

SKYLINE WEST CONSERVATION PLAN

INVENTORY, ANALYSIS AND REGULATIONS
FOR THE CONSERVATION OF
NATURAL, SCENIC AND OPEN SPACE RESOURCES

Adopted by City Council September 21, 1994
Effective September 21, 1994

Ordinance No. 168154

Bureau of Planning
Portland, Oregon
September 1994



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Bureau of Planning

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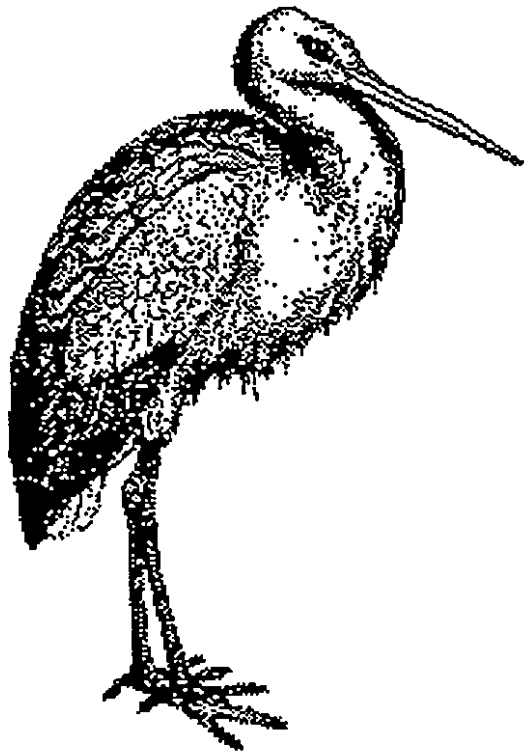
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September 1994

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CHAPTER 1

INTRODUCTION

- PURPOSE •
- RELATION TO OTHER RESOURCE PLANNING PROJECTS •
- ORGANIZATION OF THE PLAN •
- HOW TO USE THIS DOCUMENT •

Purpose

The *Skyline West Conservation Plan* provides the inventory, analysis and recommendations for protection of significant natural, scenic and open space resources located along the west slope of the Tualatin Mountain ridge in northwest Portland. The plan area is bounded on the east by NW Skyline Boulevard, and north, south and west by the Portland city limits (see Vicinity Map on page 5). The northern and southern boundaries are approximately NW McNamee and NW Cornell Roads, respectively.

This plan is the last of a series of eight conservation plans developed by the city to comply with Statewide Planning Goal 5. Goal 5 requires all cities and counties in Oregon to "conserve open space and protect natural and scenic resources." The Goal 5 Administrative Rule prescribes the following three-step planning process:

- 1) Inventory of location, quantity and quality of Goal 5 resources;
- 2) Analysis of economic, social, environmental and energy (ESEE) consequences of allowing, limiting or prohibiting conflicting uses; and
- 3) Development of a plan to protect significant resources.

On September 21, 1994, the Portland City Council adopted Ordinance No. 168154 enacting protection for significant natural, scenic and open space resources west of Skyline Boulevard, consistent with Goal 5 and its Administrative Rule.

Relation to Other Resource Planning Projects

The *Skyline West Conservation Plan* is integrated with other city resource plans. The *Northwest Hills Natural Area Protection Plan* (1991) and the *Balch Creek Watershed Protection Plan* (1991) border the plan area to the east and southeast, respectively. These plans provide similar levels of protection for similar resources east of Skyline. The *Scenic Resources Protection Plan* (1991) identifies several scenic corridors and one panorama within the Skyline plan area. The *Northwest Hills Study* (1985) addresses policy and resource issues within the plan area.

Locally, coordination efforts between city, county and Metro resource planning efforts are ongoing. Multnomah County is currently studying Goal 5 resources in the West Hills, including areas adjacent to the Skyline plan area. Important creek and habitat resources which cross the boundary between city and county are identified as significant by both jurisdictions. Washington County, which borders the plan area to the south, has completed its Goal 5 work. Significant Skyline resources are identified and protected on adjoining county lands.

On the regional level, this Conservation Plan supports the efforts of the Metropolitan Greenspaces Program to identify and protect greenspaces within the four-county metropolitan region. The *Metropolitan Greenspaces Master Plan* (1992)

identifies Cedar Mill Creek, Rock Creek, the Tualatin River and nearby Forest Park as regionally significant natural area sites. The Conservation Plan proposes conservation measures that help to protect these basins.

Organization of the Plan

The *Skyline West Conservation Plan* has six parts, five chapters and Appendices:

- Ch. 1 Introduction
 - Ch. 2 Plan Summary
 - Ch. 3 Background
 - Ch. 4 Resource Inventory and Analysis
 - Ch. 5 Proposed Conservation Measures
- Appendices

Chapters 1, 2 and 3 provide an overview of the plan, its purpose, background and policy framework. Chapter 4 covers the inventory and analysis of resources for the plan's three resource sites. Chapter 5 presents adopted implementing measures.

Plan appendices provide information on proposed zoning, habitat assessments, State Goal 5 and the Goal 5 Administrative Rule. The appendices also included a glossary of technical or unfamiliar terms, and a bibliography containing a list of references cited in the report.

How to Use this Document

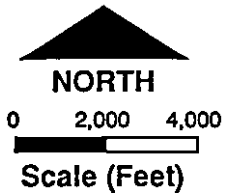
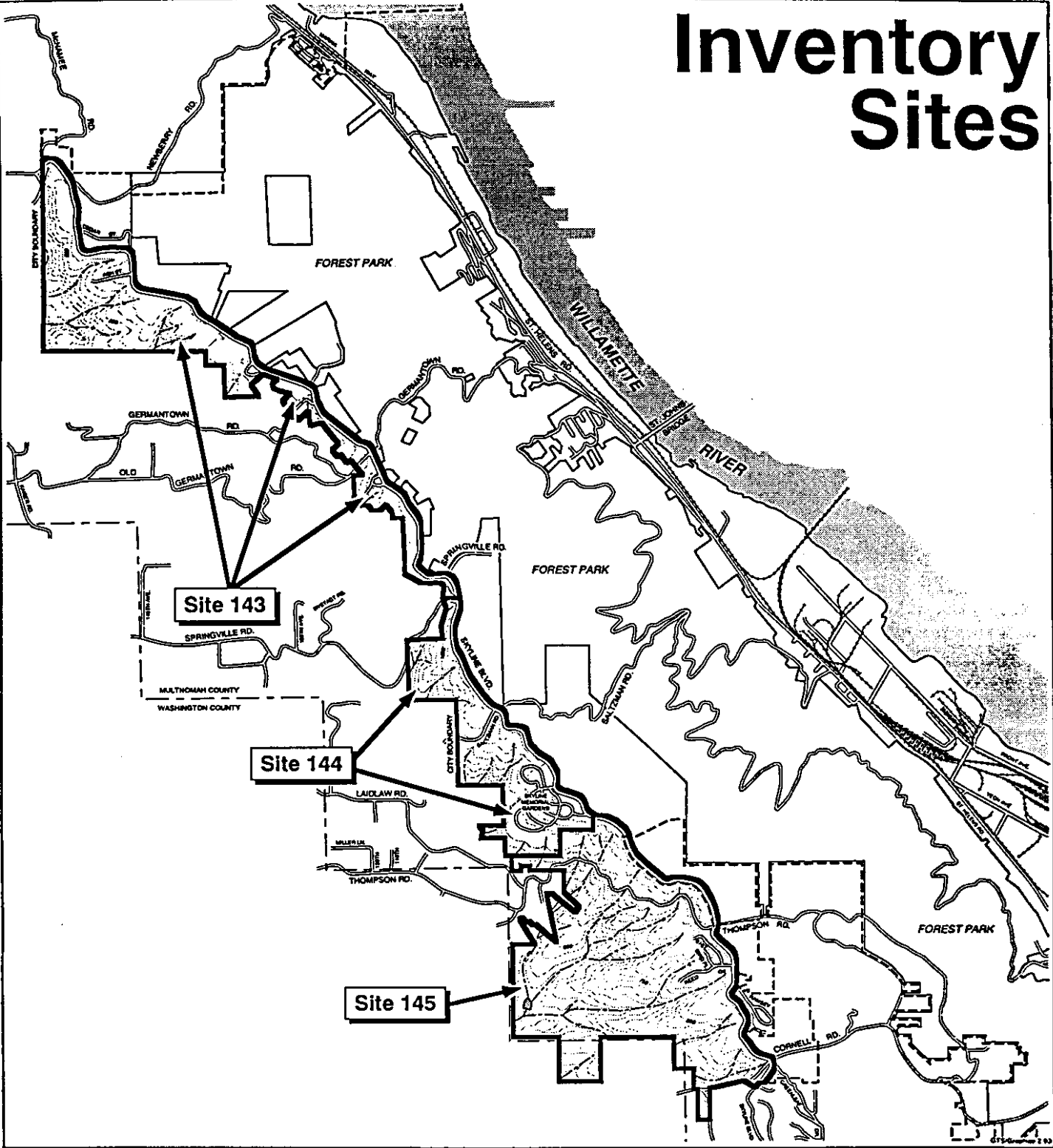
This plan serves as a policy document for planning staff in evaluating development proposals through environmental review. The plan also serves as a reference for citizens, designers, developers and neighborhood groups.

To get a quick overview of the plan and its recommendations:

- Read the one-page plan summary (Chapter 2);
- Scan chapter summaries and the site discussions in Chapter 4; and
- Review the adopted zoning contained on the Official Zoning Maps.

For information about a particular resource site, refer to the Vicinity Map on the following page, identify the site number, then turn to that site in Chapter 4. The discussion includes a site description, an inventory of resources, and an analysis of conflicting uses. Adopted regulations are discussed in Chapter 5 and adopted zoning is shown on the Official Zoning Maps.

Inventory Sites



(Elevation Contour
Intervals: 50')

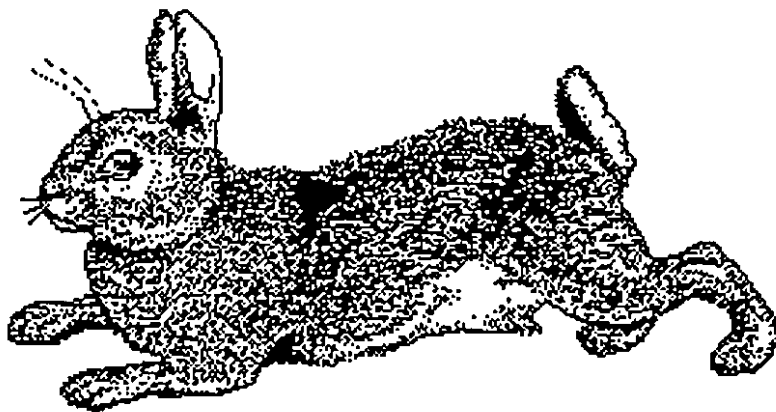
Vicinity Map

Skyline-West Resource Protection Plan

Bureau of Planning • City of Portland, Oregon

CHAPTER 2

PLAN SUMMARY



Plan Overview

The *Skyline West Conservation Plan* is the eighth, and last, of the city's environmental study reports designed to comply with Statewide Planning Goal 5. The plan provides protection for significant natural, scenic and open space resources west of Skyline Boulevard.

The planning area covers a narrow piece of the city, located west of NW Skyline Boulevard, north of Cornell Road and south of McNamee Road. The area is divided into three resource sites, each forming the upper basin of a west slope creek: Rock Creek (north), Bronson Creek (central) and Cedar Mill Creek (south). The combined planning area is approximately 1,750 acres in size.

Chapter 3 provides a brief review of the background and policy framework for the plan. Chapter 4 presents the resource inventory for each site, identifies conflicting uses, and analyzes economic, social, environmental and energy (ESEE) consequences of resource protection. Plan proposals, contained in Chapter 5, are designed to resolve conflicts and deliver resource protection as required by Goal 5.

Environmental Zones

The plan's primary implementing measure is the application of the environmental zones. These zones protect identified resources and provide a mechanism through which conflicts between resources and human uses can be resolved. Full protection (the "protection" zone) is proposed for highly valued resources such as creeks, wetlands, sensitive species or habitats with net positive ESEE consequences. Limited protection (the "conservation" zone) is proposed for significant resources to balance conflicts between land uses and resources. No protection is proposed where resources are not significant or where protection of significant resources has overall negative consequences. Adopted environmental zones are shown on city zoning maps.

Summary of City Council Actions

On September 21, 1994, the Portland City Council adopted Ordinance No. 168154 authorizing the following actions. These actions became effective upon adoption; they are presented in more detail in Chapter 5.

- Adopt the *Skyline West Conservation Plan* report including the Goal 5 inventory, analysis and recommendations;
- Amend Portland's Comprehensive Plan Goals and Policies to refer to the *Skyline West Conservation Plan*;
- Adopt the *Skyline West Conservation Plan* Policies and Objectives as the policy document for the area;
- Amend Title 33, Planning and Zoning, to implement the *Skyline West Conservation Plan*; and
- Amend the Official Zoning Maps to apply the Environmental Zones and remove the Interim Resource Protection Zone.



CHAPTER 3

BACKGROUND

- INTRODUCTION •
- GEOLOGIC HISTORY •
- PRE-SETTLEMENT HISTORY •
- PAST PLANNING EFFORTS •
- POLICY FRAMEWORK •
- SUMMARY •

Introduction

This chapter reviews the geology, pre-settlement history, past planning efforts and policy framework within the Skyline West planning area. The chapter begins with history of the geological formations, soils and seismic activity. It describes the early plant and animal life and the Native American populations that inhabited the area. Early plans for the city and the Skyline area are then reviewed, followed by more recent efforts to plan for urban growth and environmental protection. The last section of the chapter reviews state, regional and local plans that guide policy development in the Skyline planning area.

Geologic History

The oldest recorded geologic event in the Skyline West planning area began approximately twenty-two million years ago, during late Oligocene and early Miocene periods. At that time, the land area of Portland was submerged underneath an inland area of marine waters which formed thick beds of siltstone and shale, accumulating to depths of several thousand feet. This fossil rich deposit known as the Scappoose Formation underlays the West Hills of Portland. Geologists presume that the next event was the slow uplifting of the region which forced the seas to retreat. The following few million years were relatively quiet, while the sedimentary marine beds partly eroded (Houle 1987).

Sixteen million years ago, in the middle of the Miocene period, Oregon was active with volcanic events. Fissures in southeastern Washington and northwestern Oregon erupted with hundreds of cubic miles of molten materials that literally covered tens of thousands of square miles of earth. The lava formed basalt, a heavy, fine-grained igneous rock, covering the land from Idaho to the Pacific Ocean and referred to as Columbia River Basalt. In the West Hills, this basalt lies above the Scappoose Formation and is approximately seven hundred feet in depth.

After the eruptions stopped, the upper layer of basalt weathered into clay. The tropical climate in Portland caused an extensive, reddish laterite crust to form on the exposed basalt. The relative calm ended thirteen million years ago when the present-day Cascade and Coast ranges were uplifted and the basalt land surface of Portland, once flat, was squeezed and folded. The ridge that was formed by upfolded arches of layered rock, or "anticlines," is known today as Tualatin Mountains or Portland Hills. They are a narrow, northwest-trending, complexly-faulted range that rises about 1,000 feet above the Tualatin and Portland basins on either side.

These same mountain-building disturbances caused the formation of numerous parallel and transverse high-angle faults, and several southeast-dipping thrust faults along the ridge. The valley floors settled over the course of several million years until, in the Pliocene period, approximately eight to ten million years ago, 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 (Madin 1990; Price 1987). This formation has two distinct compositions: the lower facies, which consists of gravels containing quartzite, schists and granites that tie it to the ancestral Columbia River and the upper facies, which consists primarily of sandstone from basaltic origin, presumably eroded from the Cascades. The deposition of these sands and gravels began ten million years ago and ceased nearly two million years ago (Price 1987).

The last major activity affecting the study area was the wind-blown deposition of up to 100 feet of a homogeneous, nonstratified, unindurated deposit or "loess" at elevations above 600 feet, known as Portland Hills Silt. This silt is thought to have eroded from the Columbia River floodplain, carried down the Gorge, and finally wind-deposited on the West Hills. The blanket of silt accumulated thickest on the top of the slopes, decreasing near the base.

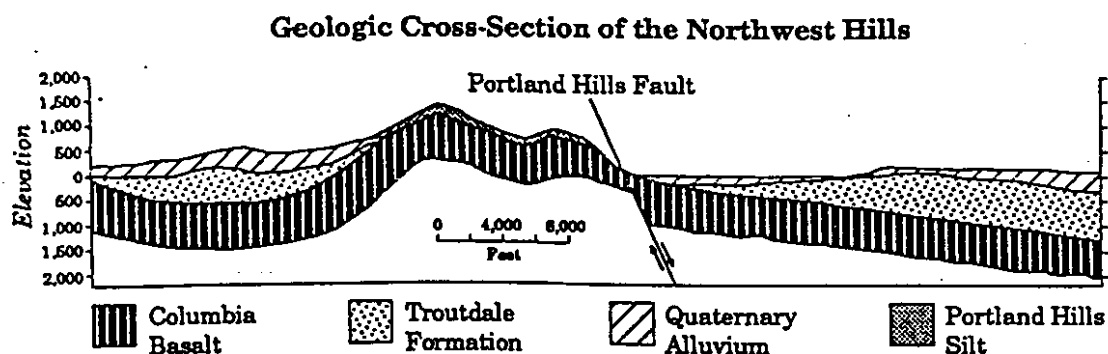
Information concerning the total depth of silt and its geographic variation is extremely limited, due to the small number of outcroppings which expose the base of the formation (Lentz 1981). Various reports indicate a gross thinning of the deposit westward. The depth of the silt decreases from approximately 120 feet on the east side of the Tualatin Mountains to 50 feet and less on the western flank (Lentz 1981). Massive flooding, approximately five million years ago, eroded this silt away from all areas below 300 feet, but replaced it with Lacustrine deposits of silt and sand.

The presence of Portland Hills Silt along the Tualatin Mountains has important implications for land use and development. This silt becomes unstable when wet, and susceptibility to landslides is high, particularly after rains have saturated the soil (Madin 1990). 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.

The unstable nature of Portland Hills Silt is compounded by the risk of seismic activity in the study area. According to Orr (Orr and Baldwin 1992), research into the relationship between movement of crustal plates and earthquakes has led to the predictions that Oregon could experience an earthquake as high as magnitude 8 on the Richter scale. The point of origin for such massive quakes would be off the Oregon coast along the subduction zone where the Juan de Fuca plate is passing under the North American plate.

Beneath Portland and the northern Willamette Valley is a network of faults which could become active at any time. After 1882, Portland experienced a recorded quake on the average of once every 5 years. In 1962 and 1968, quakes of magnitudes

Figure 1



between 3.7 and 5.0 repeatedly struck Portland from epicenters on the eastern edge of the city. Shocks were due to movement of a fault as much as 10 to 15 miles deep. A series of quakes in 1991, measuring 3.5, were focused in the Tualatin Mountains. More recent quakes, such as the Mt. Angel quake in the spring of 1993, were centered outside of Portland but tremors were felt throughout the city.

In recent personal interviews with geologists Ian Madin (1993) and Matthew Mabey (1993), they discussed the relationship between the soil characteristics and the risk of earthquake activity. Those areas covered with Portland Hills Silt, located on slopes greater than 15 percent are more apt to move depending on the depths of the soil. A lateral spread displacement and dynamic slope instability map for the Portland Quadrangle was recently completed. This map locates landslides, steepness of slopes and thickness of soils. A similar study is planned for the Skyline West plan area (the Linnton Quadrangle) by 1996. At this time, there are only a few well sites from which to record data.

Pre-Settlement History

The presence of Native American people in the Portland area dates back over 10,000 years. These people arrived during the late glacial and early post-glacial periods. Human use of the landscape over the last 10,000 years can be divided into three periods: the early post-glacial setting; the period of drier and warmer conditions (the Alithermal); and the period of the return of a milder climate. The first human populations appearing in this first period found pine, fir, lodgepole pine and alder forests. Later, fir, spruce and hemlock moved into the lowland forests (Ellis 1992).

At the end of the glacial period, the climate changed bringing conditions that were drier and warmer than previously. With the onset of the Alithermal periods, the forests opened further, creating rich grasslands and scattered stands of oak. The surrounding mountains remained forested. This period resulted in trees in need of cooler and moister conditions retreating to the hills and mountains. The lowland

forests were eventually dominated by Douglas-fir and oak. These were not dense forests, but rather open stands of trees bordered by prairies.

These conditions continued from 10,000 to 6,000, and even 4,000 years ago in some areas. Milder climates allowed the forest cover to return. Ellis (1992) believes that woodlands similar to those of today were typical of the last few thousand years. The woodlands areas were dominated by Douglas fir. Hemlock and cedar were characteristic of riparian and swampy areas. Near the end of this second period, the rise in sea level and the later flooding of the lower Columbia valley reduced the amount of riparian habitat available.

This rise in the sea level caused the Columbia River from the Pacific Ocean to the Columbia Gorge area to contain sea water. As a result, the lower Columbia would have contained brackish waters. The floodplain is assumed to have been composed of tidal swamps, marshes and flats. Floodplains offering extensive dry ground would have appeared in the Portland Basin only after the decline in sea level, thought to have begun about 3,500 years ago.

The third period was cooler and moister, creating a setting similar to those found by the first white explorers in the Portland Basin. When the sea level declined, extensive tracts of floodplain suitable for human settlement were created. For the past 3,000 to 4,000 years, the Portland area offered two basic environments: densely forested uplands and river bottoms (a mosaic of wetlands, prairies and scattered stands of trees).

During the last 10,000 years of human occupation, the resources of interest to Native people changed very little. What did change was the degree to which these people relied on particular resources and how they shaped their settlement patterns. Important upland resources included black-tailed deer, ground birds, berries, hazelnuts and acorns. Camas, a wild lily bulb baked as bread in special earthen ovens, was found in upland prairies and floodplains sources. During the Altithermal period, when the upland forests were more open, they probably supported more extensive camas fields and larger elk populations. The upland forests were an important source of fir, pine and cedar which were used in making tools, shelters and canoes. Certain medicinal plants were found only in the uplands.

The river bottoms provided fish, shellfish and sea mammals. The river and inland lakes, ponds and marshes provided great flocks of waterfowl, wapato (an Indian potato), rushes and cattails. The wet meadows supported elk herds and white-tailed deer populated the riparian woodlands. Ash and willow, used in building shelters and making baskets and nets, were more easily found on the floodplains than in the uplands. The cedar, Douglas fir and oak grew on the higher ridges of the bottoms. A variety of bears and small furbearers such as weasels, minks and rabbits were found in both upland and lowland environments. Muskrats and beavers were more commonly found in the bottoms.

Early historic accounts of the Tualatin Mountains describe a terrain of steep slopes, deep ravines, and a tangle of brush and fallen timber (Ellis 1992). The hills were drained by many unnamed creeks into the Tualatin River to the west and the Willamette River to the east. Archaeological research has recorded sites in the uplands and at the upland-floodplain edge with artifacts that date back 6,000 to 9,000 years ago. Upland sites are more rarely reported, but there are references to sites in the Tualatin Mountains, west of Linnton. Ellis predicts that the hills contain one archeological site per 130 acres of land area with higher site density along drainages and wetlands (1 site/40 acres). Using this predictive model, approximately 15 sites could be expected to have existed within the Skyline plan area.

In the early nineteenth century, the Columbia valley was occupied by several branches of Chinookan-speaking people. The Chinook tribes lived in the Lower Columbia area which includes the Columbia and Willamette River valleys. The Chinook tribes consisted of approximately 12 smaller tribes. The Multnomah Chinook occupied Sauvie Island, Scappoose Bay, the Multnomah Channel, and the Vancouver Lake area. The Clackamas occupied the Clackamas River area, also near to the Tualatin Mountains (Zucker et al. 1983).

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 stratified by wealth and heredity. The Lewis and Clark records of 1805-06 referred to the Portland Basin as the Columbia or "Wappato" valley. They estimated a Native population of 4,000 people.

Of the Chinookan villages recorded by Lewis and Clark, only two were within the present city limits of Portland. Nemaquinner was a small village listed as the home of about 100 people (twice that number in spring) of four houses near the present site of the University of Portland. The second village, Neerchokioo, was located on the Columbia River near the present site of Portland International Airport (Ellis 1992).

The confluence of the Columbia and Willamette Rivers was one of the most densely populated areas of Oregon, due to the availability of extensive salmon runs and the large trade network along the rivers. Travel was accomplished by canoe and wood plank houses were typically constructed for winter shelter. The natural resources of the area also had deep spiritual significance for the various tribes. Mountains and forests were believed to be places where humans could contact the spiritual world and fish, animals and plants were seen as spirit beings who assisted the human race. The indigenous peoples of the Portland area had a unique relationship with the land, one of stewardship, or guardianship.¹

¹ "Guardianship" was a term used by a Native American at a public workshop on West Hills resource planning.

Past Planning Efforts

Several local and regional planning efforts provide historical context to the present study. This section summarizes past planning efforts, moving from early to recent plans and concludes with a review of other Goal 5 plans related to the Skyline plan.

Early Plans

Olmsted Brothers' Report

At the turn of the century, in 1903, John Charles and Frederick Law Olmsted conducted a study of Portland and prepared a report which proposed a system of parks and provided a comprehensive framework for the development and maintenance of Portland's parks and parkways.

In addition to scenic and aesthetic values of natural areas, the Olmsteds pointed out their public health and safety, and economic benefits, and noted how protection of natural resources "adds greatly to the value of adjoining properties." They also observed that:

It is true that some people look upon [woods of the West Hills] 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. (Olmsted 1903)

Bennett and Moses Plans

City planners E. H. Bennett and Robert Moses echoed the proposals of the Olmsteds in subsequent planning proposals. 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."

The Urban Outdoors Plan

In 1971, the Columbia Region Association of Governments (CRAG), predecessor to Metro, developed "The Urban Outdoors: A New Proposal for Parks and Open Space." The Urban Outdoors plan built on the proposals of the Olmsteds, Bennett and others, calling for the creation of a system of local and regional parks, open spaces, trails and natural areas. A primary goal of the plan was to preserve and enhance:

those environmental features (the rivers, streams, floodplains, high points and historic sites) that have already stamped the region with their unique form and character, which make it a very special place to live. (CRAG 1971)

Recent Plans

Northwest Hills Study

In November 1985, the City Council adopted the land use and administrative recommendations set forth in the *Northwest Hills Study*. The purpose of the study was to determine appropriate land use densities and patterns in the planning area given present and planned urban services. Upon presentation of the study findings, the City Council directed the Bureau of Planning 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.

Portland Future Focus

In August 1991, the city adopted the *Portland Future Focus: Strategic Plan*. The purpose of the plan is to guide government, businesses, community organizations and citizens in ensuring a healthy city in the following decades. The plan includes an action plan for managing regional growth. Strategy #1 of this action plan is:

Maintain livability in the Portland Metropolitan region through an integrated planning process which focuses appropriate growth in the Central City, protects the natural environment and open spaces, strengthens cultural programs and enhances neighborhoods.

Implementation of the *Skyline West Conservation Plan* will support several action items under Strategy #1. These items include:

- 1.2 Create a regional system of linked greenways and greenspaces. As part of its Metropolitan Greenspaces Program, Metro should institute a cooperative regional system of natural areas, open space, recreational trails, crop lands and greenways. The system should integrate landscape features, natural areas, wildlife refuges, rivers and streams....
- 1.3 Institute ecosystem protection, restoration and management program that integrates landscape ecology, protection of open space, wildlife refuge parks, crop lands and the maintenance of air and water quality with economic development....

Portland's Livable City Project, begun in late 1991, is an ongoing effort to implement part of the Strategic Plan. The project's purpose is to achieve the *Future Focus* growth management goal:

Manage regional growth to provide effective public services at the lowest responsible cost, to improve environmental quality, and to enhance the quality of life.

The policies and resource protection measures of the *Skyline West Conservation Plan* will aid the Livable City project in achieving this goal.

Metropolitan Greenspaces Master Plan

The Metropolitan Greenspaces Program was initiated by Metro to identify and protect natural areas within the region, in keeping with the Future Focus action items noted above. The goal is to establish a regional system of natural areas, parks and open spaces which are connected by trails and greenways.

The *Metropolitan Greenspaces Master Plan* (July 1992) identifies Cedar Mill Creek, Rock Creek, Tualatin River and nearby Forest Park as regionally significant natural area sites. The area contains "significant wildlife habitat, providing ecological connection between Columbia River and the Tualatin Valley." The Skyline plan advances Metro's efforts to protect these regionally significant resources.

Multnomah County Planning Efforts

Multnomah County has identified significant creeks and wildlife habitat areas in the vicinity of the Skyline West plan area. These designated resources overlap the city/county boundary in several areas and are designated in a consistent manner by both jurisdictions. The city and county are coordinating on their concurrent Goal 5 planning efforts in the Skyline area.

The county's Natural Area Protection and Management Plan (June 1992) is intended to create a framework to select natural areas for acquisition by the county and to identify means to preserve, protect and enhance natural resource values on such lands. The plan recognizes the "Tualatin Mountain Corridor" as a natural area system which supports resident and anadromous fish species.

In January 1993, Multnomah County amended zoning of forest lands outside the Urban Growth Boundary in response to new state regulations. In areas adjacent to the Skyline plan area, Multiple Use Forest zoning with 19 and 38-acre minimum lot sizes was changed to Commercial Forest Use with 80-acre lot sizes. Dwellings must now be accessory to the primary forestry use.

Related City Goal 5 Plans

Historic Resources Inventory

The 1984 *Portland Historic Resources Inventory* identifies the location, quality and quantity of historic resources in Portland. The inventory volume entitled *Selected Properties - Northwest* includes the Skyline planning area. Three historic properties are identified within the northern portion of the area. These properties are discussed further in Chapter 4.

Mineral and Aggregate Resources Inventory

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. No significant mineral or aggregate sites are identified within the Skyline planning area.

