to a resource site that is designated as IL5. The natural resource inventory and ESEE decisions that apply to resource site 87: Express Creek will continue to apply within resource site IL5. All other portions of resource site 87 have been repealed and replaced by the Environmental Overlay Zone Map Correction Project. Non-industrial portions of resource site 87 are now signified as resource site FP23. The natural resource inventory and protection decisions that apply to FP23 can be found in *Volume 2 Part A2 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 21-41)*.

The following natural resource inventory, ESEE analysis, and resource protection decisions on pages 113 through 116 continue to apply to portions of resource site 87 that are now designated as IL5.

Site Size: 326 acres

Location: Between N.W. 53rd Drive and St. Helens Rd. (near Express Ave.)

Neighborhood: Linnton and Forest Park

Date(s) of Inventory: February 28 and August 13, 1990

Habitat Classification:

Upland Coniferous/Broadleaf Deciduous Forest

Riverine, Lower Perennial and Intermittent Streambeds

Seasonally Flooded

Types of Resources:

Seasonal and year-round creeks, sensitive flora and fauna, wildlife habitat, forest, open space and groundwater resources.

The site also provides scenic, recreational and historic resources.

Resource Description and Quality:

The 'Express Creek' watershed is clothed in a mosaic of vegetation types ranging from the *hardwood with young conifer* to the *mid-aged conifer* stage of secondary succession. The older forest contains mature grand fir, western hemlock and Douglas fir specimens. Forest cover protects watershed resources, serves as habitat for wildlife and provides open space, scenic and recreational resources. Snags, downed logs and woody debris found at the site are critical structural and functional components of the watershed ecosystem. The rare phantom orchid (*Eburophyton austiniae*) also occurs in the older forest. Invasive species such as ivy and holly are proliferating in the lower parts of the site, near St. Helens Road.

The primary creek at the site supports a healthy population of macroinvertebrate species. The creek and the site's forest cover provide food, water and cover for a variety of birds including pileated woodpecker, Oregon junco, robin, Wilson's warbler, house finch and golden-crowned kinglet. The site's interspersed with surrounding habitat permits wildlife to migrate through the site to Holman and Macleay Parks to the south and to the rest of

²⁹ Certain unnamed creeks within the study area including this one have been given names in this report for the sake of clarity and convenience. Creeks named in this manner appear in quotes.

Forest Park to the north. Industrial activities and traffic on and along St. Helens Road impede wildlife migration to the east.

Habitat Rating

Wildlife Habitat Score: 86		Range for All Sites: 55 to 98	
Water	:	Medium	
Food	:	Moderately High	
Cover	:	Moderately High	
Interspersion	:	High	
Uniqueness	:	Moderately High	
Disturbance	:	Low	

Scenic views and passive recreational opportunities are provided along Leif Erikson Drive, Wildwood Trail and several connecting trails. Wildwood Trail is part of the regional 40-Mile Loop system. Leif Erikson Drive and NW 53rd Drive are designated scenic corridors (see *Scenic Resources Protection Plan*).

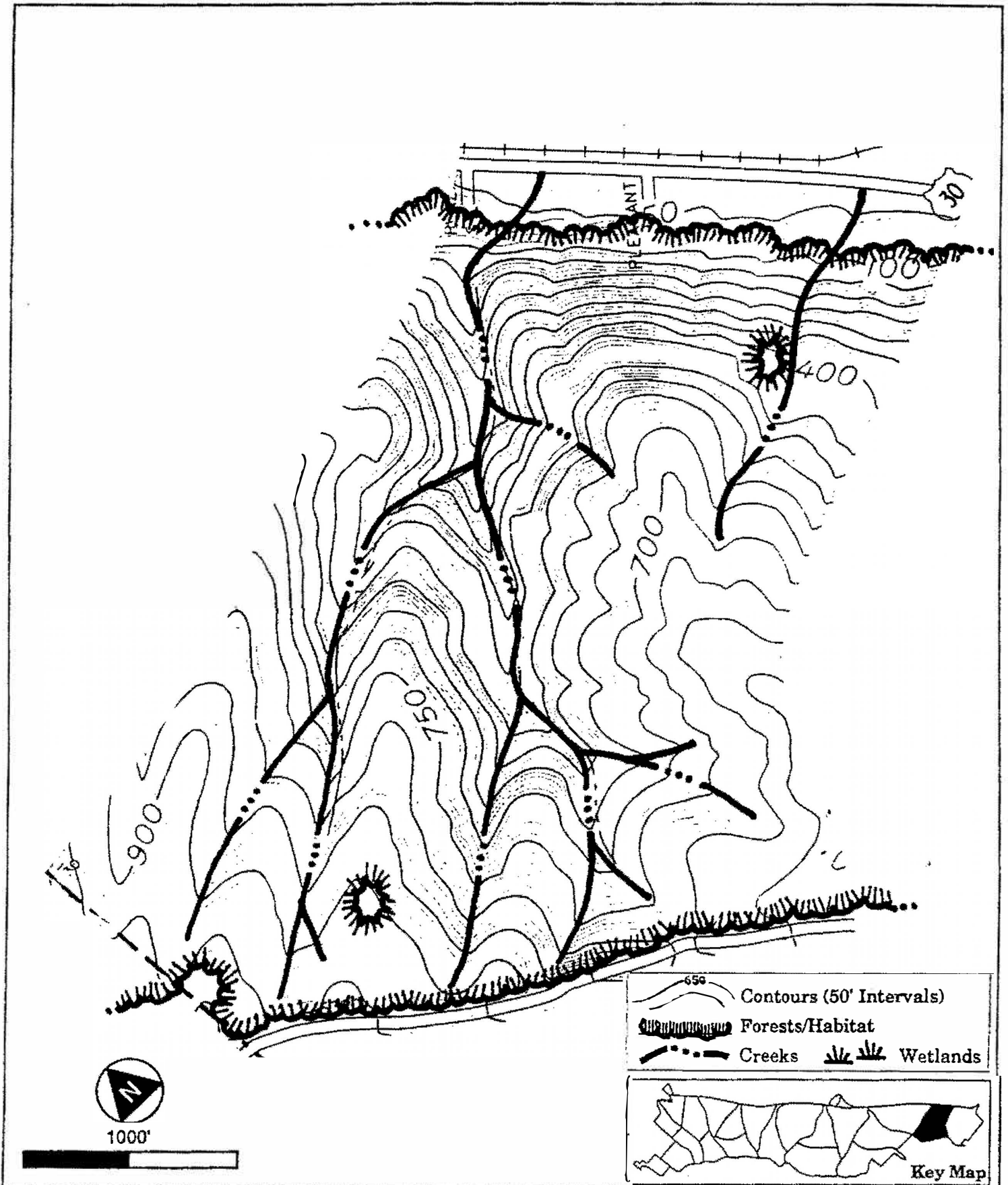
Evidence of an old homestead can be found at this site: an old well and several old fruit trees are located near "Inspiration Point." An abandoned sluice traverses the southern part of this site.

Quantity of Resources:

The 'Express Creek' basin is 211 acres in size. The remaining portion of the site is made up of minor drainage basins of between five and 25 acres. Except for approximately 12 acres of developed land, most of which is along St. Helens Road, the entire site is in forest cover.

Conclusion:

The site's forest and drainages are of high significance; developed areas without forest cover and without drainages along St. Helens Road are of low to medium significance.



NORTHWEST HILLS
 Natural Area Protection Plan

**Natural Features
 Site Map**

Site-Specific ESEE Comments: Resource Site 87

Conflicting Uses: Residential, Industrial, Landscaping

Consequences of Allowing Conflicting Uses: Residential development disturbs wildlife through interference with migration, removal of forest habitat and possible degradation of local water sources. Expansion of industrial use could lead to further removal of forest cover, invasion of non-native plant species and degradation or removal of soils, vegetation and water courses. Industrial and residential uses also interfere with wildlife migration within and between sites and between Holman and Macleay Parks. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Resource protection would result in negative consequences if development potential were reduced and could not be replaced elsewhere on site. Under the Protection Plan, approximately 3.3 acres of residential and 4 acres of industrial land are affected by environmental zones. Residential and industrial development in protected areas would be subject to review. Resource protection measures may limit but will not prohibit development at this site; estimated net change in development potential is zero.

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
RF	2.5	.8
IH	4	0

Social Consequences: Resource protection would result in positive consequences. The old homestead near Inspiration Point would be preserved as a historic and cultural resource. Recreational and educational resources, and the "country-in-the-city" character would also be preserved.

Environmental Consequences: Resource protection would result in positive consequences. These consequences include: protection and maintenance of wildlife habitat; protection of area for groundwater recharge; preservation of watershed ecosystem and preservation of migration corridors. See Chapter 6, General Analysis of ESEE Consequences.

Energy Consequences: Resource protection would result in positive consequences. Reduction in industrial energy consumption for heating and cooling systems, transportation or infrastructure use would result in energy savings.

Resource site 88 has been divided. The portion of the resource site that is zoned for industrial uses has been added to resource sites that are designated as IL2, IL3, and IL4. The natural resource inventory and ESEE decisions that apply to resource site 88: Firelane 1 - East Bluff will continue to apply within resource sites IL2, IL3, and IL4. All other portions of resource site 88 have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Non-industrial portions of resource site 88 are now signified as resource site FP22. The natural resource inventory and protection decisions that apply to FP22 can be found in *Volume 2 Part A2 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 21-41)*.

The following natural resource inventory, ESEE analysis, and resource protection decisions on pages 117 through 120 continue to apply to portions of resource site 88 that are now designated as IL2, IL3, and IL4.

Site Size: 418 acres

Location: West of St. Helens Rd., East of Firelane 1

Neighborhood: Forest Park and Linnton

Date(s) of Inventory: March 10 and August 13, 1990, and February 6, 1991

Habitat Classification:

Upland Coniferous/Broadleaf Deciduous Forest

Riverine, Intermittent Streambed

Seasonally Flooded

Types of Resources:

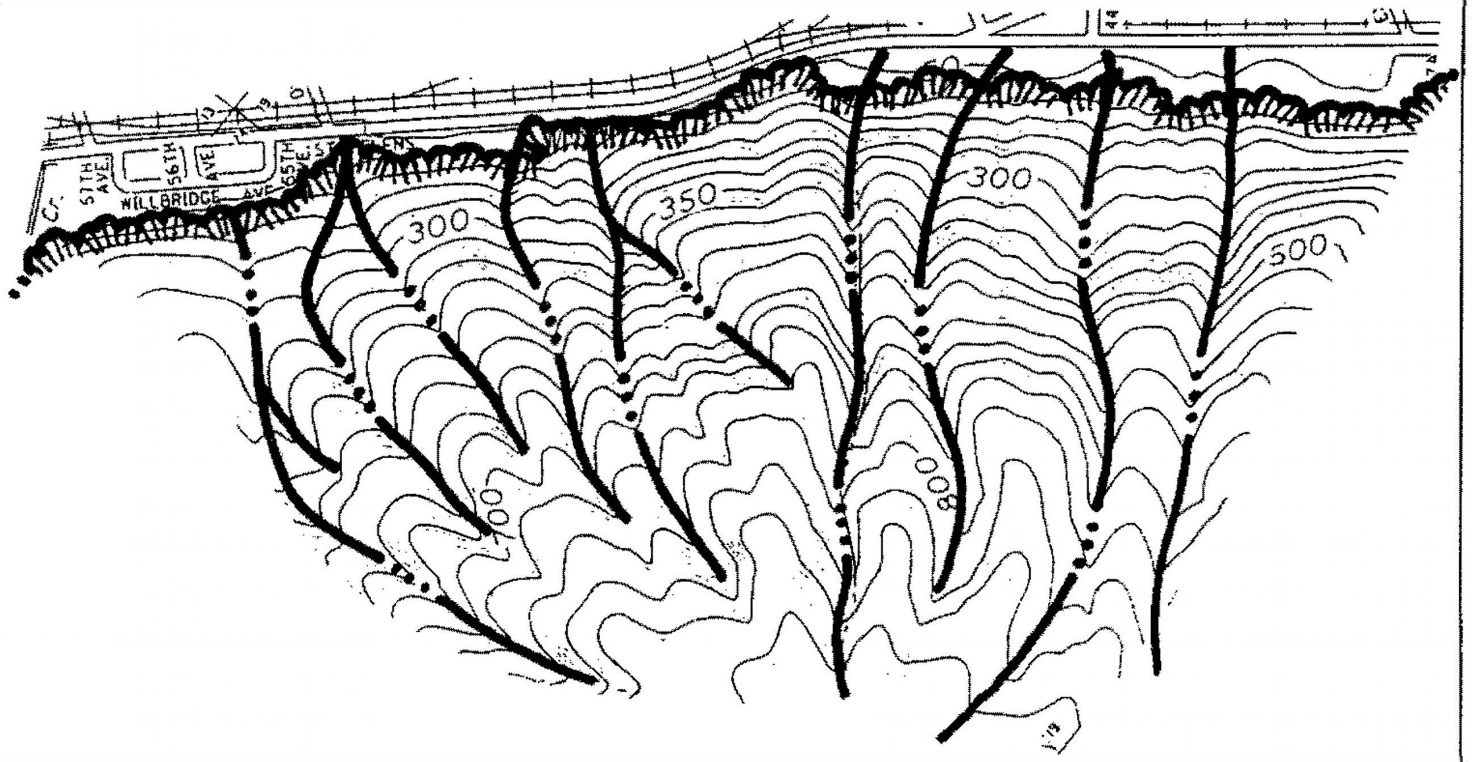
Seasonal creek, wildlife habitat, sensitive fauna, forest, open space and groundwater resources.

This site also provides scenic and recreational resources.

Resource Description and Quality:

The largest stand of *mature hardwood* within the study area exists in a wide band across the central portion of the hillside. Conifers are underrepresented throughout much of this area and are altogether absent along some of the drainages. Smaller stands of young to mid-aged second growth western hemlock forest exist along the base of the hillside and along the ridge. Forest cover protects watershed resources, serves as habitat for wildlife and provides open space, scenic and recreational values. The structure of the forest community is limited by the lack of tall conifers, large snags and herbaceous cover. Downed logs and woody debris found at the site, however, are critical structural and functional components of the watershed ecosystem. English ivy is spreading into the site near St. Helens Road.

This site provides moderate to high quality food and cover habitat for wildlife. Sources of water are limited to several small, seasonal drainages. In 1984, black bear was sited near the ridge in the southwest corner of this site. This is the closest known siting to Portland within the study area. In 1990, signs of black bear were found at three locations in the Northwest Hills, all of them north of Germantown Road. Birds observed at this site include great horned owl, pileated woodpecker, pygmy owl, red-tailed hawk and ruby crowned kinglet. Interspersion with surrounding habitat increases the site's



	Contours (50' Intervals)
	Forests/Habitat
	Creeks
	Wetlands

Key Map

NORTHWEST HILLS
 Natural Area Protection Plan

**Natural Features
 Site Map**

Site-Specific ESEE Comments: Resource Site 88

Conflicting Uses: Industrial, Landscaping

Consequences of Allowing Conflicting Uses: Approximately 4 percent of the site is used for industrial activity. Industrial use could disturb wildlife and habitat; emissions could degrade plant and animal life; and industrial activity could disturb the watershed ecosystem. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Resource protection would result in negative consequences if development potential were reduced and could not be replaced elsewhere on site. Current industrial development would not be affected by resource protection measures. Under the Protection Plan, approximately 17.4 acres of industrial land are affected by environmental zones. The application of strict resource protection measures to land within this site will reduce estimated net development potential by .4 acres. This land is jurisdictional wetlands.

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
IH	17	.4

Social Consequences: Resource protection would result in positive consequences. Open space, scenic and aesthetic, forest and recreational values provided by forest cover which are unprotected would be preserved.

Environmental Consequences: Restricting or prohibiting industrial activity along St. Helens Road would preserve forest cover as wildlife habitat. The numerous minor drainages would also be protected from disturbance. See Chapter 6, General Analysis of ESEE Consequences.

Energy Consequences: Resource protection would result in positive consequences. Reduction in industrial energy consumption for heating and cooling systems, transportation or infrastructure use would result in energy savings.

The natural resource inventory and ESEE decisions that apply to resource site 89: Lower Saltzman Creek have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 89 has been renumbered. It is now signified as resource site FP21 The natural resource inventory and protection decisions that apply to FP21 can be found in *Volume 2 Part A2 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 21-41)*.

The natural resource inventory and ESEE decisions that apply to resource site 90: Saltzman Creek Headwaters have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 90 has been renumbered. It is now signified as resource site FP20. The natural resource inventory and protection decisions that apply to FP20 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

Resource site 91 has been divided. The portion of the resource site that is zoned for industrial uses has been added to resource sites that are designated as IL1 and IL2. The natural resource inventory and ESEE decisions that apply to resource site 91: Willbridge Uplands will continue to apply within resource sites ILL1 and IL2. All other portions of resource site 9 have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Non-industrial portions of resource site 91 are now signified as resource site FP19. The natural resource inventory and protection decisions that apply to FP19 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The following natural resource inventory, ESEE analysis, and resource protection decisions on pages 129 through 132 continue to apply to portions of resource site 91 that are now designated as IL1 and IL2.