Interim Resource Protection Zone

To protect resources before the completion of the city's Goal 5 planning program, the City Council adopted the Interim Resource Protection Zone, effective January, 1991. Upon adoption of the *Skyline West Conservation Plan*, this interim zone and the water feature designations shown on the zoning maps will be removed from the plan area and replaced, where appropriate, by environmental zones.

Balch Creek Watershed Protection Plan

In January 1991, the City Council adopted the *Balch Creek Watershed Protection Plan* to fulfill part of the city's State Goal 5 requirements. The plan covers the area southeast of and adjacent to the Skyline planning area.

Balch Creek with its unique, land-locked population of cutthroat trout was identified as one of the highest valued resource areas in the city. Consequently, the Balch Creek plan applied the city's environmental protection zone to most of the basin. The adopted regulations include a development season limitation, special criteria to protect fish and wildlife, and a 90 percent forest cover requirement. Such full-basin protection measures and special standards are not expected to be necessary within the Skyline plan area which generally contains less sensitive resources.

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 inventory and analysis contained in the plan is incorporated by reference and is not repeated in this report. Scenic value is only one factor weighed in the decision to recommend environmental protection for sites in the Skyline planning area.

The Scenic Plan identifies three scenic corridors within the Skyline planning area: NW Skyline Boulevard, NW Germantown Road and NW Cornell Road. The plan also identifies one scenic viewpoint located at Skyline Memorial Gardens (VP 15-04). These identified resources are discussed further in Chapter 4.

Northwest Hills Natural Areas Protection Plan

The *Northwest Hills Natural Areas Protection Plan* was adopted by City Council in July 1991. Like the Scenic and Balch Creek plans before it, this plan was designed to satisfy part of the city's Goal 5 requirements. The Plan applies measures to protect resources on the east slope of the Tualatin ridge (across Skyline Boulevard from the study area of the present plan). Adopted actions included the following:

- Special conservation regulations, including a development season limitation and criteria for habitat and watershed protection.

- The Skyline Plan District, allowing transfer of development rights for properties within Forest Park. The plan district includes all but the southernmost portion of the Skyline planning area.
- Environmental review for land divisions.
- A Planned Unit Development requirement for certain land divisions.

Among the implications of this plan on resource planning west of Skyline is the fact that the east and west slopes of the hills are ecologically connected and wildlife regularly move across the ridgetop. Another issue is the need to accommodate a portion of the transferred housing density from Forest Park in the Skyline plan area.

Policy Framework

This section presents the policy framework which guides the development and implementation of the *Skyline West Conservation Plan*. The discussion covers coordination with legislation and public agencies from the federal to the local level. The section begins with a discussion of the state-mandated land use planning program, followed by a review of local, regional and federal policies and programs.

State

Statewide Planning Goals

Oregon's statewide land use planning program was established by Senate Bill 100 and adopted by the Legislature in 1973. The bill is included in the Oregon Revised Statutes (ORS) as Chapter 197. The 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 and maintain comprehensive plans.

After local governmental adoption, comprehensive plans are submitted to the Department of Land Conservation and Development (DLCD) for review to ensure compliance with and implementation of the Statewide Planning Goals. A comprehensive plan is acknowledged by DLCD when it is found to comply with the goals. The City of Portland's Comprehensive Plan was adopted by City Council in 1980, effective January 1, 1981, and acknowledged by DLCD in May of 1981.

Periodic Review

Also in 1981, the Legislature amended ORS Chapter 197 to require periodic review by the state of acknowledged comprehensive plans. The purpose of periodic review is to ensure that each local government's comprehensive plan and land use regulations are in compliance with the Statewide Planning Goals and coordinated with the plan and programs of other state agencies. 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 acknowledgment of the city's Comprehensive Plan, LCDC adopted an Administrative Rule for State Goal 5.

The *Skyline West Conservation Plan* updates the city's Comprehensive Plan inventory and analysis of natural, scenic and open spaces within the Skyline planning area and addresses the new Goal 5 Administrative Rule requirements. The Conservation Plan brings the city into compliance with the terms of its Local Review Order (Resolutions 34523 and 34653) concerning Goal 5 natural resources.

Statewide Planning Goal 5

Goal 5 requires Oregon cities and counties "to conserve open space and protect natural and scenic resources." The Goal 5 Administrative Rule requires local governments to follow a three-step planning process.

An inventory of resources is the first step. This involves determining 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 is identification of conflicts with protection of 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.

If there are no conflicting uses for an identified resource, a jurisdiction must adopt policies and regulations to ensure that the resource is preserved. Where conflicting uses are identified, the economic, social, environmental and energy (ESEE) consequences of resource protection must be determined. Compatibility with other Goal 5 plans and other applicable statewide planning goals must be considered. The ESEE analysis is adequate if it provides a jurisdiction with reasons why decisions are made regarding specific resources.

The final step is adoption of a program or plan to protect significant resources. Based on the inventory and analysis, a jurisdiction must decide whether to allow, limit or prohibit conflicting uses and adopt measures to implement its decisions.

Other Applicable Statewide Planning Goals

There are 19 Statewide Planning Goals. Thirteen of these goals apply, to a greater or lesser extent, to the Skyline planning process. 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 the Conservation Plan.

State Goal 5 is the focus of the present study and is discussed above. Goal 3, Agricultural Land, Goal 4, Forest Lands, generally apply to lands outside of the Urban Growth Boundary of which there are only 15 acres within the study area. Goals 6 through 14 cover topics such as air, water and land resources quality; areas subject to natural disasters and hazards; recreational needs; economic development; housing; public facilities and services; transportation; energy conservation; and urbanization. This Conservation Plan incorporates the requirements of these goals with the ESEE analysis.

The requirements of Statewide Planning Goal 15, Willamette River Greenway, were addressed in the *Willamette River Greenway Plan* (1987). Statewide Planning Goals 16, 17, 18 and 19 address coastal and ocean resources and therefore do not apply to the City of Portland.

Local

The City of Portland Comprehensive Plan

The city's Comprehensive Plan provides a coordinated set of guidelines for decision-making to guide future growth and development of the city. The Comprehensive Plan is implemented through the use of public facilities and land use policies, the Comprehensive Plan map, and the city's regulations for development, including the Zoning Code. Since the state acknowledged the city's Comprehensive Plan in 1981, land use decisions in conformance with the policies and objectives of the Plan are in compliance with the Statewide Planning Goals.

The *Skyline West Conservation Plan's* policies, objectives and recommendations are consistent with the Comprehensive Plan Goals and Policies, particularly Goal 8 - Environment. The purpose of Goal 8 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 Conservation Plan will include an amendment to Goal 8 to acknowledge the Skyline plan area as a "Special Area" (see Chapter 5). Similarly, the Conservation Plan supports other goals. Implementation of the plan, for example, will preserve housing opportunities while retaining the character of the Forest Park neighborhood consistent with Goal 2 - Urban Development, Goal 3 - Neighborhoods and Goal 4 - Housing.

There are seven additional Comprehensive Plan Goals. These goals address metropolitan coordination, economic development, transportation, energy, citizen involvement, plan review and administration, and public facilities. As with the State Planning Goals, these procedures are applied in the preparation, review and presentation of this plan. Economic development, energy and related goals are addressed in more detail in Chapter 4 as part of the ESEE analysis of resource sites.

Regional

Metro Regional Urban Growth Goals and Objectives

In September 1991, Metro developed the *Regional Urban Growth Goals and Objectives* (or RUGGOs). RUGGO Goal II.1, Natural Environment, states:

Preservation, use and modification of the natural environment of the region should maintain and enhance environmental quality while striving for the wise use and preservation of a broad range of natural resources.

Objective 9, Natural Areas, Parks and Wildlife Habitat, directs Metro to acquire, protect and manage (1) open spaces to provide passive and active recreational opportunities, and (2) an open space system providing habitat for native wildlife and plant populations. The development and implementation of the *Skyline West Conservation Plan* will assist Metro's regional efforts to establish and maintain an open space system and may aid in acquisition efforts.

Metro's ongoing Region 2040 Project is closely tied to the RUGGOs, the Greenspaces program and Portland's Livable Cities Project discussed in the preceding section. Region 2040 is aimed at identifying a collectively-shared vision for the future urban form of the region. The proposed growth concepts recognize the significant resource areas identified in the *Skyline West Conservation Plan*.

Metropolitan Housing Rule

In addition to regional coordination with Metro, the city is responsible for meeting its share of regional housing needs. The regulations proposed as part of the *Skyline West Conservation Plan* will not prevent the city from meeting its housing obligations. Resource areas proposed for protection within the plan are: 1) constrained lands which by the Metropolitan Housing Rule definition are not needed for housing; 2) areas from which housing densities may be redistributed to less constrained, "buildable" land; or 3) areas which allow housing provided impacts are controlled. Certain areas which are not needed for housing may still provide limited infill opportunities. To the extent housing density can be increased in or adjacent to these areas, urban services can be provided in a more cost effective manner. For this reason, the city encourages compact development forms which accomplish the dual objectives of resource conservation and housing development.

Federal

The Federal Clean Water Act applies to water resources in the Skyline planning area. 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." Implementation of the Conservation Plan is 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 wetlands and water bodies.

- Environmental Protection Agency (EPA): Under Section 309 of the Clean Water Act, EPA reviews environmental impact statements required for all federally funded developments having significant environmental impacts.
- 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. Permits under the Section 404 process are subject to review by EPA and the U.S. Fish and Wildlife Service.
- Oregon Division of State Lands: In accordance with Oregon statutes, a state permit is required for filling, removal or alteration of 50 cubic yards or more of material within the bed or banks of the waters of Oregon.

Summary

Skyline West natural resources were formed through a series of geologic events beginning millions of years ago. Upfolding arches of layered rocks thirteen million years ago resulted in a narrow, northwest trending range known today as the Portland Hills. The silt that covers the hills becomes unstable when wet and is susceptible to erosion and landslides, particularly on steep slopes.

The plants and animal populations in the study area changed with the climatic conditions. The abundant natural resources at the confluence of the Columbia and Willamette Rivers created an hospitable environment for human and animal habitation over the past 10,000 years. Several Chinookan tribes used the Skyline planning area to hunt and to rest on their journeys between the Tualatin and Willamette River valleys. Trails over the ridge were later used by early settlers.

Past planning efforts in the study area focused on parks and planning for natural resources. The policy framework for the present study includes compliance with State Planning Goals (particularly Goal 5), Portland Comprehensive Plan Goals and Policies, and other local, regional and national conservation programs.



CHAPTER 4

RESOURCE SITE INVENTORY AND ANALYSIS

INTRODUCTION •

RESOURCE FUNCTIONS AND VALUES •

CONFLICTING USES PERMITTED BY ZONING •

CONSEQUENCES OF ALLOWING CONFLICTING USES •

CONSEQUENCES OF LIMITING OR PROHIBITING CONFLICTING USES •

INVENTORY AND ANALYSIS OVERVIEW •

DISCUSSION FORMAT •

SITE INVENTORY AND ANALYSIS •

COMPATIBILITY WITH OTHER GOAL 5 PROGRAMS •

APPLICABLE STATEWIDE PLANNING GOALS •

CONFLICT RESOLUTION •

Introduction

The previous chapter outlined the background and policy framework for the present plan. The first part of this chapter provides an overview of resource functions and values, followed by a discussion of conflicting uses. The method used to select, inventory and evaluate resource sites is then outlined, followed by an explanation of the format used in examining resource sites. The inventory and analysis of individual resource sites is then presented. The last sections cover compatibility with other Goal 5 plans and other state goals, and conclude with conflict resolution.

Resource Functions and Values

Wildlife Habitat

Area creeks, tributaries, wetlands, ravines and forests provide important breeding, feeding and refuge areas for a variety of bird, mammal, amphibian, reptile and invertebrate species. Of these, two are state-listed sensitive species: the northern red-legged frog, which also is a Federal candidate species, and the pileated woodpecker. These species serve as indicators of the health of the watershed ecosystem.

The planning area contains a diverse bird population with some sites exceeding 70 resident and migrant species. Of the migrant species, nine warblers were identified including the rare Tennessee warbler. Other wildlife species include deer, elk, bobcat, beaver, coyote, shrews, voles, squirrels, chipmunks, weasels and bats. Pacific tree and red-legged frogs, ensatina and pacific giant salamanders, northern alligator and western fence lizards, northwestern and common garter snakes, and roughskin newt are resident herptiles.

The site's creeks, wetlands and forested ravines also exert a significant influence on downstream fish and amphibian production within the larger Tualatin River system. Among other species, this system supports state-listed sensitive coho and fall chinook salmon, cutthroat trout, pacific lamprey and northern red-legged frog.

In addition to the importance of maintaining "a balanced indigenous population of species" as identified by Federal policy, wildlife have many beneficial values ranging from vector control and plant pollination to the enjoyment and education they provide for local residents, school children and nature enthusiasts.

Vegetation

The planning area contains over 120 plant species, including several species or occurrences of particular note. The planning area also contains good examples of the Pacific Northwest's western hemlock forest community. This community is unique among all temperate forests in the world.

The forest community includes the pacific yew (*Taxus brevifolia*), a slow growing tree species in which a cancer-fighting substance known as "taxol" was recently discovered. Several significant stands of community associates western red cedar (*Thuja plicata*) and grand fir (*Abies grandis*) are found in the area, as is the madrone (*Arbutus menziesii*) which has limited distribution within the region.

In addition to providing habitat for wildlife, forest vegetation moderates the effects of winds and storms, stabilizes and enriches the soil, and slows runoff from precipitation. These functions control erosion and enable the forest floor to filter out sediments and pollutants as the water soaks down into groundwater reserves or passes into surface drainages.

By filtering water, the forest maintains good quality drinking water for residents who use wells. By stabilizing soil, increasing groundwater infiltration and reducing runoff and erosion, the forest protects the local community from landslides and other hazards such as flooding. This reduces potential demand on disaster relief agencies (and demand on tax dollars), as well as individual expenses for replacement of destroyed property and treatment for injury. Native wildlife also control populations of pests such as mosquitoes and rats.

The forest provides additional values which accrue to broader segments of society. The mixed coniferous and deciduous forest acts as a buffer from the sights and sounds of the urban metropolis. The forest mutes the noise of traffic, construction activities, and commercial activities and provides a visual screen between homes, neighborhoods and businesses. The forest absorbs air pollutants caused primarily by auto and industrial emissions. The microclimate of the forest, created in part by the shade of the vegetation and the transpiration of water from the leaves, moderates climate extremes: the forest acts as a natural air conditioner for adjacent residential areas, cooling the air during the day and warming it at night.

When an identified resource is vegetation, including forest, the principal value of the resource is the natural land that supports the vegetation. That resource value remains when vegetation is removed, so long as there is the potential for regrowth. Clearing is not a permanent change, and if a vegetated area is designated as valuable in itself or for its function in support of other resources, such as waterways, riparian areas and wetlands, removal of vegetation is not reason for changing the designation.

Wetlands and Water Features

In addition to providing critical habitat for wildlife, area creeks, ponds and wetlands recharge groundwater, control erosion and provide flood storage, desynchronization and conveyance functions. These natural water features perform important water quality functions by slowing surface waters, allowing deposition of sediments and associated nutrients, metals, and organic contaminants (at least 35 percent removal according to Hupp and Yanosky).

Forested wetlands in particular have been found to improve water quality by converting soluble nitrogen into gaseous nitrogen through denitrification (Bragan). This important microbial process represents the most important pathway for reducing nitrogen releases to aquatic systems. As water passes through soils, acidity is neutralized through sulfate reduction, a bacterial process common in saturated soils. At least 90 percent of sulfates have been shown to be neutralized by wetlands, leaving 10 percent discharged to the downstream waters (Eshleman).

Soils

Soil microorganisms, seeds and root stocks, nutrients, oxygen and moisture play essential roles in supporting life above the ground. Soil is a living organism without which the forest and water resource values discussed above would not exist. Soil also provides water management functions, effecting water recharge, discharge and storage.

Soils, underlying geologic formations, ground and surface waters, vegetation and wildlife are interdependent elements of the natural community. The ability of these elements to function properly is an important measure of the general health and vitality of the local environment. A healthy environment preserves a neighborhood's scenic, recreational and educational values, and contributes to Portland's high quality of life.

Other Values

The area's natural resources provide important educational and recreational values. Educational values include hands-on learning about ecology and environmental issues, basic life skills training (communication, problem solving skills, etc.), community benefit projects (such as trash clean-ups, environmental monitoring), and development of pride, self respect and sensory awareness. As local high school students have testified: "Greenspaces teach you how to think."

As the metropolitan area grows over the next decade, natural resource and open space areas will help maintain the population's health. These areas provide opportunities for recreation and exercise as well as opportunities to escape the stresses of urban life. The parks, trails and natural open spaces of the planning area provide such amenities for keeping a growing population physically and psychologically healthy.

Summary

The planning area contains locally, and in certain cases regionally, significant resources with a broad range of values. These values include the provision of habitat for wildlife, domestic water supplies, groundwater recharge and discharge, slope stabilization, flood storage and desynchronization, sediment and erosion control, neighborhood livability and scenic amenities, and recreational and educational values. The primary beneficiaries of these resource values are neighborhood residents, but many of the benefits accrue to residents and businesses throughout the Portland metropolitan area.

Conflicting Uses Permitted by Zoning

As indicated in the preceding paragraph, individual resources are interdependent elements of a complex natural system; the impacts of conflicting uses rarely will affect one resource without affecting others. For similar reasons, the cumulative impacts of conflicting uses can have far reaching effects on resources.

As a component of Goal 5 resource planning, local governments must identify conflicting uses within inventoried Goal 5 resource areas. According to the Goal 5 administrative rule, a conflicting use is one that, if allowed, could negatively impact a significant resource site. Such uses are permitted in the Portland base zones as allowed uses, uses subject to limitations, or conditional uses. In some cases, a use may be allowed subject to limitations and allowed only as a conditional use in others. Conflicting uses not allowed in a base zone may be permitted by recognition of legal nonconforming status or through a temporary use agreement.

The administrative rule directs local governments to examine the uses allowed within broad zoning categories (e.g., residential, commercial). For the purposes of this plan, the examination of broad zoning categories covered the following zones in the Skyline West Study area: open space, residential farm and forest, limited single-dwelling, low density single-dwelling, and neighborhood commercial. Table 1 (page 34) lists the uses permitted under the base zones present in the study area which conflict with Goal 5 resources.

This discussion identifies existing and potential conflicting land uses in each zone, including a brief examination of how two overlay zones and a plan district affect conflicting uses in the study area. The discussion also includes an examination of the uses not assigned to a single zoning category, such as temporary uses. The analysis of economic, social, environmental, and energy consequences of protecting significant resources addresses the existing and the potential conflicting use allowed in each resource site.

Open Space

The study area includes 101 acres zoned OS, Open Space, located at Skyline Memorial Gardens (Site 144). The purpose of the OS zone is to preserve public and private open and natural areas identified in the Comprehensive Plan. Agriculture, parks and open areas are the only uses allowed by right in the OS zone.

Certain facilities which are part of a park and open area use are allowed as conditional uses. Retail sales and service uses are allowed as conditional uses only when they are associated with a park and open area use. Several institutional uses are allowed as conditional uses: basic utilities, community service and daycare. Radio and television broadcast facilities and rail lines and utility corridors are permitted as conditional uses as well.

Temporary uses permitted in the OS zone are: fairs, carnivals, and other special events; temporary activities and structures needed for natural disasters and emergencies, and staging areas for public utility installation.

Existing conflicting uses in the OS zoned areas consist of a cemetery, which is an allowed use as a Park and Open Area. The following accessory facilities are considered conditional uses: mausoleums, chapels and similar accessory structures associated with funerals or burials, and parking areas. Portions of the Open Space land are currently undeveloped.

Farm and Forest

The plan area includes 558 acres of land zoned RF, Residential Farm/Forest. The RF zoned land is located north of Skyline Memorial Gardens. The RF zone is applied to lands suitable for agriculture and forestry and which are presently deficient in public services.

Agriculture and household living are allowed by right in the RF zone. Some parks, open areas, and daycare uses are allowed as limited uses. Group living uses, institutional uses, aviation and passenger terminals, radio and television broadcast facilities, mining, and railroad lines and utility corridors are permitted as conditional uses. Temporary uses allowed consist of mobile homes (during construction); residential sales offices; sales; fairs and carnivals; shows of model homes; temporary activities and structures for natural disasters and emergencies, and staging areas for public utility installation.

The existing land uses in the RF zone consist of 64 single dwellings and one office building. Approximately 65 properties zoned RF are undeveloped. Data from the County tax records indicate that approximately 378 acres are undeveloped.

Limited Density Single-Dwelling

The study area includes two acres of land zoned R20, Limited Density Single-Dwelling. These parcels also have a Low Density Single-Dwelling (R10) Comprehensive Plan Designation. These properties are located between Skyline Boulevard and Thompson Road. All of the properties zoned R20 are currently vacant, and all but one do not meet the minimum lot standards of the R20 zone. These properties are currently landlocked, though access is expected to be provided via roads platted as part of the Forest Heights Phase 7 development.

Agriculture and household living are the only uses allowed by right. Some parks, open areas, and radio and television broadcast facilities are allowed as limited uses. Group living uses, all other institutional uses, and rail lines and utility corridors are allowed as conditional uses. Temporary uses allowed in the RF zone are also allowed in the R20 zone.

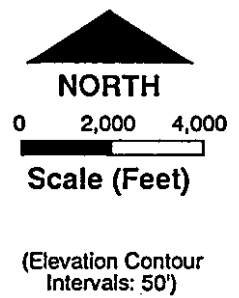
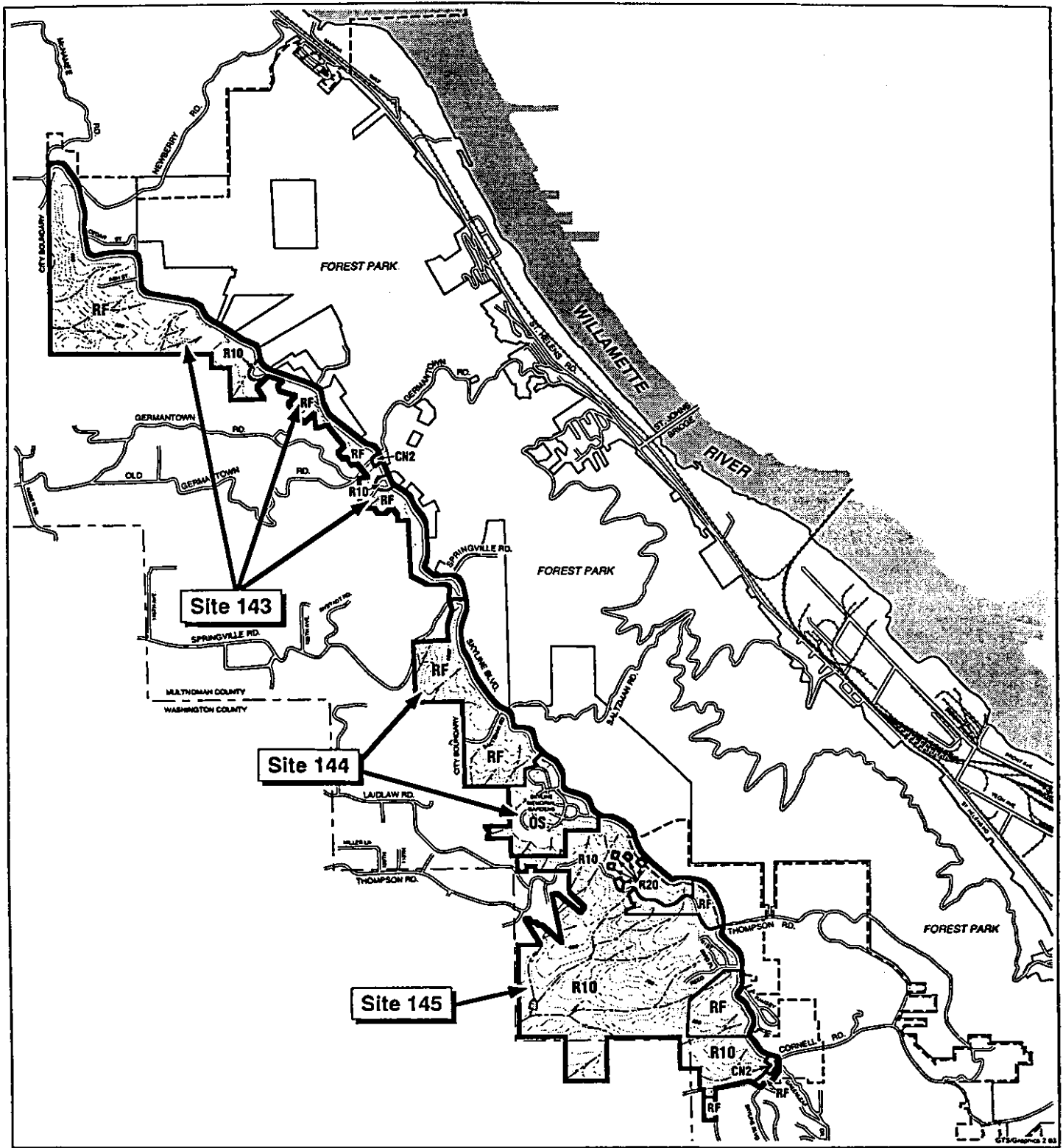
Table 1
Conflicting Uses Permitted by City of Portland Zoning
in the Skyline West Study Area

Use Categories	Base Zones				
	OS	RF	R20	R10	CN2
Residential Categories					
Household Living	N	Y	Y	Y	Y
Group Living	N	CU	CU	CU	L/CU
Commercial Categories					
Retail Sales and Service	CU	N	N	N	Y
Office	N	N	N	N	Y
Quick Vehicle Servicing	N	N	N	N	Y
Commercial Outdoor Recreation	CU	N	N	N	N
Industrial Categories					
Manufacturing and Production	N	N	N	N	L
Institutional Categories					
Basic Utilities	CU	CU	CU	CU	Y
Community Service	CU	CU	CU	CU	Y
Parks and Open Areas	L/CU	L/CU	L/CU	L/CU	Y
Schools	CU	CU	CU	CU	Y
Colleges	N	CU	CU	CU	Y
Medical Centers	N	CU	CU	CU	Y
Religious Institutions	N	CU	CU	CU	Y
Daycare	CU	L/CU	L/CU	L/CU	Y
Other Categories					
Agriculture	Y	Y	Y	CU	N
Aviation and Surface Passenger Terminals	N	CU	N	N	N
Mining	CU	CU	N	N	N
Radio and Television Broadcast Facilities	L/CU	L/CU	L/CU	L/CU	L/CU
Rail Lines and Utility Corridors	CU	CU	CU	CU	CU

Note: Uses prohibited in all of the above zones are not included in this table.

LEGEND

- Y Allowed subject to the development standards of this zone and other regulations of Title 33
- L Allowed subject to limitations
- L/CU Allowed with special limitations in certain circumstances or Conditional Use Review Required
- CU Conditional Use Review Required
- N Prohibited in this zone



Vicinity and Zoning Map

Skyline-West

Resource Protection Plan

Low Density Single-Dwelling

Most of the lower portion of the Skyline West study area, between Cornell Road and Skyline Memorial Gardens, is zoned R10, Low Density Single-Dwelling Residential. Approximately 495 acres have this designation, much of it within Forest Heights Estates. The R10 zone is intended for areas with public services but which are subject to significant development constraints.

Household living is the only use allowed by right in the R10 zone. Some parks, open areas, and radio and television broadcast facilities are allowed subject to limitations. Group living uses, all other institutional uses, agriculture, radio and television broadcast facilities, and rail lines and utility corridors are permitted as conditional uses. Temporary uses allowed in the RF and R20 zones are also allowed in the R10 zone.

In the R10 zoned portions of the plan area, 258 properties are developed with a single dwelling and approximately 350 residential building lots are vacant (as of Fall 1993). One retail service use is also located within the R10 zone.

Neighborhood Commercial

The study area includes two properties, totaling less than one acre of land, zoned CN2, Neighborhood Commercial 2. These properties are located at the intersections of Skyline Boulevard and Cornell Road and Skyline Boulevard and Old Germantown Road. Commercial uses in the CN2 zone provide services for nearby residential areas, and other uses which are small scale and have little impact. Both CN2 zoned properties are vacant.

Household living uses, retail sales and service uses, office uses, and all institutional uses are allowed by right. Some group living uses, manufacturing and production uses, and radio and television broadcast facilities are allowed subject to limitations. The remaining group living uses, radio and television broadcast facilities, and all rail lines and utility corridors are allowed as conditional uses. The following temporary uses are allowed: parking lot sales, seasonal outdoor sales, fairs and carnivals, warehouse sales, temporary activities and structures needed for natural disasters and emergencies, and staging areas for public utility installation.

Overlay Zones and Plan Districts

In addition to the base zones, some of the study area is included within overlay zones and a plan district. All of the study area north of approximately Thompson Road is within the Skyline Plan District. The plan district provides a mechanism for the protection of sites with highly valued natural resources through transfer of residential development rights from these sites to less sensitive sites.

Properties which abut Skyline Boulevard, Cornell and Germantown Roads are located within the Scenic Resource (s) overlay zone. The scenic zone regulates certain forms of development within 100 feet of these scenic corridors.

A few lots located immediately north of Springville Road and west of Skyline Boulevard contain the Future Urban (f) overlay zone. This area is within the Portland city limits but outside of the Urban Growth Boundary. The overlay zone requires a minimum lot size of 20 acres. Existing lots of less than 20 acres can be developed, but may not be reduced in area.

Finally, some properties have a water feature designation and are within the Interim Resource Protection overlay zone. This zone provides interim protection for Goal 5 resources until they can be reviewed as part of the Skyline Plan. The zone will be removed from the planning area upon adoption of the Skyline Plan.

Other Uses

There are a few allowed uses that are not assigned to a single category by the city zoning code. These include infrastructure; various nonconforming and revocable uses; and land divisions, partitions and property line adjustments.

Infrastructure Uses

These uses include roads; water, sewer, electric, and television lines; and other public and private utilities not described by the zoning code category "Basic Utilities." Infrastructure is allowed in all city zones; however, sewer service only exists and is planned for in the lower portion of the study area (Resource Site 145). Some of these uses are regulated city public works and building codes, but these codes are not acknowledged land use regulations and do not carry out Statewide Planning Goal 5 decisions.