Site Size: 383 acres

Location: West of St. Helens Road, in Willbridge area above Doane Lake

Neighborhood: Linnton and Forest Park

Date(s) of Inventory: March 13, August 9 and August 16, 1990

Habitat Classification:

Upland Coniferous/Broadleaf Deciduous Forest

Riverine, Intermittent Streambed

Seasonally Flooded

Types of Resources:

Seasonal creeks, wildlife habitat, rare and sensitive fauna, forest, open space and groundwater resources.

The site also provides scenic and recreational resources.

Resource Description and Quality:

This site is made up of one large (215 acres) and two small (<50 acres) intermittent creek basins with a diverse riparian habitat. Substantial down woody material has accumulated in the streambed and on the forest floor. *Conifer topping hardwood* covers most of the basin. A large stand of *mid-aged conifer* is located near the center of the site; small stands of *mature hardwood*, *hardwood with young conifer* and *shrub* are also present. Large western hemlock and Douglas fir trees are prevalent at this site. Forest cover protects watershed resources and provides open space, scenic and recreational resources. Snags, downed logs and woody debris found at the site are critical structural and functional components of the watershed ecosystem. The western wahoo occurs along the lower creek banks. Invasive species including ivy, holly, laurel and clematis are proliferating near St. Helens Road.

The site provides high quality food, water and cover habitat for wildlife. Birds using this site include pileated woodpecker, vulture, red-tailed hawk and a variety of songbirds. Evidence of both bear and bobcat were discovered in August, 1990, making this site the closest known occurrence of these two mammals to Portland in recent years. Extensive coyote runs were identified at this site, which serves as a coyote feeding and breeding area. The site's primary creek supports a healthy population of macroinvertebrates. St.

Helens Road impairs wildlife migration between the forest and the Willamette River.

Habitat Rating

Wildlife Habitat Score: 86		Range for All Sites: 55 to 98
Water	:	High
Food	:	High
Cover	:	Moderately High
Interspersion	:	High
Uniqueness	:	Moderately High
Disturbance	:	High

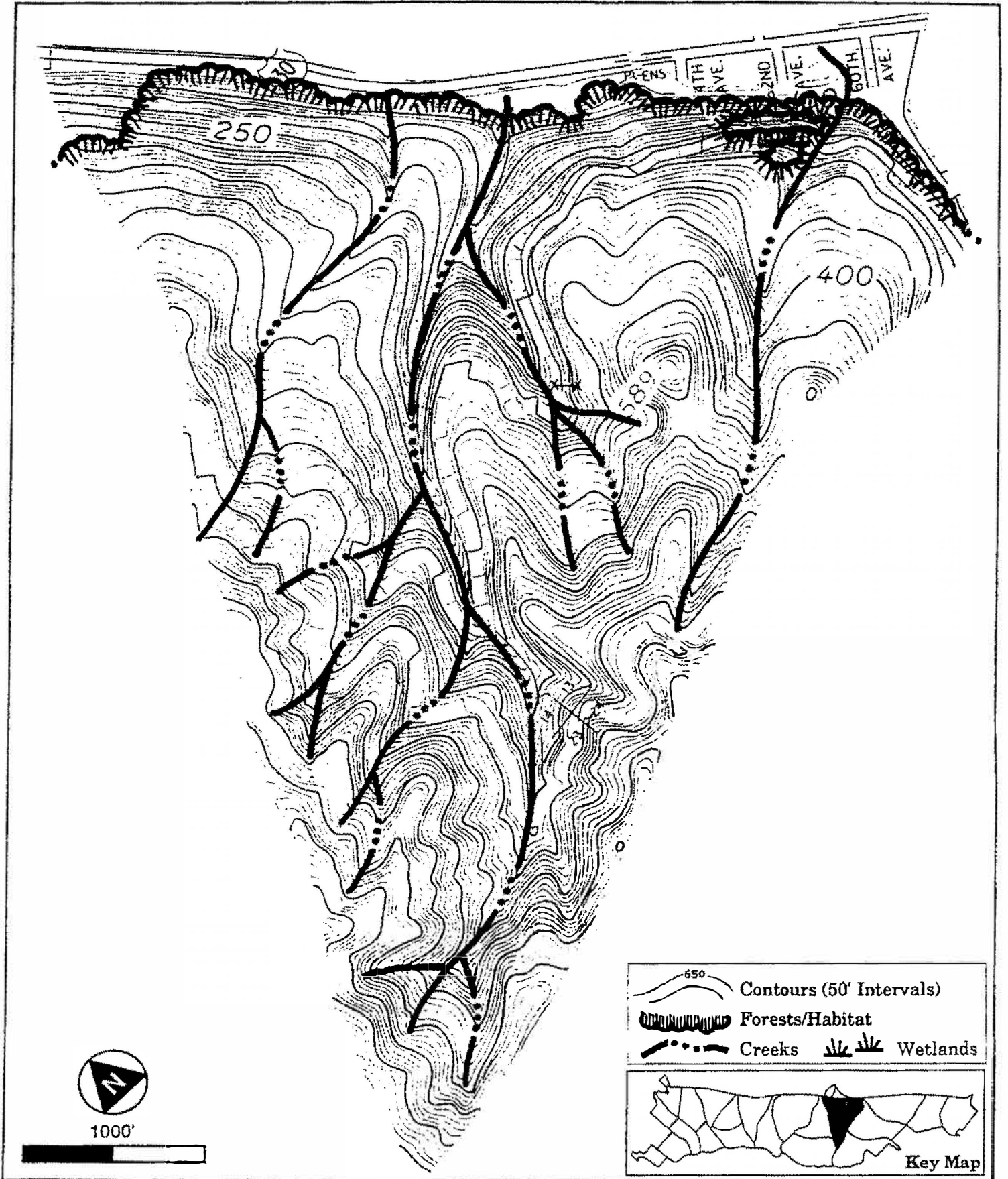
Scenic views and recreational opportunities are provided along Leif Erikson Drive (scenic corridor), Saltzman Road, Wildwood Trail (40-Mile Loop) and Maple Trail.

Quantity of Resources:

This 383-acre site includes a first-order creek with a 215-acre basin and two smaller (<50 acres) drainages. Approximately 95 percent of the site is in forest cover which provides food, cover and breeding habitat for resident and migratory wildlife.

Conclusion:

The forested slopes and drainages at this site are of high significance. The developed residential areas without drainages or forest cover are of low significance.



NORTHWEST HILLS
 Natural Area Protection Plan

**Natural Features
 Site Map**

Site-Specific ESEE Comments: Resource Site 91

Conflicting Uses: Residential, Landscaping, Industrial

Consequences of Allowing Conflicting Uses: Conflicting uses would disturb forest cover, watershed ecosystem and wildlife habitat. Both residential and industrial use could affect the site's primary creek. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Resource protection would result in negative consequences if development potential were reduced and could not be replaced elsewhere on site. Current industrial and residential development would not be affected by resource protection measures. Under the Protection Plan, approximately 15 acres of residential and 2.5 acres of industrial land are affected by environmental zones. Residential and industrial development in protected areas would be subject to review. Resource protection measures may limit but will not prohibit development at this site; estimated net change in development potential is zero.

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
R10	5	0
R2.5	10	0
IH	2.5	0

Social Consequences: Resource protection would result in positive consequences. The scenic and recreational values of Leif Erikson Drive, Saltzman Road and Maple Trail would be preserved.

Environmental Consequences: Resource protection would result in positive consequences. Food, water and cover habitat for wildlife would be protected. The first order creek and the smaller drainages would be protected from potential effects of industry. See Chapter 6, General Analysis of ESEE Consequences.

Energy Consequences: Resource protection would result in positive consequences. Reduction in industrial energy consumption for heating and cooling systems, transportation or infrastructure use would result in energy savings.

Site Size: 20 acres

Location: East of St. Helens Road, north of Saltzman Road; site bordered on all sides by railroad embankments

Neighborhood: Northwest Industrial

Date(s) of Inventory: March 2, 1990, and WGP Inventory (1986)

Habitat Classification:

Riparian Hardwood Forest

Riverine, Lower Perennial and Intermittent Streambeds

Palustrine, Open Water and Scrub-Shrub Wetlands

Permanently Flooded

Excavated

Types of Resources:

Palustrine wetlands, perennial and seasonal creek, wildlife habitat, forest and open space.

Resource Description and Quality:

This site contains a permanently flooded pond, adjacent riparian hardwoods and emergent wetlands, and is fed by one seasonal creek and one perennial creek (Doane Creek).

The open water and scrub-shrub wetlands provide an important year-round water source for local bird and animal populations. Riparian plants and aquatic insects at the site provide food and cover for birds and waterfowl, including red-tailed hawk, hairy woodpecker, barn swallow, green-backed heron and mallard.

The entire site is enclosed by railroad embankments which isolate it from the nearby Willamette River and Forest Park, as well as from surrounding industrial activities and traffic. This results in relatively low on-site disturbance, but significantly impedes non-avian wildlife migration. The site has the potential to act as a link between the Willamette River and Forest Park. The lack of public access to the site reduces or eliminates the site's potential recreational values.

Invasive plant species such as holly, ivy and blackberry threaten the vitality of the local plant community. In addition, the potential for toxic leachate from a nearby Superfund site poses a significant water quality concern.

Habitat Rating

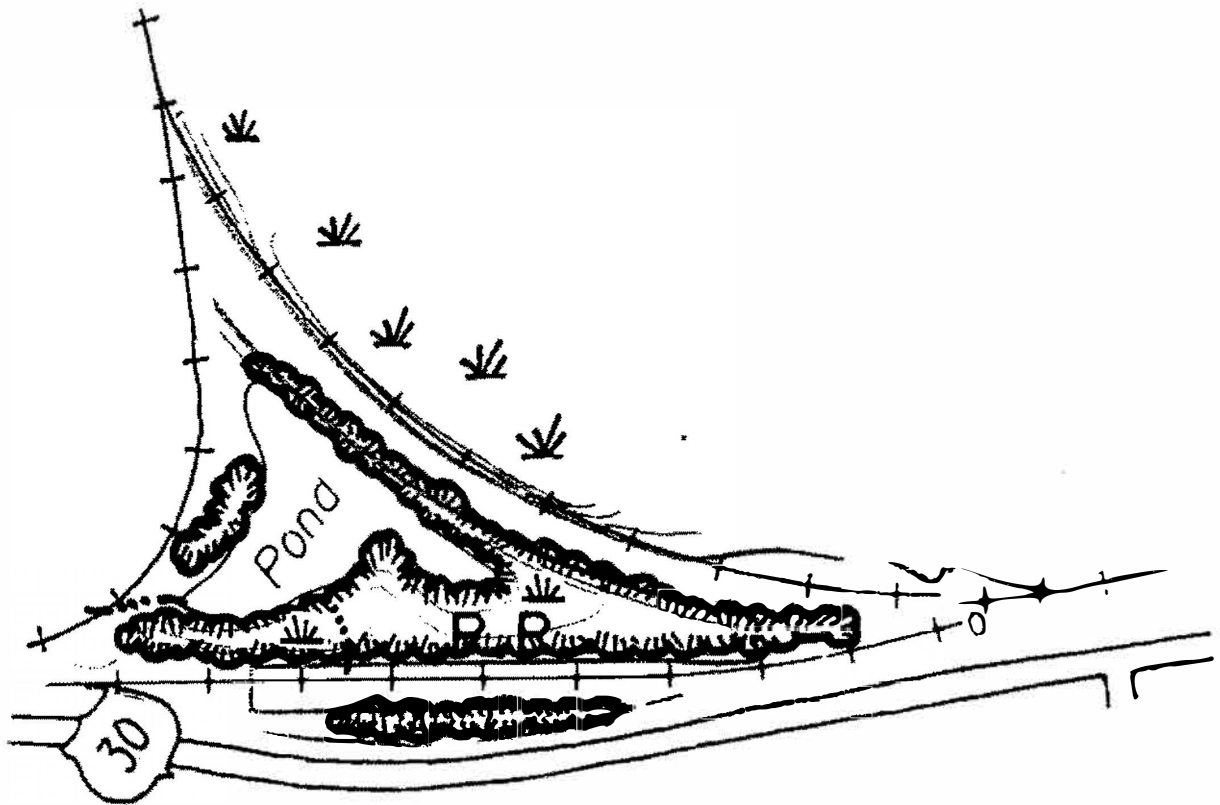
Wildlife Habitat Score: 85		Range for All Sites: 55 to 98
Water	:	High
Food	:	High
Cover	:	Medium
Interspersion	:	Low
Uniqueness	:	Medium
Disturbance	:	Low

Quantity of Resources:..

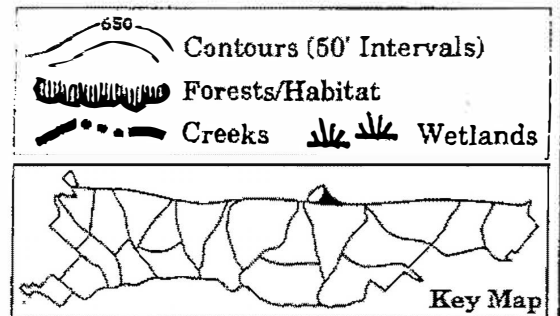
All of this 20-acre site provides significant habitat components for wildlife. The site includes approximately four acres of riparian hardwood forest, an eight-acre pond bordered by scrub-shrub wetlands and fed by two creeks with basins of 215 and 770 acres.

Conclusion:

The entire site, to the base of the existing railway embankments, is of high significance.



500'



NORTHWEST HILLS
 Natural Area Protection Plan

**Natural Features
 Site Map**

92

Site-Specific ESEE Comments: Resource Site 92

Conflicting Uses: Industrial, Landscaping, Rail Traffic

Consequences of Allowing Conflicting Uses: Industrial use interferes with non-avian wildlife migration. Traffic along St. Helens Road also prevents interspersions with surrounding sites. Conflicting uses may disturb the site's connection to the Willamette River and Forest Park. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Resource protection would not result in negative consequences. Industrial use is not feasible or economic as the site is landlocked by railway embankments and not accessible, and large portions of it is covered by pond and wetlands areas. Under the Protection Plan, approximately 14 acres of industrial land are affected by environmental zones. Industrial development in protected areas would be subject to review. The application of strict resource protection measures to land within this site will reduce estimated net development potential by 11.5 acres (wetlands).

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
IH	2.5	11.5

Social Consequences: Resource protection would result in positive consequences if pedestrian access is improved in the future. The lack of public access to the site reduces or eliminates the site's potential recreational values.

Environmental Consequences: Resource protection would result in positive consequences. Wildlife habitat including local wetlands would be protected from effects of local industrial use. The site has the potential to act as a link between the Willamette River and Forest Park.

Energy Consequences: Resource protection would not result in negative consequences.

Site Size: 26 acres

Location: Between St. Helens Road and Front Avenue, north of Doane Lake

Neighborhood: Northwest Industrial

Date(s) of Inventory: March 2, 1990, and WGP Inventory (1986)

Habitat Classification:

Riparian Hardwood Forest

Riverine, Lower Perennial Streambed

Palustrine, Scrub-Shrub Wetland

Seasonally Flooded

Types of Resources:

Year-round creek, palustrine wetlands, wildlife habitat, forest and open space.

Resource Description and Quality:

This highly disturbed site consists of a large open field with scattered shrub and tree cover, and a short reach of Doane Creek bordered by a gallery of riparian hardwoods. The plant community in the open field is in an early seral shrub stage of regeneration, retarded by dense Himalayan blackberry growth and by fairly recent and extensive disturbances (primarily fill activities).

The open field is dominated by Himalayan blackberry and Queen Anne's lace which provide limited food and cover for songbirds. Red-tailed hawk and hairy woodpecker were observed foraging in the riparian hardwoods. The creek and adjacent cover provide a limited, year-round water source, food and cover for wildlife in the area.

Habitat Rating

Wildlife Habitat Score: 55 Range for All Sites: 55 to 98

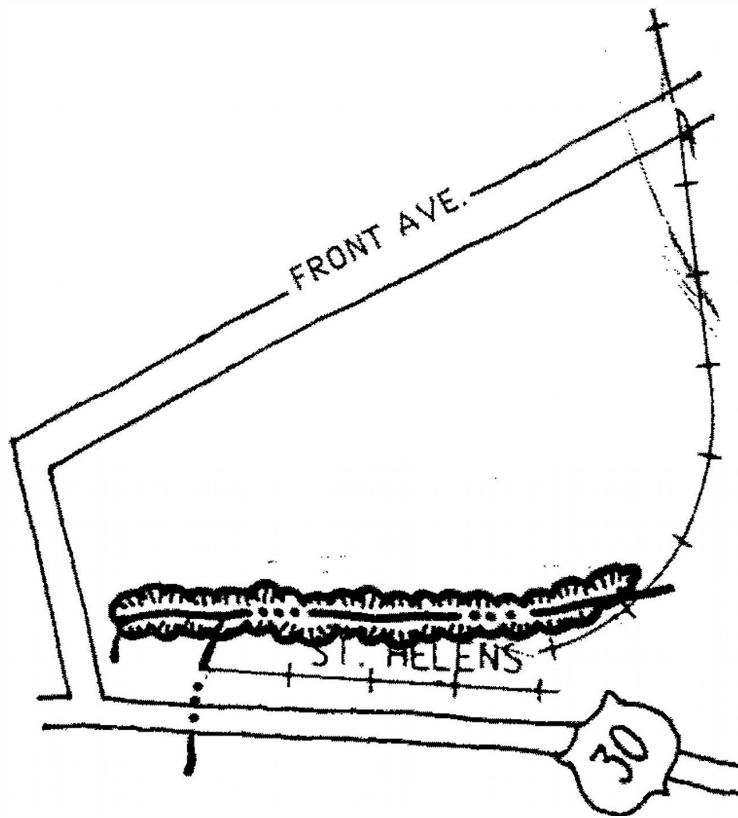
Water	: Medium
Food	: Medium
Cover	: Medium
Interspersion	: Low
Uniqueness	: Low
Disturbance	: High

Quantity of Resources:

The year-round Doane Creek is located along the eastern boundary of this site. Doane Creek drains 770 acres of forested land, passes through the Rivergate Quarry site (see Site 94), then under St. Helens Road and the Burlington Northern Railroad to reach this site. The 26-acre site contains roughly four acres of riparian forest along the creek and 22 acres of open field with scattered shrubs and bare ground, and a few trees.