Nonconforming Situations

Nonconforming situations are created when zoning or zoning regulations change. As part of the change, existing uses, density or development might no longer be allowed. These are situations lawfully established under repealed provisions of the zoning code or maps, or established before the existence of city zoning. Nonconforming uses can exist in any category or in any zone.

Revocable Permit Uses

These are uses that violated city zoning, but were allowed to continue by zoning code provisions that were repealed on January 1, 1991. These permits are no longer issued, and extensions are limited to three years, so that most have now expired. Revocable permit uses can be in any category, and can occur in any zone.

Land Divisions, Partitions, and Property Line Adjustments

These are city procedures that establish lots or relocate property lines within any zone. These procedures prescribe where every allowed use can be carried out. New lots usually allow more conflicting uses than the lots from which they were created.

Summary

This section provided a review of existing and potential conflicting uses allowed by zoning. These uses generally fall into one of the following categories:

- open space uses;
- residential uses;
- commercial uses;
- institutional uses; and
- other uses such as agriculture, aviation and surface passenger terminals, mining, radio and TV broadcast facilities, rail lines and utility corridors, nonconforming situations; and temporary uses.

The following section discusses the consequences of allowing conflicting uses in or near Goal 5 resource areas.

Consequences of Allowing Conflicting Uses

The preceding discussion identified the base zones in the Skyline West plan area and the conflicting uses allowed within these zones. If these uses actually occurred at the intensities allowed by the zone, they would diminish or destroy identified values of one or more resources in the planning area.

This section describes the impacts of permitted uses on resource areas within the plan area. Where the report identifies the same impacts for different conflicting uses, reference is made to the first analysis which is not repeated. This section analyzes the consequences of limiting or prohibiting these uses for individual resource sites.

Residential Uses

Residential uses identified in the zoning code include household living and group living. Household living is residential occupancy of a dwelling unit by a household. Group living is different from household living in that it involves occupancy of a structure by a group of people who do not meet the definition of a household. For the purpose of a conflicting uses analysis, both types of residential uses can degrade or destroy natural resources during both construction and use of residential structures. This section examines the consequences of housing, for both households and group living situations, on Goal 5 resources.

Housing is permitted in residential and commercial zones. In addition to the construction of homes, housing may include the construction of garages and other accessory buildings, access drives, parking areas, landscaped areas, utility connections and related development.

Preparing land for housing commonly includes removal of vegetation. Removal of vegetative cover denudes or eliminates habitat for many native animals. Lost

habitat includes feeding, nesting, perching and roosting places for birds, and loss of feeding, breeding and refuge areas for mammals, herptiles and insects. Vegetation clearing removes plants which produce edible seeds, berries, nuts, bark, leaves, stems and roots for animals. Clearing also removes important structural features of the forest such as multiple layered canopies, snags and downed logs, and large trees. These important habitat components are removed and replaced with ecologically barren buildings, fences, driveways, parking lots and other impervious surfaces.

Forest fragmentation caused by the clearing of vegetation for residential 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. Roads, traffic and fences can also form barriers to wildlife migration. 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.

Household lights, loud noises and other outdoor activities disturb the breeding and predator instincts of animals. Activity levels as defined by noise and movement increase from between 10 and 100 times that of normal (natural system), also producing disruptions in competition and communication habits as well as mating and predation, making it difficult or impossible for native species to exist (Brown 1987). Additionally, litter and garbage in resource areas degrade habitat values, and household pets can kill or injure native wildlife and compete for limited space.

The steep slopes of the plan area become susceptible to erosion, slumping and landslides when forest cover is removed and when cuts and fills are made for roads and buildings. Vegetation clearing and site grading activities accelerate soil loss and erosion, and can precipitate landslides and flooding, posing significant hazards to people and property. Soil loss and erosion can result from common construction activities such as vegetation removal, grading and compaction even on sites with gentle slopes. These activities also can reduce the capacity of soil to support vegetation and effect groundwater recharge by reducing fertility, soil micro-organisms, seeds and root stocks and damaging soil structure.

The construction of homes, roads and other impervious surfaces has adverse consequences beyond those described above. The adverse impacts of impervious surfaces include the following:

- Increases erosion, flooding and landslides
 - Increased impervious surfaces increase surface runoff and peak flows, resulting in soil loss and erosion, and potential landslides and floods;
 - These activities can damage soil structure and fertility, degrade or eliminate wildlife habitat as well as result in public safety hazards.
- Alters hydrology
 - Increased impervious surfaces reduce groundwater recharge, lower the volume of water in wetlands and surface drainages contributed by

groundwater, form a barrier to plant growth and wildlife movement, and interfere with the transfer of air and gases;

- This can alter an area's hydrology by lowering surface water levels or groundwater tables and removing a local source of water and moisture essential to the survival of amphibians and aquatic organisms as well as terrestrial animals.
- Increases pollution
 - Leaks (oil, gas, tar, antifreeze, etc.) from vehicles, heating and cooling systems, and roofs degrade habitat and water quality;
 - Pesticides, herbicides and fertilizers applied to landscaped areas can pollute ground and surface waters, and degrade habitat;
 - Dirt and mud eroded from cultivated land or deposited from vehicles can cause sedimentation of wetlands and drainages;
 - Septic drain fields can contaminate ground and surface waters.

Other detrimental impacts of housing include reduction of open space, scenic and recreational values. Common residential landscaping practices also can have detrimental impacts. The removal of native vegetation and the establishment of lawns and non-native landscape features reduce resource values.

Lawns in particular can be ecological deserts. Lawns are maintained as monocultures often with herbicides, fertilizers and pesticides which degrade nearby habitat areas and water quality. They require regular irrigation which reduces drinking water supplies and can exacerbate summer water shortages.

Landscape trees, shrubs and groundcover often are invasive, non-native species that escape into natural areas and compete aggressively with natives. Ivy, holly and laurel are commonly used in landscaped areas. Landscaping normally does not affect open space, but can degrade scenic and recreational values.

Commercial Uses

Commercial uses, such retail sales, are permitted in the CN2 zone. Two limited commercial uses are permitted in the open space zone: commercial outdoor recreation and retail sales and service associated with park and open areas use.

Within the Skyline resource areas, commercial zoning is limited to two small locations on Skyline Boulevard. Both locations are zoned CN2, Neighborhood Commercial. The CN2 zone allows a floor area ratio (FAR) of 0.75 to 1 and building coverage of 65 percent of site area. The zone requires landscaping over 15 percent of site area. One-third of this area, however, can include impervious surfaces such as paved walkways. Allowing conflicting uses fully will therefore eliminate most resources since the site can be covered with buildings and as much as 85 percent impervious surfaces. Removal of forest cover and planting of exotic vegetation is permitted and generally has the same effects as those described for housing above.

All housing effects described above apply. As a practical matter, commercial business lot coverage normally exceeds that of housing, and this compounds the problem of impervious surfaces (e.g., reduced water penetration and supply of nutrients to the soil, lower groundwater levels, interference with the transfer of air and gases, etc.). Commercial uses in the study area can significantly diminish or destroy open space, scenic and recreational values.

Industrial Uses

Industrial uses are allowed with special limitations in commercially zoned areas. The two properties zoned CN2 allow manufacturing and production with special limitations. No other industrial uses are allowed within the plan area.

The consequences of allowing industrial uses within the CN2-zoned areas are similar to those described above for commercial uses. Industrial uses such as manufacturing and production are limited to 5,000 square feet of total floor area exclusive of parking area. However, depending on the size of a site, as much as 85 percent of the site can still be covered with buildings and impervious surface. Industrial uses also have more detrimental impacts on nearby resource areas than do commercial uses. These impacts include, but are not limited to, industrial emissions into the air and water and waste storage and disposal.

Institutional Uses

Institutional uses are limited or conditional uses in most zones except commercial. In commercial zones, institutional uses are allowed outright. In residential zones, institutional uses are limited or conditional uses. The city Zoning Code has nine different categories of institutional uses ranging from Parks and Open Areas (with relatively few adverse impacts) to Schools and Medical Centers (with greater impacts). Because of the wide range of impacts, this section briefly reviews the impacts of each category below.

Basic Utilities are infrastructure services that need to be located in or near the area where the service is provided. Although operation of existing facilities has few adverse environmental effects, construction and maintenance practices for new basic utilities have a variety of adverse effects. These activities often create cleared corridors which increase wind and light penetration into the forest providing opportunities for the establishment of invasive, non-native plant species. Construction often fragments wildlife habitat, degrades wetlands and drainages, increases stormwater runoff and erosion, and reduces forest cover. Forest cover removal has the same effects as those described for housing. Certain types of basic utilities, such as stormwater retention areas, sediment traps and constructed wetland pollution treatment facilities can have beneficial environmental effects if located without disruption to existing resources. Replacement of existing resource areas with these facilities normally has detrimental effects.

Community Service uses provide a local service to people of the community (examples include libraries, museums and community centers). Essential services

uses provide on-site food or shelter beds and include emergency shelters, soup kitchens and surplus food-distribution centers. These two uses have the same effects as commercial businesses.

Parks and Open Areas uses focus on natural areas, community gardens or public squares. These lands tend to have few structures and include parks, golf courses, cemeteries, recreational trails and botanical gardens. Skyline Memorial Gardens is the predominant park and open area use in the planning area. Parks and Open Areas construction and maintenance practices can cause erosion and damage vegetation and habitat. Removal of vegetation, creation of impervious surfaces such as roads, parking lots and tennis courts, and construction of buildings are activities commonly associated with development of Parks and Open Areas. The environmental consequences of these activities are similar to those described for housing except that normally a substantially smaller percentage of land area is covered by impervious surfaces. Intensive recreation such as cycling, motoring and equestrian sports also cause erosion, particularly when off maintained trails. Unleashed domestic animals in parks and open areas can injure or kill wildlife.

Schools, Colleges, Medical Centers and Religious Institutions are separate institutional categories but have similar effects. Schools include public and private schools through high school level. Colleges include universities, colleges and seminaries. Medical Centers include hospitals and tend to be on multiple blocks or in campus settings. Religious Institutions provide meeting areas for religious activities and include churches, temples, synagogues and mosques. The construction and maintenance of School, College, Medical Center and Religious Institution grounds have the same effects as parks and open space. Structures and facilities (including parking areas) have the same effects as commercial uses.

Daycare includes preschools, nursery schools and adult daycare programs. Daycare uses are normally small in size and often are contained within other institutional use buildings (e.g., Medical Centers, Schools, Colleges, Religious Institutions and Community Service Providers). When within such existing buildings, daycare impacts are limited to the additional new parking or building facilities required for the use. These new facilities have the same impervious surface effects as housing. Daycare centers independent of other uses have the same effects as housing, except that larger buildings and parking areas increase the effects of impervious surfaces.

Agriculture

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. The removal of forest cover has the same effects as those for housing. The conversion of forest to farm land replaces diverse forest plant communities with few, cultivated species. Vegetation acts as a filter, cleansing runoff before it reaches streams or wetlands. Removal of vegetation for agricultural uses eliminates these benefits. Agriculture also commonly involves the use of pesticides, herbicides and fertilizers. These chemicals contaminate surface- and ground-water areas and harm

wildlife. Animal fecal contamination occurs as a result of pasture use and can have similar environmental effects.

Agriculture often draws irrigation water from wells. Extensive use of groundwater can result in draw down of the water table, which in turn can reduce surface drainage flows and eliminate a water source for wildlife. Agriculture normally does not diminish open space, but can degrade scenic and recreational opportunities.

Aviation and Surface Passenger Terminals

Aviation and surface passenger terminals are allowed as conditional uses in the RF, Residential Farm/Forest zone. These uses completely destroy natural resources. The existing pattern of parcels and development in the RF zone preclude development of either aviation or surface passenger terminals.

Mining

Mining is a conditional use in the open space and the RF zone. It is prohibited all other zones in the planning area. No existing or potential mineral or aggregate resource mining operations are identified in the area (BOP 1988).

Radio and TV Broadcast Facilities

Most low powered transmitters such as cordless telephones and citizen band radios are allowed in all zones. Other radio and television broadcast facilities are allowed subject to limitations or as conditional uses in OS, RF, R20, R10, and CN2 zones. Their effects are the same as basic utilities, but with greater adverse visual effects.

Rail Lines and Utility Corridors

Rail lines and utility corridors are allowed as conditional uses in all Skyline zones. Their effects are the same as basic utilities, except that construction of rail lines often requires substantial excavation and fill to meet 0-3 percent slope standards. Generally, additional grading results in a greater area of resource disturbance and greater degradation of soil, vegetation and habitat resources.

Summary

This section identified the consequences of allowing the nine conflicting uses identified in the Skyline West planning area. If these uses occurred at the intensities allowed by existing city zoning, they would have significant adverse environmental consequences.

Consequences of Limiting or Prohibiting Conflicting Uses

The environmental consequences of limiting or prohibiting conflicting uses are summarized below. Other consequences are discussed in the ESEE analysis of individual resource sites later in this chapter.

Limiting or prohibiting uses which conflict with identified natural resources clearly has direct benefits for these same resources. The natural resource functions and values described earlier in this chapter are protected through the control or elimination of conflicting uses. Since these resources are part of an interconnected natural system, protection of one resource has beneficial consequences for other resources. Protection of forest vegetation, for example, will maintain food and cover habitat for wildlife, stabilize and protect soils and steep slopes, filter out potential air and water pollutants, and sustain surface and ground water resources.

Limiting or prohibiting conflicting uses protects forests, soils, geologic features, wildlife habitat, surface drainages, wetlands, groundwater reserves and domestic water supplies. Slope stabilization, dissipation of erosive forces, and flood storage functions would be protected, reducing the area's susceptibility to landslides, floods and similar hazards. Open space, recreation, scenic and heritage resources would also be protected. Limiting or prohibiting conflicting uses also would preserve the significant contribution of the planning area's resources to local neighborhood identity and livability.

Inventory and Analysis Overview

Skyline West was among several areas identified as containing significant natural resources in the original city inventory conducted in 1986. As part of that inventory, biologists Esther Lev and Michael Jennings carried out an extensive city-wide inventory which included several sites within the Skyline West planning area. A technical advisory committee of private and public sector natural resource experts was established to review inventory areas and methodology. Local scientific literature was reviewed and information was solicited from citizens, neighborhood associations, special interest groups and city agencies. With the information compiled by Planning staff, the technical advisory committee, biologists and neighborhood residents, inventory sites were then delineated and mapped.

Skyline West is the last remaining area to be addressed by the city to satisfy its Periodic Review requirements for State Goal 5 (natural resources) and comply with the terms of a state order (Proposed Local Review Order, City of Portland Resolutions 34523 and 34653). Page 122 of this Order requires, in part, "...Planning Commission and City Council review and adoption of Environmental Mapping for the West Hills area...." The West Hills area was divided into five areas due to its large size; Skyline West is the last portion of the hills to be studied.

Site Selection

Resource sites were selected based on the locations of watersheds for the three primary creek systems within the planning area: Rock Creek, Bronson Creek and Cedar Mill Creek. The headwaters and upper branches of these creeks are located in Portland; downstream the creeks enter unincorporated Multnomah County, then Washington County where they flow into the Tualatin River. The sites are

numbered following previous city resource numbering conventions. Rock Creek, at the northern end of the planning area, is Resource Site 143; Bronson Creek in the central area is Site 144; and Cedar Mill Creek to the south is Site 145. The planning area totals approximately 1,750 acres in size.

Inventory and Analysis Methods

Field inventory work was conducted in the Skyline West planning area between 1992 and 1994. Some sites were previously evaluated in the 1986 city inventory, the Metro Urban Greenspaces Inventory (1990-1991), or by local biologists. Information collected included wildlife habitats assessments, data on plant communities, wetland and creek resources, scenic, recreational and other human use.

Additional information was gathered from the following sources: Oregon Water Resources Board (data on wells and surface water rights), Oregon Department of Fish and Wildlife (fisheries), Oregon Natural Heritage Program (RT&E species). Other sources reviewed include: local inventories or land use cases, State Geologic Survey maps, USDA Soil Survey maps, Portland Physiographic Inventory maps (Redfern 1976), National Wetlands Inventory maps, USGS topographic maps, City topo maps, infra-red aerial photographs (Bergman 1991), aerial blue prints (Metro 1993). Additional references used during the development of the plan inventory and analysis are cited in the Bibliography (Appendix F).

The object of the inventory is to establish the location, quantity and quality of resources within the planning area. These features and other notable aspects of identified resources are summarized for each site in the Site Inventory and Analysis section later in this chapter. To evaluate the relative significance of a resource, several factors were considered. Each resource has certain functional values. Depending on the location, quantity and quality of the particular resource, these values may be important or they may not be important.

If the values are important when considering the factors discussed below, the resource was deemed significant. Decision factors are those factors which, on their own, are important and establish the significance of a resource. Contributing factors may have limited or moderate importance on their own, but when two or more contributing factors for the same resource area are combined, that resource is deemed significant. In general, contributing factors are associated with resource values which may be limited due to the geographic, physiographic or related conditions in the Skyline West planning area. For example, the plan area's ridgetop location means that many of its watercourses cannot provide major flood storage value but may contribute some storage capacity.

Following is a list of decision and contributing factors:

Resource Value	Decision Factors
Fish/Wildlife Habitat	Provides habitat for threatened, endangered or state-listed sensitive species; or Wildlife Habitat Assessment is 45 points or more; or provides a viable connection between or enhances adjoining habitat areas
Water Purification	If 75% of creek length has an average vegetative coverage of 25% or greater in riparian zone, vegetation has positive influence on water quality and riparian zone significant
Slope/Soil Stabilization	Vegetative cover is significant if on slopes of 50% or more, soils have vegetative canopy cover of 75% or more
Domestic Water Supply	Oregon Water Resources Dept. records show surface or groundwater usage; source waters are significant
Groundwater Recharge	Resource is pervious and permits infiltration to aquifers or groundwater reserves which supply water for domestic use or sustain flows in significant creeks during dry season
Heritage	Resource has unique historic, cultural or natural value

Resource Value	Contributing Factors
Fish/Wildlife Habitat	Resource provides positive influence on off-site habitat for threatened, endangered or state-listed sensitive species
Slope/Soil Stabilization	Vegetative cover on slopes of 30% or more, soils have vegetative canopy cover of at least 75%
Flood Storage	Creeks, associated wetlands and flood plains, or other resources reduce intensity of flood events
Surface Drainage	Creeks conduct runoff water, sediments and nutrients from highlands to lowlying land or water bodies
Education	Resource is or potentially could be used for public educational purposes, or is ecologically or scientifically significant according to the Natural Heritage Program
Recreation	Resource is within a designated open space area, or public park or right-of-way and is or potentially could be an integral part of area's recreational activities

- Visual/Scenic Amenity** Resource is visible from a public area, provides amenity value to adjoining land uses, or is an identified urban design element of the neighborhood or city
- Buffering Land Uses** Resource provides a visual or auditory buffer between residential neighborhoods or different land uses

Sources for most of the above information are cited in the first part of this section. Additional sources were used as well. The Rare, Threatened and Endangered Plants and Animals of Oregon (Oregon Natural Heritage Program, 1993) was consulted; this reference also contains state-listed sensitive species. Sensitive species constitute naturally reproducing native vertebrates which are likely to become threatened or endangered throughout all or a significant portion of their range in Oregon.

City field inventories include the Wildlife Habitat Assessment (WHA) process which involves analysis of physical environments for which wildlife have known preferences. The WHA form is used to rate habitat values numerically for comparison purposes 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 rare flora, fauna or habitat types are also noted.

Once a resource is found to be significant, existing and potential uses which may conflict with the preservation of that resource must be identified. Where there are no conflicts, the resource must be fully protected. Where conflicts arise, a conflicting use analysis must be carried out. This analysis involves weighing economic, social, environmental and energy considerations. The economic analysis, in particular, involves several important principles and methods that warrant further explanation. These features of the economic analysis are outlined next, followed by a review of the discussion format.

Economic Consequences on Conflicting Uses

Protection of natural resources can have significant economic consequences on property values, both positive and negative. In order to assess these impacts it is necessary to understand what influences the value of a property. The value of real property is defined as the present worth of its future benefits. The degree of value is measured in terms of money.

Value is classified into two general categories: value in use and value in exchange. Value in use is the property's value to its owner or user. Exchange value is the market value, the highest price a property would bring if the sale were to take place under conditions ideal for both the buyer and the seller. To have value, a property must have both utility and scarcity. Utility refers to the ability to arouse desire for possession and the power to give satisfaction, based on individual tastes. Without scarcity, even with utility, value diminishes with excessive supply.

Principles of Value

The following principles of value illustrate ways in which property values can be increased or decreased with respect to the location of significant natural resources on a site (Rockwell et al. 1988).

- The Principle of Substitution: No one will pay more for a piece of property than they would have to pay for an equally desirable substitute property. Properties with significant natural resources are zoned consistently with other properties within the City of Portland where similar resources are located. Such properties are zoned "P" (preservation) or "C" (conservation) depending on the value of the resource and the level of protection necessary.
- The Principle of Highest and Best Use: The highest and best use is the one that will provide the greatest net return over a period of time. In the case of residential properties, this includes amenities as well as monetary returns. Local and national studies have shown that forested areas, wetland and other amenities enhance the quality of life for the property owner and the community as a whole.
- Use Density: If a property's apparent highest and best use is not in demand, then another highest and best use would have to be used to determine value. Currently there is a strong demand for residential dwellings near natural amenities. These amenities are often cited as primary reasons why residents move to the planning area. Properties where significant resources are located often can be developed to take advantage of their natural amenities without disturbing them.
- Principle of Supply and Demand: Values rise as demand increases and/or supply decreases. Values fall when demand decreases and/or supply increases. However, land scarcity, alone, does not create demand. The availability of financing, interest rates, wage levels, property taxes and population growth or shifts are all factors that influence demand, and consequently, property value. The supply of sites offering natural amenities is limited by past development practices and natural conditions. Increases in the demand for residential dwellings that offer natural amenities increases the value of existing and future dwelling sites.
- The Principle of Change: It is the future, not the past, that influences value. Change begins with a period of integration and moves towards equilibrium, when a property's value is stabilized. Change ends with disintegration, when the property's present economic usefulness life is over. Resource protection helps guarantee that the significant natural resources that generate amenity values will continue into the future and retain values over time.
- The Principle of Contribution: Contribution refers to the value that an improvement or a feature adds to the overall value of a property. Significant natural resources contribute to increased enjoyment and quality of life

conditions for property owners and the community as a whole. The increment of value associated with natural resources is said to be "capitalized" into the market value of the property.

- The Principle of Increasing and Decreasing Returns: There is a point where any additional improvements to land will either have no effect or actually become detrimental to value. Properties currently receiving benefits from significant resources that are being protected with a certain degree of regulation, for example, designated open areas in subdivisions, may not have a market increase in value with additional environmental protection. However, there is added value for the community as a whole from the protection of significant resources such as wetlands or steep slopes.

Property value is also associated with the proximity of the property to the rest of the community. This includes the nearness of public transit, schools, shopping areas and other activity centers. Other physical factors include traffic patterns, sizes and shapes of lots, land use patterns, availability of utilities, potential threats such as pollution or noise, and visual consideration such as views and topographical aesthetics. Proximity to parks and natural areas also increase value.

As previously mentioned, the physical characteristics of a property influence value. These characteristics include its width, frontage, and depth. When a lot is deeper than typical lots in the area, its value per "front" foot increases, but its value per square foot decreases. For shorter lots the reverse is true. The first twenty-five percent of a lot holds 40 percent of its overall value; the second twenty-five percent accounts for 30 percent of the value, the next twenty-five percent is 20 percent of the overall value; and the back twenty-five percent is worth only 10 percent of the overall value.

In many cases, significant natural resources are located on the back portions of a property where the land value itself only accounts for 10 percent of the total value of the property. Restrictions placed on the lesser valued portions of a lot are balanced by the increase in value attributed to the environmental amenities retained. In addition, a site that has aesthetic appeal is more valuable than one that is monotonous and flat. However, if a site is costly to develop because it is located far above or below street-level or is excessively hilly, its value will be diminished.

Additional Cost Factors

In the past, there have been concerns over increases in development costs resulting from the application of environmental zones. As is indicated below, these costs are more than offset, in most instances, by density transfer options, by environmental streamlining proposals, and by considering the net present value of development and amenity values (as explained in the following section).

The highest development constraints occur where full protection is designated. Full protection is implemented through the application of the "protection" zone for

significant resources. The protection zone normally applies to portions of properties with precipitous slopes, or within floodplains, wetlands or geologic hazard areas which are rarely targeted for development. The area of a property located within a protection zone is still used in the calculation of allowed density for the property; in other words, a site's development potential in terms of housing units is not reduced by the full protection designation.

All of the major subdivisions within the planning area have set aside open space areas which normally contain creeks, wetlands or steeply sloped areas. This is a consistent pattern for both existing and proposed developments, one which recognizes the severe building constraints of some of the significant resource areas. Where there is coincidence between these open spaces and the protection designations, there are no additional costs to development. In such cases, building sites are located on the more suitable areas of the site for development. One type of subdivision, the Planned Unit Development (PUD), is especially appropriate for development sites with environmental zones. PUD's provide for a broad range of development options, including a range of lot sizes, patterns and uses, with areas set aside in open space. Development may thus occur outside protected resource areas on less steep, wet or constrained sites. This pattern also allows for more efficient and cost-effective use of infrastructure (roads, water lines, sewers, etc.).

The "conservation" zone is applied to resources to limit conflicting uses. It allows for development after review, given that impacts are controlled and mitigated. As with the protection zone, the area designated with a conservation zone is used in the density calculation for a given site. The land use review for development within the conservation zone is an administrative review without a public hearing (except if decision is appealed). The cost is approximately \$300 for a pre-application conference and \$400 for the review. Preliminary recommendations being developed as part of the Environmental Zone Streamline Project (expected to be adopted immediately following the Skyline plan) will reduce these costs. A pre-application conference will no longer be required within conservation zones. The streamline project also recommends new performance standards in lieu of environmental review for certain development within conservation zones. These recommendations will result in a savings of time and money.

Finally, the existing Interim Resource Protection Zone that applies to most creeks in the planning area will be repealed upon adoption of this Conservation Plan. In most cases, the interim measures will be replaced by environmental zones; in some cases, the Conservation Plan recommends no protection for these areas based on the plan inventory and analysis.

Economic Consequences on Resources

In determining the economic consequences of protecting significant resources, it is first necessary to define value with respect to a significant resource. Many of the gains from environmental policies are not readily apparent in the form of immediate monetary gains. The benefits are found more in an increase in the

quality of life than in any increment to a region's economic output. Environmental features have been shown to increase property values as they provide aesthetic and recreational pleasure and a more livable environment. As a result, properties next to these features have higher property values and produce greater tax revenues.

Many environmental resources are considered "positive undepletable externalities" or public goods. Such goods are non-rival in consumption, that is, if one person increases their consumption of the good, it does not preclude or reduce its availability to others.

Some benefits from resources can be found beyond the immediate resource area, as is the case with wetlands and their ability to purify and recharge aquifers. When benefits occur off-site, wetland owners are prevented from charging fees for these benefits. Since owners cannot recoup the value of these benefits directly, the market price per acre does not fully reflect the true exchange value of wetland relative to other goods. In fact, most environmental resources are not priced because they have no direct market where they are bought and sold like other products. This makes the establishment of value very difficult. Therefore, it is necessary to use other methods of identifying value in order to perform economic analysis.

Environmental goods have irreversibility properties, that is, if the resource is not preserved, it is likely to be eliminated with little or no chance of regeneration. In addition, environmental resources have uncertainty. Since the future is unknown, there is a potential cost if the resource is eliminated and a future choice is foregone. A third feature of environmental goods is their uniqueness.

Methods of Evaluating Significant Resources

Hedonic Models and Willingness to Pay (WTP) Methods

A basic idea underlying a measurement of value for a resource is that individual preferences form the basis for benefit measurement. A positive preference will be revealed in the form of willingness to pay for it. Each individual's willingness to pay will differ, so it is necessary to aggregate over all individuals for a total willingness to pay figure. This direct method attempts to elicit preferences for non-market goods by asking individuals to express their views in a simulated market for the goods in question.²

² Although it can be assumed that people will not be willing to pay for something they do not want, it is not possible to know if WTP as measured by market prices accurately measures the whole benefit to either individuals or society. Some may be willing to pay more, which means the benefit they receive is larger than the price they would have to pay. The excess is considered consumer surplus.

$$\text{Gross WTP} = \text{Market price} + \text{consumer surplus}$$

The value of significant resources can be established using "user" values. Those who actively participate in the environment secure a direct benefit from it, such as recreational activities, hiking, picnicing, etc. There are additional values expressed through options to use the environment. Thus, the value of the environment as a potential benefit rather than an actual present use value. It is expressed as a preference or willingness to pay for the preservation of an environment against some probability that the individual will make use of it at a later date.

$$\text{Total user value} = \text{Actual use value} + \text{Option value}$$

The value attributed to a property is the result of a stream of benefits derived from the land. This might include agricultural output, shelter, access to a workplace, commercial amenities, parks and the environmental quality of the neighborhood where the land is located. All these benefits accrue to the person who has the right to use that piece of property. Given that different locations have varied environmental attributes, such variations will result in differences in property values.

The hedonic approach, using this premise, attempts to identify how much difference there is between properties with differing attributes and infer how much people are willing to pay for a particular attribute, such as an environmental amenity. Using multiple linear regression, the model includes as many variables as are assumed to be contributors to value. These variables are typically classified as property variables, neighborhood variables, accessibility variables and environmental variables (public benefits would not be included).

Brown and Pollakowski (1976) conducted a study in the Green Lake area of Seattle, Washington to examine the impact of water features on housing values, using a hedonic model. They found that previous studies indicated that the contribution of a water resource to property values generally is not significant beyond 4,000 feet from the edge of the water feature.

In their study, they found that a dwelling unit located 200 feet away from a water feature sold for about \$850 more than a comparable one located 100 feet away, indicating the desirability of a setback area between the dwelling and the water feature. A dwelling with a 300-foot setback sold for about \$1,350 more than one located 100 feet away indicating greater value is generated with an increase in the depth of the setback. In the case of no setback, three-fourths of the location value of proximity to water is lost at a distance of 300 feet from the edge of the water feature. The researchers constructed an optimal open space model that used a land value gradient with an optimal open space of about 100 feet compared to the actual average distance of about 300 feet.

This finding is of importance as most significant resources have been found to increase the value of properties the closer the dwelling is to the resource. However, in the case of water features, a setback area contributes to an increase in property values. The setback area acts as a buffer between the significant resource and the dwelling.

Intrinsic refers to value which exists strictly because it exists. It is captured by those who have a preference in the form of non-use value.

Intrinsic value = Existence value

thus;

Total user value = Actual use value + Option value + Existence value

where Option value = Value in use (by individuals) + Value in use by future individuals + Value in use by others (vicarious value to individuals).

Garrod and Willis (1992) used a willingness to pay (WTP) methodology based on the notion that individual households express a demand for trees and woods as a housing attribute. They maintained that the total benefits of forests are more accurately captured in property values since the price of a house reflects willingness to pay to live near an environmental amenity. Their study looked at the impact of forest type on housing prices and the demand for particular types of forests.

Morales (1980) performed a study that sampled the value of houses with and without trees, in Amherst, Massachusetts and found trees were estimated to add \$2,686, or 6 percent of the total housing value. Anderson and Cordell (1988) found that developers, aware of the increment of value attributable to resources, were able to capture the increase in value by protecting trees in buffer zones in developments.

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

Location	Impact of property values	Specific evaluations
Philadelphia, PA	Property values were shown to decrease proportionally with distance from open space.	A 1,294-acre park accounted for 33% of the land value at a 40-foot distance, 9% at 1,000 feet and 4.2% at 2,500 feet (Hammer et al. 1974).
Boulder, CO	Property values near greenbelts were shown to decrease with distance away from the green belt.	Housing prices declined an average \$4.20 for each foot a house was located away from a greenbelt. The average value of property next to the greenbelt was 32% higher than those 3,200 feet away (Correll et al. 1978).
Boise River Greenbelt, Idaho	The greenbelt was shown to be directly responsible for raising appraised property values within the greenbelt.	Increases in appraised value exceeded \$200 million. Property values of undeveloped land were \$26,000 to \$34,000/acre near greenbelt vs \$10,000 to \$17,000 elsewhere (Cooper 1989).
Hunters Brook, a 142-unit cluster development set aside 97 acres of pine forest to be protected in open space.	Properties adjacent to protected woods had a faster selling time.	Homes were easier to sell because of their proximity to the protected woods. The site's rural character and acres of habitat were preserved (<i>New York Times</i> May 8, 1987).

Contingent Valuation Method (CVM)

One method for measuring the increased value attributable to natural resources is to use a contingent valuation method (CVM). Using a survey instrument or personal interviews, a CVM discovers an individual's preference for a good by determining the maximum willingness to pay for changes in the provision of that good. It is used most widely in public goods analysis.

A recent CVM study conducted in Multnomah County evaluated four types of natural resource areas: a natural open space, a permanent wetland, a limited-access forest, and a developed park with full recreational facilities (Manuel 1993). Forest was defined as a site dominated by trees or woody vegetation over 15 feet in height, supporting wildlife and habitat. In absolute terms, the highest valued environmental resource was the forest, with higher-priced homes being more positively affected than lower-priced homes. In general, properties closer to a natural resource have greater value than those further away. Three housing types were used. The study used evaluators with expertise in the field of real estate evaluation, including realtors, tax assessors and residential property appraisers.

The study also addressed the policy tradeoff between the benefits of natural resource areas and tax revenues that are forgone if development is limited due to natural resource locations. The example compared a hypothetical 20-acre resource area that was developed without protection of natural resources with a 20-acre site that protected forest resources. The researcher stated that if accurate measurements could be made of housing values, the tax revenues from preserving the forest area may, in fact, be greater than those generated if the area is developed.

Schofield (1989) cites the sources of bias due to expectations regarding who actually would pay for amenities as a problem associated with the use of CVM. The concern centers around the possible understating of values by respondents who see themselves as future targets of a charge, while those who expect the goods or services to be provided free would overstate the true value.

In summary, the value of amenities such as water features (lakes, streams, and/or creeks) and forested areas close to residential units are capitalized into property values. The increased assessed values result in increased tax revenues. Protecting forested areas near residential developments has been found to increase the value of a project.

Intermediate Goods Method

Water features have been recognized in previous public policies as deserving full protection because of the integral part such features play in an ecosystem. Water resources are often ranked highest among natural resources, especially in forested areas where wildlife habitat is enhanced with riparian areas.

Recent information developed from OMSI (Portland) and Mill End Store (Milwaukie) projects indicate that construction costs for the vegetated swale

stormwater convergence systems (w/infiltration, biofiltration, conveyance) represent a significant savings over the originally proposed cost of the standard stormwater pipe system (Lipton 1994). The value of the wetlands can be computed by estimating the cost of developing a comparable water system. The value is considered an intermediate good because it is a service performed by a wetlands that results in improved water quality.

A region-wide survey conducted in November of 1992 in the Portland Metropolitan area found that of the 400 residents surveyed, 55 percent wanted to preserve "greenspace" for the maintenance of water quality. According to Metro, preserving greenspaces for improved water quality was viewed as more important than preserving endangered species or providing recreation or tourist activities.

Manuel (1993) indicates that it is difficult to quantify in dollars the value of improved water quality. In addition, not all the benefits can be captured using a CVM methodology. When the market price of homes is used as a proxy for benefits accrued due to the natural resources, it captures only the private benefits of natural resources. There are also public benefits, such as the ecological benefits of wetlands for the improvement of water quality, which were not included in the expert evaluations. This would result in an undervalue of the amenities using CVM.

Another approach to evaluating environmental benefits provided by natural resources is to quantify these benefits. One study, conducted in 1991, estimated \$273 worth of environmental benefits for one year for a single tree as follows:

- Air conditioning: \$73
- Controlling erosion and storm water: \$75
- Wildlife shelter: \$75
- Controlling air pollution: \$50

Compounding this amount for 50 years at 5 percent, the value of a single tree can reach \$57,151 (Oregon CommuniTree News 1993). This evaluation is useful when a tree inventory is conducted for a particular lot or subdivision.

Another study estimates for the average base value of trees of various sizes:

Diameter of trunk at 4.5 feet	Average base value
10"	\$1,729
14"	\$3,388
26"	\$11,682
30"	\$15,554

In summary, wetlands can provide a significant cost savings over conventional stormwater systems; this value can be estimated by determining the cost of developing a comparable water system. Forested areas provide services such as air conditioning, pollution control and wildlife habitat. The intermediate goods values

attributable to significant natural resources accrue to the general public rather than to individual property owners.

Damage Costs Avoided

Another approach to establishing the value of natural resources is in terms of the damage prevention services provided. This value can be determined using replacement cost or the cost of property damage which would occur if the natural resource were lost, using the damage costs avoided principle. These approaches are particularly applicable with respect to erosion and slope slippage. In areas with unstable slopes and/or high earthquake potential, the value of the natural resources left in place increases as the preservation of the natural resource prevents society or individuals from making risky investments in developments that are most likely to be destroyed.

According to Mabey and Madin (1993), landslides are an ongoing problem in Oregon. The shaking from an earthquake will tend to cause existing landslides to move and generate forces that create new ones. Therefore, known landslide masses can be identified as areas with potential for severe damage during an earthquake. In addition, the steepness of a slope and soil thickness are indicators of the stability of a slope. On the basis of slope and soil information, a factor of safety against sliding was computed for the West Hills. It was determined that the areas of the West Hills that have slopes greater than 15 percent or that are in the vicinity of an existing landslide are at the greatest risk in the event of an earthquake or a natural landslide event.

There are many slopes greater than 15 percent in the study area. In addition, several ancient landslides have been identified (Madin 1989). Murdoch, Singh and Thayer (1993) used a hedonic model in their study of the Loma Prieta earthquake to demonstrate that areas designated as earthquake prone had reduced property values. They found that on average, homes located outside of the risky area were valued at approximately 3.7 percent more than comparable homes inside the area. In their study this value was approximately \$10,770. For homes located on safer soil, the market premium was about 2.5 percent or \$7,250 for an average home, however, the model interpretation is not as reliable on soil types.

Brookshire, et al (1985) used an expected utility model of self-insurance, structured as a hedonic model applied to low-probability, high-loss earthquake hazards. Individuals can self-insure by purchasing a dwelling in areas where the expected earthquake damage is relatively low. In this model, the important variable is safety and due to the nature of earthquakes, it is also random. In their study, the weighted expected damage by frequency of occurrence was \$5,920 per dwelling. Preserving steep slopes and significant resources on these slopes can prevent damage from occurring.

Net Present Values

It is generally assumed that benefits or costs matter more if they are experienced now rather than later (Pearce & Turner 1991). Economists recommend an adjustment be made in values to reflect the lowering or discounting of values in the future. Discounting allows values in different time periods to be compared at one point in time. The principle of discounting assumes that resources invested today will earn a return in years to come.³

The practice of discounting is also a means to share costs and benefits between generations. According to Pearce and Turner (1991), counting only the current generation's preferences through the willingness-to-pay methods biases the choice against future generations unless there is some built-in mechanism to ensure that current generations choose on behalf of future generations and take their interest into account.

The economic consequences of not protecting significant resources are irreversible, that is, if development occurs, the preservation benefits are lost forever. To illustrate this concept, consider a hypothetical development project with an initial cost of \$1. The development benefits from this project are \$D per year forever, with a discount rate of r. The present value (PV) of D is as follows:

$$PV_D = -1 + D/r$$

In addition to the costs, there is the foregone benefits from the destruction of the resource as a natural asset. The present value (PV) of the foregone resource will be:

$$PV_P = P/r$$

The net present value (NPV) then is:

$$NPV_D = -1 + D/r - P/r$$

For the decision to favor development, the NPV_P must be greater than zero or:

$$(D-P) > r$$

Pearce and Turner (1991) claim that the relative price of P is likely to rise as the natural environment becomes scarcer. This rise in price should not be confused with the effects of inflation when the general price level of all goods and services increases in price. The preservation benefit in year t is:

$$P_t = P_0 e^{rt}$$

³ The discount rate can be thought of in terms of an interest rate. If the rate is 5 percent, then \$100 invested today will earn \$5.00 over a one year period. On the other hand, if you want \$100 in one year, you need only invest \$95.24 today.

$$X(1 + .05) = 100 \text{ or } X = 100/1.05 = 95.24$$

Benefits or costs occurring the future are discounted, or divided by 1 plus the discount rate and taken to a power equivalent to the number of periods of time from year zero (Stokey & Zeckhauser 1978). If the number of periods extends far into the future, then the value is divided by the discount rate directly.

where P_0 is the initial year's preservation benefit, e is the exponential factor and g is the growth rate of the price of preservation benefits relative to the general price level. Development value is subject to change due to technological changes which make it less attractive through time. The development benefits then must be discounted by a factor of k , reflecting the rate of 'technological decay' of the development.

$$D_t = D_0 e^{-kt}$$

The net present value (NVP) with these additional refinements leads to:

$$NPV_D = -1 + (D / r + k) - (P / r - g)$$

A decision to develop would be based on a positive value if, and only if, the square root of D is greater than the square root of P plus the square root of k plus g .⁴

The development benefits may need to be nearly 50% greater than preservation benefits for the development to be worth more than the value of environmental resources lost. The impact of this illustration is to realize that even if it were possible to quantify the value of significant resources, these values should not be equated directly with the values derived from development.

In summary, significant natural resources provide values based on the costs not evoked in the event of a natural disaster or erosion. These values accrue to the general public, although the initial incidence of these costs fall on individual property owners. The actual payment in the form of disaster relief are most often made with public funds. Finally, the concept of net present value illustrates why resource values cannot be equated directly with values derived from development.

Other Factors Underlying Recommendations

In order to help weigh the respective economic consequences on resources and on conflicting uses, significant resources were divided into three groups, A, B and C, referring to highest significance, highly significant and significant, respectively. A-quality resources are the highest rated within the planning area, either through the number of decision and contributing factors met, the exceptional value of particular factors, or both. B-quality resources rated lower than A-quality resources generally but consistently meet two or more decision factors. C-quality resources are significant but lower rated than B-quality resources and may only satisfy two or more contributing factors. A-, B- and C-quality resource areas are identified on the resource inventory maps in the Site Inventory and Analysis section of this chapter.

Another convention employed in the analysis is the notion of a building envelope. Consistent with similar city code definitions, "building envelope" was defined as a

⁴ As an example, let P be .2 and let $k + g = .01$. Then, the inequality indicates that for the development to be worthwhile, D must have a minimum value of $(.547)^2$ or 0.299. This means that the ratio of D to P is $.299 / .2$ or 1.49. That is, the development benefits must be 49 percent higher than preservation benefits for the development to be worth more than the value of environmental resources lost.

40-foot by 40-foot area in which residential building may occur. This convention aided in the evaluation of relative impacts of limiting or prohibiting conflicting uses; for example, prohibiting such uses within a building envelope would eliminate a site's development potential.

For larger parcels that contain significant resources, there is a loss of flexibility. To compensate for this loss, Planned Unit Developments, allow greater site design flexibility than conventional zoning and subdivision regulations. The intent is to:

- Provide flexibility in architectural design, placement, and clustering of buildings; use of open areas and outdoor living areas; provision of circulation facilities and parking; and related site and design considerations;
- Encourage the conservation of natural features;
- Provide for efficient use of public services and improvements;
- Encourage and preserve opportunities for energy efficient development;
- Promote an attractive and safe living environment in residential zones.

PUDs have been used successfully throughout the study area. Developers have taken advantage of the marketing opportunities made available by the preservation of natural areas, careful integration of residential uses, and an understanding that amenity values can be capitalized into private land values.

Another factor considered during the analysis of conflicting uses is transfer of development rights (TDR). The Skyline Plan District (Chapter 33.575) was adopted to allow transfers of residential density from fully protected properties near Forest Park to more suitable building sites in RF-zoned lands along Skyline Boulevard. The northern portion of the Skyline West plan area is included in the Skyline Plan District. Unconstrained portions of this area is generally eligible as a receiving area for TDRs. Housing density at eligible sites can be increased by 50 percent (to 0.75 units per acre) and under certain conditions to one unit per acre.

After the analysis is performed, a decision must be made whether to provide full protection, no protection, or limited protection. A decision to fully protect significant natural resources preserves the amenity value of the forest and water features, the intermediate goods value of improved water quality and wildlife habitat, and the damage costs avoided values due to the existence of vegetation that contribute to the stabilization of steep slopes. No protection allows conflicting uses, but results in the loss of significant resources and associated values. Limiting protection of significant resources involves finding a balance between development and resource preservation.

Discussion Format

The inventory and analysis of resource sites in the following section summarizes material gathered during field visits as well as resource information collected from

other sources as noted above. The elements of the resource site summaries and the discussion format are reviewed below.

Resource Site #: **Name** **Map:** Quarter section maps

Resource Site Size: Approximate acreage of resource site

Approx. Boundaries: Approximate north, east, south and west boundaries

Neighborhood: Name of the local neighborhood

Inventory Dates: Dates of field inventories within the resource site

Habitat Classification: Based on the Cowardin classification system

Types of Resources: List of resources, described in more detail below

Functional Values: List of resource values, discussed earlier in this chapter

Resource Location and Description

Describes the location and significant resource features of individual sites.

Resource Quantity and Quality

Resource quantity and quality is evaluated using information from field inventories, local and regional planning efforts and other sources.

Composite Wildlife Habitat Rating:

The habitat rating provides a summary of the relative quality of wildlife habitat within a particular resource site. At the top of the habitat rating box, the range of habitat scores for the site is indicated. The previous section explains the decision and contributing factors used in weighing the significance of habitat resources. The functional value of the three principal habitat components, water, food and cover, is then generalized (from "low" to "high") based on the following habitat scores:

	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 special features (habitat type, flora and fauna); *disturbance* is a combination of physical and human disturbance (note: a high score corresponds to a "low" disturbance); *interspersions* is assessed directly from interspersions score.

	Low	Medium	High
Interspersion	0 - 1	2 - 4	5 - 6
Uniqueness	0 - 3	4 - 7	8 - 12
Disturbance	8 - 6	5 - 3	2 - 0

Conclusion

Summarizes the inventory and the significance of individual resources.

ESEE Consequences

This section identifies applicable conflicting uses for the resource site and provides an analysis of allowing, limiting or prohibiting conflicting uses.

Economic Consequences

Economic factors considered include a comparison of the value of the resource to the economic impact on properties containing resources. Also considered were the effects on property values and development potential and effects on quality of life.

Social Consequences

Social consequences considered in this analysis include effects on area policies; cultural, recreational and scenic values; regional identity and local landscape character; housing and education; and effects on public health, safety and welfare.

Environmental Consequences

Limiting or prohibiting conflicting uses protect natural resources and resource values. These consequences are discussed further in the Consequences of Limiting or Prohibiting Conflicting Uses section above.

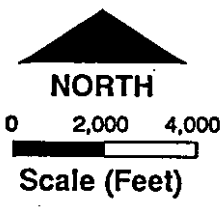
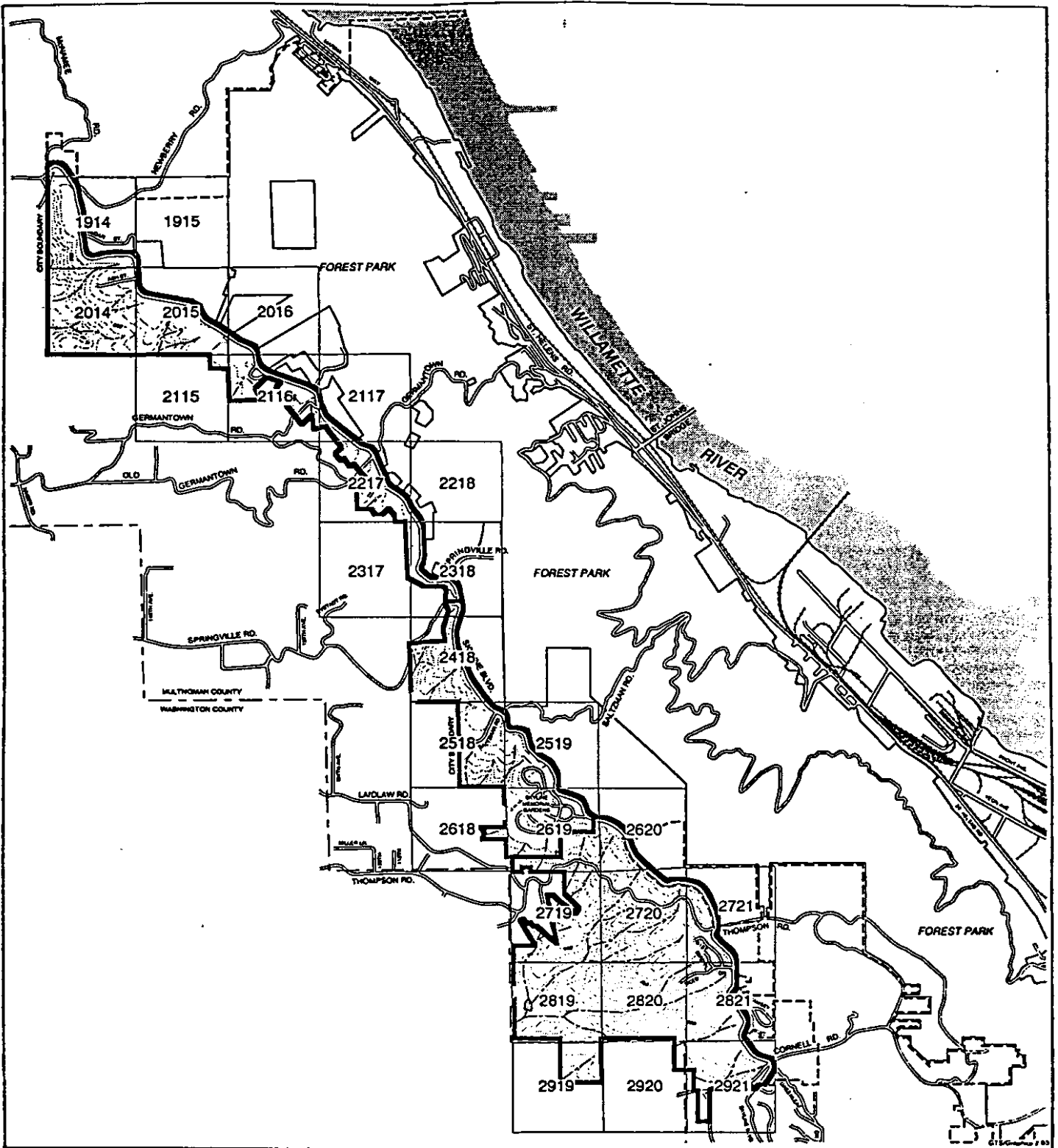
Energy Consequences

This subsection reviews energy consequences on transportation and urbanization; infrastructure and services; and heating and cooling of structures.

Site Inventory and Analysis

The following section presents the inventory and analysis of the three resource sites within the planning area. The inventory provides information on resource location, quality and quantity. The analysis reviews the economic, social, environmental and energy consequences of allowing, limiting or prohibiting conflicting uses.

The next chapter develops a plan to conserve identified resources based on the inventory and analysis of this chapter. The map on the following page shows the study area with an overlay of quarter section map numbers. This map is a useful cross-reference with the city's Official Zoning Maps. The Vicinity Map on page 63 provides a key to the location of resource sites discussed in this section. Each site summary also contains a map showing resource areas and zoning within the site.



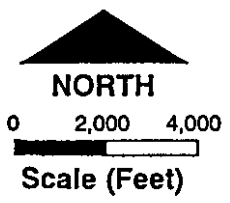
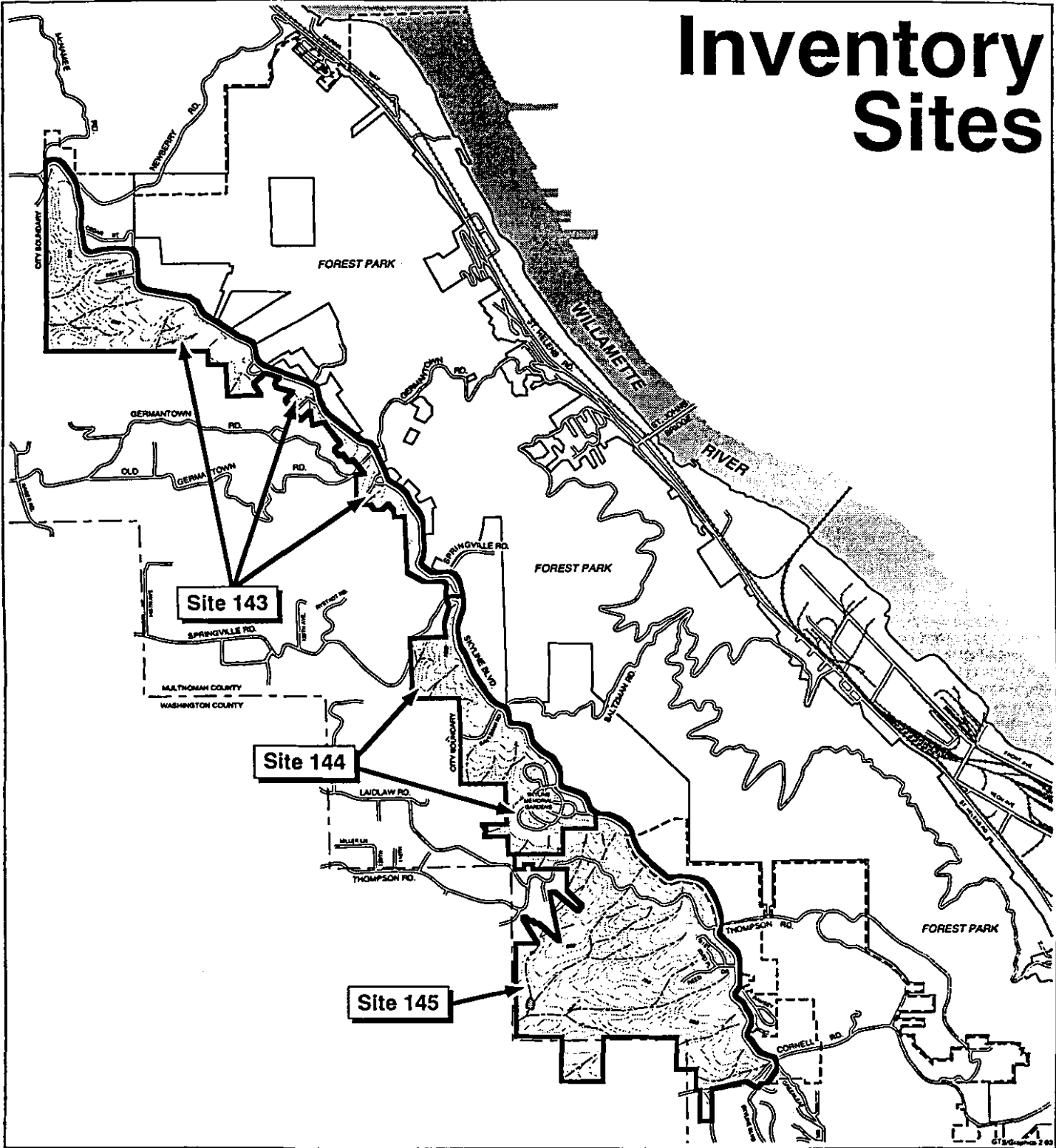
(Elevation Contour Intervals: 50')

Quarter-Sections Map

Skyline-West

Resource Protection Plan

Inventory Sites



(Elevation Contour Intervals: 50')

Vicinity Map

Skyline-West Resource Protection Plan

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Resource Site 143: Rock Creek Headwaters Maps: 1814, 1914, 2014-15,
2115-16, 2217-18, 2318

Resource Site Size: 500 acres

Approx. Boundaries: NW McNamee Rd., north; Skyline Blvd., east; NW Springville Rd., south; City Limits, west

Neighborhood: Forest Park

Inventory Dates: 6/18/86, 3/24/93, 3/31/93, 4/5/93, 9/9/93, 4/19/94

Habitat Classification:

- Upland Coniferous/Broadleaf Deciduous Forest
- Riverine, Intermittent Streambed, Seasonally Flooded
- Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded
- Palustrine, Emergent, Seasonally Flooded
- Palustrine, Unconsolidated Bottom, Permanently Flooded

Types of Resources:

Forest, wildlife habitat, sensitive fauna, intermittent and perennial creeks and creek headwaters, palustrine wetlands, groundwater, open space

Functional Values:

Food, water, cover and territory for wildlife; groundwater recharge and discharge; slope stabilization, sediment and erosion control; microclimate amelioration; air and water quality protection; scenic values

Resource Location and Description

This is the rural outpost at the northwestern limits of Portland. Scattered single dwelling residences, agricultural uses, an old grange building and undeveloped woodlands border Skyline Blvd. as it meanders along the broad, rolling ridgetop. The site is long and fairly narrow, stretching between Skyline Blvd. and the western city limits, from NW Springville Rd. north to NW McNamee Rd.

This site marks the source, or headwaters, of two tributaries to Rock Creek. Rock Creek flows south and west into the Tualatin Valley until, near Beaverton, it merges with the Tualatin River. The bulk of the elevation change for the Rock Creek tributaries occurs in Portland and unincorporated Multnomah County. From a high point of 1,110 ft. at the southern boundary of Site 143, and 850 ft. at the northern boundary, the creeks drop to less than 200 ft. before entering Washington County two or three miles away. The upper basin location of this site provides a biological link to and exerts a significant influence upon downstream land and

water resources. The site's location also serves as a ridgetop link between Portland's habitat areas and the natural areas to the northwest.

Resource Quantity and Quality

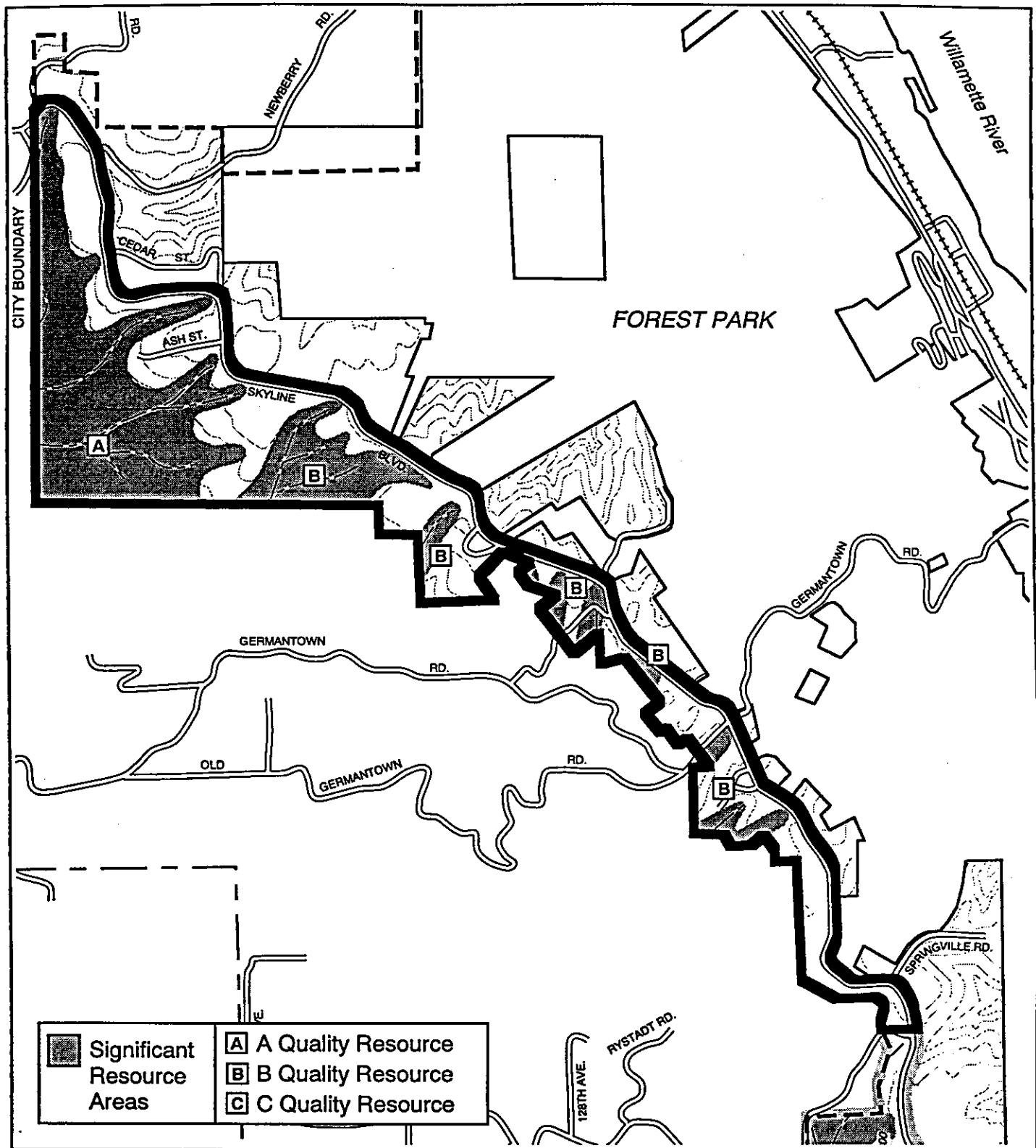
This site is a sensitive headwaters area and contains the source and upper reaches of two primary tributaries to Rock Creek. The total length of the creeks and associated drainages within the site is approximately four lineal miles. In addition to the riverine creek system, three palustrine wetlands are identified in the National Wetlands Inventory. One additional emergent wetland and other wetlands directly associated with the site's creeks were identified in the field inventory. This 500-acre resource site contains approximately 340 acres of forest in varying stages of succession (as of Spring, 1994). As is common elsewhere on the west slope, the older and more diverse forest generally occurs within the broad ravines.