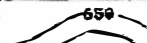



Conclusion:

The riparian area is of high significance; the disturbed open field is of low significance.



500'



-  Contours (50' Intervals)
-  Forests/Habitat
-  Creeks
-  Wetlands



Key Map

NORTHWEST HILLS
Natural Area Protection Plan

**Natural Features
Site Map**

93

Site-Specific ESEE Comments: Resource Site 93

Conflicting Uses: Industrial, Landscaping

Consequences of Allowing Conflicting Uses: Allowing conflicting uses to continue would result in further disturbance of the site. The four acre riparian area may be disturbed by industrial activity. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Protection of the entire 26-acre site would result in high negative consequences since most of the site is level and cleared. General and heavy industrial uses would be less affected by protection of the 4-acre riparian area along the western boundary of the site due to the significant drop to the creekbed. Under the Protection Plan, approximately 5.2 acres of industrial land are affected by environmental zones. Industrial development in protected areas would be subject to review. The application of strict resource protection measures to land within this site will reduce estimated net development potential by 1.7 acres (wetlands).

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
IH	3.5	1.7

Social Consequences: Scenic values of the forested ravine would be protected by plan regulations.

Environmental Consequences: Resource protection would result in positive consequences. The riparian area would be protected from disturbance. Restrictions on industrial use of open field would not have any positive effects on already disturbed open field. The creek and adjacent cover would continue to provide habitat for wildlife. See Chapter 6, General Analysis of ESEE Consequences.

Energy Consequences: Resource protection would result in positive consequences. Reduction in industrial energy consumption for heating and cooling systems, transportation or infrastructure use would result in energy savings.

Resource site 94 has been divided. The portion of the resource site that is zoned for industrial uses has been added to the resource site that is designated as IL1 . The natural resource inventory and ESEE decisions that apply to resource site 94: Lower Doane Creek/Quarry will continue to apply within resource site IL1. All other portions of resource site 94 have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Non-industrial portions of resource site 94 are now signified as resource site FP16. The natural resource inventory and protection decisions that apply to FP16 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The following natural resource inventory, ESEE analysis, and resource protection decisions on pages 141 through 144 continue to apply to portions of resource site 94 that are now designated as IL1.

Site No. 94 Unit: Lower Doane Creek/Quarry Maps: 2319-21, 2419-20

Site Size: 343 acres

Location: West of St. Helens Road, between Saltzman Road and Firelane 7

Neighborhood: Linnton

Date(s) of Inventory: August 9 and August 13, 1990

Habitat Classification:

Upland Coniferous/Broadleaf Deciduous Forest

Riverine, Upper Perennial Streambed, Unconsolidated Bottom

Palustrine, Emergent and Scrub/Shrub Wetland

Seasonally Flooded

Types of Resources:

Year round creek, palustrine wetland, wildlife habitat, sensitive fauna, forest, open space and groundwater resources.

The site also provides scenic and recreational resources.

Resource Description and Quality:

This site forms the lower portion of the Doane Creek watershed. Most of the basin of this year-round creek is in forest cover and elevated from the noises and traffic in the industrial area along St. Helens Road. At the bottom of the basin, however, the streambed and the natural hillside terrain have been highly disturbed by past mining activities. A small palustrine wetland has formed adjacent to Doane Creek in an abandoned quarry excavation.

This site has a diverse riparian habitat and climax conifer species are well established in the uplands. Western wahoo--on the 1976 Provisional List of Rare and Endangered Plants in Oregon--is present along the creek. Substantial down woody material has accumulated in the streambed and on the forest floor. *Conifer topping hardwood* and *mid-aged conifer* are the most common vegetation types at the site, though small patches of *hardwood with young conifer*, *mature hardwood* and *shrub* are also present. Forest cover protects watershed resources, serves as habitat for wildlife and provides open space, scenic and recreational resources. Snags, downed logs and woody debris found at the site are critical structural and functional components of the watershed ecosystem. Invasive species such as holly, ivy, laurel and western clematis threaten the plant community.

The wetland provides secluded habitat for a variety of songbirds and waterfowl. The site provides high quality food, water and cover habitat for wildlife. Fauna using this site include black bear, porcupines, pileated woodpecker, pygmy owl, red-tailed hawk and a variety of songbirds. Rare red legged frogs were observed along the creek (above the quarry). The abandoned, fenced-off quarry site and St. Helens Road impair wildlife migration through the forest and between the forest and the Willamette River. Game trails were observed along the creek above the quarry.

Habitat Rating

Wildlife Habitat Score: 86		Range for All Sites: 55 to 98	
Water	:	High	
Food	:	High	
Cover	:	Moderately High	
Interspersion	:	High	
Uniqueness	:	Moderately High	
Disturbance	:	High	

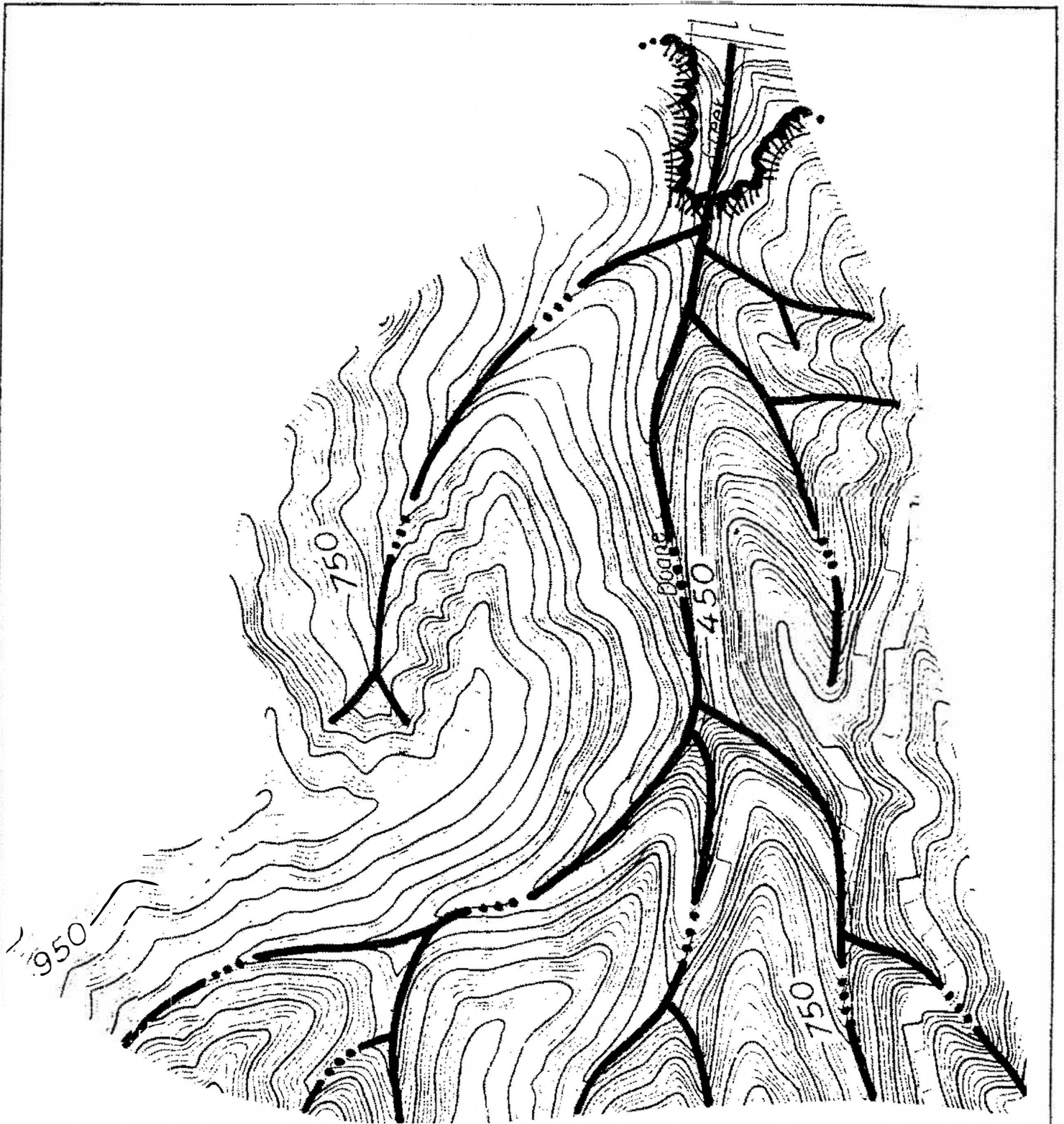
Scenic views and passive recreational opportunities are provided along Leif Erikson Drive (scenic corridor) and Wildwood Trail (40-Mile Loop).

Quantity of Resources:

This site forms the lower half of Doane Creek's 770-acre drainage basin. Approximately 95 percent of the site is in forest cover which provides food and cover habitat for resident and migratory wildlife. Approximately 15 acres have been excavated as part of the mining operation and contains a 1,000 sq. ft. artificial wetland. Though much of the quarry is fenced, all of this site can potentially serve as open space area.

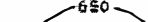



Conclusion:

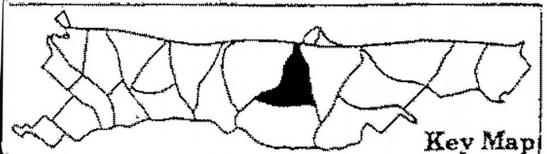
Doane Creek and the forested upland areas are of high significance. The Rivergate Quarry site has little resource value with the exception of the excavated wetland, its adjacent vegetation and the altered Doane Creek channel which are of medium significance.



1000'



-  Contours (50' Intervals)
-  Forests/Habitat
-  Creeks
-  Wetlands



Key Map

NORTHWEST HILLS

Natural Area Protection Plan

Natural Features
Site Map

94

Site-Specific ESEE Comments: Resource Site 94

Conflicting Uses: Industrial, Residential, Landscaping, Agriculture, Forestry

Consequences of Allowing Conflicting Uses: The land zoned heavy industrial is a quarry site no longer in operation (see Mineral and Aggregate Resources in Chapter 5). The existence of the site would not contribute to further disturbance of streambed and hill terrain. Both the quarry and St. Helens Road impair wildlife migration through the forest. See Chapter 6, General Analysis of ESEE Consequences, for further discussion of impacts.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Most of the site is zoned for Open Space uses. There are .4 acres of land zoned for residential farm/forest use. There is the potential for a single dwelling on the site if processed through a Substandard Lot review. Under the Protection Plan, approximately 1.2 acres of industrial land are affected by environmental zones. Industrial development in protected areas would be subject to review. Resource protection measures may limit but will not prohibit development at this site; estimated net change in development potential is zero.

Current Zoning	Estimated Acreage Affected by EC Zone	Estimated Acreage Affected by EP Zone
IH	1.2	0

Social Consequences: Scenic and recreational values are partially protected by Open Space (OS) designation. Further restrictions would improve these values.

Environmental Consequences: Resource protection would result in positive consequences. Restricting further mining activity would protect Doane Creek and its watershed. See Chapter 6, General Analysis of ESEE Consequences.

Energy Consequences: Resource protection would result in no negative consequences since the site has already been mined.

The natural resource inventory and ESEE decisions that apply to resource site 95: Doane Creek Headwaters have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 95 has been renumbered. It is now signified as resource site FP15. The natural resource inventory and protection decisions that apply to FP15 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 96: Firelane 7 – North have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 96 has been renumbered. It is now signified as resource site FP14. The natural resource inventory and protection decisions that apply to FP14 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 97: Springville Creek have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 97 has been renumbered. It is now signified as resource site FP13. The natural resource inventory and protection decisions that apply to FP13 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 98: Upper Clark-Wilson Creek have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 98 has been divided and renumbered. It is now signified as resource sites FP11 and FP12. The natural resource inventory and protection decisions that apply to FP11 and FP 12 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 99: Linnton Creek Headwaters have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 99 has been renumbered. It is now signified as resource site FP9. The natural resource inventory and protection decisions that apply to FP9 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 100: Lower Linnton Creek have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 100 has been renumbered. It is now signified as resource site FP10. The natural resource inventory and protection decisions that apply to FP10 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 101: Linnton Park have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 101 has been renumbered. It is now signified as resource site FP8. The natural resource inventory and protection decisions that apply to FP8 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 102: Newton Creek Headwaters have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 102 has been renumbered. It is now signified as resource site FP7. The natural resource inventory and protection decisions that apply to FP7 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 103: Lower Newton Creek Headwaters have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 103 has been renumbered. It is now signified as resource site FP6. The natural resource inventory and protection decisions that apply to FP6 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 104: Harborton Uplands have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 104 has been renumbered. It is now signified as resource site FP2. The natural resource inventory and protection decisions that apply to FP2 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

Site Size: 34 acres

Location: East of St. Helens Road, north of PGE Harborton Substation

Neighborhood: Linnton

Date(s) of Inventory: July 12, 1986, and April 5, 1990

Habitat Classification:

Upland Riparian Forest

Riverine, Upper Perennial and Intermittent Streambed

Palustrine, Forested, Scrub/Shrub and Emergent Wetlands

Seasonally Flooded

Types of Resources:

Seasonal creek, palustrine wetlands, wildlife habitat and open space.

The site also provides scenic, historic and recreational resources.

Resource Description and Quality:

This natural area, located along the northern boundary of Portland, provides high quality wildlife habitat and a unique link between the Northwest Hills and the Willamette River. High quality forested, scrub/shrub and emergent wetlands are found at this site.

The palustrine wetlands provide potential out-of-channel rearing areas for coho salmon, cutthroat trout and steelhead. The site provides a year-round water source and a variety of food and cover for terrestrial wildlife. Bird species observed foraging and resting at the site include red-tailed hawk, osprey, Canada goose, pintails, mallards and a variety of songbirds. Deer, beaver, raccoon and rabbit have also been observed at the site. The site's connection to the Willamette River enhances its habitat value. However, opportunities for migration of mammals between this site and the Northwest Hills forest are limited.

Habitat Rating

Wildlife Habitat Score: 94 Range for All Sites: 55 to 98

Water	: High
Food	: Moderately High
Cover	: Moderately High
Interspersion	: Moderately High
Uniqueness	: High
Disturbance	: Low

This site offers high quality scenic and recreational resources with access to the Willamette River and views of the river and Forest Park.

It is conjectured, based on historical survey maps (T1N, R1W; surveyed in 1855), that the first Linnton Townsite was located at this site and on adjacent land presently occupied by the PGE Substation.

Quantity of Resources:

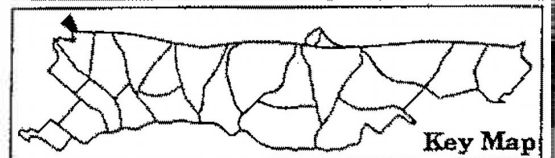
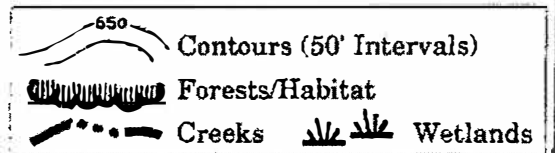
According to the National Wetlands Inventory, all but about four of the site's 34 acres are composed of forested, scrub/shrub and emergent wetlands. The wetlands are fed by a small seasonal creek draining 65 acres.

Conclusion:

This entire site is of very high significance.



500'



NORTHWEST HILLS
 Natural Area Protection Plan

Site-Specific ESEE Comments: Resource Site 105

Conflicting Uses: There are no conflicting uses.

Consequences of Allowing Conflicting Uses: This site is zoned Open Space and protected by the Willamette Greenway River Natural (RN) overlay zone. Therefore, the possible effects of conflicting uses allowed by the Open Space zone are mitigated.

Consequences of Limiting or Prohibiting Conflicting Uses:

Economic Consequences: Resource protection would result in no negative consequences.

Social Consequences: Resource protection would result in no negative consequences. Passive recreational use of open space is already allowed and would not be affected by resource protection measures.

Environmental Consequences: Resource protection would result in no negative consequences.

Energy Consequences: Resource protection would result in no negative consequences.

The natural resource inventory and ESEE decisions that apply to resource site 106: Lower Miller Creek have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 106 has been renumbered. It is now signified as resource site FP1. The natural resource inventory and protection decisions that apply to FP1 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 107: Miller Creek Headwaters - East have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 107 has been renumbered. It is now signified as resource site FP5. The natural resource inventory and protection decisions that apply to FP5 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 108: Miller Creek Headwaters - South have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 108 has been renumbered. It is now signified as resource site FP4. The natural resource inventory and protection decisions that apply to FP4 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

The natural resource inventory and ESEE decisions that apply to resource site 109: Miller Creek Headwaters - West have been repealed and replaced by the *Environmental Overlay Zone Map Correction Project*. Resource Site 109 has been renumbered. It is now signified as resource site FP3. The natural resource inventory and protection decisions that apply to FP3 can be found in *Volume 2 Part A1 - Forest Park and Northwest District, Natural Resource Inventory and Protection Decisions (Resource Sites 1-20)*.

CHAPTER 8
PLAN PROTECTION MEASURES

- INTRODUCTION •**
- GENERAL SUMMARY •**
- AMENDMENTS TO COMPREHENSIVE PLAN GOALS AND POLICIES •**
 - PROTECTION PLAN POLICIES & OBJECTIVES •**
 - AMENDMENTS TO TITLE 33, PLANNING AND ZONING, AND
TITLE 34, SUBDIVISIONS AND PARTITIONING REGULATIONS •**
- AMENDMENTS TO COMPREHENSIVE PLAN MAP DESIGNATIONS
AND OFFICIAL ZONING MAPS •**
- EXCEPTION TO STATEWIDE PLANNING GOAL 4, FOREST LANDS •**

Introduction

This chapter provides a general summary of resource protection measures as they relate to the findings of earlier chapters, and presents Protection Plan policies and objectives which form a foundation for these protection measures. New code language is presented at the end of the chapter.

General Summary

Natural resources of the Northwest Hills are interacting, interdependent elements of a complex natural system. This system, a western Oregon coniferous forest ecosystem, spans ten watershed subsystems which drain the eastern slopes of Portland's Northwest Hills. The Northwest Hills ecosystem is part of a larger natural system which extends out from the study area in all directions and is linked to the natural habitats of the Willamette Valley and the Oregon Coast Range.

Statewide Planning Goal 5 requires that resources found to be significant, be protected. The administrative rule for the Goal requires that an inventory be conducted to determine the location, quantity and quality of resources, and that where conflicting uses are identified, these resources are to be analyzed to determine the economic, social, environmental and energy (ESEE) consequences of resource protection. The resource inventory is contained in Chapters 5 and 7. The ESEE analysis is presented in Chapters 6 and 7. This chapter contains the policies, objectives and regulations necessary to implement the required protection of significant resources. The implementation measures include:

- **Amendments to Portland's Comprehensive Plan Goals and Policies** to refer to the *Northwest Hills Natural Areas Protection Plan*;
- **Adoption of the Northwest Hills Natural Areas Protection Plan Policies and Objectives** as the policy document for the area;
- **Amendments to Title 33, Planning and Zoning and Title 34, Subdivisions and Partitioning Regulations** to implement the Plan;
- **Amendments to the Comprehensive Plan Map Designations and Official Zoning Maps** to apply the environmental zones, change base zones and correct Open Space mapping errors; and
- **Adoption of an exception to Statewide Planning Goal 4, Forest Lands**, to meet Federal Clean Water Act requirements and comply with Statewide Planning Goal 6, Air, Water and Land Resources Quality.

Environmental Overlay Zones

The primary resource protection measure of the *Northwest Hills Natural Areas Protection Plan* is the application of the city's environmental overlay zones. The environmental zones are applied to the resource itself and to areas necessary to protect the resource. The environmental zones protect identified natural resources and resource values from adverse impacts and provide a mechanism through which conflicts between resources and human uses can be resolved.

The Protection Plan applies the city's two environmental overlay zones to resource and impact areas within the Northwest Hills planning area. The Environmental Protection zone, EP, allows development after review in a 25-foot Transition Area, subject to Transition Area development standards. In the Resource Area (over 25 feet into the zone), development may be permitted after review but approval criteria are extremely strict to ensure protection of resource functions and values. The same Transition Area standards apply to the Environmental Conservation zone, EC, but review approval criteria are less strict for development within the Resource Area. In the EC Resource Area, development is allowed after review so long as impacts are controlled and mitigated.

The adopted environmental overlay zones are contained on the city's Official Zoning Maps.

Amendments to Portland's Comprehensive Plan Goals and Policies

The following amendments to Comprehensive Plan Goal 8 are necessary to acknowledge the adoption of *Northwest Hills Natural Areas Protection Plan* and to clarify some inconsistent language. Language added shown in *italics*, language deleted shown in ~~strike-through~~.

- Amend Comprehensive Plan Goal 8, Policy 8.11, to add a new policy area for the Northwest Hills, as follows:

"8.11, Special Areas

Recognize unique land qualities and adopt specific planning objectives for special areas.

- A. Willamette River Greenway (no change)
- B. Balch Creek Watershed (no change)
- C. Johnson Creek Basin Policy (no change)
- D. *Northwest Hills*

Protect and preserve forest, wildlife and watershed resources through implementation of the Northwest Hills Natural Areas Protection Plan."

- Amend part of Comprehensive Plan Goal 8, Policy 8.18, Natural Resource Management Plans, to delete policy language (reference already made under 33.800.050 B), as follows:

~~“.....Plans approved through the regulations of the Environmental zones are deemed to be in compliance with Policies 8.9 through 8.17.”~~

Changes to Comprehensive Plan Goal 10 are needed to clarify policy language and to delete a typographic error. Under this policy, only Comprehensive Plan map designations (2) Farm and Forest through (7) Attached Residential have “absolute” maximum density language, yet specific regulations of the Zoning Code sometimes allow greater densities than those stated for these designations. An example is the provision which, under certain conditions, allows duplexes to be built on corner lots in the R20 through R5 zones. Similarly, the Transfer of Development Rights provision contained in the “Skyline Plan District” proposed by this Plan would, under certain conditions, allow greater densities in the Residential Farm/Forest (RF) zone. In the proposed amendments below, the word “generally” is added to statements regarding maximum density in the Comprehensive Plan Map designations (2) Farm and Forest through (7) Attached Residential. This change will clarify that the zoning code contains specific implementing regulations that are not reflected in the summary descriptions of the Comprehensive Plan map designations. A typographic error in the Farm and Forest language is also corrected.

- Amend Comprehensive Plan Goal 10, Policy 10.3, Comprehensive Plan Map, as follows:

The Comprehensive Plan Map is the official long-range planning guide for uses and development in the city. The Comprehensive Plan Map uses the designations listed below. The designations state the type of area each is intended for, general uses and development types desired, and the corresponding zone or zones which implement the designation. Comprehensive Plan Map designations are shown on the Official Zoning Maps.

1. Open Space (no change)

2. Farm and Forest

This designation is intended for agricultural and forested areas in the city which are presently deficient in public services.

Agriculture, forestry and extremely low density single-dwelling residential and agriculture will be the primary uses. The maximum density is *generally* one unit per two acres. The corresponding zone is RF.

3. **Limited Single-Dwelling**
This designation is intended for areas with long term service limitations and significant development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 2.2 units per acre. The corresponding zone is R20.
4. **Low Density Single-Dwelling**
This designation is intended for areas with public services but which are subject to significant development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 4.4 units per acre. The corresponding zone is R10.
5. **Medium Density Single-Dwelling**
This designation is intended for areas with adequate public services but minor development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 6.2 units per acre. The corresponding zone is R7.
6. **High Density Single-Dwelling**
This designation continues Portland's most common pattern of single-dwelling development. It is intended for areas with good public services and no development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 8.7 units per acre. The corresponding zone is R5.
7. **Attached Residential**
This designation is intended for areas with complete public services and without development constraints. It allows a mixture of housing types of a single-dwelling character, including attached houses. Allowed densities for attached houses are higher than for detached housing. The maximum density is *generally* 17.4 units per acre for attached housing. To allow the fulfillment of these densities, the allowed scale of these projects should be allowed to be greater than for other single-dwelling housing structure types. The corresponding zone is R2.5."

Northwest Hills Natural Areas Protection Plan Policies & Objectives

The *Northwest Hills Natural Areas Protection Plan* recognizes the human and natural resource values of the Northwest Hills. The Plan applies measures to protect the interrelated forest and watershed ecosystem while allowing human activity in locations that can sustain such activity, and guiding conflicting uses away from more sensitive resource areas. The Plan's

protection measures are based on a set of policies and objectives which are derived from the inventory and analysis of natural resources and human uses in preceding chapters.

The following policies and objectives will provide specific guidance for staff and applicants during review of proposals within the environmental zones in the *Northwest Hills Natural Areas Protection Plan* area.

Protection Plan Policies & Objectives

This section identifies specific policies and objectives for the *Northwest Hills Natural Areas Protection Plan*. Protection measures needed to carry out these policies and objectives are listed in the following section. These measures are designed to preserve Northwest Hills natural resource functions and values.

#1 Development Policy

Preserve the unique qualities of the Northwest Hills by integrating natural resource values and human uses in a manner which protects and enhances the area's natural amenities and country-in-the-city character.

The Northwest Hills natural area is an unique urban wilderness bordered by corridors of low-intensity human uses and development. The area's strong sense of country-in-the-city, unrivalled within Portland, is a vital and integral part of Portland's landscape and an irreplaceable link between natural and urban processes. Sustainable, low-impact human uses can be integrated with natural amenities along established development corridors in a balanced fashion which preserves the area's unique natural character and resources.

Objectives

The following objectives promote integration of natural resource values and human uses while preserving the unique attributes of the Northwest Hills:

- 1.1 Enhance the country-in-the-city character of the Northwest Hills by preserving and enhancing scenic and natural resources through implementation of the *Northwest Hills Natural Areas Protection Plan* and the *Scenic Resources Protection Plan*.
- 1.2 Promote the stewardship and buffering values of low-impact human uses along established development corridors by encouraging the planting of native vegetation and the conservation and management of natural and scenic resources.
- 1.3 Protect and retain as much existing native vegetation as possible before, during and after site alteration or construction activities.

- 1.4 Guide development away from sensitive natural resource areas such as wetlands, creeks and creek headwaters, steep slopes, wildlife habitat and groundwater recharge areas.
- 1.5 Use development as a means of improving or repairing the natural and scenic qualities of the Northwest Hills by locating buildings on less sensitive or formerly disturbed sites, planting native vegetation to match surrounding natural conditions and preserving healthier and more sensitive landscapes.

#2 Recreation and Education Policy

Recognize the value of the Northwest Hills forest as a regionally-significant recreational and educational resource.

The Northwest Hills forest, and Forest Park in particular, is a unique recreational and educational resource offering urban residents a wilderness park-like experience within walking distance of the center of Portland. The park provides an opportunity for Portland-area students and residents to learn about and experience a western Oregon coniferous forest ecosystem, which hosts an abundance and diversity of native plants and wildlife similar to that found in the forests of the Oregon Coast Range. Forest Park also contains a network of over 60 miles of recreation trails including the Wildwood Trail, which is the largest completed section of the 40-Mile Loop. Plans are being developed to link Portland with the Pacific Coast via a "Greenway to the Pacific." If successful, Portland's Wildwood Trail and 40-Mile Loop could one day form integral pieces of a trail connecting the Pacific Rim Trail with trails along the Oregon Coast.

Objectives

The following objectives are aimed at ensuring the protection and enrichment of educational and recreational opportunities in the Northwest Hills:

- 2.1 Retain and enhance the passive recreational and educational values of Forest Park through ecological management practices which enhance the urban wilderness character of the park.
- 2.2 Avoid park development activities which remove forest vegetation, introduce non-native plants or add impervious surfaces.
- 2.3 Preserve indigenous plant and animal communities to retain and enrich opportunities for learning about the western Oregon coniferous forest ecosystem.

- 2.4 Apply ecological management principles to the construction and maintenance of trails; plan future trail extensions which result in the least possible impact to sensitive habitat areas and watershed resources; remove or relocate trails which lead users into sensitive resource areas.

#3 Natural Hazards Policy

Protect soil and watershed resources and reduce the potential for landslides, land failures, and flooding by minimizing disturbance to natural terrain, vegetation and drainageways and by directing site development away from natural hazards.

The Northwest Hills slopes and soils are in a balance with vegetation, underlying geology and local levels of precipitation. Forest vegetation moderates the effects of winds and storms, stabilizes the soil and slows runoff from precipitation, thereby minimizing erosion and allowing the forest floor to filter out sediments as the water soaks down into groundwater reserves or passes into streams. By decreasing runoff and increasing groundwater infiltration, the forest protects downstream neighborhoods from flooding. Also, by stabilizing the soil and reducing runoff and erosion, the forest protects the community from landslides, slumps and mudflows. Maintaining this equilibrium reduces the potential danger to public health and safety posed by steep hillside slopes.

Clearing of vegetation, movement of earth and construction of houses, roads and other impervious surfaces can disturb the balance between vegetation, soils, geologic formations and climate. When this happens, mass earth movements, erosion and flooding often result, posing significant dangers to public health and safety. These events also increase public and private expenditures for repair of damaged buildings and property, slope stabilization, flood control and stormwater management. Hillside disturbance can also degrade or destroy the attractive and distinctive qualities of the community's setting, and reduce real estate values.

Human activities which avoid steep hillside slopes and which minimize disturbance of soil, rock and vegetative cover are less likely to trigger landslides or cause flooding. For all ground- or vegetation-disturbing activities, a thorough pre-disturbance investigation should be conducted, and appropriate construction practices and, if applicable, development design should be used.

Objectives

The following objectives are aimed at protecting public health and safety and preserving the balance of sensitive resources in the Northwest Hills:

- 3.1 Thoroughly investigate proposed development sites for land suitability and limitations, including potential impacts of vegetation removal, site grading, road and building construction, and septic system and utility construction.
- 3.2 Limit development to portions of site located away from sensitive slopes, soils and other conditions identified in soils, geology and/or hydrology investigations and reports.
- 3.3 Plan and orient development and roads so that ground- and vegetation-disturbing activities are minimized and steep slopes are avoided.
- 3.4 Disturbance of existing site terrain and vegetation should be limited to the minimum area necessary to complete construction activities.
- 3.5 Manage and control on- and off-site water runoff and soil erosion impacts before, during and after construction.
- 3.6 Limit construction season to between May 1 and October 1, and when possible, complete all construction activities in one development season.
- 3.7 Revegetate bare soils as soon as possible after exposure.

Amendments to Title 33, Planning and Zoning and Title 34, Subdivisions and Partitioning Regulations

The following amendments to Title 33 and Title 34 are necessary to:

- Remove the *Northwest Hills Natural Areas Protection Plan* area from Temporary Prohibition on the Disturbance of Forests chapter;
 - Provide specific regulations for the area in the Environmental Zones chapter;
 - Create the Skyline Plan District to allow transfer of development rights for properties that are covered entirely with the Environmental Protection overlay zone; and
 - Require Planned Unit Development for land divisions where more than one half the property is in environmental overlay zones.
- Amend Chapter 33.299.030, Temporary Prohibition on the Disturbance of Forests, as follows:

“33.299.030 Prohibition. The following activities are prohibited in forests within the areas designated as the Tualatin River Basin, N.W. Hills

Natural Areas, S.W. Hills Natural Areas, Johnson Creek, and East Buttes and Uplands as shown on the map at the end of this Chapter....”

- Amend Chapter 33.430, Environmental Zones, to add the following language:

“33.430.050 Items subject to these regulations

A. through I. (no change)

J. *Land divisions as regulated by Title 34, Subdivision and Partitioning Regulations.*”

and

“33.430.070.C. All other development *and land divisions*. All other development *and land divisions* are subject to....”

- Amend Chapter 33.430, Environmental Zones, to add the following standards for development activities in the Northwest Hills:

“33.430.200 Development Standards

The development standards of this section apply to all transition and natural resource areas.

A. through J. (no change)

K. ~~Balch Creek Watershed~~. *Development season and prohibited plants.* In the areas within the Balch Creek Watershed *and the Northwest Hills Natural Areas Protection Plan*, the following additional development standards apply....”

- Amend Chapter 33.430, Environmental Zones, to add the following approval criteria for development activities in the Northwest Hills:

“33.430.340 Approval Criteria

An environmental review application will be approved if the review body finds that the applicant has shown that all of the applicable approval criteria stated below are met.

A. through G. (no change)

H. *Development in the Northwest Hills. In addition to the other approval criteria stated in this section, the following approval criteria must also be met in resource and transition areas in the area covered by the Northwest Hills Natural Areas Protection Plan:*

- 1. *Wildlife. The location, quantity, quality and structural characteristics of forest vegetation must be sufficient to provide habitat and maintain travel corridors for the following indicator species: pileated woodpecker, sharp-shinned hawk, Roosevelt elk, white-footed vole and red-legged frog. Standards to meet this***

criteria are provided in the Habitat Evaluation Procedures (HEP) developed by the United States Fish and Wildlife Service.