The site slopes from the ridge along Skyline southwest towards the Tualatin Valley. The topography ranges from gentle slopes along the ridgetop to precipitous ravine slopes exceeding 80 percent.

The site's creeks and associated tributaries, wetlands and ravines provide important forage, cover and nesting habitat for a variety of bird, mammal, amphibian and reptile species. The pileated woodpecker is a state-listed sensitive species identified within the site. The pileated 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. The pileated woodpecker is an indicator of the health of the Rock Creek watershed ecosystem.

The site's water features are important for a variety of reasons not least of which is their influence on downstream water quality and fish production. The Tualatin River system supports state-listed sensitive coho and fall chinook salmon, cutthroat trout, pacific lamprey and northern red-legged frog. The Tualatin River is also under a DEQ enforcement order requiring all jurisdictions within the watershed to take actions to improve water quality, including control of erosion and reduction of sediment and nutrient loads. Though the site's intermittent and upper perennial creeks are generally not inhabited by fish, they do provide primary habitat for amphibians and reptiles. Pacific tree frog, ensatina and pacific giant salamander, and roughskin newt are sensitive amphibians that rely on the moist, wooded areas of the site with cool water of good quality. Downed logs and woody debris are common at this site and provide important cover and food sources for amphibians and other wildlife. Several non-poisonous, beneficial reptiles also use the site, including the uncommon western fence lizard (open, rocky areas and forest edges), garter snakes (forest and edge areas), and turtles (ponds).

Among the more notable mammal species observed within Site 143 are bobcat, grey fox and Roosevelt elk. Black-tail deer use both forest and edge habitat and are occasionally observed crossing Skyline Boulevard in the vicinity of the BPA power

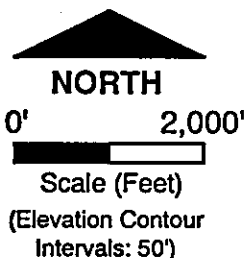


Map 1 - Site 143

Skyline-West

Resource Protection Plan

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lines. As many as 70 bird species also use the site, including the pileated woodpecker, sharp shinned and red-tailed hawks, white-crowned and song sparrows, evening grosbeaks, Townsend's solitaire and Swainson's thrush. Several of these species depend on both wetland and upland habitat for survival; for example, the deer, bobcat, frogs, and forest bird species depend on either daily or seasonal shifts in habitat to forage, escape flooding or predation, and breed.

Composite Wildlife Habitat Rating:

Range of Habitat Scores:	14 - 80
Water	: Medium
Food	: Moderately High
Cover	: Moderately High
Interspersion	: Medium
Uniqueness	: Medium
Disturbance	: Low

In addition to providing habitat for wildlife, the site's forest cover protects soil and watershed resources, and contribute to the rural character of the site. Some of the resource values include slope stabilization, dissipation of erosive forces, and sediment and pollutant removal. The forest helps to purify the air as well as the water, and provides shelter from storms and cold winds. The forest also adds to the scenic qualities of the area, giving it a semi-rural character.

The forest provides a good example of the Pacific Northwest's western hemlock forest community. This community is unique among all temperate forests in the world (Waring and Franklin 1979).⁵ This site contains the pacific yew (*Taxus brevifolia*), the bark of which contains a cancer-fighting substance known as "taxol." Another important forest component found at the site is grand fir (*Abies grandis*). This tree and its later successional associates red cedar and hemlock are well established at the site.

The far northern portion of the site is composed primarily of Goble silt loam soils. This silt loam is high in volcanic ash weathered from the parent material, Columbia River Basalt. Because of steep slopes, a seasonal perched water table, slowly permeable fragipan and low bearing strength, this soil has severe limitations for building site development and sanitary facilities (Mult. Co. Soil Survey, 1983). The remainder of the site is composed of Cascade silt loam along the ridgetop, with a small inclusion of Cornelius silt loam at the intersection of Skyline and Germantown. These soils have similar limitations for development though with less precipitous slopes.

⁵ 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.

The Columbia River Basalt underlying the site yields moderate to large amounts (up to 1,000 gallons per minute) of water to wells that penetrate the basalt below the regional water table, and lesser amounts (2 to 300 gpm) of perched groundwater to wells and springs above the water table. Groundwater is moderately hard to hard with occasionally high chloride content. Recharge occurs principally through infiltration, but also through migration from overlying and underlying formations and adjacent recharge areas (Redfern 1976). Water Resource Board records of wells and surface water rights are summarized below.

Map	Quarter Section	Wells	SWR
1914	NE 1/4 Sec 5 1N1W	3	
2116	NE 1/4 Sec 9 1N1W	1	
2217	SW 1/4 Sec 10 1N1W		1
2318	NE 1/4 Sec 15 1N1W		1

Section	Wells
4 (1N1W)	3
5 (1N1W)	13
9 (1N1W)	23
10 (1N1W)	14

Skyline Blvd. and Germantown Road are designated as scenic corridors in the city's *Scenic Resources Protection Plan*. The Tualatin Mountains were used for campsites by Chinookan hunting parties from the Columbia River or by Tualatin Plains groups crossing the Tualatin Mountains to gather wapato, hunt waterfowl, fish or trade. A stone mortar and pestle were reported found near this site, on the east side of Skyline. Germantown and Springville Roads follow early trails used by pioneer farmers of the Tualatin Valley Plains to bring their wheat and produce to Springville and other settlements along the Willamette River in the 1840s.

Conclusion

This site contains significant natural resources. One state-listed species is identified within the site, with five additional sensitive fish species identified downstream from the site. Resource values associated with water quality and slope stability are significant within the forested ravines. Certain water resources also provide important domestic water supplies and the entire site is part of the Tualatin Basin requiring measures to protect and improve water quality. Based on the decision factors discussed earlier in this chapter, the significant resources are located within the ravines and on certain upland ridges.

Site 143 Economic, Social, Environmental, and Energy Consequences

This section analyzes the consequences of protecting significant natural resources in Site 143, and the consequences of allowing these resources to be degraded or destroyed. The analysis addresses four types of consequences: economic, social, environmental and energy. Environmental consequences of allowing conflicting uses are addressed in the beginning of this chapter.

This site contains the following zoning categories: Residential Farm and Forest (RF), Residential 10,000 (R10) and Neighborhood Commercial 2 (CN2). Significant resources at the site are located only within areas zoned RF (see Table 1 for allowed uses). Therefore, no conflicts exist between significant resources and commercial and medium density (R10) land within this site. One nonconforming commercial use is located in an R10 zone and also is not in conflict with an identified resources.

Certain uses allowed in the RF zone are not feasible within or applicable to the resource site. Site 143 does not include any properties with revocable use permits and no new uses are permitted, so the analysis will not address these uses. The analysis does not address mining because the site does not include any existing or potential mineral or aggregate extraction operations. The analysis does not address rail line corridors because none exist or are proposed for the site and area topography exceeds maximum gradient for rail lines. Aviation and surface passenger terminals are not feasible due to the topography, shape and development pattern of Site 143.

Economic Consequences

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 143.⁶ Maps of subdivisions and subdivision phases referenced in this analysis are available for review at the Bureau of Planning.

Skyline Ridge

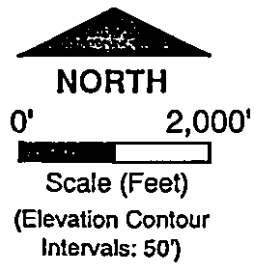
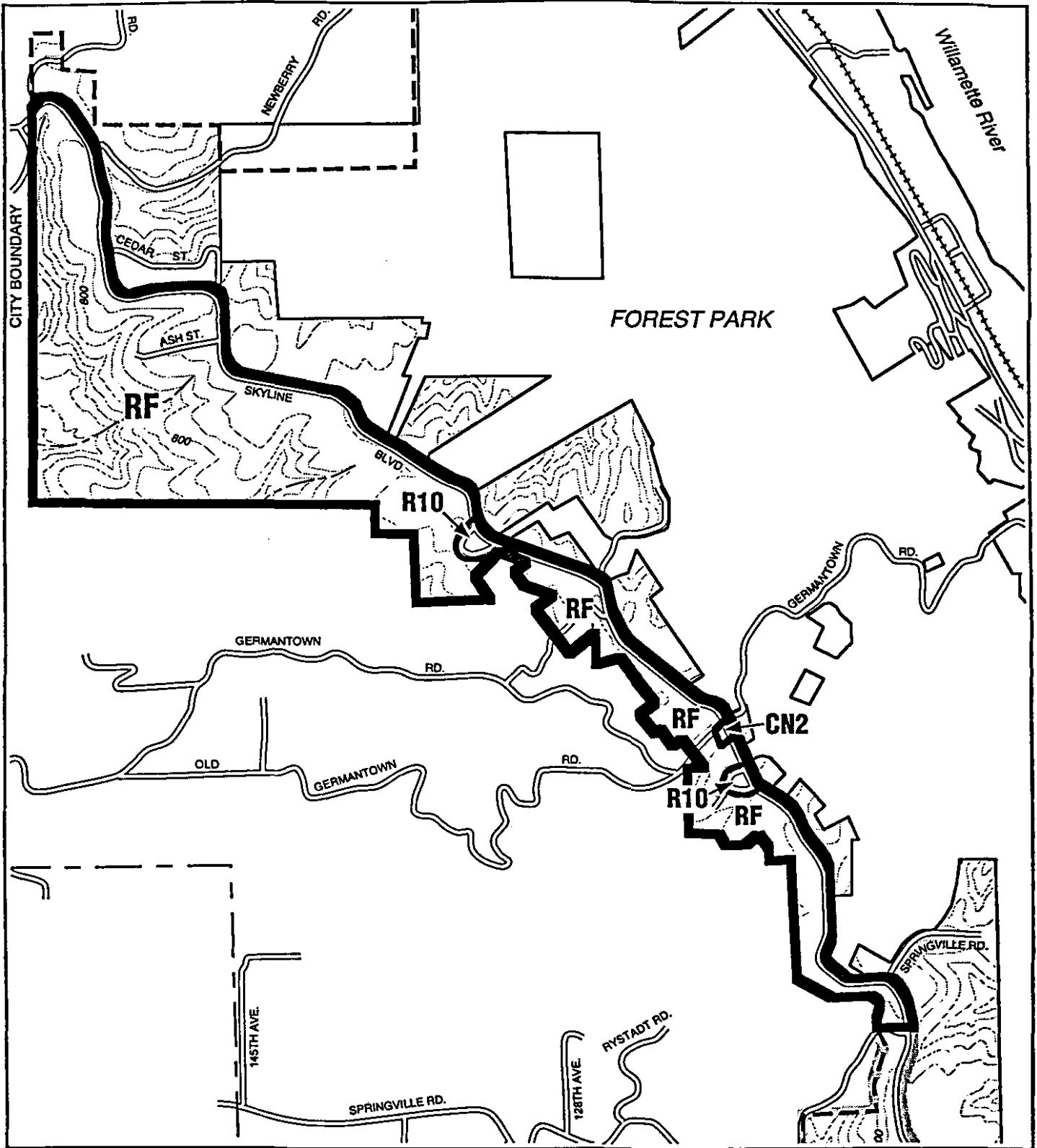
Recorded Planned Unit Development/Major Subdivision of 25 low density lots located south of N. W. Skyline Boulevard, about one-half mile south of Newberry Road. There are a total of three drainage ways created by ridges on the site. There are "B" quality resources located in the designated open space, (Tract A) and "C" quality resources in the designated open space, (Tract B). There are "B" quality resources located on twelve lots outside the building envelopes.

Fully Protecting Significant Resources

Fully protecting the "B" and "C" quality resources located in the open space areas has no negative economic impacts on these resources or on conflicting uses and has positive economic impacts by insuring the existence of the resources. Fully protecting the "B" quality resources on the twelve lots has minimal negative economic impacts on accessory development. There are benefits associated with the amenity values of the resources that are capitalized into adjacent property values.

Fully protecting the resources does not affect development potential because the building envelopes contain no significant resources. Fully protecting the significant

⁶ For the purpose of this analysis, a "building envelope" is defined as a 40-foot by 40-foot area in which residential building may occur.



Site 143 - Zoning
Skyline-West
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resources preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and increases the damage cost avoided values through stabilization of the slopes. These values are greater for the "B" resources, and less for "C" resources.

Negative economic impacts = minimal impact on conflicting uses due to siting limitations on accessory development

Positive economic impacts = "B" and "C" quality resources in open space areas;
"B" quality resources on lots outside of building envelopes;
potential capitalization of amenity values into property values

Net economic impacts = positive

No Protection for Significant Resources

The "B" and "C" quality resources in the open spaces areas are at risk of uncontrolled tree cutting or degradation. There are negative economic impacts attributable to the loss of the "B" quality resources on the twelve lots. Providing no protection for the significant resources risks the loss of the amenity values associated with the forest cover and water features, the wildlife habitat values, and the damage cost avoided values provided by the stabilization of the slopes.

Negative economic impacts = degradation of "B" and "C" quality resources in open spaces;
loss of "B" quality resources located on twelve lots;
reduction in capitalized amenity values into property values

Positive economic impacts = minimal increased flexibility for siting conflicting uses

Net economic impacts = negative

Limiting Protection for Significant Resources

Open space areas containing "B" quality resources are bordered by lots with building envelopes that are outside of the resource site. There are no significant negative economic impacts associated with protecting these resources in either open space areas or on lots. There are positive economic impacts in the form of assurance of future benefits. If development is allowed in the "B" quality resource areas, there is a risk of lowering of damage cost avoided values, reducing the amenity value of the forest, degrading water quality and reducing wildlife values.

Negative economic impacts = none

Positive economic impacts = "B" and "C" quality resources in open space areas;
"B" quality resources on lots outside of building envelopes;
potential capitalization of amenity values into property values

Net economic impacts = positive

Recommendations

"B" in open space:	full protection;
"B" on lots:	full protection along ravine, limited protection along boundaries;
"C" in open space:	limited protection

Parcels in Site 143

Site 143 contains "A" quality resources in the northwestern corner of the site, west of Skyline Summit. The "A" quality resources are located on 31 smaller parcels and a large 100-acre site. Along the eastern boundary of this larger site are small areas of "C" quality resources (within the upland plateaus) which are too small to identify clearly on the resource map. There are "B" quality resources located east of Skyline Summit on 30 parcels.

At hearings before the Planning Commission, public testimony addressed the positive and negative consequences of applying environmental zoning to the aforementioned 100-acre site (Tax Lots 20, 25, 26, 27 and 28 of Section 5, 1N1W). In 1982, a Planned Unit Development (PUD) was proposed and received preliminary approval for this property. It contained 46 lots and the required amount of common and private open space, designated approximately where the "A" quality resources are located. No final approval was granted and this PUD has since expired. However, the resource materials placed in the application record were used in this study, including a Preliminary Geotechnical Evaluation by Dames and Moore. The statement of planning objectives for the PUD emphasized that the proposed development plan was designed to retain the present forest characteristics of the site. The lot arrangement and circulation system were located to maximize preserved open space and exceed the open space requirement for PUDs. Buildable areas were located outside of the natural streams, identified as sensitive in the Hearings Officer report, while removal of existing vegetation would be kept to a minimum on building sites and retained in open spaces.

A local developer testified that the market already perceives the environmental overlay. The previous PUD approval with open space areas educated the development community as to the value of the resources and their location on the

property. By applying the environmental zoning, the adoption of this plan removes the risk of uncertainty over whether these valuable amenities will be preserved. This is especially true for residential developers who intend to capture the higher end of the housing market. The adoption of this plan reflects this understanding and reduces the risk of losing the amenity values for residential purposes.

Fully Protecting Significant Resources

Developed parcels containing "A" or "B" quality resources on the back portions of the parcel have minimal negative economic impacts from fully protecting the resources. There are increases in value associated with assurance of the continued existence of the resources, including the headwaters of Rock Creek and habitat for sensitive species. Fully protecting "A" quality resources preserves the high amenity values of the forest and water features, the high wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. This is also true of "B" quality resources, particularly in the larger creek system to the north. Full protection of "C" quality resources has lower values for habitat and forest, and do not contain water features.

Negative economic impacts = loss of flexibility for siting new development where "A" and "B" quality resources are located

Positive economic impacts = "A" and "B" quality resources; potential capitalization of amenity values into property values; marginal "C" resource values

Net economic impacts = positive

No Protection for Significant Resources

The "A" and "B" quality resources include water features that would be subject to degradation and pollution without protection. Loss of the resources located on developed properties could result in a decrease in property values by the amount associated with the proximity to forest, wildlife habitat and water features. Slope destabilization and erosion would result from the loss of the resources. Parcels with "A" or "B" quality resources that are not protected risk the loss of the amenity values associated with the forest cover and water features, the wildlife habitat values, and the damage cost avoided values provided by the stabilization of the slopes. No protection of "C" quality resources would result in some loss of forest and habitat values, no loss of water values, and some gain in development flexibility.

Negative economic impacts = loss of "A" and "B" quality resources; reduction in capitalized value of amenity values into property values; loss of marginal "C" quality resources

Positive economic impacts = increased flexibility in siting development

Net economic impacts = negative

Limiting Protection for Significant Resources

Where development is permitted, there is a risk of lowering the damage cost avoided values, reducing the amenity value of the forest and water features and wildlife values. Protecting "A" and "B" quality resources can maintain the amenity values and their potential capitalization into property values. Limited protection of "C" quality resources saves some values while allowing development.

Negative economic impacts = loss of "A" and/or "B" quality resources where development is permitted

Positive economic impacts = "A", "B" and "C" quality resources; potential capitalization of amenity values into property values

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" quality resources along creeks and ravines, with limited protection of boundary areas of the ravines. In addition, the analysis indicates full protection of "B" quality resources in the larger, northern creek area, with limited protection of the ravines and other smaller drainages. Due to their small size and lower values, no protection is recommended for "C" quality resources.

Social Consequences

This analysis considers the social consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 143.

Fully Protecting Significant Resources

Fully protecting resources supports adopted local policies to avoid development "where landslide hazard are predominant or natural conditions are unique and sensitive..." (Bureau of Planning 1985). Protection results in reduced landslide, erosion and flood hazards and increased air and water quality. Protecting the site's natural resources would complement and maintain the wooded, rural character of the site. Protected vegetation also provides a filter for noise, odors, air and water pollutants within neighborhoods. Though the site does not provide needed housing, some housing opportunities could be lost if redistribution to non-resource

areas was precluded. Certain potential neighborhood services such as daycare and community centers could be limited under full protection. Full protection has overall positive social consequences though with some limitations for siting housing and community support services.

No Protection for Significant Resources

No protection is inconsistent with adopted local conservation policies. The risk of landslide and flood hazards is higher. Scenic corridors are protected independently, but area's wooded character is at risk. Natural buffering values of vegetation is at risk. Housing and community support services are constrained only by physical site conditions. No protection has negative social consequences; some siting flexibility gained.

Limiting Protection for Significant Resources

Limited protection supports adopted local conservation policies. This action limits potential landslide, erosion and flood hazards and increases air and water quality. The site's wooded character and the vegetation's buffering values would be partially lost. Housing and community support service opportunities would be maintained. Limiting protection has overall positive consequences though with some social amenity values at risk.

Recommendations:

Fully protect significant water features, vegetation and steep slopes. Provide limited protection along resource boundaries where full protection would preclude housing and community support services.

Environmental Consequences

This analysis considers the environmental consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 143.

Fully Protecting Significant Resources

This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive.

No Protection for Significant Resources

No protection results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Limiting Protection for Significant Resources

This action conserves significant environmental resources and resource values identified in the site inventory. The environmental consequences are generally positive, but there is a risk that some resources and values will be lost.

Recommendations:

Fully protect significant resources.

Energy Consequences

This analysis considers the energy consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 143.

Fully Protecting Significant Resources

Where significant trees are located adjacent to buildings, protection provides beneficial energy effects. Trees reduce energy needs for heating and cooling by tempering the effects of the local climate. Trees provide shelter from winter winds and storms, and shade buildings and absorb heat during the summer. One tree can provide air conditioning benefits totaling \$73 per year (Oregon CommuniTree News 1993). Evergreen (and to a lesser extent deciduous) trees located close to buildings may reduce solar access and passive heat gain during the cooler months. Full protection of steep ravines can reduce energy consumption by eliminating long, steep or hazardous access for residential services and infrastructure. Such protection promotes compact development forms, common wall construction, and similar energy saving practices. Full protection of whole properties risks higher energy costs associated with transportation and infrastructure if housing, neighborhood institutions or local farm operations are pushed outside established urban areas. Energy consequences are generally positive, though potentially negative if certain uses are forced outside of the UGB.

No Protection for Significant Resources

No protection risks the detrimental energy effects of suburban sprawl, including residential service and infrastructure inefficiencies. Energy savings for heating and cooling of structures will be lost through the loss of trees that ameliorate local climate. Where resources apply to whole properties, providing areas of no protection will decrease the pressure for housing, neighborhood institutions or local farm operations to occur outside established urban boundaries, potentially reducing energy costs associated with transportation and infrastructure. Energy consequences are negative unless no other local (urban) sites exist for certain uses.

Limiting Protection for Significant Resources

Limiting protection will conserve some trees that reduce energy needs for heating and cooling by ameliorating the local climate. Long, steep or hazardous access for residential services and infrastructure can be limited, providing energy savings. Compact development forms, common wall construction, and similar energy saving practices could result with energy benefits. No housing, neighborhood institutions or local farm operations would be displaced. Net energy consequences are positive.

Recommendations:

Fully protect significant resources, except where whole vacant properties are affected. Provide limited protection of non-creek resources in such cases.

Resource Site 144: Bronson Creek Headwaters Maps: 2318, 2418, 2518-19, 2618-19

Resource Site Size: 270 acres

Approx. Boundaries: NW Springville Road, north; Skyline Blvd., east; Skyline Memorial Gardens, south; City Limits, west

Neighborhood: Forest Park

Inventory Dates: 4/5/93, 4/6/93, 5/4/94

Habitat Classification:

- Upland Coniferous/Broadleaf Deciduous Forest
- Riverine, Intermittent Streambed, Seasonally Flooded
- Palustrine, Unconsolidated Bottom, Permanently Flooded

Types of Resources:

Forest, wildlife habitat, sensitive fauna, intermittent creeks and creek headwaters, palustrine wetlands, groundwater, open space

Functional Values:

Food, water, cover and territory for wildlife; groundwater recharge and discharge; slope stabilization, sediment and erosion control; microclimate amelioration; air and water quality protection; scenic values

Resource Location and Description

This site is the headwaters area for Bronson Creek which eventually merges with Rock Creek near NW 185th Avenue and Germantown Road. The creek basin is southwest sloping and predominantly forested and remains so as it leaves the city into unincorporated Multnomah County; it then meanders through rural farmland and scattered housing in Washington County. About a dozen single dwelling residences are distributed along Skyline Blvd. intermixed with wooded areas and agricultural uses. The site is situated between Skyline Blvd. and the western city limits, from NW Springville Rd. south to Skyline Memorial Gardens. The site's steep, upper basin location provides an important biological link to downstream land and water resources. The site also serves as a migratory link for mammals, birds and herptiles along and across the ridgetop.

Resource Quantity and Quality

This site contains two headwaters tributaries to Bronson Creek. The total length of the tributaries and associated drainages within the site is approximately two lineal miles. In addition to the riverine creek system, one pond and several emergent wetlands associated with creeks are located in the site. Approximately 170 acres of

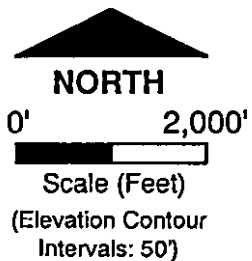
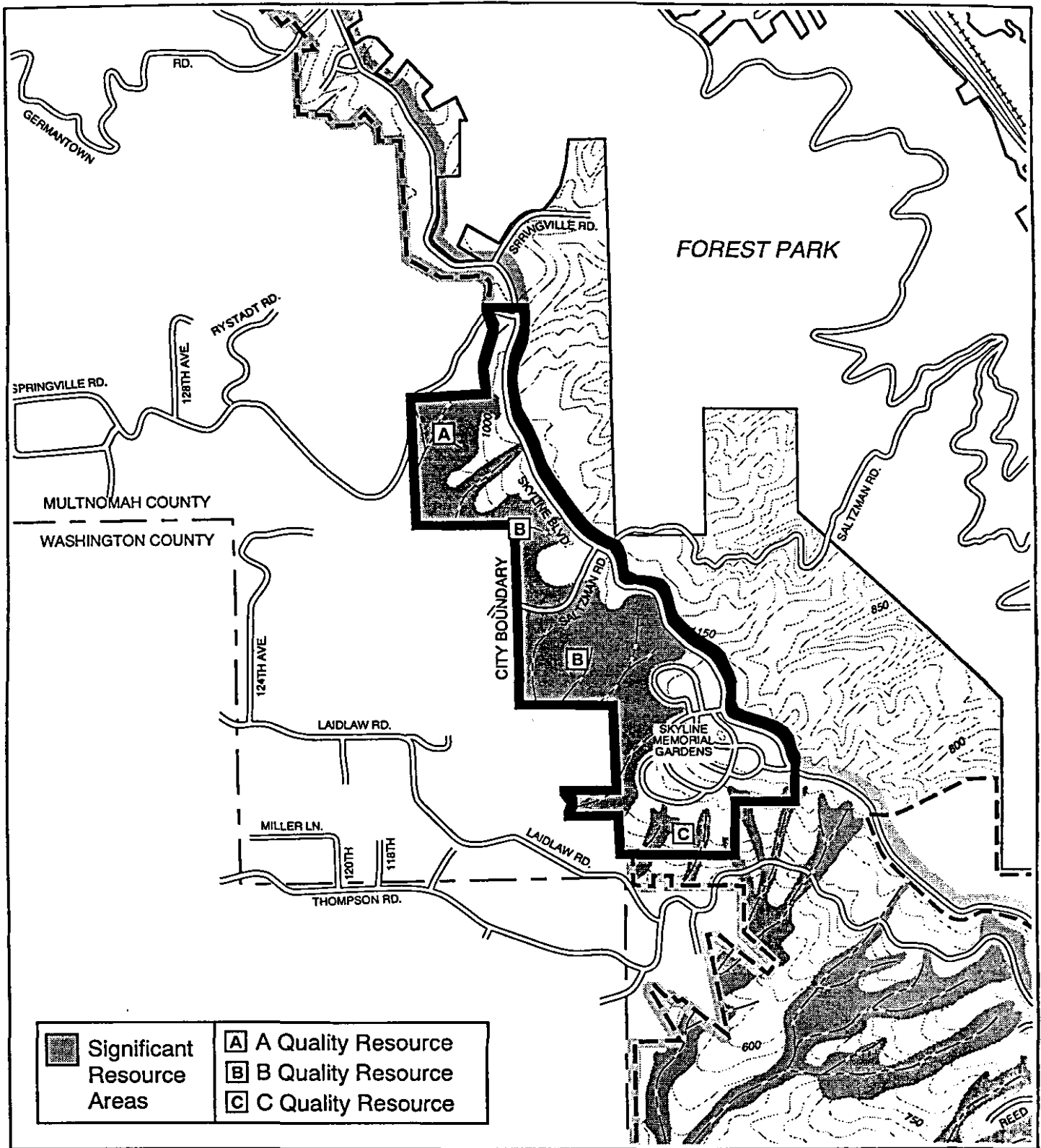
this 270-acre site is forested (as of Spring, 1994). The forest ranges from early to mid-successional stages, approximately 20 to 120 years in age. Slopes across the site range from level on the ridgetop at Skyline Memorial Gardens to as much as 100 percent in the ravines.

The site's headwater tributaries, wetlands, ravines and forest provide important forage, cover and nesting habitat for a variety of bird, mammal, amphibian and reptile species. Two state-listed sensitive species occur within the site. The northern red-legged frog (also a Federal candidate species) breeds in a downstream pond and migrates up through the northern tributary (its presence in the southern tributary is expected but not known). One frog was identified in 1994 near the intersection of Skyline and Springville Road (Hayes 1994). The sensitive pileated woodpecker is also present in the ravines where older conifers and snags are common. The woodpecker and frog both serve as indicators of the health of the Bronson Creek watershed ecosystem.

Though not inhabited by fish, the sites creeks do exert a significant influence on downstream water quality and fish production. Bronson Creek feeds into the Tualatin River system which supports a variety of fish including several state-listed sensitive species such as coho and fall chinook salmon, cutthroat trout, pacific lamprey. The Tualatin River is also under a DEQ enforcement order requiring all jurisdictions within the watershed to take actions to improve water quality, including control of erosion and reduction of sediment and nutrient loads.

The watercourses are in forest cover and contain dispersed large woody debris. These features help to retain moisture and provide important sources of food and cover for amphibian species such as the ensatina and pacific giant salamanders, roughskin newt and red-legged frog. Reptiles include northwestern and common garter snakes, and the northern alligator lizard. The creek and creek tributaries also provide a seasonal water source for terrestrial vertebrates such as bobcat, black-tailed deer, coyote, vagrant shrew, shrew-mole, deer mouse and Townsend's vole which use the site. Bird species identified at this site include hawks, owls, woodpeckers, warblers, wrens and numerous other forest bird species. The site's interspersion with downstream and adjacent forest allows for free migration of wildlife and increases its value as habitat.

In addition to providing habitat for wildlife, the forest protects soil and watershed resources, and contribute to the rural character of the site. Some of the resource values include slope stabilization, dissipation of erosive forces, and sediment and nutrient removal. The forest helps to purify the air as well as the water, and provides shelter from storms and cold winds. The forest also adds to the scenic qualities of the area, giving it a semi-rural character.



Map 2 - Site 144

Skyline-West

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Composite Wildlife Habitat Rating:

Range of Habitat Scores:		39 - 86
Water	:	Medium
Food	:	Moderately High
Cover	:	Moderately High
Interspersion	:	Medium
Uniqueness	:	Medium
Disturbance	:	Low

The site's forest provides a good example of the Pacific Northwest's western hemlock forest community. This community is unique among all temperate forests in the world (Waring and Franklin 1979). Some of the site's ravines contain significant stands of western red cedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*), two later successional associates of the western hemlock community.

With one exception, the entire site is composed of Cascade silt loam soils. This silt loam is formed in silty materials and has a seasonally high water table, slow permeability, and a fragipan at 20 to 30 inches. Except in relatively level areas along the ridgetop, this soil has severe limitations for building site development and sanitary facilities, particularly during the wet winter months (Mult. Co. Soil Survey, 1983). A small Delena silt loam inclusion borders Skyline Blvd. approximately 2000 ft. south of Springville Rd. This soil also has severe limitations for building site development and sanitary facilities due primarily to wetness.

The Columbia River Basalt underlying the site yields moderate to large amounts (up to 1,000 gpm) of water to local wells. Groundwater is moderately hard to hard with occasionally high chloride content. Recharge occurs principally through infiltration, but also through migration from overlying and underlying formations and adjacent recharge areas (Redfern 1976). Water Resource Board records of wells and surface water rights are summarized below.

Map	Quarter Section	Wells	SWR
2318	NE 1/4 Sec 15 1N1W		1
2518	NE 1/4 Sec 22 1N1W	4	1
2619	SW 1/4 Sec 23 1N1W		2

Section	Wells
15 (1N1W)	7
22 (1N1W)	9
23 (1N1W)	11

Skyline Boulevard is a designated scenic corridor in the city's *Scenic Resources Protection Plan*. The scenic corridor designation is intended to preserve and enhance the scenic character along corridors, and where possible, scenic vistas from corridors. Skyline Memorial Gardens has a designated scenic viewpoint.

Conclusion

This site contains significant natural resources including forest, water and sensitive fauna resources. Two state-listed species are identified within the site, with four additional sensitive fish species identified downstream from the site. Resource values associated with water quality and slope stability are significant within the forested ravines. Certain water resources also provide important domestic water supplies and the entire site is part of the Tualatin Basin requiring measures to protect and improve water quality. Based on the decision factors discussed earlier in this chapter, most of the significant resources are located within the site's ravines. A few exceptions occur on upland plateaus with significant values.

Site 144 Economic, Social, Environmental, and Energy Consequences

This section analyzes the consequences of protecting significant natural resources in Site 144, and the consequences of allowing these resources to be degraded or destroyed. The analysis addresses four types of consequences: economic, social, environmental and energy. Environmental consequences of allowing conflicting uses are addressed in the beginning of this chapter.

This site contains the following zoning categories: Residential Farm and Forest (RF) and Open Space (OS). Significant resources at the site are located within areas contained in both these zones (see Table 1 for allowed uses).

Certain uses allowed in the RF zone are not feasible within or applicable to the resource site. Site 144 does not include any properties with revocable use permits and no new uses are permitted, so the analysis will not address these uses. The analysis does not address mining because the site does not include any existing or potential mineral or aggregate extraction operations. The analysis does not address rail line corridors because none exist or are proposed for the site and area topography exceeds maximum gradient for rail lines. Aviation and surface passenger terminals are not feasible due to the topography, shape and development pattern of Site 144.

Economic Consequences

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 144.

Parcels in Site 144

There are "A" quality resources in the northwestern section of the site. There is a "B" quality resource in the center portion of the site, south of Saltzman Road and in the area north of Saltzman Road. There are "C" quality resources in the southern portion of the site.

Five parcels contain "A" quality resources. The "B" quality resources, north of Saltzman Road, are located on five parcels. The "B" quality resources, south of Saltzman Road, are located on six parcels. There are "B" and "C" quality resources located on the Skyline Memorial Garden property; "B" on the RF-zoned portion of the cemetery, and both "B" and "C" on the OS-zoned portion.

Fully Protecting Significant Resources

Fully protecting "A" resources preserves the highest resource values within the site, but would preclude development of two parcels. Protection of "B" resources within RF-zoned areas would preserve slightly lower values but precludes development of one parcel and removes all housing opportunities at the cemetery site. Protection of "B" resources within OS-zoned areas would preserve resource values without affecting housing, but could potentially reduce cemetery expansion opportunities. Protection of "C" resources preserves lower valued resources but also restricts cemetery expansion options.

Full protection of significant resources preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of slopes. These values are greatest for "A" quality ravines and "B" quality creeks.

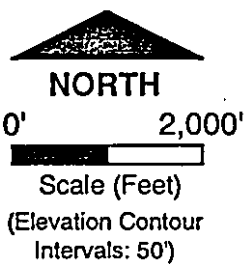
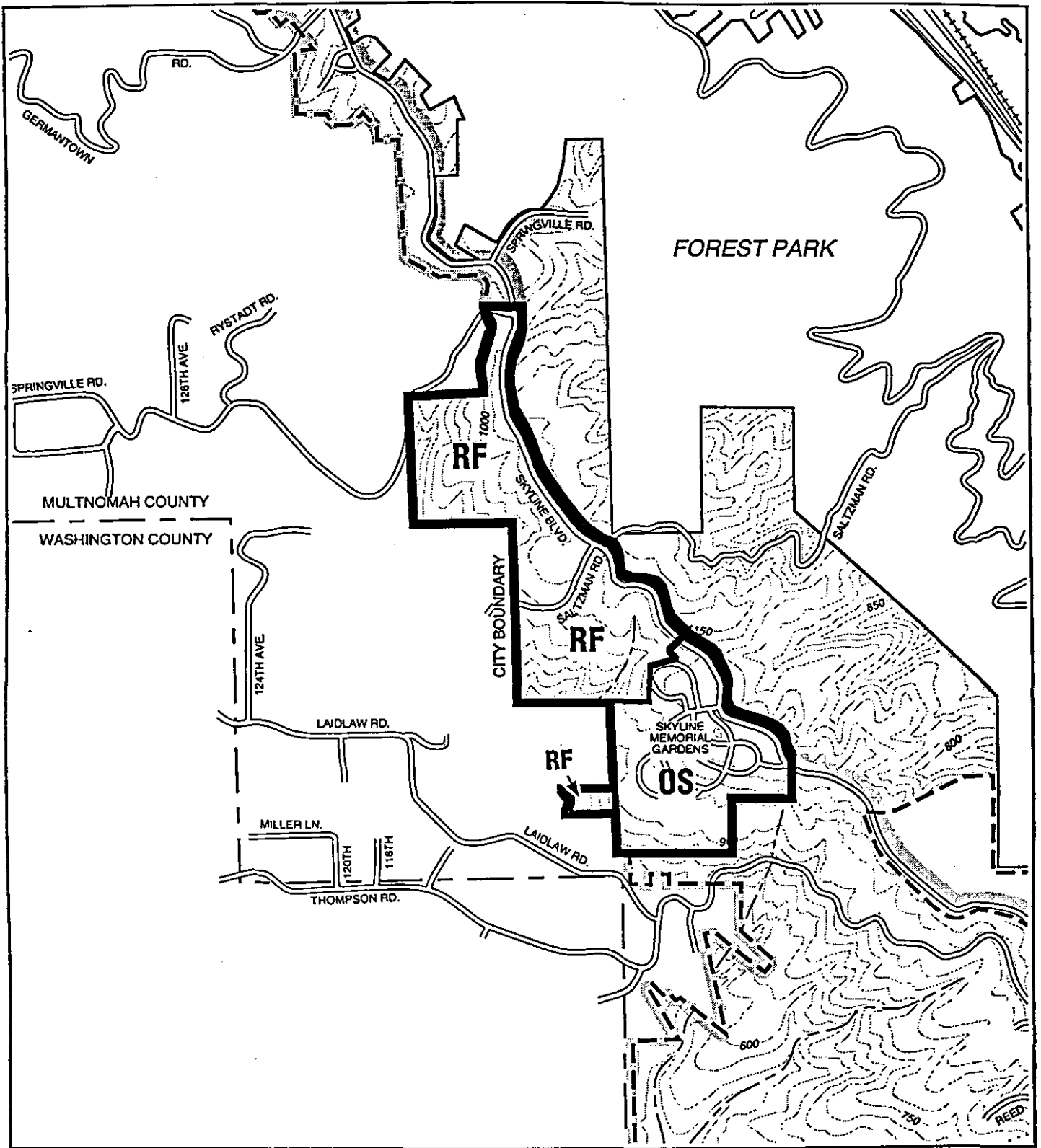
Negative economic impacts = loss of development potential on two parcels with "A" quality resources;
loss of development potential on one parcel and cemetery RF land with "B" quality resources

Positive economic impacts = "A", "B" and "C" quality resources;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

No Protection for Significant Resources

Portions of some parcels containing significant resources would be subject to erosion if the resources are not protected. Slope stabilization and habitat values would be degraded. Providing no protection for the significant resources risks the loss of the amenity values associated with the forest cover and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values provided by the stabilization of the slopes. Two entire parcels with "A" quality resources and two RF parcels with "B" quality resources could be developed.



Site 144 - Zoning
Skyline-West
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Negative economic impacts = loss of "A", "B" and "C" quality resources;
potential decrease in property values due to reduced capitalization of amenity values

Positive economic impacts = four parcels developable

Net economic impacts = negative

Limiting Protection for Significant Resources

Three parcels entirely within "A" and "B" quality resource areas are developable. The RF cemetery site is developable. Protecting "A" and "B" resources located on developed parcels will have no significant negative economic impacts. Where development is permitted, there is risk of lowering of damage cost avoided values, reducing the amenity value of the forest and water features, and reducing water quality and wildlife values. Protecting "A", "B" and "C" quality resources can maintain the amenity values and their potential capitalization into property values.

Negative economic impacts = loss of "A", "B" and "C" quality resources where development is permitted;

Positive economic impacts = "A", "B" and "C" quality resources;
potential increase in property values due to capitalization of amenity values;

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the analysis indicates full protection of "A" quality resources along ravines, with limited protection along boundary areas. In addition, the analysis indicates full protection of "B" quality resources along creeks, with limited protection along ravines and woodland areas containing "B" quality resources. Limited protection is indicated for "C" quality resources.

Social Consequences

This analysis considers the social consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 144.

Fully Protecting Significant Resources

Fully protecting resources supports adopted local policies to avoid development "where landslide hazard are predominant or natural conditions are unique and sensitive...."(Bureau of Planning 1985). This action reduces landslide, erosion and flood hazards and increased air and water quality. Protecting the site's natural resources would complement and maintain the wooded, rural character of the site. Protecting vegetation also filters noise, odors, air and water pollutants within the site. Though the site does not provide needed housing, some housing opportunities could be lost if redistribution to non-resource areas was precluded. Certain potential neighborhood services such as daycare and community centers could be limited under full protection. Expansion of the cemetery could be restricted to non-resource areas. Full protection has overall positive social consequences though with some limitations for siting housing and community support services.

No Protection for Significant Resources

No protection is inconsistent with adopted local conservation policies. The risk of landslide and flood hazards is higher. Scenic corridors are protected independently, but area's wooded character is at risk. Natural buffering values of vegetation at risk. Housing, community support services, and cemetery expansion would be constrained only by physical site conditions. No protection has negative social consequences; some siting flexibility gained.

Limiting Protection for Significant Resources

Limited protection supports adopted local conservation policies. This action limits potential landslide, erosion and flood hazards and increases air and water quality. The site's wooded character and the vegetation's buffering values would be partially at risk. Housing, community support service and cemetery expansion opportunities would be maintained. Limiting protection has overall positive consequences though with some social amenity values at risk.

Recommendations:

Fully protect significant resources, except on parcels where housing or community support services would be precluded. Provide limited protection of resources in such cases sufficient to allow these uses to occur.

Environmental Consequences

This analysis considers the environmental consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 144.

Fully Protecting Significant Resources

This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive.

No Protection for Significant Resources

No protection results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Limiting Protection for Significant Resources

This action conserves significant environmental resources and resource values identified in the site inventory. The environmental consequences are generally positive, but there is a risk that some resources and values will be lost.

Recommendations:

Fully protect significant resources.

Energy Consequences

This analysis considers the energy consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 144.

Fully Protecting Significant Resources

Where significant trees are located adjacent to buildings, protection provides beneficial energy effects. Trees reduce energy needs for heating and cooling by tempering the effects of the local climate. Trees provide shelter from winter winds and storms, and shade buildings and absorb heat during the summer. One tree can provide air conditioning benefits totaling \$73 per year (Oregon CommuniTree News 1993). Evergreen (and to a lesser extent deciduous) trees located close to buildings may reduce solar access and passive heat gain during the cooler months. Full protection of the site's steep ravines can reduce energy consumption by eliminating long, steep or hazardous access for residential services and infrastructure. Such protection promotes compact development forms, common wall construction, and similar energy saving practices. Full protection of whole properties risks higher energy costs associated with transportation and infrastructure if housing, neighborhood institutions or local farm operations are pushed outside established urban areas. Energy consequences are generally positive, though potentially negative if certain uses are forced outside of the UGB.

No Protection for Significant Resources

No protection risks the detrimental energy effects of suburban sprawl, including residential service and infrastructure inefficiencies. Energy savings for heating and cooling of structures will be lost through the loss of trees that ameliorate local climate. Where resources apply to whole properties, providing areas of no protection will decrease the pressure for housing, neighborhood institutions or local farm operations to occur outside established urban boundaries, potentially reducing energy costs associated with transportation and infrastructure. Energy consequences are negative unless no other local (urban) sites exist for certain uses.

Limiting Protection for Significant Resources

Limiting protection will conserve some trees that reduce energy needs for heating and cooling by ameliorating the local climate. Long, steep or hazardous access for residential services and infrastructure can be limited, providing energy savings. Compact development forms, common wall construction, and similar energy saving practices could result in energy benefits. No housing, institutions or local farm operations would be displaced. Net energy consequences are positive.

Recommendations:

Fully protect significant resources, except where whole vacant properties are affected. Provide limited protection of resources sufficient to allow use.

Resource Site 145: Cedar Mill Creek Headwaters Maps: 2619-20, 2719-21,
2819-21, 2919-21

Resource Site Size: 970 acres

Approx. Boundaries: Skyline Memorial Gardens, north; NW Skyline Blvd., east;
City Limits, south and west

Neighborhood: Forest Park

Inventory Dates: 6/18/86, 4/14/93, 3/25/94, 3/29/94, 4/11/94, 4/22/94

Habitat Classification:

- Upland Coniferous/Broadleaf Deciduous Forest
- Riverine, Intermittent Streambed, Seasonally Flooded
- Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded
- Palustrine, Emergent, Seasonally Flooded
- Palustrine, Forested, Seasonally Flooded
- Palustrine, Unconsolidated Bottom, Permanently Flooded

Types of Resources:

Forest, wildlife habitat, sensitive fauna, intermittent and perennial creeks and creek headwaters, palustrine wetlands, groundwater, open space

Functional Values:

Food, water, cover and territory for wildlife; groundwater recharge and discharge; slope stabilization, sediment and erosion control; microclimate amelioration; air and water quality protection; scenic, recreational and educational values

Resource Location and Description

This is the largest resource site in the plan area and forms a sub-basin of the Cedar Mill Creek basin. The site is located west of NW Skyline Boulevard, north of the city limits along NW Cornell Road, east of the city limits, and south of Skyline Memorial Gardens.

An array of first and second order creeks pass through steep, forested ravines and merge in the southwest corner of the site at Mill Pond. The ravines are separated by southwest trending forested ridges or recently developed residential areas which are part of large area subdivisions. Downstream of Mill Pond, another creek in the Washington County portion of the site merges with the main stem and eventually forms Cedar Mill Creek. Cedar Mill Creek becomes Beaverton Creek (and passes through the towns of Cedar Mill and Beaverton) before flowing into the Tualatin River. The steep, upper basin location of this site provides an important biological

link to downstream land and water resources. The site also serves as a migratory link for mammals, birds and herptiles along and across the West Hills ridge.

Resource Quantity and Quality

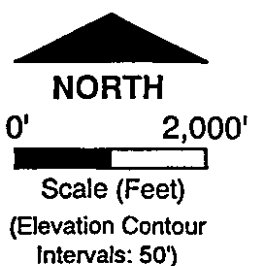
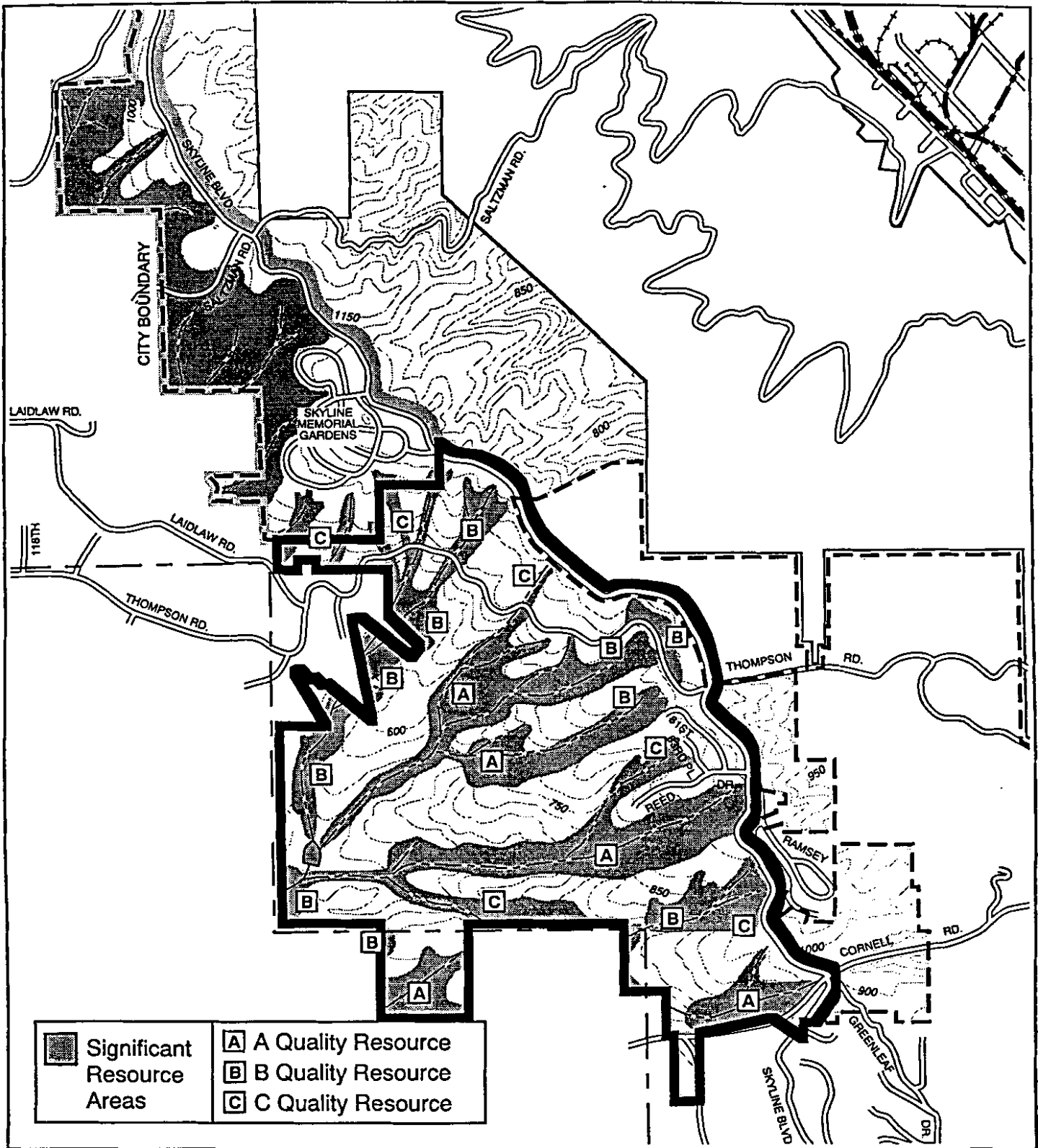
Multiple first order creek branches feed the site's five primary creeks which meet to form Cedar Mill Creek. The total length of the creeks and creek branches within the site is approximately ten lineal miles. In addition to the riverine creek system, three palustrine wetlands are identified in the National Wetlands Inventory. Three additional wetlands were identified in the field inventory, as well as numerous forested and emergent wetlands directly associated with the site's creeks. The wetlands range in size from 1,000 sq. ft. to three acres and cover a total area of approximately 12 acres.

Of the total 970 acres, approximately 700 acres of this site is forested (as of Spring, 1994). The forest ranges from early to mid-successional stages, or roughly ten to 100 years in age. The older forest is typically situated in creek ravines and is relatively dense with diverse species composition (over 125 species); the younger forest tends to be sparse (open canopy) with lower species diversity. The creek ravines also typically provide more significant wildlife habitat values, though habitat along certain ridges and upland plateaus is significant.

The site's creeks and associated tributaries, wetlands and ravines provide important forage, cover and nesting habitat for a variety of bird, mammal, amphibian and reptile species. Two state-listed sensitive species have been identified within the site to date. The northern red-legged frog, which also is a Federal candidate species, is a rare amphibian that breeds in January and February in local ponds or creek pools (including at least one wetland identified above), travels upstream through neighboring ravines to terrestrial habitats during the summer, and eventually returns to breed in downstream ponds. Juvenile frogs were identified in 1994 in the creek south of Reed Drive (Hayes 1994).

The pileated woodpecker, a sensitive species distributed widely within the site, 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. Wildlife biologists 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. The pileated woodpecker and red-legged frog both serve as indicators of the health of the Cedar Mill Creek watershed ecosystem.

Black-tailed deer, Townsend's chipmunk and chickaree are common throughout the site; other mammals include bobcat, beaver, coyote, vagrant shrew, shrew-mole, Townsend's mole, little brown myotis, Mazama pocket gopher, deer mouse, Townsend's vole, muskrat, long-tailed weasel, raccoon and striped skunk. Pacific tree frog, ensatina and pacific giant salamander, roughskin newt, northern alligator



Map 3 - Site 145

Skyline-West

Resource Protection Plan

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lizard, northwestern and common garter snake are resident herptiles. Several of these species depend on both wetland and upland habitat for survival; for example, the deer, bobcat, beaver, chipmunk, frogs, and forest bird species depend on either daily or seasonal shifts in habitat to forage, escape flooding or predation, and breed.

Birds recorded at the Cedar Mill Creek site include the following:

hairy woodpecker	red-wing blackbird	American kestrel	great blue heron
downy woodpecker	Brewer's blackbird	California quail	green-backed heron
pileated woodpecker	Bewick's wren	band-tailed pigeon	wood duck
red-br. sapsucker	winter wren	mourning dove	green-winged teal
Cooper's hawk	ruffed grouse	western screech-owl	blue-winged teal
sharp-shinned hawk	Oregon junco	great horned owl	cinnamon teal
red-tailed hawk	r. hummingbird	vaux's swift	mallard
barn swallow	bushtit	stellar jay	American wigeon
bank swallow	song sparrow (s)	scrub jay	belted kingfisher
cliff swallow	golden-crowned s.	yellow warbler (w)	evening grosbeak
tree swallow (s)	white-crowned s.	Tennessee w.	bl.-headed grosbeak
violet-green s.	golden-cr. kinglet	orange-crowned w.	rufous-s. towhee
olive-s. flycatcher	ruby-cr. kinglet	Audubon w.	c. yellowthroat
western flycatcher	Swainson's thrush	yellow-rumped w.	northern oriole
w. wood peewee	varied thrush	bl.-throated grey w.	purple finch
red-br. nuthatch	American crow	Townsend's w.	house finch
brown creeper	robin	MacGillivray's w.	goldfinch
chestnut-b chickadee	cedar waxwing	Wilson's w.	pine siskin
black-cap chickadee	northern flicker	band-tailed pigeon	br.-headed cowbird
nighthawk	common flicker	bufflehead	gadwall
common merganser	solitary sandpiper	western tanager	

The site's creeks, wetlands and forested ravines exert a significant influence on downstream water quality and on fish and amphibian production within the larger Tualatin River system. This system supports a broad range of species including the state-listed sensitive coho and fall chinook salmon, cutthroat trout, pacific lamprey and northern red-legged frog.

Composite Wildlife Habitat Rating (Ravines and Wetlands):

Range of Habitat Scores:	17 - 81
Water	: Medium
Food	: Moderately High
Cover	: Moderately High
Interspersion	: Medium
Uniqueness	: Low
Disturbance	: Low

Composite Wildlife Habitat Rating (Ridges and Plateaus):

Range of Habitat Scores:	7 - 48
Water	: Not Present
Food	: Medium
Cover	: Moderately Low
Interspersion	: Medium
Uniqueness	: Low
Disturbance	: Medium

The Tualatin River is under a DEQ order requiring all jurisdictions within the watershed to take actions to improve water quality, including control of erosion and reduction of sediment and nutrient loads.

In addition to providing habitat for wildlife, the site's forest cover protects soil and watershed resources. Forest resource values include slope stabilization, dissipation of erosive forces, and sediment and nutrient removal. The forest helps to purify the air as well as the water, and provides shelter from storms and cold winds. The forest also adds to the scenic qualities of the area, giving local neighborhoods a semi-rural character and providing buffers between them.

The site's forest contains several notable floral features. Forest species include the pacific yew (*Taxus brevifolia*), a slow growing tree species commonly associated with later successional forests. In recent years, a cancer-fighting substance known as "taxol" was discovered in the bark of the yew. Several significant stands of western red cedar (*Thuja plicata*) and grand fir (*Abies grandis*) are also found in this site. These trees are later successional associates of the western hemlock forest community. Also of note is the presence of madrone (*Arbutus menziesii*) with limited distribution in the region.

The following pages contain a list of plant species identified within Site 145. Plants are listed by taxonomic family, then alphabetically by scientific name. Non-native plants are denoted with a double asterisk (**) symbol. Species diversity is generally higher than at other sites within the planning area. No sensitive, threatened or endangered plants were identified.

Approximately 95 percent of the site is composed of Cascade silt loam soils. This soil is formed in silty materials and has a seasonally high water table, slow permeability, and a fragipan at 20 to 30 inches. Except in relatively level areas along the ridgetop, this soil has severe limitations for building site development and sanitary facilities due primarily to slope, wetness and low bearing strength (SCS Soil Survey 1983).