2. *Land Hazards and Erosion. Erosion control measures of the City of Portland's Erosion Control Plans Technical Guidance Handbook (January, 1991) must be employed during all ground disturbing construction.*
3. *Parks and Open Space. Overall scenic, recreational, educational and open space values of Forest Park must not be diminished as a result of development activities.*
4. *Miller Creek Watershed. In the Miller Creek Watershed, development activities must not degrade natural water quality, quantity and seasonal flow conditions, and must not increase water temperatures above 68°F. In addition, development activities must not decrease opportunities for fish and amphibian passage."*

- Amend Section 33.430.370, Natural Resource Management Plans, as follows:

"33.430.370, Natural Resource Management Plans

A. through D. (no change)

E. Approval criteria for adoption of a plan. A natural resource management plan will be adopted if it is found that:

1. **The plan is consistent with the purpose of the environmental zones;**
2. **The plan complies with the requirements for natural resource management plans stated in this section; and**
3. **The plan meets the relevant environmental review approval criteria stated in 33.430.340.A through F."**

- Create a new chapter in the Zoning Code entitled Chapter 33.575, Skyline Plan District. This plan district provides a mechanism for the transfer of development rights from sites that have been designated for protection through the application of the Environmental Protection overlay zone to areas that can accommodate the additional density. The regulations reduce development pressure on the protected sites while containing safeguards so that the transferred density is developed appropriately at the receiving sites. It is intended that this plan district will be deleted when all the development rights from eligible sending sites have been transferred. This new chapter includes Map 575-1, Skyline Plan District (see page 219).

"CHAPTER 33.575

SKYLINE PLAN DISTRICT

Sections:

33.575.010 Purpose

33.575.020 Where the Regulations Apply

33.575.030 Transfer of Development Rights
33.575.040 Review for Timeliness
Map 575-1 Skyline Plan District

33.575.010 Purpose

The Skyline plan district provides a mechanism for the protection of sites with sensitive and highly valued natural resources and is part of the implementation of the State Goal 5 Update Project. It allows for the transfer of development rights from sites that have been designated for protection through the application of the Environmental Protection overlay zone to areas that can accommodate the additional density. The regulations reduce development pressure on the protected sites while containing safeguards so that the transferred density is developed appropriately at the receiving sites.

33.575.020 Where the Regulations Apply

The regulations of this chapter apply to the Skyline plan district area as shown on the Map 575-1 at the end of this chapter, and on the Official Zoning Maps.

33.575.030 Transfer of Development Rights

Transfer of residential development rights between sites in the plan district is allowed as follows.

A. Definition. For the purposes of this chapter, "development rights" means the potential number of dwelling units that would be allowed in the base zone on the site.

B. Sending sites. Only sites in the single dwelling zones that are covered entirely with the Environmental Protection overlay zone are eligible to transfer residential development rights.

C. Receiving sites. Only sites in the RF zone that are inside the Urban Growth Boundary are eligible to receive residential development rights from the sending sites. The dwelling units resulting from the transfer may not be placed on portions of the receiving sites that are within an environmental overlay zone.

D. Maximum density. The total density at the receiving site may not exceed 150 percent of the allowable density under the base zone, except that when the following standards are met, total density may be increased to 200 percent.

- 1. For every unit transferred to the receiving site, there is one acre of land with slopes of less than 10 percent; and*

2. *Approval for on-site septic disposal is granted or sanitary sewer is available to all lots proposed as part of the Planned Unit Development.*

E. Transfer process. The transfer of development rights is allowed by right subject to the requirements of this chapter.

1. *PUD required. In order to use the transferred development rights, the receiving site must be approved for development through the Planned Unit Development (PUD) regulations of Chapter 33.269. The purpose of the PUD review is to ensure that the extra density is developed appropriately on the receiving site according to the requirements and approval criteria in Chapter 33.269.*
2. *Sending site included. The sending site must be a part of the application for PUD review on the receiving site. The purpose of this requirement is to allow the City to track the reduced development potential on sending sites.*
3. *Covenant required. The property owner of the sending site must execute a covenant with the City that reflects the reduced development potential on the sending site. The covenant must meet the requirements of 33.700.060. The covenant must be recorded before approval of the final plan, or if the PUD includes a land division, before the Director's approval of the final plat.*

F. Adjustments prohibited. Adjustments to the provisions of this section are prohibited.

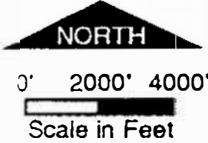
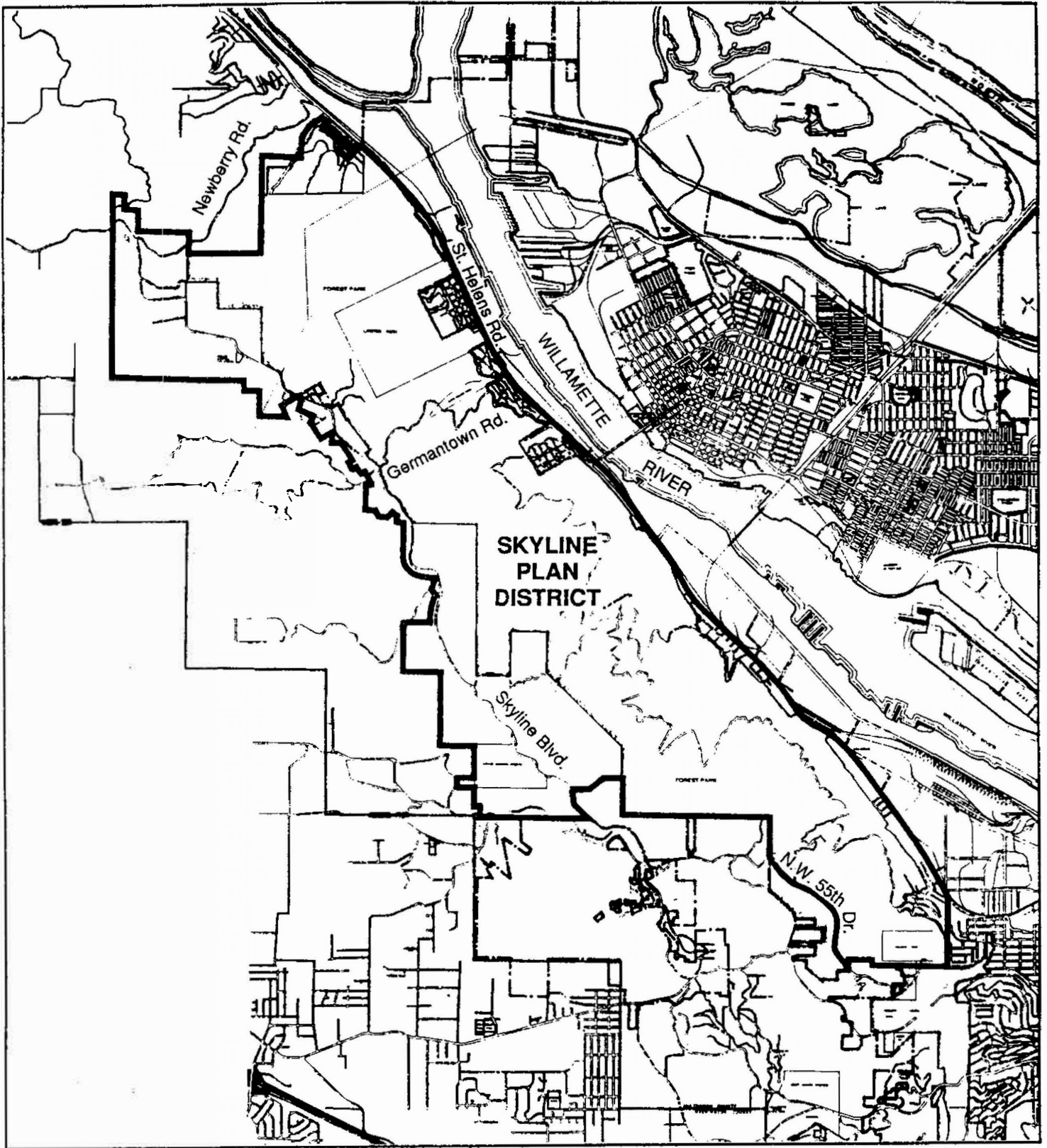
33.575.040 Review for Timeliness

The regulations of this chapter must be reviewed for timeliness before December 31, 2000. It is intended that this plan district will be deleted when all the development rights from eligible sending sites have been transferred."

- Amend Title 34 to add the following language:

"34.12.050 PUD Required

Planned Unit Development, as regulated by Chapter 33.269, is required for major land division requests where 50 percent or more of the land area of all lots and/or parcels in common ownership is in an environmental zone."



Plan District Boundary

Map 575-1
**Skyline
Plan District**

Bureau of Planning • City of Portland, Oregon

Amendments to the Comprehensive Plan Map Designations and Official Zoning Maps

The adopted mapping applies the environmental overlay zones within the study area (see Official Zoning Maps). It also changes certain areas of residential R10 zoning to R20 (R10) and one area of residential R7 (R5) zoning to R20 (R10). The mapping corrects some zoning map errors in regard to the Open Space zoning intended for placement on city-owned land in Forest Park. The following regulations are removed from the zoning maps: 1) water feature designations within the study area, 2) Scenic Resource overlay zone designations in areas where environmental zones are applied, and 3) the Temporary Prohibition on Forest Disturbance designation within the study area.

The Environmental Protection overlay zone is applied to resource areas with high functional values that are in need of protection according to the inventory and ESEE analysis findings. Generally, the Environmental Protection overlay zone is applied to highly significant wetland, pond and creek systems, and high quality upland resources which include ecologically or scientifically significant natural areas, sensitive natural communities, fish and wildlife areas and habitats where sensitive, threatened or (locally) rare species are identified, and plant communities with old or (locally) rare species or which serve critical soil and slope stabilization functions. Additionally, this zone is applied to riparian areas within the direct influence zone (based on the potential height of trees which provide shade, stabilize creek banks and adjacent slopes or provide organic material to the water body). The Environmental Protection zone will insure the protection of the functional values of these resources, the continuation of critical fish and wildlife habitat elements, and the preservation of the integrity and viability of the Northwest Hills ecosystem as a whole. The application of this zone will also protect existing and future development from natural hazards such as landslides and flooding, and retain the natural character and regional identity which the Northwest Hills forest provides.

The Environmental Conservation zone is applied to areas that while not as highly rated as the Environmental Protection zone areas, are of significant value to the overall system and warrant protection. These areas are generally able to support certain levels of development where impacts are controlled and mitigated.

Changes to zoning are needed as an additional resource protection measure and for reasons of inadequate services. The area currently zoned R7 (R5) extends over a steep ravine and creek system which is unable to sustain development at this density. All of the zone change areas are not served by sewer and must presently be served by on-site septic systems. Development at the presently zoned housing densities in these areas is currently unfeasible

because lot sizes would not be large enough to provide on-site disposal. Generally, a minimum of about one-half acre is required for private septic systems; the city's R20 zone allows a density of one dwelling unit to 20,000 sq. ft. which most closely approximates the minimum required area. The R10 Comprehensive Plan designation for these areas would permit greater housing densities if and when sewers become available.

Open Space (OS) mapping corrections implemented under this Protection Plan are intended to eliminate errors where privately-owned properties mistakenly received OS designations under the Comprehensive Plan, implemented in 1981. Similarly, corrections are proposed for city-owned property intended for OS Comprehensive Plan designations which mistakenly received FF (now RF), R10 or other zone designations.

Recommended Actions:

The following actions are needed to amend the Comprehensive Plan Map Designations and Official Zoning Maps.

- Amend Comprehensive Plan and Official Zoning Maps to apply EC and EP overlay zones to the *Northwest Hills Natural Areas Protection Plan Area*.
- Amend Comprehensive Plan map designations and Official Zoning Maps to change indicated R10 and R7 (R5) zones to R20 (R10).
- Amend Comprehensive Plan map designations and Official Zoning Maps to change OS zoning on residential property to appropriate residential zone. This action corrects mapping errors.
- Amend Comprehensive Plan map designations and Official Zoning Maps to change residential zoning of park land to OS. This action corrects mapping errors.
- Amend Official Zoning Maps to remove water feature designations and the Temporary Prohibition on Forest Disturbance designation from within the *Northwest Hills Natural Areas Protection Plan Area*.
- Amend Official Zoning Maps to remove the Scenic Resource overlay zone designation from areas where the environmental zones are applied.

Exception to Statewide Planning Goal 4, Forest Lands

Statewide Planning Goal 4, Forest Lands requires local governments "to conserve forest land by maintaining the forest land base and to protect the state's forest economy by making economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the

leading use on forest land consistent with sound management of soil, air, water, and fish and wildlife resources and to provide for recreational opportunities and agriculture.” For land outside the urban growth boundary but inside the City of Portland limits, the city must take an exception to Goal 4 for several reasons. The city must meet Federal Clean Water Act responsibilities and comply with Statewide Planning Goal 6, Air, Water, and Land Resources Quality.³¹ The land subject to the exception is also developed in such a pattern that uses allowed by the applicable goal are impracticable.

Exception Criteria

Statewide Planning Goal 2 states “A local government may adopt an exception to a goal when:

- (a) The land subject to the exception is physically developed to the extent that it is no longer available for uses allowed by the applicable goal;
- (b) The land subject to the exception is irrevocably committed to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable; or
- (c) The following standards are met:
 - 1) Reasons justify why the state policy embodied in the applicable goals should not apply;
 - 2) Areas which do not require a new exception cannot reasonably accommodate the use;
 - 3) The long-term environmental, economic, social and energy consequences resulting from the use at the proposed site with measure designed to reduce adverse impacts are not significantly more adverse than would typically result from the same proposal being located in areas requiring a goal exception other than the proposed site; and
 - 4) The proposed uses are compatible with other adjacent uses or will be so rendered through measures designed to reduce adverse impacts.”

³¹ See Federal Register November 16, 1990.

Findings

1. The City of Portland meets two of criteria for taking an exception to Statewide Planning Goal 4. The lands subject to the exception are either physically developed to the extent that they are no longer available for uses allowed by the applicable goal or irrevocably committed to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable. The process for taking an exception to a statewide planning goal is covered in Chapter 33.850 of the City of Portland's Zoning Code.
2. The proposed exception area is located within the City of Portland's corporate boundary, but outside of the Metropolitan Service District's (METRO) acknowledged urban growth boundary as shown on Map A, Goal 4 Exception Area. This area is also included inside the city's *Northwest Hills Natural Areas Protection Plan* study area.
3. Soils are either Cascade Silt Loam or Goble Silt Loam. The soils are used for farming, timber production, urban development and wildlife habitat. Historically, the kind of trees grown for commercial forestry purposes are Douglas fir. These trees take approximately 60 to 80 years to grow in these soils. The main limitations for timber production are the slow permeable fragipan at a depth of 20 to 30 inches and the resultant perched water table from December through April. Some windthrow is possible because of the restricted rooting depth. When the soil is wet, the use of some conventional logging systems is limited.³²

The last commercial operations were approximately 30 years ago, but the sites were not replaced with commercial species and are now dominated by scrub, alder and maple. These sites cannot be returned to commercial forestry because there is not enough time for a crop to grow before the sites will be used for urban development.

4. There are approximately 483 acres of land divided into 43 individual tax lots. Of these, 29 are used for single family residences, 12 are vacant and two are developed with non-residential uses. The mean lot size is 10.7 acres and the median is 1.14 acres, with the smaller lots interspersed with or included with the larger lots.
5. There are 27 lots which meet the criteria for lands physically developed to the extent that they are no longer available for uses allowed by the applicable goal (see Table 4). Of these, 26 lots are developed to the maximum density allowed with a single family dwelling unit. There is

³² United States Dept of Agriculture Soil Conservation Service (1983) Soils Survey of Multnomah County, OR.

one lot developed to the maximum density allowed with an industrial use.

6. There are 16 lots which meet the criteria for lands irrevocably committed to uses not allowed by the applicable goal (see Table 5). Some of these sites were included in a recently approved planned unit development. There are two lots which are committed to non-residential uses. The remaining lots are available for low density residential development. There are 15 lots on soils with severe or severe to moderate landslide potential. The remaining lot is on soils with moderate landslide potential, but is less than one quarter of an acre in area. The combination of relatively poor soils, steep slopes, a seasonally perched water table and severe landslide potential makes conventional logging practices difficult and impracticable.
7. All lots have received a Comprehensive Plan designation of Residential Farm/Forest (RF) with a Future Urban (f) overlay zone. In the RF zone, both residential and forest uses are allowed by right. Sites receiving the Future Urban overlay zone have a minimum lot area of 20 acres. Existing lots of less than 20 acres may be developed, but may not be reduced in area.
8. The proposed exception area was left outside the urban growth boundary when the boundary was delineated due to its designation as "natural resource" land on the Metropolitan Service District (METRO) Land Use Framework Map.³³
9. The City of Portland cannot regulate forest practices on the lands subject to the exception because the lands are outside the urban growth boundary and ORS 527.800 prohibits local jurisdictions from regulating forest practices on forest lands outside an urban growth boundary.
10. The City of Portland's Federal Clean Water Act responsibilities include the following:
 - A. Complying with National Pollutant Discharge Elimination System permit for stormwater. This is a requirement for all municipalities with a population of more than 100,000 people. This requirement applies to the entire city, not just the portion of the city within the urban growth boundary. The City of Portland is required to apply for a Federal stormwater permit on November 18, 1991;
 - B. Assuming general permit authority from the Oregon Department of Environmental Quality (DEQ) to regulate site clearing practices for sites of five acres or more; and
 - C. Meeting total maximum daily load (TMDL) requirements imposed by DEQ rules for the Tualatin River basin.

³³ City of Portland, Bureau of Planning, (1985) Northwest Hills Study pp. 69-74.

11. In summary, these sites warrant exception due to the existing patterns of residential development, the pattern of land parcelization, the soil types and conditions, past forest practices and the need for regulatory authority over forest practices outside the urban growth boundary.

Statement of Reasons

The land subject to the exception is physically developed to the extent that it is no longer available for uses allowed by the applicable goal.

The land subject to the exception is physically developed to the extent that is no longer available for uses allowed by the applicable goal. Of the 43 lots in the area, 29 are developed with a structure. Of the remaining 14 lots, 12 are vacant, but planned for future low density residential use. Commercial forestry is impracticable on lots improved with a dwelling unit because most of the lots are not large enough to accommodate the use, smaller lots are interspersed within larger lots, and because the largest remaining vacant lot was approved for subdivision for residential development under acknowledged provisions of the Portland Comprehensive Plan and zoning ordinance on May 30, 1991.³⁴ According to the revised Goal 4 administrative rule, economically viable commercial forestry operations require at the minimum an 80-acre parcel.³⁵

The exception area will not be fully urbanized until the city can meet the Goal 14 Urbanization factors for amending the urban growth boundary and bring the area inside the boundary. Currently, the area has all urban services except sanitary sewer. The application of the city's Environmental Zones will maintain the existing character of the area until full urban services are available.

The exception is consistent with the current planning time frame. The city is in the second half of a 20-year urban growth boundary planning frame. Adjustments to the boundary are expected at 20-year intervals. The area will be used for low density residential development before a commercial crop of trees could be ready for harvest in 60 to 80 years.

The land subject to the exception is irrevocably committed to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable.

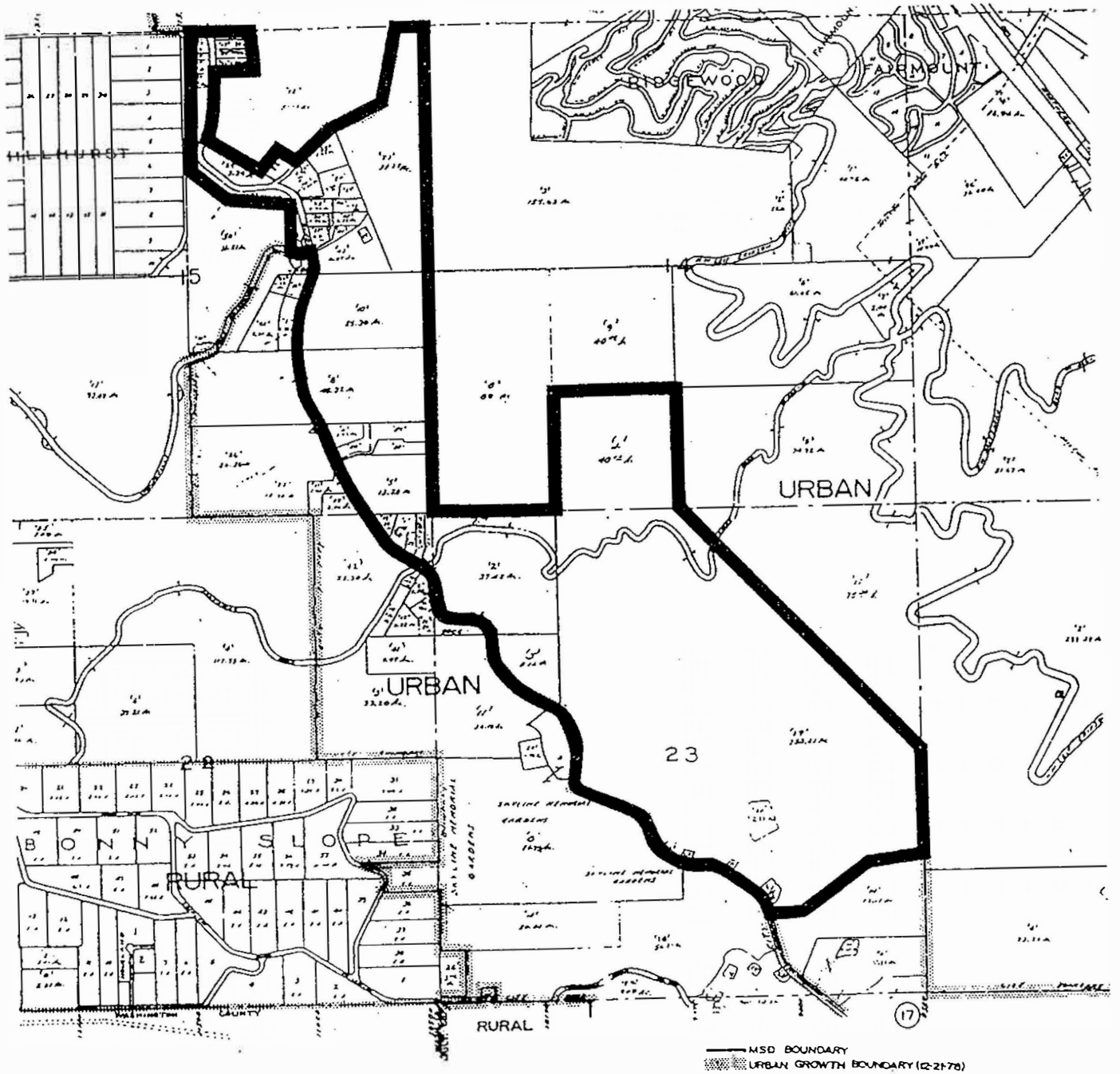
The land subject to the exception is irrevocably committed to uses not allowed by Goal 4 and because of other relevant factors. The subject parcels are designated for future low density residential development. Of the 43

³⁴ Report and Decision of Hearings Officer 91-0048 SU PU City of Portland, Oregon.

³⁵ Oregon Administrative Rules 660-06-026.

parcels, 29 are developed with a single family residential unit. A Planned Unit Development proposal has been approved for the exception area. The Planned Unit Development (PUD) includes dedicated 40 percent open space which cannot be logged and must be protected. The dispersed pattern of low density residential development makes commercial forestry impracticable because residential use is not compatible with commercial forestry uses and because dedicated open space in PUDs must be protected.

Required Compliance with State Planning Goal 6 and the Clean Water Act
If commercial forestry is allowed to take place on these lands, the city will not be able to comply with its Federal Clean Water Act requirements or with Statewide Planning Goal 6, Air, Water and Land Resources Quality. The city exercises complete authority to regulate forest practices inside the urban growth boundary. Similar authority is needed for areas outside the urban growth boundary. The city has federally mandated directives for these lands different from and more pervasive than purposes embodied in State Forest Practices rules. This authority is required to regulate tree cutting and clearing practices in order to prevent erosion and associated degradation of water bodies.



1" = 1200'

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Map A. Goal 4 Exception Area

Table 4. Lands Meeting Physically Developed Criteria

TAX LOT	TAX LOT	SECTION	CURRENT ZONING	QTR SEC MAP	2 ACRES	EXISTING USE	BUILT TO MAX DENSITY
TL 29	TL 29	151N1W	RFf	2318	YES	INDUSTRIAL	YES
TL 19	TL 19	151N1W	RFf	2318	YES	DWG SGL	YES
TL 17	TL 17	151N1W	RFf	2318	YES	DWG SGL	YES
TL 21	TL 21	151N1W	RFf	2318	YES	DWG SGL	YES
TL 22	TL 22	151N1W	RFf	2318	YES	DWG SGL	YES
TL 25	TL 25	151N1W	RFf	2318	YES	DWG SGL	YES
TL 34	TL 34	151N1W	RFf	2318	YES	DWG SGL	YES
TL 45	TL 45	151N1W	RFf	2318	YES	DWG SGL	YES
TL 37	TL 37	151N1W	RFf	2318	YES	DWG SGL	YES
TL 43	TL 43	151N1W	RFf	2318	NO	DWG SGL	YES
TL 6	TL 6	151N1W	RFf	2418	NO	DWG SGL	YES
TL 5	TL 5	151N1W	RFf	2418	NO	DWG SGL	YES
TL 63	TL 63	151N1W	RFf	2318	NO	DWG SGL	YES
TL 29	TL 29	151N1W	RFf	2318	YES	DWG SGL	YES
TL 40	TL 40	151N1W	RFf	2318	YES	DWG SGL	YES
TL 54	TL 54	151N1W	RFf	2318	YES	DWG SGL	YES
TL 59	TL 59	151N1W	RFf	2318	YES	DWG SGL	YES
TL 67	TL 67	151N1W	RFf	2418	NO	DWG SGL	YES
TL 57	TL 57	151N1W	RFf	2418	NO	DWG SGL	YES
TL 58	TL 58	151N1W	RFf	2418	NO	DWG SGL	YES
TL 61	TL 61	151N1W	RFf	2318	YES	DWG SGL	YES
TL 19	TL 19	221N1W	RFf	2518	YES	DWG SGL	YES
TL 1	TL 1	221N1W	RFf	2518	NO	DWG SGL	YES
TL 23	TL 23	221N1W	RFf	2518	YES	DWG SGL	YES
TL 24	TL 24	221N1W	RFf	2518	YES	DWG SGL	YES
TL 25	TL 25	231N1W	RFf	2518	YES	DWG SGL	YES
TL 2	TL 2	231N1W	RFf	2519	NO	DWG SGL	YES
TL 21	TL 21	231N1W	RFf	2619	YES	DWG SGL	YES
TL 24	TL 24	221N1W	RFf	2518	YES	DWG SGL	YES

Table 5. Lands Meeting Irrevocably Committed Criteria

TAX LOT	SECTION	CURRENT ZONING	ACREAGE	QTR SEC MAP	EXISTING USE	LAND DIV APPROVED	LANDSLIDE POTENTIAL
TL 24	151N1W	RFf	0.91	2318	VACANT	NO	SEVERE
TL 29	151N1W	RFf	1.1	2318	INDUSTRIAL	NO	SEVERE
TL 20	151N1W	RFf	0.9	2318	VACANT	NO	SEVERE
TL 46	151N1W	RFf	1.05	2318	VACANT	NO	SEVERE
TL 23	151N1W	RFf	35.27	2318	VACANT	NO	SEVERE
TL 43	151N1W	RFf	6.07	2318	DWG SGL	NO	SEVERE
TL 10	151N1W	RFf	25.3	2418	DWG SGL	NO	SEVERE/MOD
TL 56	151N1W	RFf	2.09	2418	VACANT	NO	SEVERE/MOD
TL 4	141N1W	RFf	40	2419	MISC	NO	SEVERE/MOD
TL 44	151N1W	RFf	0.34	2318	VACANT	NO	SEVERE/MOD
TL 3	231N1W	RFf	8.72	2519	VACANT	NO	SEVERE/MOD
TL 19	231N1W	RFf	253.41*	231N1W	VACANT	YES	SEVERE/MOD
TL 22	231N1W	RFf	0.46	2619	VACANT	NO	SEVERE/MOD
TL 20	231N1W	RFf	0.28	2620	VACANT	NO	SEVERE/MOD
TL 27	231N1W	RFf	0.23	2620	VACANT	NO	MODERATE
TL 12	231N1W	RFf	0.95	2620	VACANT	NO	SEVERE/MOD
* Lots sizes range from 4.5 to 24.5 acres							
Common space is 72 acres.							
Open space is 47 acres.							

**Enabling Legislation for Goal 4 Exception
Oregon Laws Chapter 919, 1991; effective September 29, 1991**

C-Eng. SB 1125

1 (b) The Bureau of Land Management to pay 15 percent of the study cost.

2 (c) The Bonneville Power Administration to pay 25 percent of the study cost.

3 SECTION 27. Section 28 of this Act is added to and made a part of ORS 321.005 to 321.185.

4 SECTION 28. (1) In addition to the taxes levied under ORS 321.015 (1) to (3), there hereby is
5 levied a privilege tax upon taxpayers on the harvesting of all merchantable forest products har-
6 vested on forestland during the period beginning July 1, 1991, and ending June 30, 1993, in the
7 amount provided in subsection (2) of this section.

8 (2) The rate of tax levied in subsection (1) of this section shall be 13 cents per thousand feet,
9 board measure, on all merchantable forest products harvested on forestland.

10 (3) The tax shall be measured by and be applicable to each per thousand feet, board measure,
11 and such shall be subject to and determined by the procedures and provisions of ORS 321.015 (4)
12 and (5).

13 (4) The tax levied by subsection (1) of this section shall be due and payable to the department
14 in the manner and procedure, including penalties and interest, as set forth for the collection of the
15 privilege tax in ORS 321.005 to 321.185.

16 (5) The revenue from the tax levied by subsection (1) of this section shall be remitted to the
17 State Treasurer who shall deposit it in a suspense account established under ORS 321.145 (1). After
18 payment of refunds, which shall be paid in the same manner as other forest products harvest tax
19 refunds are paid in ORS 321.145 (2), the balance of the additional tax imposed under subsection (1)
20 of this section shall be deposited to the account referred to in ORS 526.060.

21 SECTION 29. ORS 527.722 is amended to read:

22 527.722. (1) Notwithstanding any provisions of ORS chapters 196, 197, 215 and 227, and except
23 as provided in subsections (2), (3) and (4) ~~and (3)~~ of this section, no unit of local government shall
24 adopt any rules, regulations or ordinances or take any other actions that prohibit, limit, regulate,
25 subject to approval or in any other way affect forest practices on forestlands located outside of an
26 acknowledged urban growth boundary.

27 (2) Nothing in subsection (1) of this section prohibits local governments from adopting and ap-
28 plying a comprehensive plan or land use ~~regulations~~ regulation to forestland to allow, prohibit or
29 regulate:

30 (a) Forest practices on lands located within an acknowledged urban growth boundary;

31 (b) Forest practices on lands located outside of an acknowledged urban growth boundary,
32 and within the city limits as they exist on July 1, 1991, of a city with a population of 100,000
33 or more, for which an acknowledged exception to an agriculture or forestland goal has been
34 taken;

35 ~~[(a)]~~ (c) The establishment or alteration of structures other than temporary onsite structures
36 which are auxiliary to and used during the term of a particular forest operation;

37 ~~[(b)]~~ (d) The siting or alteration of dwellings;

38 ~~[(c)]~~ (e) Physical alterations of the land, including but not limited to those made for purposes
39 of exploration, mining, commercial gravel extraction and processing, landfills, dams, reservoirs, road
40 construction or recreational facilities, when such uses are not auxiliary to forest practices; or

41 ~~[(d)]~~ (f) Partitions and subdivisions of the land; or.

42 ~~[(e)]~~ (3) Nothing in ~~[this]~~ subsection (2) of this section shall prohibit a local government from
43 enforcing the provisions of ORS 455.310 to 455.715 and the rules adopted thereunder.

44 ~~[(3)]~~ (4) Counties can prohibit forest practices on land for which an acknowledged exception to

1 an agricultural or forestland goal has been taken.

2 (5) To insure that all forest operations in this state are regulated to achieve protection
3 of soil, air, water, fish and wildlife resources, in addition to all other forestlands, the Oregon
4 Forest Practices Act applies to forestlands inside any urban growth boundary unless a local
5 government has adopted regulations for forest practices. Such local regulations shall:

6 (a) Protect soil, air, water, fish and wildlife resources; and

7 (b) Be acknowledged as being in compliance with land use planning goals.

8 (6) Local governments which have, before the effective date of this 1991 Act, adopted a
9 comprehensive plan policy or land use regulation allowing, prohibiting or regulating forest
10 practices consistent with subsections (1) to (5) of this section shall inform the State Forester
11 of such policies and regulations within 60 days of the effective date of this 1991 Act. Exist-
12 ence or adoption of such policies or regulations relieves the State Forester of responsibility
13 to administer the Oregon Forest Practices Act within the affected area.

14 (7) The Director of the Department of Land Conservation and Development shall provide
15 the State Forester copies of notices submitted pursuant to ORS 197.615, whenever such no-
16 tices concern the adoption, amendment or repeal of a comprehensive land use regulation al-
17 lowing, prohibiting or regulating forest practices.

18 SECTION 30. ORS 527.992 is added to and made a part of ORS 527.610 to 527.730 and 527.990.

19 SECTION 31. In addition to and not in lieu of any other appropriations or moneys made avail-
20 able by law or from other sources, there is appropriated to the State Forestry Department for the
21 biennium beginning July 1, 1991, out of the General Fund, the sum of \$1,140,000. Such sum may only
22 be expended for forest practices operations to carry out the provisions of this Act.