Several small soil inclusions are scattered along the edges of the site. These inclusions are the Cascade-Urban land complex (along the developed, middle section of Skyline Blvd.), Cornelius silt loam, Cornelius-Urban land complex and

Plant List for Resource Site 145

COMMON NAME	SCIENTIFIC NAME		
<u>Horsetail</u> Common Horsetail	<u>Equisetaceae</u> <i>Equisetum arvense</i>	<u>Buttercup</u> Western White Anemone Western Clematis Little Buttercup Creeping Buttercup	<u>Ranunculaceae</u> <i>Anemone deltoidea</i> <i>Clematis ligusticifolia</i> <i>Ranunculus uncinatus</i> <i>Ranunculus repens</i>
<u>Common Fern</u> N. Maidenhair Fern Lady Fern Spreading Wood Fern Licorice Fern Sword Fern Bracken Fern	<u>Polypodiaceae</u> <i>Adiantum pedatum</i> <i>Athyrium filix-femina</i> <i>Dryopteris austriaca</i> <i>Polypodium glycyrrhiza</i> <i>Polystichum munitum</i> <i>Pteridium aquilinum</i>	<u>Barberry</u> Vanillaleaf Tall Oregon Grape Dull Oregon Graps White Inside-out Flower	<u>Berberidaceae</u> <i>Achlys triphylla</i> <i>Berberis aquifolium</i> <i>Berberis nervosa</i> <i>Vancouveria hexandra</i>
<u>Yew</u> Pacific Yew	<u>Taxaceae</u> <i>Taxus brevifolia</i>	<u>Mustard</u> Water Cress**	<u>Cruciferae</u> <i>Rorippa nasturtium-aquaticum</i>
<u>Cypress</u> Western Red Cedar	<u>Cupressaceae</u> <i>Thuja plicata</i>	<u>Saxifrage</u> Greater Boykinia Western Saxifrage Fringecup Laceflower Pig-a-back Plant	<u>Saxifragaceae</u> <i>Boykinia major</i> <i>Saxifraga occidentalis</i> <i>Tellima grandiflorum</i> <i>Tiarella trifoliata</i> <i>Tolmiea menziesii</i>
<u>Pine</u> Grand Fir Douglas Fir Western Hemlock	<u>Pinaceae</u> <i>Abies grandis</i> <i>Pseudotsuga menziesii</i> <i>Tsuga heterophylla</i>	<u>Currant</u> Red-flowering Currant	<u>Grossulariaceae</u> <i>Ribes sanguineum</i>
<u>Willow</u> Black Cottonwood Pacific Willow	<u>Salicaceae</u> <i>Populus trichocarpa</i> <i>Salix lasiandra</i>	<u>Hydrangea</u> Mockorange	<u>Hydrangeaceae</u> <i>Philadelphus lewisii</i>
<u>Birch</u> Red Alder Western Hazel	<u>Betulaceae</u> <i>Alnus rubra</i> <i>Corylus cornuta</i>	<u>Rose</u> Western Serviceberry Wood Strawberry Ocean-spray Indian Plum Pacific Ninebark Common Chokecherry Bitter Cherry Baldhip Rose Nootka Rose Swamp Rose Himalayan Blackberry** Evergreen Blackberry** Trailing Blackberry**	<u>Rosaceae</u> <i>Amelanchier alnifolia</i> <i>Fragaria vesca</i> <i>Holodiscus discolor</i> <i>Oemleria cerasiformis</i> <i>Physocarpus capitatus</i> <i>Prunus virginiana</i> <i>Prunus emarginata</i> <i>Rosa gymnocarpa</i> <i>Rosa nutkana</i> <i>Rosa pisocarpa</i> <i>Rubus discolor</i> <i>Rubus laciniatus</i> <i>Rubus lasiococcus</i> <i>Rubus leucodermis</i> <i>Rubus parviflorus</i> <i>Rubus spetabilis</i> <i>Rubus ursinus</i> <i>Sorbus sitchensis</i>
<u>Beech</u> Oregon White Oak	<u>Fagaceae</u> <i>Quercus garryana</i>		
<u>Nettle</u> Stinging Nettle	<u>Urticaceae</u> <i>Urtica dioica</i>		
<u>Birthwort</u> Wild Ginger	<u>Aristolochiaceae</u> <i>Asarum caudatum</i>		
<u>Buckwheat</u> Western Dock Curly Dock	<u>Polygonaceae</u> <i>Rumex occidentalis</i> <i>Rumex crispus</i>		
<u>Purslane</u> Narrow-leaved Montia Miner's Lettuce	<u>Portulacaceae</u> <i>Montia linearis</i> <i>Montia sibirica</i>		
<u>Pink</u> Starwort**	<u>Caryophyllaceae</u> <i>Stellaria media</i>		

<u>Pea</u> American Vetch	<u>Leguminosae</u> <i>Vicia americana</i>	Small-flowered Tonella American Brooklime	<i>Tonella tenella</i> <i>Veronica americana</i>
<u>Maple</u> Vine Maple Big-leaf Maple	<u>Aceraceae</u> <i>Acer circinatum</i> <i>Acer macrophyllum</i>	<u>Madder</u> Cleavers Sweetscented Bedstraw	<u>Rubiaceae</u> <i>Galium aparine</i> <i>Galium triflorum</i>
<u>Buckthorn</u> Cascara	<u>Rhamnaceae</u> <i>Rhamnus purshiana</i>	<u>Honeysuckle</u> Trumpet Vine Black Twinberry Red Elderberry Common Snowberry	<u>Caprifoliaceae</u> <i>Lonicera ciliosa</i> <i>Lonicera involucrata</i> <i>Sambucus racemosa</i> <i>Symphoricarpos albus</i>
<u>Violet</u> Stream Violet	<u>Violaceae</u> <i>Viola glabella</i>	<u>Aster</u> Yarrow Pathfinder Large-flowered Agoseris Pearly-everlasting Common California Aster Pineapple Weed Sweet Coltsfoot	<u>Compositae</u> <i>Achillea millefolium</i> <i>Adenocaulon bicolor</i> <i>Agoseris grandiflora</i> <i>Anaphalis margaritacea</i> <i>Aster chilensis</i> <i>Matricaria matricarioides</i> <i>Petasites frigidus</i>
<u>Ginseng</u> English Ivy** Devil's Club	<u>Araliaceae</u> <i>Hedera helix</i> <i>Oplopanax horridum</i>	<u>Rush</u> Common Rush	<u>Juncaceae</u> <i>Juncus effusus</i>
<u>Parsley</u> Cow-parsnip Parsley-leaved Lovage Pacific Water-parsley	<u>Umbelliferae</u> <i>Heracleum lanatum</i> <i>Ligusticum apiifolium</i> <i>Oenanthe sarmentosa</i>	<u>Sedge</u> Henderson's Wood Sedge Slough Sedge Small-fruit Bulrush	<u>Cyperaceae</u> <i>Carex hendersonii</i> <i>Carex obnupta</i> <i>Scirpus microcarpus</i>
<u>Dogwood</u> Pacific Dogwood	<u>Cornaceae</u> <i>Cornus nuttallii</i>	<u>Grass</u> Orchard-grass** Oniongrass Reed Canarygrass**	<u>Poaceae</u> <i>Dactylis glomerata</i> <i>Melica bulbosa</i> <i>Phalaris arundinacea</i>
<u>Heath</u> Pacific Madrone Salal Red Huckleberry Evergreen Huckleberry	<u>Ericaceae</u> <i>Arbutus menziesii</i> <i>Gaultheria shallon</i> <i>Vaccinium parvifolium</i> <i>Vaccinium ovatum</i>	<u>Cat-tail</u> Common Cat-tail	<u>Typhaceae</u> <i>Typha latifolia</i>
<u>Ash</u> Oregon Ash	<u>Oleacea</u> <i>Fraxinus latifolia</i>	<u>Arum</u> Skunk Cabbage	<u>Araceae</u> <i>Lysichitum americanum</i>
<u>Phlox</u> Bicolored Linanthus Microsteris	<u>Polemoniaceae</u> <i>Linanthus bicolor</i> <i>Microsteris gracilis</i>	<u>Lily</u> Hooker Fairy-bell Tiger Lily W. False Solomon's Seal Starry False Solomon's S. Twisted-stalk Western Trillium	<u>Liliaceae</u> <i>Disporum hookeri</i> <i>Lilium columbianum</i> <i>Smilacina racemosa</i> <i>Smilacina stellata</i> <i>Streptopus amplexifolius</i> <i>Trillium ovatum</i>
<u>Waterleaf</u> Pacific Waterleaf	<u>Hydrophyllaceae</u> <i>Hydrophyllum tenuipes</i>	<u>Iris</u> Oregon Iris	<u>Iridacea</u> <i>Iris tenax</i>
<u>Verbena</u> Wild Hyssop	<u>Verbenaceae</u> <i>Verbena hastata</i>		
<u>Mint</u> Yerba Buena** Swamp Hedge-nettle**	<u>Labiatae</u> <i>Satureja douglasii</i> <i>Stachys palustris</i>		
<u>Nightshade</u> Garden Nightshade	<u>Solanaceae</u> <i>Solanum nigrum</i>		
<u>Figwort</u> Mudwort Chickweed Monkey-fl.	<u>Scrophulariaceae</u> <i>Limosella aquatica</i> <i>Mimulus alsinoides</i>		

Faloma silt loam (all found in the southwest, Washington County portion of the site). Faloma is a hydric soil; it and the other inclusions all have moderate to severe limitations for building site development and sanitary facilities similar to the Cascade soils.

The Columbia River Basalt underlying the site yields moderate to large amounts (up to 1,000 gallons per minute) of water to wells that penetrate the basalt below the regional water table, and lesser amounts (2 to 300 gpm) of perched groundwater to wells and springs above the water table. Groundwater is moderately hard to hard with occasionally high chloride content. Recharge occurs principally through infiltration, but also through migration from overlying and underlying formations and adjacent recharge areas (Redfern 1976). Water Resource Board records of wells and surface water rights are summarized below.

Map	Quarter Section	Wells	SWR
2619	SW 1/4 Sec 23 1N1W	2	
2620	SE 1/4 Sec 23 1N1W	2	
2720	NE 1/4 Sec 26 1N1W	2	
2721	NW 1/4 Sec 25 1N1W	2	
2819	NW 1/4 Sec 26 1N1W		2

Section	Wells
25 (1N1W)	12
26 (1N1W)	5

Skyline Boulevard and Cornell Road are designated scenic corridors in the city's *Scenic Resources Protection Plan*. The scenic corridor designation is intended to preserve and enhance the scenic character along corridors, and where possible, scenic vistas from corridors. Certain standards apply to the length of buildings, development in side setbacks, screening of mechanical equipment, signs and preservation of trees.

Conclusion

This site contains significant natural resources. Two state-listed sensitive species (frog and woodpecker) are identified within the site, with four additional sensitive fish species identified downstream from the site. Resource values associated with water quality and slope stability are significant within the forested and often steep ravines. Certain water resources also provide important domestic water supplies and the entire site is part of the Tualatin Basin requiring measures to protect and improve water quality. Based on the decision factors discussed earlier in this chapter, most of the significant resources are located within the site's multiple ravines. Exceptions occur on certain forested ridges with higher habitat scores or other significant resource values.

Site 145 Economic, Social, Environmental, and Energy Consequences

This section analyzes the consequences of protecting significant natural resources in Site 145, and the consequences of allowing these resources to be degraded or destroyed. The analysis addresses four types of consequences: economic, social, environmental and energy. Environmental consequences of allowing conflicting uses are addressed in the beginning of this chapter.

Resource Site 145 contains the following zoning categories: Residential Farm and Forest (RF), Residential 20,000 (R20), Residential 10,000 (R10), Neighborhood Commercial 2 (CN2) and Open Space (OS). Significant resources at the site, however, are located only within areas zoned RF, R10 and OS (see Table 1 for allowed uses). Therefore, no conflicts exist between significant resources and commercial (CN2) and low density (R20) land within this site.

Certain uses allowed in the RF, R10 and OS zones are not feasible within or applicable to the resource site. Site 145 does not include any properties with revocable use permits and no new revocable uses are permitted, so the analysis will not address these uses. The analysis does not address mining because the site does not include any existing or potential mineral or aggregate extraction operations (see BOP 1988). The analysis does not address rail line corridors because none exist or are proposed for the site and area topography exceeds maximum gradient for rail lines. Aviation and surface passenger terminals are not feasible due to the topography, shape and development pattern of Site 145.

Economic Consequences

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 145.⁷ Maps of subdivisions and subdivision phases referenced in this analysis are available for review at the Bureau of Planning.

Phase 1 of Forest Heights

Recorded subdivision plat of 144 low density lots and three medium density sites: Austen Row 8 units (fully built); Miller Hill 69 designated units; and Leighbrook 27 designated units. Phase 1 contains two significant creek/ravine corridors. The northern ravine (north of Miller) contains "A" quality resources. The southern ravine (south of Miller) contains "C" quality resources. There are approximately 15 acres of "A" quality resources and 12 acres of "C" quality resources located in designated open spaces. Nine lots have narrow back portions with "A" quality resources. One flag lot contains "A" quality resources. The northern portion of the

⁷ For the purpose of this analysis, a "building envelope" is defined as a 40-foot by 40-foot area in which residential building may occur.

Austen Row parcel contains "A" quality resources. There are "C" quality resources on the edges of the lots adjacent to the "C" quality resources located in open spaces.

Fully Protecting Significant Resources:

The "A" quality resources on the nine lots are within the back portions of the lots, outside the building envelopes. Development on these lots will be minimally constrained. The flag lot cannot be developed because there are "A" quality resources inside the building envelope. Austen Row is fully built. The significant resources are located behind this development. There are minimal negative economic impacts, except for the loss of development on the flag lot. Fully protecting the significant "A" quality resources preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. Fully protecting the significant resources has positive economic impacts. Fully protecting the "C" quality resources also has positive economic impacts, however they are not as high in value, particularly with respect to wildlife habitat and damage costs avoided values.

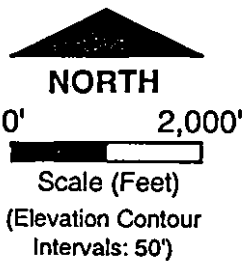
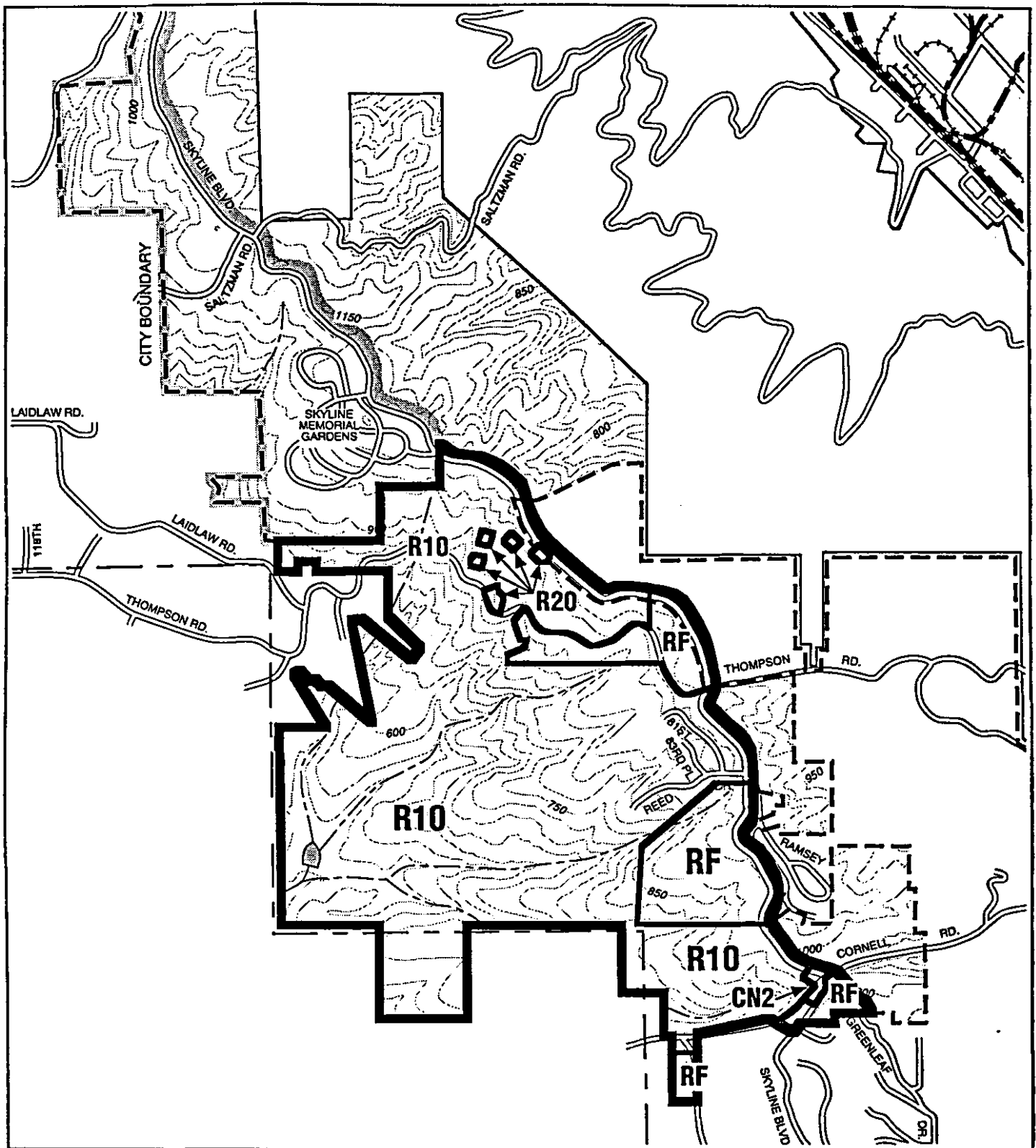
Negative economic impacts = loss of development where "A" resources are located inside building envelope on flag lot;
decreased siting flexibility for development where "A" resources are located outside building envelopes

Positive economic impacts = "A" and "C" resources located in open spaces;
"A" and "C" resources located outside building envelope;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

No Protection for Significant Resources

The lots containing "A" quality resources can be developed inside their building envelopes. Several lots would be susceptible to erosion and possible slope failure if significant resources are not protected on the back portions of the lots. Providing no protection for the significant resources on lots or in open space risks the loss of the amenity values associated with the forest cover and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values provided by the stabilization of the slopes.



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- Negative economic impacts = degradation of "A" and "C" quality resources in open spaces;
 loss of "A" and "C" quality resources outside building envelope;
 loss of "A" quality resources inside building envelope on flag lot
- Positive economic impacts = opportunity to develop flag lot;
 increased siting flexibility
- Net economic impacts = negative

Limiting Protection for Significant Resources

The open space areas of Phase 1 include 15 acres of "A" quality resources and 12 acres of "C" quality resources. There are no negative economic impacts to protecting these resources. There are positive economic impacts in the form of assurance of future benefits. If development is allowed in the "A" quality resource areas, there is risk of lowering of damage cost avoided values, reducing the amenity value of the forest and water features, reducing water quality and wildlife values.

- Negative economic impacts = potential degradation of "A" quality resources;
- Positive economic impacts = "A" and "C" quality resources located in open spaces;
 "A" quality resources located outside building envelope;
 potential increase in property values due to capitalization of amenity values
- Net economic impacts = positive

Recommendations for recorded subdivision plat:

- "A" in OS & on lots, not flag: full protection
 "A" in flag lot: limited protection
 "C" in OS & on lots: limited protection

Phase 2 of Forest Heights

Recorded subdivision plat of 168 low density lots. Phase 2 includes one-half of Silver Ridge 64 medium density units (32 units) which are not yet approved; Site (W) (83 medium density units); a commercial/recreation site of 6.6 acres; and Mill Pond Park. The "A" quality resources are located north of Miller, in Site (W) with 3.5 acres located in the designated open space areas. These resources include

wetlands and ravines. There are 7.5 acres of "B" quality resources located in designated open space areas. Seventeen lots contain "C" quality resources. There are 4 acres of "C" quality resources in designated open space areas.

Fully Protecting Significant Resources

Site (W) contains an "A" quality wetland area. The density proposed for this site can be redistributed with open space areas to avoid the resource area. Protecting "B" quality resources located in open space has no negative impacts. Thirteen of the lots containing "C" quality resources can be developed if the dwelling units are located in a building envelope close to the roadway and away from the resources. The majority of the area of four of lots contain "C" quality resources, including the area inside the building envelope. Full protection would prevent development of these lots. Therefore, there are negative economic impacts for these four lots. Fully protecting the significant resource preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = loss of development potential inside building envelope containing "A" or "C" quality resources

Positive economic impacts = "A", "B" and "C" quality resources in open space;
"C" quality resources outside building envelope;
"A" and "C" quality resources inside building envelopes;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

No Protection for Significant Resources

The "A" quality wetland is at risk. "A", "B" and "C" resources located in open space are subject to degradation. The 17 lots containing resources could be developed inside their building envelopes. The four lots containing "C" quality resources could be developed. The 83 medium density units could be developed, subject to state and federal regulations. If development is allowed in the resource, there is a risk of lowering of damage cost avoided values, reducing the amenity value of the forest and water features, and reducing water quality and wildlife habitat values.

Negative economic impacts = degradation of "A", "B" and "C" quality resources in open spaces;
loss of "C" quality resources outside building envelope;
loss of "A" and "C" quality resources inside building envelopes;
potential decrease in property values due to reduction in capitalization of amenity values

Positive economic impacts = potential development inside building envelope containing "C" quality resources

Net economic impacts = negative

Limiting Protection for Significant Resources

If development is allowed in the resource area, there is risk of lowering of damage cost avoided values, reducing the amenity value of the forest and water features, reducing water quality and wildlife habitat values. The economic impacts for limiting protection are otherwise similar to fully protecting the significant resources, with the exception of the four lots and the 83 medium density units.

Negative economic impacts = potential loss of "A" and "C" quality resources on lots

Positive economic impacts = "A", "B" and "C" quality resources in open space;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

Recommendations for recorded subdivision plat

"A" in open space:	full protection
"B" in open space:	full protection
"C" in open space:	limited protection
"A" in (W):	full protection of wetlands, limited protection of border
"C" on lots:	limited protection on northern edge
"C" inside envelopes:	no protection

Phase 3 of Forest Heights

Recorded subdivision plat of 168 low density lots. Phase 3 includes one-half of Silver Ridge (32 medium density units) and The Village at Forest Heights (70

medium density units) in S South. Ten acres of "A" quality resources are located in designated open areas near the south creek and 5.5 acres are located near the north tributary. Nine lots contain "A" quality resources outside the building envelopes. There are 5.5 acres of "B" quality resources located in designated open space areas, including a man-made water feature. There are an additional 3 acres of "B" quality resources adjacent to the S South. Fourteen lots contain "B" quality resources outside the building envelopes.

Fully Protecting Significant Resources

The lots containing "A" and "B" quality resources can be developed because the resources are located outside the building envelopes. Therefore, there are minimal negative economic impacts. Fully protecting the significant resources preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. There are limited negative impacts on uses including reduced flexibility.

Negative economic impacts = minimal loss of flexibility for siting

Positive economic impacts = "A" and "B" quality resources in open space;
"A" and "B" quality resources outside building envelope;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

No Protection for Significant Resources

"A" and "B" quality resource areas are at risk, resulting in the loss of damage cost avoided values, the reduction of the amenity value of the forest and water features, water quality values and wildlife habitat values.

Negative economic impacts = loss of "A" and "B" quality resources in open space;
loss of "A" and "B" quality resources outside building envelope;
potential decrease in property values due to reduction in capitalization of amenity values

Positive economic impacts = none

Net economic impacts = negative

Limiting Protection for Significant Resources

If development is allowed in resource areas, there is risk of lowering of damage cost avoided values, reducing the amenity value of the forest and water features, reducing water quality wildlife habitat values.

Negative economic impacts = potential loss of "A" and "B" resources

Positive economic impacts = "A" and "B" quality resources in open space;
"A" and "B" quality resources outside building envelope;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

Recommendations for recorded subdivision plat

"A" in open space:	full protection
"B" in open space:	full protection
"A" on lots:	full protection of ravines, limited protection along boundary
"B" on lots:	limited protection

Phase 4 of Forest Heights

Proposed subdivision of 117 lots. Phase 4 tentatively includes Site (T) a site with 160 medium density designated units and S North, a site with 47 medium density designated units. To the extent that "A" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development. In the most recent version of the site plan there are "A" quality resources in the center open space area, on twenty-four lots outside building envelopes and on seven lots inside the building envelopes.

Fully Protecting Significant Resources

More than half of the site contains "A" quality resources. There are "A" quality resources in the center open space area and inside the building envelope of seven proposed lots. These seven proposed lots could not be developed. Twenty-four proposed lots contain "A" quality resources outside the building envelopes. Fully protecting the significant resources preserves the amenity value of the forest and water features, the improved water quality values of the water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = loss of development potential inside building envelope where "A" quality resources are located;

Positive economic impacts = "A" quality resources in open space and on lots

Net economic impacts = positive

No Protection for Significant Resources

The resources could be degraded, resulting in destabilization of slopes, loss of habitat, and water quality damage. The "A" quality resource areas are at risk of being lost which would lower of damage cost avoided values, reduce the amenity value of the forest and water features, and reduce the water quality and wildlife habitat values.

Negative economic impacts = loss of "A" quality resources

Positive economic impacts = increased development potential where "A" quality resources are on lots

Net economic impacts = negative

Limiting Protection for Significant Resources

If development is allowed in the "A" quality resource areas, there is a risk of lowering of damage cost avoided values, reducing the amenity value of the forest and water features, reducing water quality wildlife habitat values. "A" quality resources within proposed building envelopes would be lost.

Negative economic impacts = potential loss of "A" quality resources

Positive economic impacts = "A" quality resources in open spaces

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" quality resources, with limited protection along boundaries of "A" quality resource areas.

Phase 5 of Forest Heights

Proposed subdivision of 114 low density lots. Site (Q) is designated for 206 medium density units and Site (Q/R) for 125 medium density units. This Phase also contains a 10-acre school site. There are 31 proposed lots with "A" quality resources outside the building envelope and 10 proposed lots with "A" quality resources inside the building envelope. The site contains "A" quality significant resources in the designated open space areas. There are also "B" quality resources on the northeastern corner of (Q). To the extent that "A" and "B" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development.

Fully Protecting Significant Resources

"A" quality significant resources in the proposed open spaces areas would be protected. The 31 proposed lots could be developed as the resource is located outside the building envelopes. The 10 proposed lots with resources within the building envelopes could not be developed. The "B" quality resources can be preserved by redistributing the density of (Q) and restricting siting flexibility. Fully protecting the significant resource preserves the amenity value of the forest and water features, the wildlife shelter values, the water quality values and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = potential loss of conflicting use in
"A" and "B" quality resources areas

Positive economic impacts = "A" quality resources in proposed
open spaces;
"A" and "B" quality resources;
potential increase in property values
due to capitalization of amenity
values

Net economic impacts = positive

No Protection for Significant Resources

The "A" quality resources located in the open space areas are subject to degradation without protection. The "B" quality resources in (Q) would be degraded if density is not redistributed. The "A" and "B" quality resources located on the proposed lots are at risk resulting in loss of values.

Negative economic impacts = degradation of "A" quality resources
in open spaces;
loss of "A" and "B" quality resources;
potential decrease in property values
due to reduction in capitalization of
amenity values

Positive economic impacts = potential increased flexibility in siting of conflicting uses

Net economic impacts = negative

Limiting Protection for Significant Resources

The "A" and "B" quality resources on the proposed lots would be lost. However, protecting the "A" and "B" quality resources in open spaces maintains the amenity value of the forest and water features, the wildlife shelter values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = potential loss of "A" and "B" quality resources

Positive economic impacts = "A" quality resources in open spaces; "A" and "B" quality resources; potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" quality resources, with limited protection along boundaries of "A" areas. In addition, the economic analysis indicates full protection of "B" quality resources in northern boundary of (Q) and in southern creek area.

Phase 6 Forest Heights

Proposed Site (R) designated for 37 medium density units. There are "B" quality resources located in the middle third of the phase. To the extent that "B" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development.

Fully Protecting Significant Resources

The middle third of the site contains "B" quality resources, partially located in open space and partially located in Site (R). Fully protecting the significant resource preserves the amenity value of the forest and water features, the intermediate values of the water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. Density for Site (R) can be redistributed to avoid the resource area.

Negative economic impacts = reduced flexibility for siting development

Positive economic impacts = "B" quality resources
potential increase in amenity values

Net economic impacts = positive

No Protection for Significant Resources

The "B" quality resource areas would be lost, resulting in the lowering of damage cost avoided values and the reduction of the amenity value of the forest and water features, water quality values and wildlife habitat values. Some greater siting flexibility may be obtained.

Negative economic impacts = loss of "B" quality resources

Positive economic impacts = greater siting flexibility

Net economic impacts = negative

Limiting Protection for Significant Resources

The "B" quality resources in the middle third of the site partially overlap Site (R). Loss of resources would occur where development permitted, with corresponding loss of amenity values. Housing units can be redistributed to avoid the resource area though limited development within resource area is possible.

Negative economic impacts = potential loss of "B" quality resources
potential loss of amenity values

Positive economic impacts = "B" quality resources

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "B" quality resources, with limited protection along south boundary.

Phase 6 (East) Forest Heights

Recorded subdivision plat of 73 low density lots. There are "A" quality resources in the open space in the southern portion of the site. There are "B" quality resources in the northwestern corner and "C" quality resources in the southwestern corner.

Fully Protecting Significant Resources

The "A", "B" and "C" quality resources are all located in designated open spaces in this phase. Fully protecting these resources preserves the amenity value of the forest and water features, the water quality, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = none

Positive economic impacts = "A", "B" and "C" quality resources located in open space

Net economic impacts = positive

No Protection for Significant Resources

The "A", "B" and "C" quality resources within the open spaces areas are at risk of degradation without protection.

Negative economic impacts = degradation of "A", "B" and "C" quality resources located in open space

Positive economic impacts = none

Net economic impacts = negative

Limiting Protection for Significant Resources

The amenity value of the forest and water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes are retained by protecting the "A" and "B" quality resources. The "C" quality resources also provide these values, but to a lesser degree.

Negative economic impacts = none

Positive economic impacts = "A", "B" and "C" quality resources located in open space

Net economic impacts = positive

Recommendations for recorded subdivision plat

"A" in open space: full protection
"B" in open space: full protection
"C" in open space: limited protection

Phase 6 (West) Forest Heights

Proposed subdivision of 135 low density lots. More than half of the site contains "A" quality resources, including the entire open space area. There are 20 proposed lots with "A" quality resources outside the building envelope and 36 proposed lots with "A" quality resources inside the building envelope. Three lots in the northwestern corner contain a "B" quality wetland area. To the extent that "A" and "B" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development.

Fully Protecting Significant Resources

Ravines and wetlands will be preserved. There are no negative economic impacts associated with fully protecting the "A" quality resources in the open space areas, while there are positive economic impacts in the form of assurance of future benefits. The 36 proposed lots that contain "A" quality resources over all or most of the lot are potentially undevelopable since there is no non-source areas for the building envelope. Fully protecting the significant resources preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. Fully protecting the significant resources has positive economic impacts, but negatively impacts the development potential of 36 proposed lots.

Negative economic impacts = potential loss of development of conflicting use within "A" and "B" quality resources

Positive economic impacts = "A" quality resources in proposed open spaces;
"A" and "B" quality resources on proposed lots;
potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

No Protection for Significant Resources

Loss of ravine resources and wetlands could result in the destabilization of slopes, loss of habitat, and water quality damage. If development is allowed in the "A" or "B" quality resource areas, there is a loss of damage cost avoided values and a reduction in the amenity value of the forest and water features, water quality values and wildlife habitat values.

Negative economic impacts = loss of "A" and "B" quality resources

Positive economic impacts = increased flexibility for siting conflicting uses

Net economic impacts = negative

Limiting Protection for Significant Resources

There are minimal negative economic impacts associated with protecting the "A" quality resources in the open space areas, while there are some economic benefits in the form of assurance of future benefits. Limited protection of "A" or "B" quality resources would result in some resources being lost where development is permitted.