23 SECTION 32. In addition to and not in lieu of any other appropriations or moneys made avail-
24 able by law or from other sources, there is appropriated to the State Department of Fish and
25 Wildlife, for the biennium beginning July 1, 1991, out of the General Fund, the sum of \$102,322. Such
26 sum may only be expended by the Habitat Conservation Division to carry out the provisions of this
27 Act.

28 SECTION 33. In addition to and not in lieu of any other appropriations or moneys made avail-
29 able by law or from other sources, there is appropriated to the Department of Environmental Qual-
30 ity for the biennium beginning July 1, 1991, out of the General Fund, the sum of \$219,903. Such sum
31 may only be expended to carry out the provisions of this Act.

32 SECTION 34. The limitation on expenditure otherwise provided by law, for the biennium be-
33 ginning July 1, 1991, as the maximum limit for payment of expenses from fees, moneys or other re-
34 venues, including Miscellaneous Receipts, excluding federal funds, collected or received by the State
35 Forestry Department, for forest practices operations, is increased by \$1,525,802.

36 SECTION 35. The limitation on expenditures otherwise provided by law, for the biennium be-
37 ginning July 1, 1991, as the maximum limit for the payment of expenses from federal funds received
38 by the State Forestry Department is increased by \$390,000. Such sum may only be expended to carry
39 out the provisions of this Act.

40

APPENDIX A
ADOPTING ORDINANCE

ORDINANCE No. 164517 As Amended

- * Adopt Natural Resources Inventory, ESEE Analysis, *Northwest Hills Natural Areas Protection Plan*; amend Comprehensive Plan, Title 33 and Title 34 of the City Code; and amend Comprehensive Plan Map and Official Zoning Maps of the City of Portland (Ordinance)*

The City of Portland Ordains:

Section 1. The Council finds:

1. In 1974, the State of Oregon adopted Statewide Planning Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources, that requires jurisdictions to conserve open space and protect natural and scenic resources.
2. The City of Portland adopted its Comprehensive Plan on October 16, 1980 (effective date, January 1, 1981) and was acknowledged as being in conformance with Statewide Goals for Land Use Planning by the Land Conservation and Development Commission on May 1, 1981. At the time of its adoption the plan complied with State Goals 5.
3. The Land Conservation and Development Commission's (LCDC) administrative rules for Goal 5 (OAR 660-16-000 through 660-16-025) outline the process to be followed in identifying and evaluating resources and achieving compliance with Goal 5. LCDC adopted these administrative rules in September 1981.
4. With the adoption of the administrative rule for State Goal 5 by DLCD, the City's Comprehensive Plan was no longer in compliance with State Goal 5.
5. The City has undertaken a review of its Comprehensive Plan as part of Periodic Review to bring the plan into compliance with the State Goals, particularly Goal 5.
6. An inventory of wetlands, water bodies, open spaces, and wildlife habitat areas was developed by Planning Bureau staff and biologist consultants, and reviewed by neighborhood associations, individuals, and special-interest groups during the planning process.

7. Twenty-four resource sites were evaluated.
8. The wetland, water body, open space, and wildlife habitat resources were further examined through the Economic, Environmental, Social and Energy (ESEE) process outlined in the Goal 5 administrative rule to determine the appropriate level of protection.
9. The *Northwest Hills Natural Areas Protection Plan* is a framework of Comprehensive Plan policy amendments and regulatory measures that protect and enhance the significant wetland, water body, open space, and wildlife habitat resources that were determined to require partial or complete protection through the ESEE Analysis.

State Goal Findings:

10. Goal 1, Citizen Involvement, requires opportunities for citizens to be involved in all phases of the planning process. Development of the *Northwest Hills Natural Areas Protection Plan* meets this goal because it included citizen review of all phases of the project, including soliciting information on the location, quantity, and quality of potential natural resources, and impacts of conflicting uses. Since March of 1990 Planning Bureau staff has held or attended 17 public meetings which included neighborhood association meetings (meeting notices were sent to up to 1000 members), and public workshops and forums (notices to up to 2000 local residents and interested persons, and announcements in local papers). Affected property owners, neighborhood and business associations within and adjacent to the planning area, and people requesting notification were mailed a notice of the May 14th Planning Commission hearing on April 12, 1991. Notice was also published in the Oregonian and other local papers. The Discussion Draft of the Plan was available for public review on April 16. The Planning Bureau Staff Report and Recommendations and the Proposed Draft were available ten days prior to the May 14th hearing. Notice of the City Council hearing was mailed to all persons requesting notice and all persons participating in the Planning Commission process.
11. Goal 2, Land Use Planning, requires the development of a process and policy framework which acts as a basis for all land use decisions and assures that decisions and actions are based on an understanding of the facts relevant to the decision. The Northwest Hills Project conforms to this goal. The *Northwest Hills Natural Areas Protection Plan* adopts policies to amend the Comprehensive Plan and implement zoning regulations that assures conformance with the Plan's policies and

objectives. Development of the inventory, ESEE analysis, and protection measures for the Northwest Hills area followed established city procedures for legislative actions.

12. Goal 3, Agricultural Lands, provides for the preservation and maintenance of the State's agricultural land. The *Northwest Hills Natural Areas Protection Plan* is consistent with this goal. The regulations of the *Northwest Hills Natural Areas Protection Plan* will apply in areas zoned for farm and forest uses; they do not affect existing agricultural uses.
13. Goal 4, Forest Lands, provides for the preservation and maintenance of the State's forest lands. The *Northwest Hills Natural Areas Protection Plan* takes exception to this goal to protect water quality and because the existing development pattern irrevocably commits the area to uses which conflict with normal forest practices.
14. Goal 5, Open Space, Scenic and Historic Areas, and Natural Resources, provides for the conservation of open space and the protection of natural and scenic resources. The *Northwest Hills Natural Areas Protection Plan* will be the controlling document in the protection of wetlands, water bodies, open spaces, and wildlife habitat areas in the plan area and will ensure and enhance the City's compliance with this goal by doing the following:
 - a. The Comprehensive Plan policies and objectives that are part of the *Northwest Hills Natural Areas Protection Plan* are designed to protect and preserve significant natural resources in the plan area by identifying specific natural resource values and the means by which they are to be protected.
 - b. Significant natural resources are protected through application of environmental zones on distinct resource features.
 - c. Title 33 is amended to add a new chapter 33.575, Skyline Plan District, which provides a mechanism for protection of sites with sensitive and highly-valued natural resources by allowing for the transfer of development rights from sites that have been designated for protection by application of the Environmental zone to areas that can accommodate the additional density.
 - d. The Scenic Resource overlay is removed from areas to receive environmental zoning because environmental review includes consideration of scenic values and the development standards of the Scenic Resource zone.

15. Goal 6, Air, Water and Land Resource Quality, provides for the maintenance and improvement of these resources. The *Northwest Hills Natural Areas Protection Plan* protects water resources by limiting development in areas where these resources would be negatively affected, encouraging groundwater recharge to augment summer flow in Northwest Hills creeks, and retaining and enhancing riparian vegetation to provide shade and lower water temperatures, trap sediment, and absorb certain chemical pollutants. Protection of natural resource quality is consistent with maintaining and improving water quality. The Environmental zone includes provisions for the preservation of trees in the plan area. Trees help to preserve the land by reducing erosion and stabilizing soils and steep hillside slopes. The plan will contribute to air quality because the tree preservation provisions of the plan will help control smog and trap particulates.
16. Goal 7, Areas Subject to Natural Disasters and Hazards, provides for the protection of life and property from natural disasters and hazards. The *Northwest Hills Natural Areas Protection Plan* is consistent with the intent of this goal because it encourages development away from hazard-prone areas and allows for the transfer of development rights from hazard-prone areas to more suitable areas within the Skyline Plan District. It also protects wetlands, creeks, and floodplains to allow for stormwater retention or detention, and drainage of flood waters.
17. Goal 8, Recreational Needs, provides for satisfying the recreational needs of both citizens of and visitors to the State. The *Northwest Hills Natural Areas Protection Plan* is supportive of this goal because Portland's natural resources contribute to the recreational enjoyment of the City by both citizens and visitors. Provisions of the plan call for protection of the recreational opportunities which exist in the forests of the Northwest Hills, and allow public visual and physical access to Northwest Hills at selected points away from sensitive resource areas.
18. Goal 9, Economy of the State, provides for diversification and improvement of the economy of the State. The natural resources ESEE Analysis has balanced the impact on economic development with the protection of each identified natural resource. Protection of natural resources identified in the plan will have limited impacts on development in the City because *Northwest Hills Natural Areas Protection Plan* regulations and application of Environmental zones have been structured to allow reasonable economic development opportunities on privately-owned parcels containing significant natural resources. On lands with highly-valued natural resource areas, transfer of residential development rights is allowed to other areas more suitable for development through application of the Skyline Plan District. The

plan is in conformance with this goal because where economic impacts outweigh the value of the natural resource, the resource has received limited or no protection and development is allowed.

19. Goal 10, Housing, provides for meeting the housing needs of the State. The natural resources ESEE Analysis has balanced the impact on housing development with the protection of each identified natural resource. Protection of the natural resources identified in the plan will result in no net housing loss. Where potential housing impacts are significant, provisions of the Skyline Plan District which allow the transfer of residential development rights mitigate these impacts.
20. Goal 11, Public Facilities and Services, provides for planning and development of timely, orderly and efficient public service facilities that can serve as a framework for the urban development of the City. The *Northwest Hills Natural Areas Protection Plan* conforms with this goal by balancing protection of resources with the need of the City to develop compactly. Protection of natural resources is limited where urban levels of development would be precluded. On lands with highly-valued natural resource areas, transfer of development rights is allowed to other areas where urban services can be provided in a more orderly and efficient manner through application of the Skyline Plan District.
21. Goal 12, Transportation, provides for the development of a safe, convenient and economic transportation system. The *Northwest Hills Natural Areas Protection Plan* is supportive of this goal by allowing needed transportation facilities through significant natural resources if adverse impacts on resources can be mitigated.
22. Goal 13, Energy Conservation, provides for the distribution of land uses in a pattern that maximizes the conservation of energy. The natural resources ESEE Analysis considered the impact on energy conservation for natural resources considered for protection. The *Northwest Hills Natural Areas Protection Plan* conforms with this goal by considering the impact on energy conservation. The plan provides limited or no protection of natural resources where preservation could lead to an energy-inefficient use of land as identified by existing Comprehensive Plan Map designations. The plan is supportive of this goal because it preserves recreational opportunities close in to the major population center of the State, leading to less travel time. Because this resource is closer to users, less transportation energy is required and a greater range of transportation modes, including bicycling and walking, can be used. Designated bicycle, equestrian, and pedestrian trails within Forest Park make these alternative forms of transportation more attractive.

23. Goal 14, Urbanization, provides for the orderly and efficient transition of rural lands to urban uses. The *Northwest Hills Natural Areas Protection Plan* conforms to this goal by allowing uses to develop consistent with present Comprehensive Plan Map designations. The plan identifies natural resources outside of the urban growth boundary to assist the orderly transition to potential future urban development.
24. Goal 15, Willamette River Greenway, provides for the protection, conservation, and maintenance of the natural, scenic, historic, agricultural and recreational qualities of land along the Willamette River. There are three sites in the *Northwest Hills Natural Areas Protection Plan* which are adjacent to the Willamette River Greenway. Natural resources at these sites are protected by the regulations of the *Northwest Hills Natural Areas Protection Plan* and the *Willamette Greenway Plan* (1987). The remaining sites all drain into the Willamette River and important watershed resources are protected by the plan.
25. Goals 16, 17, 18 and 19 deal with Estuarine Resources, Coastal Shorelines, Beaches and Dunes, and Ocean Resources respectively. These goals are not applicable to the *Northwest Hills Natural Areas Protection Plan* because none of these resources are present within Portland.

State Goal 4 Exception Findings:

26. The City of Portland meets two of criteria for taking an exception to Statewide Planning Goal 4 for the reasons set forth in Exhibit C. The lands subject to the exception are either physically developed to the extent that they are no longer available for uses allowed by the applicable goal or irrevocably committed to uses not allowed by the applicable goal because existing adjacent uses and other relevant factors make uses allowed by the applicable goal impracticable. The process for taking an exception to a statewide planning goal is covered in Chapter 33.850 of the City of Portland's Zoning Code.
27. The proposed exception area is located within the City of Portland's corporate boundary, but outside of the Metropolitan Service District's (METRO) acknowledged urban growth boundary as shown on Map A of Exhibit C. This area is also included inside the City's *Northwest Hills Natural Areas Protection Plan* study area.
28. Soils are either Cascade Silt Loam or Goble Silt Loam. The soils are used for farming, timber production, urban development and wildlife habitat. Historically, the kind of trees grown for commercial forestry purposes are Douglas fir. These trees take approximately 60 to 80 years to grow in these soils. The main limitations for timber production are the slow permeable fragipan at a depth of 20 to 30 inches and the resultant

perched water table from December through April. Some windthrow is possible because of the restricted rooting depth. When the soil is wet, the use of some conventional logging systems is limited.¹

The last commercial operations were approximately 30 years ago, but the sites were not replaced with commercial species and are now dominated by scrub, alder and maple. These sites cannot be returned to commercial forestry because there is not enough time for a crop to grow before the sites will be used for urban development.

29. There are approximately 483 acres of land divided into 43 individual tax lots. Of these, 29 are used for single family residences, 12 are vacant and 2 are developed with non-residential uses. The mean lot size is 10.7 acres and the median is 1.14 acres, with the smaller lots interspersed with or included with the larger lots.
30. There are 27 lots which meet the criteria for lands physically developed to the extent that they are not longer available for uses allowed by the applicable goal (see Table 1 of Exhibit C). Of these, 26 lots are developed to the maximum density allowed with a single family dwelling unit. There is one lot developed to the maximum density allowed with an industrial use.
31. There are 16 lots which meet the criteria for lands irrevocably committed to uses not allowed by the applicable goal (see Table 2 of Exhibit C). Some of these sites were included in a recently approved planned unit development. There are two lots which are committed to non-residential uses. The remaining lots are available for low density residential development. There are 15 lots on soils with severe or severe to moderate landslide potential. The remaining lot is on soils with moderate landslide potential, but is less than one quarter of an acre in area. The combination of relatively poor soils, steep slopes, a seasonally perched water table, and severe landslide potential makes conventional logging practices difficult and impracticable.
32. All lots have received a Comprehensive Plan Designation of Residential Farm/Forest (RF) with a Future Urban (f) overlay zone. In the RF zone, both residential and forest uses are allowed by right. Sites receiving the Future Urban overlay zone have a minimum lot area of 20 acres. Existing lots of less than 20 acres may be developed, but may not be reduced in area.

¹ United States Dept of Agriculture Soil Conservation Service (1983) Soils Survey of Multnomah County, OR.

33. The proposed exception area was left outside the urban growth boundary when the boundary was delineated due to its designation as "natural resource" land on the Metropolitan Service District (METRO) Land Use Framework Map.²
34. The City of Portland cannot regulate forest practices on the lands subject to the exception because the lands are outside the urban growth boundary and ORS 527.800 prohibits local jurisdictions from regulating forest practices on forest lands outside an urban growth boundary.
35. The City of Portland's Federal Clean Water Act responsibilities include the following:
 - a. Complying with National Pollutant Discharge Elimination System permit for stormwater. This is a requirement for all municipalities with a population of more than 100,000 people. This requirement applies to the entire city, not just the portion of the City within the urban growth boundary. The City of Portland is required to apply for a Federal stormwater permit on November 18, 1991;
 - b. Assuming general permit authority from the Oregon Department of Environmental Quality (DEQ) to regulate site clearing practices for sites of 5 acres or more; and
 - c. Meeting total maximum daily load (TMDL) requirements imposed by DEQ rules for the Tualatin River basin.
36. The City Council reaffirms its support for the inclusion of all City property in the Northwest Hills Area within the Urban Growth Boundary.
37. At such time that changes are made to the Urban Growth Boundary (UGB) or to the Comprehensive Plan Map Designations for land presently located outside the UGB, a new Economic, Social, Environmental and Energy (ESEE) Analysis of conflicting uses must be conducted for the affected areas to ensure compliance with Statewide Planning Goal 5. It is the Council's expectation that the intensity of development would generally increase as a result of their inclusion in the UGB.
38. As a result of the exception to LCDC Goal 4 taken as part of this Protection Plan, it is no longer necessary or appropriate to protect the subject lands for forest use.

² City of Portland, Bureau of Planning, (1985) Northwest Hills Study pp. 69-74.

39. In summary, these sites warrant exception due to the existing patterns of residential development, the pattern of land parcelization, the soil types and conditions, past forest practices and the need for regulatory authority over forest practices outside the urban growth boundary.

Comprehensive Plan Findings:

40. The *Northwest Hills Natural Areas Protection Plan*, including its implementing measures, is in conformance with the City's Comprehensive Plan and is especially supportive of certain goals and policies. The review of goals and policies in this section of the ordinance is limited to those which are directly relevant to the plan.
41. Goal 1, Metropolitan Coordination, provides for planning activities to be coordinated with federal, state and regional plans. The *Northwest Hills Natural Areas Protection Plan* complies with the State's required post-acknowledgement review process and is part of the State-required periodic review of the City's Comprehensive Plan.
- a. The plan is consistent with Policy 1.2, Urban Planning Area Boundary, because it has inventoried and evaluated natural resources within its planning area inside the existing City limits in the Northwest Hills area.
 - b. The plan is consistent with Policy 1.4, Intergovernmental Coordination, because other jurisdictions within the planning area have been notified of the Northwest Hills Project and have had opportunities to be involved in the review process.

The Metropolitan Service District (METRO) is developing a plan to implement the Urban Growth Goals and Objectives (METRO, 1990). The *Northwest Hills Natural Areas Plan* addresses several of METRO's proposed policies under Goal 2 "Natural Environment of the Region."

- a. 7.1 Open Space Assessment: This policy calls for local governments to establish quantifiable targets for setting aside certain amounts and types of open space. The *Northwest Hills Natural Areas Plan* site inventories include data on land set aside for open space.
- b. 7.2 Corridor Systems: This policy calls for the development of interconnected recreational and wildlife corridor systems within the metropolitan region. The *Northwest Hills Natural Areas Protection Plan* will assist with achieving this objective through the preservation of natural areas where passive recreational opportunities exist. The individual site inventories included in the *Northwest Hills Natural Areas Protection Plan* will also aid in the development of recreational and wildlife corridors.
- c. 7.3 Wildlife Inventory: This policy requires a detailed biological inventory of the region to be maintained to establish an accurate

baseline of native wildlife populations. The Wildlife Habitat Assessments and Site Inventory Summaries (Chapter 7) included in *Northwest Hills Natural Areas Protection Plan* provide new data for the regional inventory.

42. Goal 2, Urban Development, provides for maintaining Portland's role as the region's major employment, population, and cultural center through expanding opportunities for housing and jobs while retaining the character of established areas. The *Northwest Hills Natural Areas Protection Plan* conforms with this goal by minimizing impacts on employment areas and preserving natural resources which enhance the City as a place to live, work, and recreate.
- a. The plan is consistent with Policy 2.1, Population Growth, because the plan minimizes the impact of preserving natural resources on existing and future land uses within the City.
 - b. The plan is consistent with Policy 2.5, Natural Resource Area, because it protects wetlands, waterbodies, open spaces, wildlife habitat areas and other natural resources in the plan area.
 - c. The plan is supportive of Policy 2.6, Open Space, because it will enhance enjoyment of designated open space areas by encouraging and enhancing the scenic and natural resource characteristics of these areas.
 - d. The plan is supportive of Policy 2.8, Forest Lands, because it provides for the preservation of forest resources.
 - e. The plan is consistent with Policy 2.18, Utilization of Vacant Land, because it protects significant natural resources while allowing vacant land to develop in accordance with its Comprehensive Plan Map designation.
43. Goal 3, Neighborhoods, provides for the preservation and reinforcement of the stability and diversity of the City's neighborhoods while allowing for increased densities. The *Northwest Hills Natural Areas Protection Plan* conforms with this goal because it has evaluated, through the ESEE Analysis, the impact of protection of identified resources on opportunities for development within neighborhoods. Significant natural resources have been carefully mapped or given only limited protection where impacts on development opportunities outweigh impacts on resources. Natural resources are protected where neighborhood associations have identified those that are important to the livability and attractiveness of the neighborhood.
- a. The plan is supportive of Policy 3.4, Historic Preservation, because the plan protects the historic resources in the Northwest Hills.

- b. The plan is supportive of Policy 3.5, Neighborhood Involvement, because all recognized neighborhood associations were notified at the onset of this project and solicited for information on potential resources and for comments on recommended regulations. Several neighborhoods responded and many of their recommendations are incorporated into the *Northwest Hills Natural Areas Protection Plan*. In addition, ten neighborhood meetings were held on the plan and neighborhoods were notified of all public hearings.
44. Goal 4, Housing, provides for a diversity in the type, density, and location of housing in order to provide an adequate supply within the City. The *Northwest Hills Natural Areas Protection Plan* is consistent with this policy because it has evaluated the impact of protection of inventoried natural resources on the supply of existing and potential housing. Significant natural resources are protected in a way to minimize their impact on both existing housing and the potential for new housing development. In some instances, the environmental zones has been reduced in width or not applied to resources in order to preserve housing opportunities. Site development standards mitigate the impact of development rather than limit development opportunities. Where housing development is severely restricted, provisions of the Skyline Plan District allow the transfer of residential development rights mitigate these impacts.
45. Goal 5, Economic Development, provides for increasing the quantity and quality of job opportunities through the creation of an attractive business and industrial environment. The *Northwest Hills Natural Areas Protection Plan* is consistent with this goal because it has evaluated the economic impact of protecting inventoried natural resources in the ESEE Analysis. Where the negative economic impact of protecting the resource outweighed the value of the resource, limited or no protection measures were included.
 - a. This plan is supportive of Policy 5.2, Economic Environment, because it promotes the image of Portland as a livable, attractive City which acts as positive aspect of business recruitment. The plan is consistent with the policy because it balances the importance of an adequate supply of land by minimizing the impact of protecting natural resources on areas that are the targets of business and industrial development.
 - b. The plan is supportive of Policy 5.5, International Image, because it strengthens the attractiveness of the area thereby enhancing the City's reputation as a destination for international tourists.

- c. The plan is supportive of Policy 5.8, Public/Private Partnership, because it describes ways in which private activities can support natural resources and further enhance the City as an attractive place to work.
46. Goal 6, Transportation, promotes an efficient and balanced urban transportation system, consistent with the Arterial Streets Classification Policy. The *Northwest Hills Natural Areas Protection Plan* is consistent with and supportive of this goal because it encourages the development of pedestrian and bicycle facilities in conjunction with designated natural resources and allows fuller enjoyment and use of both.
47. Goal 7, Energy, provides for increasing the energy efficiency of existing structures and the transportation systems of the City. The *Northwest Hills Natural Areas Protection Plan* is consistent with this policy because it has considered the energy impacts of protecting scenic resources in the ESEE Analysis for each resource. The designation and protection of natural resources within the City will reduce the need to travel to enjoy or study wetlands, water bodies, open spaces, and natural areas, thereby reducing overall energy costs.
48. Goal 8, Environment, provides for maintaining and improving the quality of Portland's air, water and land resources and protecting neighborhoods and business centers from noise pollution. The *Northwest Hills Natural Areas Protection Plan* is especially supportive of this goal and is designed to implement the policies of the goal as it relates to natural resources. In addition, the plan modifies existing policies to further clarify the City's intent in protecting and enhancing the natural resource of the Northwest Hills plan area.
- a. The plan is supportive of Policy 8.8, Groundwater Protection because it encourages groundwater recharge which in turn contributes to year-round flows in Northwest Hills creeks and their tributaries.
- b. The plan supports of Policy 8.9, Open Space, by providing additional protection for Portland Parks, particularly Forest Park.
- c. The plan is supportive of Policy 8.10, Drainageways, because it limits development within certain creeks, drainageways, and floodplains to protect watershed resources. Stormwater runoff to creeks and drainageways is also limited in both quantity and quality, to meet water quality standards and protect property from flooding. Riparian and upland areas along drainageways are protected to allow passage of wildlife into Northwest Portland.

- d. The plan is supportive of Policy 8.11, Special Areas, because it adopts a policy identifying unique resource qualities for the Northwest Hills area.
 - e. The plan is supportive of Policy 8.13, Natural Hazards, because it reduces residential development densities in areas of steep slopes, unstable soils, and floodplains.
 - f. The plan is supportive of and implements Policy 8.14, Natural Resources, by creating zoning regulations that protect significant natural and scenic resources. The plan balances the conservation of natural resources with the need for other urban uses in the accompanying ESEE Analysis.
 - g. The plan is supportive of Policy 8.15, Wetlands/Riparian/Water Bodies Protection because it protects Northwest Hills creeks, tributaries, and associated wetlands and riparian areas for values related to flood protection, sediment and erosion control, water quality, groundwater recharge and discharge, education, vegetation, and fish and wildlife habitat.
 - h. The plan is supportive of Policy 8.16, Uplands Protection, because it identifies and protects forested, meadow, and other upland areas which serve significant wildlife habitat, slope protection, and groundwater recharge functions.
 - i. The plan is supportive of Policy 8.17, Wildlife, because it protects existing fish and wildlife habitat areas, and encourages enhancement of vegetation and open space throughout the Northwest Hills plan area for wildlife habitat.
49. Goal 9, Citizen Involvement, provides for improving the method for citizen involvement in the on-going land use decision-making process and providing opportunities for citizen participation in the implementation, review, and amendment of the the Comprehensive Plan. The *Northwest Hills Natural Areas Protection Plan* and implementing measures are consistent with this goal because there has been extensive citizen involvement throughout the process of developing the plan. Public meetings were held to request input on the development of the plan and implementing measures. Staff met with individuals, interest groups, and neighborhood organizations to discuss the project. The Planning Commission held four briefing and work sessions and a public hearing to allow for public input. Notice was sent to property owners potentially affected by the implementing measures as well as to neighborhood, and interest groups and individuals. Additional notice was provided to groups and individuals of the City

Council hearings. The Planning Commission adopted the Plan unanimously, and recommended that the Portland City Council adopt and implement the plan provisions.

- a. The plan is consistent with Policy 9.1, Citizen Involvement Coordination, because opportunities were provided throughout the planning process to change aspects of the process to increase opportunities for review. Staff reports were available to the public within the the required time frames and were provided free of charge. Notice of meetings and hearings were sent to neighborhood associations, property owners, and to the members of the public requesting such notice.
 - b. The plan is consistent with Policy 9.2, Comprehensive Plan Review, because the *Northwest Hill Natural Areas Protection Plan* is part of the periodic review of the Plan called for in this policy.
 - c. The plan is consistent with Policy 9.3, Comprehensive Plan Amendment, because proposed changes to the Comprehensive Plan were discussed with the public and were a part of the notice that was mailed to groups and individuals. Proposed changes were discussed at Planning Commission hearings and the proposed language was modified in response to citizen review.
50. Goal 10, Plan Review and Administration, describes the process for maintaining the Comprehensive Plan as Portland's policy framework for land development. The goal calls for periodic review of the Plan to assure that it remains an up-to-date and workable framework. The *Northwest Hills Natural Areas Protection Plan* fulfills one aspect of the requirement for periodic review by providing an inventory, analysis, and implementing measures that address State Goal 5 and City Goal 8 as they relate to natural resources.
- a. The plan is supportive of Policy 10.1, Major Plan Review, because the *Northwest Hills Natural Areas Protection Plan* is part of periodic review of the plan.
 - b. The plan is supportive of Policy 10.2, Interim Plan Review and Amendment, because the amendments to the Plan and implementing regulations have been reviewed by the Planning Commission prior to action by the City Council, consistent with citizen involvement procedures and State law as required by this policy.
 - c. The plan is supportive of Policy 10.9, Revised Zoning Code, because the implementing changes and additions to the Zoning Code have

been reviewed to be consistent with the new Zoning Code adopted by City Council in 1990.

51. Goal 11, Public Facilities, provides for a timely, orderly, and efficient arrangement of public facilities that support existing and planned land use patterns and densities. The plan conforms with this goal by evaluating the impact of natural resource protection on public facilities development in the ESEE Analysis of protecting each natural resource included in the inventory. The analysis has led to limiting protection of natural resources to ensure that an orderly and efficient pattern of development can occur.

General Findings:

52. The Bureau of Planning recommendation on the natural resources inventory, ESEE analysis, and protection plan, including implementing measures, was adopted unanimously as amended by the Planning Commission.
53. The *Northwest Hills Natural Areas Protection Plan* is the result of extensive planning effort and citizen involvement. The plan identifies and preserves significant natural resources that contribute to Portland's high quality of life.
54. The *Northwest Hills Natural Areas Protection Plan* and its implementing regulations fulfill State requirements to protect significant wetlands, water bodies, open spaces, scenic areas, and wildlife habitat areas as part of State Land Use Planning Goal 5.
55. The State post-acknowledgement requirements were followed in the development of the plan and its implementing actions. Notice of the proposed action was mailed to DLCD on May 6, 1991 along with copies of the proposed plan, the ESEE Analysis, and the inventory.
56. The *Northwest Hills Natural Areas Protection Plan* is part of periodic review of the Comprehensive Plan required by the State and the City's own Comprehensive Plan.
57. It is in the public interest for the *Northwest Hills Natural Areas Protection Plan*, including amendments to the Comprehensive Plan, and amendments and additions to Title 33 and Title 34 to be adopted and implemented.

NOW, THEREFORE, the Council directs:

- a. The Recommended *Northwest Hills Natural Areas Protection Plan* (Exhibit A) and Appendices (Exhibit B) is hereby adopted.
- b. Ordinance No. 150580 is hereby amended by adding Policy 8.11D of the Comprehensive Plan, to read as follows:

"8.11, Special Areas

Recognize unique land qualities and adopt specific planning objectives for special areas.

- A. Willamette River Greenway (no change)
- B. Balch Creek Watershed (no change)
- C. [Proposed Johnson Creek Basin Policy]
- D. *Northwest Hills*
Protect and preserve forest, wildlife and watershed resources through implementation of the Northwest Hills Natural Areas Protection Plan."

- c. Ordinance No. 150580 is hereby amended by deleting the following language from Policy 8.18 of the Comprehensive Plan, as follows:

~~".....Plans approved through the regulations of the Environmental zones are deemed to be in compliance with Policies 8.9 through 8.17."~~

- d. Ordinance No. 150580 is hereby amended by amending Policy 10.3 of the Comprehensive Plan, to read as follows:

The Comprehensive Plan Map is the official long-range planning guide for uses and development in the city. The Comprehensive Plan Map uses the designations listed below. The designations state the type of area each is intended for, general uses and development types desired, and the corresponding zone or zones which implement the designation. Comprehensive Plan Map designations are shown on the Official Zoning Maps.

1. Open Space (no change)
2. Farm and Forest
This designation is intended for agricultural and forested areas in the city which are presently deficient in public services. Agriculture, forestry and extremely low density single-dwelling residential and agriculture will be the primary uses. The maximum density is generally one unit per two acres. The corresponding zone is RF.
3. Limited Single-Dwelling
This designation is intended for areas with long term service limitations and significant development constraints. Single-

dwelling residential will be the primary use. The maximum density is *generally* 2.2 units per acre. The corresponding zone is R20.

4. **Low Density Single-Dwelling**
This designation is intended for areas with public services but which are subject to significant development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 4.4 units per acre. The corresponding zone is R10.
 5. **Medium Density Single-Dwelling**
This designation is intended for areas with adequate public services but minor development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 6.2 units per acre. The corresponding zone is R7.
 6. **High Density Single-Dwelling**
This designation continues Portland's most common pattern of single-dwelling development. It is intended for areas with good public services and no development constraints. Single-dwelling residential will be the primary use. The maximum density is *generally* 8.7 units per acre. The corresponding zone is R5.
 7. **Attached Residential**
This designation is intended for areas with complete public services and without development constraints. It allows a mixture of housing types of a single-dwelling character, including attached houses. Allowed densities for attached houses are higher than for detached housing. The maximum density is *generally* 17.4 units per acre for attached housing. To allow the fulfillment of these densities, the allowed scale of these projects should be allowed to be greater than for other single-dwelling housing structure types. The corresponding zone is R2.5."
- e. Ordinance No. 150580 is hereby amended to include the Exception to State Goal 4, Forest Lands, as set forth in Exhibit C.
 - f. Ordinance No. 163608 enacting Title 33, Planning and Zoning, and Ordinance No. 146129 enacting Title 34, Subdivision and Partitioning Regulations, of the Municipal Code of the City of Portland, is hereby amended as set forth in Exhibit A.
 - g. The City Council directs the Bureau of Planning to study and recommend to the Planning Commission as part of its Skyline-West Goal 5 Study modification of the Future Urban (f) overlay zone to permit appropriate development of the Goal 4 Exception areas as near the allowed density of the RF zone as is consistent with the LCDC rules governing rural development.

ORDINANCE No.

- h. The Comprehensive Plan Map Designations and the Official Zoning Maps of the City of Portland are hereby amended to reflect application of the Environmental Zones, amendments to base zones, and application of the Skyline Plan District as shown in Exhibit B.
- i. Ordinance 163957 is hereby amended by removing the Scenic Resource overlay zone from land receiving Environmental zones in the *Northwest Hills Natural Areas Protection Plan* area.

Section 2. The Council declares an emergency exists because unprotected natural resources are threatened by degradation in areas within the Northwest Hills planning area. Natural values will be lost without immediate protection afforded by the plan. Expected land division requests may be inconsistent with plan protection measures, creating increased conflict with resource protection goals and regulations which are a part of this plan. Therefore, this Ordinance shall be in force and be effective upon adoption

Passed by the Council, **JUL 31 1991**

Commissioner Gretchen Kafoury
July 3, 1991
Tim Brooks/Damian Syrnyk/dpns

BARBARA CLARK
Auditor of the City of Portland
By *Britta Olsan*
Deputy

APPENDIX B
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