Negative economic impacts = loss of "A" and "B" quality resources where development is permitted

Positive economic impacts = "A" and "B" quality resources outside building envelopes; proposed lots in resource area developable; potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" quality resources along the ravine, with limited protection along boundaries of "A" quality resource areas. In addition, the economic analysis indicates limited protection for "B" quality resources.

Phase 7 of Forest Heights

Proposed subdivision of 211 low density lots. There are two "B" quality and six "C" quality resources running from north to south through the proposed phase. To the extent that "B" and "C" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development.

Fully Protecting Significant Resources

The "B" quality resources in the proposed open spaces have no negative economic impacts associated with full protection, while there are positive benefits for the assurance of future existence. The "C" quality resources are of less value and are within proposed open space areas, with the exception of several edges of lots and the roadways. Fully protecting the quality resources preserves the amenity value of the forest and water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = potential loss of flexibility in siting development

Positive economic impacts = "B" and "C" quality resources

Net economic impacts = positive

No Protection for Significant Resources

The proposed open space areas contain "B" and "C" quality resources. The resources could be degraded, resulting in the destabilization of slopes, loss of habitat, and water quality damage. The proposed road crossings will degrade the "C" quality resources.

Negative economic impacts = potential loss of "B" and "C" quality resources

Positive economic impacts = greater siting flexibility

Net economic impacts = negative

Limiting Protection for Significant Resources

There are minimal negative economic impacts associated with protecting the "B" and "C" quality resources in proposed open space areas, while there are positive economic impacts in the form of assurance of future benefits. Limited protection would result in some resources being lost where development is permitted.

Negative economic impacts = potential loss of "B" and "C" resources

Positive economic impacts = "B" and "C" quality resources in open spaces

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "B" quality resources along the creek, with limited protection along boundaries of "B" quality resource areas. In addition, the economic analysis indicates limited protection for "C" quality resources.

Blue Point

Recorded subdivision plat of 35 acres with 59 designated low density lots in the northern two-thirds of the subdivision. The "A" quality resource, a significant ravine is located primarily in Parcel (D), which is designated as common open space.

Fully Protecting Significant Resources

The "A" quality resources are located in a designated common space. Fully protecting the significant resources preserves the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = none

Positive economic impacts = "A" quality resource in open spaces;
potential increase in property values
due to capitalization of amenity
values

Net economic impacts = positive

No Protection for Significant Resources

Even though "A" quality resources are located in a designated open space, the resource could be degraded, resulting in slope destabilization, water pollution and wildlife habitat loss.

Negative economic impacts = degradation of "A" quality resources
in open spaces;

Positive economic impacts = none

Net economic impacts = negative

Limiting Protection for Significant Resources

The "A" quality resources in the open space would receive additional protection. Protecting these resources conserves many of the amenity values of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values. However, some resources could be degraded, resulting in limited slope destabilization, water pollution and wildlife habitat loss.

Negative economic impacts = none

Positive economic impacts = "A" quality resources in open spaces;

Net economic impacts = positive

Recommendations for recorded subdivision plat

"A" in open space: full protection

Skyline Summit

This site is a partially recorded subdivision with Phases 1 through 6. Phase 1, 2, and 3 are recorded subdivision plats. Phase 1 is in the process of being built out. There are "B" quality resources on the back third of seven lots in the northern section of the phase and "C" quality resources on the back portions of three lots in the southern section. Phase 2 contains "B" quality resources on the back half of eleven lots. Phase 3 contains "C" quality resources in the designated open space area and on the back portion of six lots in the southern portion of the phase. There are four lots with "A" quality resources. Phase 4 contains "A" quality resources in the proposed

open space areas in the northern half of the phase. There are forty-one proposed lots with "B" quality resources. Phase 5 contains "A" quality resources in the southeastern corner which cover four proposed lots, and the adjacent proposed open space. The "C" quality resources are located on one proposed lot. Phase 6 contains "A" quality resources over most of the phase, including the proposed southern open space area and eleven proposed lots. To the extent that "A", "B" and "C" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development.

Fully Protecting Significant Resources

The "B" quality resources in Phases 1 and 2 are located on the back portions of the lots. The "C" quality resource in Phase 3 is located primarily in the designated open space and outside of the building envelopes of the lots. The open space area in Phase 4 contains "A" quality resources. There are minimal negative economic impacts on open space and positive benefits for the assurance of future existence. The lots containing "A" quality resources on the majority of the lot areas cannot be developed under full protection. The proposed lots in the southern section of Phase 4 contain "B" quality resources in the back portions, outside the building envelopes. Fully protecting the quality resources preserves the amenity value of the forest and water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = the potential loss of development
where "A", "B" or "C" quality
resources are located

Positive economic impacts = "A", "B" and "C" quality resources in
open spaces;
"A", "B" and "C" quality resources
outside building envelopes;
"A", "B" and "C" quality resources
inside building envelopes;
potential increase in property values
due to capitalization of amenity
values

Net economic impacts = neutral

No Protection for Significant Resources

"A", "B" and "C" quality resources located in open space areas could be degraded. Slope destabilization, habitat losses and reduced water quality are all consequences of no protection. "A", "B" and "C" quality resources are at risk, resulting the lowering of damage cost avoided values, reducing the amenity value of the forest and water features, reducing water quality values and wildlife habitat values.

Negative economic impacts = degradation of "A", "B" and "C" quality resources in open spaces; loss of "A", "B" and "C" quality resources outside building envelopes; loss of "A", "B" and "C" quality resources inside building envelopes

Positive economic impacts = increased flexibility for siting conflicting uses

Net economic impacts = negative

Limiting Protection for Significant Resources

The "A", "B" and/or "C" quality resources located inside building envelopes will be lost, and those outside the envelope are at risk. The resources located in open space will preserve the amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = loss of "A", "B" and "C" quality resources inside building envelopes; potential loss of resources outside building envelopes

Positive economic impacts = "A", "B" and "C" quality resources in open spaces; potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

Recommendations for recorded subdivision plats for Phases 1, 2 and 3

"A" in open space: full protection
"A" outside building envelope: full protection
"B" in open space: full protection
"B" outside building envelope: full protection along stream, limited protection on boundary
"C" in open space: limited protection
"C" outside building envelope: limited protection

Recommendations for Phases 4, 5 and 6

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" and "B" quality resources, with limited protection along the boundaries of the "A" and "B"

quality resource areas. Limited protection is indicated for "C" quality resources.

The Summit

Proposed subdivision of 119 low density lots. There are "B" quality resources in the southern section of the site and "A" quality resources in the northern portion. There are "C" quality resources located in southeastern corner of the site, near Skyline Boulevard. To the extent that "A" and "B" quality resource locations are known prior to the approval process, economic losses can be minimized through appropriate siting of development.

Fully Protecting Significant Resources

The proposed subdivision contains "B" quality resources in the southern section of the site. The majority of the resources are located in the proposed open space areas. However, twenty-three proposed lots contain "B" quality resources. The northern most portion of the site contains "A" quality resources. These resources are located in designated open space and on twenty-seven proposed lots. Fully protecting the quality resources preserves the amenity value of the forest and water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. Four proposed lots contain "C" resources with lower values and ten proposed lots contain a combination of "B" and "C" quality resources.

Negative economic impacts = reduction of development flexibility
within significant resource area

Positive economic impacts = "A", "B" and "C" quality resources;
potential increase in property values
due to capitalization of amenity
values

Net economic impacts = positive

No Protection for Significant Resources

The majority of the "A" and "B" quality resources are located in open space areas. However, these resources can be degraded, resulting in slope destabilization, water pollution, wildlife habitat loss. Resources located within proposed lot areas would be lost. The "C" quality resources are at risk of degradation or loss, though their values are lower, particularly along the site boundary and Skyline Boulevard.

Negative economic impacts = loss of "A", "B" and "C" quality
resources;
reduction in amenity value

Positive economic impacts = increased development flexibility

Net economic impacts = negative

Limiting Protection for Significant Resources

Resources located on proposed lots would be lost where development is permitted. This would result in a reduction of amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes.

Negative economic impacts = potential loss of "A", "B" and "C" quality resources

Positive economic impacts = "A", "B" and "C" quality resources; potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" and "B" quality resources along ravines, with limited protection along the boundaries. The economic analysis also indicates limited protection of "C" quality resources, with no protection along the site boundary.

Parcels in Site 145

The site contains several smaller parcels in the vicinity of Thompson Road. There are two parcels with "A" quality resources, two parcels with "B" resources and seven with "C" resources. The resources are creeks, small ravines and forested slopes.

Fully Protecting Significant Resources

Fully protecting the quality resources preserves the amenity value of the forest and water features, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. These values are greatest for "A" quality resources, then "B" and "C" in decreasing magnitude. Some negative impacts would result from reduced siting flexibility.

Negative economic impacts = loss of siting flexibility

Positive economic impacts = "A", "B" and "C" quality resources; potential increase in property values due to capitalization of amenity values

Net economic impacts = positive

No Protection for Significant Resources

Resources located within parcel areas would be lost, resulting in loss of amenity values. Siting flexibility is increased.

Negative economic impacts = loss of "A", "B" and "C" quality resources;
reduction in amenity value

Positive economic impacts = increased siting flexibility

Net economic impacts = negative

Limiting Protection for Significant Resources

Resources located on parcels would be lost where development is permitted. This would result in a reduction of amenity value of the forest and water features, the improved water quality values, the wildlife habitat values, and the damage cost avoided values through stabilization of the slopes. Siting flexibility is maintained.

Negative economic impacts = potential loss of "A", "B" and "C" quality resources

Positive economic impacts = "A", "B" and "C" quality resources;
potential increase in property values
due to capitalization of amenity values

Net economic impacts = positive

Recommendations:

Given the information contained in the inventory on resource quantity and quality, the economic analysis indicates full protection of "A" and "B" quality resources along creeks, with limited protection along the ravines and forested slopes. The economic analysis also indicates limited protection along of "C" quality resources.

Social Consequences

This analysis considers the social consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 145.

Fully Protecting Significant Resources

Fully protecting resources supports adopted local policies to avoid development "where landslide hazard are predominant or natural conditions are unique and sensitive...." (Bureau of Planning 1985). Protection results in reduced landslide, erosion and flood hazards and increased air and water quality. Protecting the site's

natural resources would preserve the wooded buffers and ravines between the site's small residential neighborhoods, and reduce noise, odors, air and water pollutants. Fully protecting the natural resources of Site 145 would preserve opportunities for environmental education within designated park and common open areas. Such action would not detrimentally affect the siting of the proposed school, but could reduce opportunities for housing or community support services. Full protection has overall positive social consequences.

No Protection for Significant Resources

No protection is inconsistent with adopted local conservation policies. The risk of landslide and flood hazards is higher. Scenic corridors are protected independently, but area's woodland and ravine buffer are at risk, as are the ameliorating effects of the forest on noise, odors, air and water quality. Housing opportunities are preserved. No protection has negative social consequences.

Limiting Protection for Significant Resources

Limited protection supports adopted local conservation policies. This action limits potential landslide, erosion and flood hazards and increases air and water quality. The site's wooded character and the vegetation's buffering values would be partially lost. Limiting protection has overall positive consequences though with some social amenity values at risk.

Recommendations:

Fully protect significant resources, except on parcels where housing or community support services would be precluded.

Environmental Consequences

This analysis considers the environmental consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 145.

Fully Protecting Significant Resources

This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive.

No Protection for Significant Resources

No protection results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Limiting Protection for Significant Resources

This action conserves significant environmental resources and resource values identified in the site inventory. The environmental consequences are generally positive, but there is a risk that some resources and values will be lost.

Recommendations:

Fully protect significant resources.

Energy Consequences

This analysis considers the energy consequences of prohibiting, limiting or allowing conflicting uses within Resource Site 145.

Fully Protecting Significant Resources

Where significant trees are located adjacent to buildings, protection of trees reduces energy needs for heating and cooling by tempering the effects of the local climate. Trees provide shelter from winter winds and storms, and shade buildings and absorb heat during the summer. One tree can provide air conditioning benefits totaling \$73 per year (Oregon CommuniTree News 1993). Evergreen (and to a lesser extent deciduous) trees located close to buildings may reduce solar access and passive heat gain during the cooler months. Full protection of steep slopes and ravines can reduce energy consumption by eliminating long, steep or hazardous access for residential services and infrastructure. Such protection promotes compact development forms, common wall construction, and similar energy saving practices. Full protection of whole properties risks higher energy costs associated with transportation and infrastructure if housing or neighborhood institutions are pushed outside established urban areas. Energy consequences are generally positive.

No Protection for Significant Resources

No protection risks the detrimental energy effects of suburban sprawl, including residential service and infrastructure inefficiencies. Energy savings for heating and cooling of structures will be lost through the loss of trees that ameliorate local climate. Where resources apply to whole properties, providing areas of no protection may decrease the pressure for housing or neighborhood institutions to occur outside established urban boundaries, potentially reducing energy costs associated with transportation and infrastructure. Energy consequences are negative unless no other local (urban) sites exist for these uses.

Limiting Protection for Significant Resources

Limiting protection will conserve some trees that reduce energy needs for heating and cooling by ameliorating the local climate. Long, steep or hazardous access for residential services and infrastructure can be limited, providing energy savings. Compact development forms, common wall construction, and similar energy saving practices could result with energy benefits. Net energy consequences are positive.

Recommendations:

Fully protect significant resources, except where whole vacant properties are affected. Provide limited protection of resources sufficient to allow use.

Compatibility with other Goal 5 Programs

The City of Portland has completed Goal 5 planning for mineral and aggregate resources, scenic resources and for other natural resource areas throughout Portland. The City is currently updating its inventory of historic resources.

The *Skyline West Conservation Plan* is be compatible with these other Goal 5 plans because the same inventory, analysis and regulation process is followed as required by the Administrative Rule. In addition, where significant Goal 5 resources identified in other plans were located in the Skyline plan area, these resources are identified and protection levels are maintained or enhanced. The City is currently updating its 1984 *Historic Resources Inventory* through a series of community plans. The *Skyline West Conservation Plan* identified and addresses inventoried historic properties within the plan area

Multnomah County and Washington County are the two jurisdictions with Goal 5 programs adjoining the *Skyline West Conservation Plan* area.

Multnomah County

Multnomah County is currently developing the *West Hills Rural Area Plan*. One of the plan's purposes is to update the *Multnomah County Comprehensive Framework Plan* to comply with the Goal 5 administrative rule. The county has completed its resource inventory for the wildlife habitat, scenic, open space, forest, and stream and riparian resources located adjacent to the Skyline plan area. These resources overlap the city/county boundary in numerous areas and are designated in a consistent manner by both jurisdictions. The city and county are coordinating on their concurrent Goal 5 planning efforts in the Skyline area.

Washington County

Washington County completed its Goal 5 planning in 1983 with the adoption of its Comprehensive Plan. The county is currently evaluating new code language in its Rural/Natural Areas Resource Plan and Development Code to better comply with Goal 5. The county's program for protecting significant natural resources includes development and performance standards in its Community Development Code. The *Skyline West Conservation Plan* program for protection of Goal 5 resources is compatible with Washington County's program.

Applicable Statewide Planning Goals

This section reviews applicable statewide planning goals with particular bearing on the analysis contained in this plan. Other state goals are addressed in Chapter 3.

Goal 6, Air, Water, and Land Resources Quality, directs local governments to maintain and improve the quality of the air, water and land resources of the State. This plan will help the City meet its water quality obligations in the Tualatin

Watershed. In addition, the plan will help the City comply with this goal through the protection of significant forest, soil and water resources within the study area.

Goal 7, Areas Subject to Natural Disasters and Hazards, provides for the protection of both life and property from natural hazards and disasters. Protecting the forest cover on this site's slopes, as well as the water and drainage resources, will accomplish this goal. Protecting forest cover as a means of soil stabilization will prevent erosion and slides due to excavation, clearing and grading. Limiting or prohibiting conflicting uses on steep slopes and soils susceptible to landslides will also accomplish this goal.

Goal 10, Housing, directs local governments to provide for the housing needs of citizens of the State. The Metropolitan Housing Rule, which provides local governments with administrative direction, does not require cities to include those lands with slopes greater than 25 percent or lands within the floodplain as part of the City's buildable lands inventory. Protection measures proposed in the Skyline Plan apply primarily to these constrained lands and will not prevent the City from meeting its needed housing obligations.

Goal 11, Public Facilities and Services, directs 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. This plan will help the City comply with this goal by protecting the hillside forest adjacent to the ravine and guiding development away from these sensitive areas.

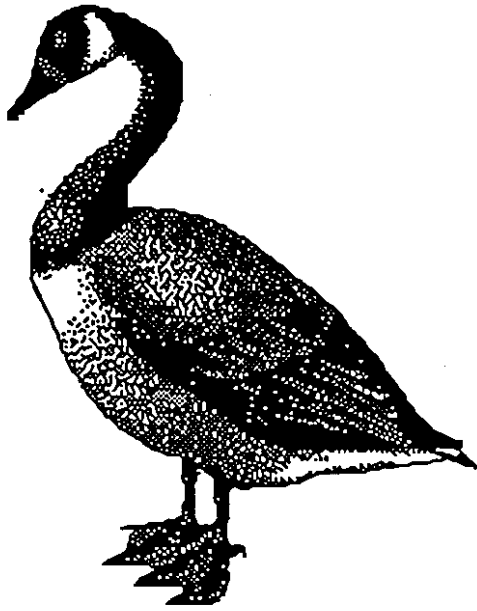
Conflict Resolution

The important natural resources and resource values within the plan area were discussed earlier in this chapter. The following table lists the resource site, the location and a summary of the identified conflicts between significant resources and conflicting uses. The recommendations for each of the four ESEE factors considered are listed. "Full" designates full protection, "limited" designates limited protection and "none" indicates no protection. The final column lists the recommended decision on the level of resource protection.

Conflict Resolution Summary Table

Site	Location	Identified Conflicts	Econ	Social	Environ	Energy	Decision
143	Skyline Ridge	"B" in open space; "B" on lots along ravines; "B" on lots on boundary; "C" in open space.	Full Full Limited Limited	Full Full Limited Limited	Full Full Full Limited	Full Full Full Full	Full Full Limited Limited
	Parcels	"A" along creeks and ravines; "A" along ravine boundaries; "B" along northern creek; "B" in ravines, small creeks. "C" on upland plateau	Full Limited Full Limited None	Full Limited Full Limited None	Full Full Full Full Limited	Full Full Full Full Limited	Full Limited Full Full Limited None
144	Parcels	"A" along ravines; "A" along boundary areas; "B" along creeks; "B" in ravines and woods; "C" quality resources.	Full Limited Full Limited Limited	Full Limited Full Limited Limited	Full Full Full Full Limited	Full Limited Full Limited Limited	Full Limited Full Limited Limited
145	Forest Heights, Phase 1	"A" open space, lots, not flag "A" in flag lot "C" in open space "C" on lots	Full Limited Limited Limited	Full Limited Full Full	Full Full Limited Limited	Full Limited Full Full	Full Limited Limited Limited
	Phase 2	"A" in open space "B" in open space "C" in open space: "A" in Site (W), wetlands "A" in Site (W), border "C" on lots "C" in envelopes	Full Full Limited Full Limited Limited None	Full Full Full Full Limited Full None	Full Full Limited Full Full Limited Limited	Full Full Full Full Full Full Limited	Full Full Limited Full Limited Limited None
	Phase 3	"A" in open space "B" in open space "A" on lots of ravines "A" on lots along boundary "B" on lots	Full Full Full Limited Limited	Full Full Full Limited Full	Full Full Full Full Full	Full Full Full Full Full	Full Full Full Limited Limited
	Phase 4	"A" quality resources "A" boundary areas	Full Limited	Full Limited	Full Full	Full Limited	Full Limited
	Phase 5	"A" quality resources "A" boundary areas "B" quality resources	Full Limited Full	Full Limited Full	Full Full Full	Full Full Full	Full Limited Full
	Phase 6	"B" quality resources, "B" along south boundary.	Full Limited	Full Limited	Full Full	Full Full	Full Limited
	Phase 6 (East)	"A" in open space "B" in open space "C" in open space	Full Full Limited	Full Full Full	Full Full Limited	Full Full Full	Full Full Limited
	Phase 6 (West)	"A" along the ravine "A" boundary areas "B" quality resources	Full Limited Limited	Full Limited Limited	Full Full Full	Full Limited Full	Full Limited Limited

Site	Location	Identified Conflicts	Econ	Social	Environ	Energy	Decision
	Phase 7	"B" along the creek "B" boundary areas "C" quality resources	Full Limited Limited	Full Limited Full	Full Full Limited	Full Full Full	Full Limited Limited
	Blue Point	"A" in open space	Full	Full	Full	Full	Full
	Skyline Summit, Phases 1, 2, 3	"A" in open space "A" outside building envelope "B" in open space "B" outside env, along stream "B" on boundary "C" in open space "C" outside building envelope	Full Full Full Full Limited Limited Limited	Full Full Full Full Limited Full Full	Full Full Full Full Full Limited Limited	Full Full Full Full Full Full Full	Full Full Full Full Limited Limited Limited
	Phases 4, 5, 6	"A" quality resources "B" quality resources "A" and "B" boundary areas "C" quality resources	Full Full Limited Limited	Full Full Limited Full	Full Full Full Limited	Full Full Full Full	Full Full Limited Limited
	The Summit	"A" quality resources "B" along ravines "B" boundary areas "C" adjacent to "B" "C" on site boundary	Full Full Limited Limited None	Full Full Limited Full None	Full Full Full Limited Limited	Full Full Full Limited Limited	Full Full Limited Limited None
	Parcels	"A" and "B" along creek "A" and "B" ravines, slopes "C" quality resources	Full Limited Limited	Full Limited Full	Full Full Limited	Full Limited Full	Full Limited Limited



CHAPTER 5

PLAN CONSERVATION MEASURES

INTRODUCTION •

GENERAL SUMMARY •

AMENDMENTS TO COMPREHENSIVE PLAN GOALS AND POLICIES •

PROTECTION PLAN POLICIES & OBJECTIVES •

AMENDMENTS TO TITLE 33, PLANNING AND ZONING •

AMENDMENTS TO OFFICIAL ZONING MAPS •

Introduction

This chapter provides a general summary of adopted resource conservation measures. Plan policies and objectives which form a foundation for these measures are presented, followed by the adopted measures and zoning code language.

General Summary

The Skyline West planning area contains three resource sites occupying the headwaters region of three drainage basins: Rock Creek, Bronson Creek and Cedar Mill Creek. Development pressure is high in the area and threatens to degrade natural, scenic and open space values. Measures are needed to limit and in certain areas prohibit conflicting uses so that development can be allowed to continue without degradation of identified wetlands, surface and ground water resources, native plant and animal communities, and scenic, recreational and open space resources.

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. Existing or potential land uses that conflict with significant resources are then identified. These uses are then analyzed to determine the economic, social, environmental and energy (ESEE) consequences of resource protection. In the course of this analysis, the effects of resource protection are weighed against each other. From the analysis a plan is formulated to balance the need for continued social, economic and energy uses with the need for resource protection.

The resource inventory and analysis is presented in Chapter 4. This chapter contains the policies, objectives and regulations necessary to implement the required protection of significant Goal 5 resources within the plan area. The implementation measures include:

- **An Amendment to Portland's Comprehensive Plan Goals and Policies** to refer to the *Skyline West Conservation Plan*;
- **Adoption of the *Skyline West Conservation Plan* Policies and Objectives** as the policy document for the area;
- **Amendments to Title 33, Planning and Zoning**, to implement the *Skyline West Conservation Plan*; and
- **Amendments to the Official Zoning Maps** to apply the environmental zones to designated resource areas and remove the Interim Resource Protection Zone.

Environmental Overlay Zones

The primary conservation measure of the *Skyline West Conservation Plan* is the application of the city's environmental zones to significant resources which are found to warrant limited or full protection. The environmental zones protect identified resources and resource values from adverse impacts and provide a mechanism through which conflicts between resources and human uses can be resolved.

The Conservation Plan applies the city's two environmental overlay zones to resource and impact areas within the planning area. The Environmental Conservation (EC) zone limits conflicting uses while the Environmental Protection (EP) zone is designed to prohibit conflicting uses. Each zone contains a transition area and a resource area. In the transition area, development is allowed subject to transition area development standards. In the resource area of the EC zone, development is allowed after review so long as impacts are controlled and mitigated. In the resource area of the EP zone, development may be permitted after review but approval criteria are extremely strict to ensure protection of resource functions and values.

Amendments to Portland's Comprehensive Plan Goals and Policies

The following amendment to Comprehensive Plan Goal 8 is necessary to acknowledge the adoption of *Skyline West Conservation Plan*. Language to be added is underlined.

- Amend Comprehensive Plan Goal 8, Policy 8.11, to add a new policy area for Skyline West. Place special areas in alphabetical order.

8.11, Special Areas

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

- A. Balch Creek Watershed (no change)**
- B. East Buttes, Terraces and Wetlands (no change)**
- C. Fanno Creek Watershed (no change)**
- D. Johnson Creek Basin (no change)**
- E. Northwest Hills (no change)**
- F. Skyline West**
Conserve wildlife, forest and water resource values of the Skyline planning area through implementation of the Skyline Conservation Plan.
- F. Southwest Hills (re-letter to G; no other change)**
- G. Willamette River Greenway (re-letter to H; no other change)**

Conservation Plan Policies & Objectives

This plan recognizes human and natural resource values on the west slope of the Tualatin ridge. The plan applies measures to protect natural resource values 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 the preceding chapter.

The following policies and objectives will provide specific guidance for staff and applicants during review of development proposals within the environmental zones in the Skyline West planning area.

Conservation Plan Policies & Objectives

This section identifies specific policies and objectives for the *Skyline West Conservation Plan*. Protection measures needed to carry out these policies and objectives are described at the end of this chapter. These measures are designed to protect significant functions and values of Skyline West natural resources.

#1 Overall Policy

Protect significant natural resources to preserve and enhance Skyline area natural amenities and livability for residents and visitors.

#2 Natural Resource Policy

Protect significant natural resources and resource values by guiding conflicting uses and development away from these resource areas to less sensitive, more suitable building sites.

Objectives

The following objectives are intended to protect significant resources and resource values while allowing urban development to continue:

1. Protect natural communities, sensitive species and significant wildlife habitat and maintain connections between these communities by applying appropriate environmental regulations;
2. Retain the natural character of the area's forested slopes interspersed with streams by promoting compatible development away from ravines;

3. Use development as a means of improving or repairing the natural and scenic qualities of the planning area by locating development on less sensitive or already disturbed sites, planting native vegetation to match surrounding conditions, and preserving healthier landscapes with important natural values;
4. Retain as much existing native vegetation as possible before, during and after site alteration or construction activities;
5. Restore natural values by taking actions such as daylighting culverted creek sections, reducing ground and surface water use during dry summer months, removing invasive exotic plants and planting native vegetation in their place;
6. Enhance amphibian and aquatic habitat through planting of native streamside vegetation to provide shade and reduce water temperatures, and limit impervious surfaces to increase summer creek flows and reduce flooding and erosion; and
7. Improve water quality by reducing sediment, nutrient and other contaminant levels in creeks.

#3 Natural Hazards Policy

Protect water, soil and forest resources and resource values and reduce landslide and flood hazards by minimizing disturbance to natural terrain, vegetation and drainageways and by directing site development away from hazard-prone areas.

Objectives

The following are objectives which can protect existing and future development from natural hazards within and downhill from the planning area:

1. 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.
2. Plan and orient development and roads away from sensitive slopes, soils and other potentially hazardous conditions identified in soils, geology or hydrology reports.
3. Within resource areas, disturbance of existing terrain and vegetation should be limited to the minimum area necessary to complete approved construction activities;
4. Manage and control on- and off-site water runoff and soil erosion impacts before, during and after construction; and

5. When possible, limit ground-disturbing activities to the dry season and complete all construction and re-vegetation activities in one season.

Amendments to Title 33, Planning and Zoning

The following amendments to Title 33 are necessary to acknowledge the *Skyline West Conservation Plan* report and to protect Skyline area natural resources from the threat of particularly invasive, exotic plants. At the time of this printing, only two code changes are proposed.

- Amend Chapter 33.430, Environmental Zones, to add the *Skyline West Conservation Plan* report to the list contained in 33.430.120, Environmental Reports.
- Amend the Portland Plant List to place Scot's broom, reed canary grass and purple loosestrife on the prohibited plant list. The new prohibited plants are aggressive and invasive exotic species whose intrusion into resource areas have reached critical mass. These species pose a serious threat to the continued health and vitality of native plant and animal communities within the plan area and throughout the city.

Amendments to the Official Zoning Maps

This Conservation Plan applies environmental zones within the plan area (see Official Zoning Maps for quarter sections shown on page 62). The water feature designations of the Interim Resource Protection Zone and the Forest Disturbance references are removed from the zoning maps.

The Environmental Protection overlay zone is applied to resource areas with high functional values that are in need of full protection according to the inventory and analysis findings. Generally, the Protection zone is applied to high quality wetlands, creeks and ravines, as well as ecologically or scientifically significant natural areas, high quality habitat areas for sensitive wildlife, and other resources which provide significant values based on the decision factors described in the previous chapter. The Protection zone will insure the protection of resource values, the continuation of critical plant and wildlife habitat elements, and the preservation of the integrity and viability of Skyline resources as a whole. The application of this zone will also protect area neighborhoods from hazards such as landslides and flooding, and retain the natural character and identity of the West Hills.

The Environmental Conservation zone is applied to areas that, while not as highly rated as Protection zone areas, provide significant values that warrant protection.

These areas are generally able to support certain levels of development provided impacts are controlled. The Conservation zone balances resource-use conflicts in these areas.

The Interim Resource Protection overlay zone is removed from the planning area. This interim zoning to protect water features is the last such zoning within the city; its removal completes the transition to permanent city zoning for Goal 5 natural resources. References to Forest Disturbance are removed from the zoning maps; these interim regulations are no longer applicable to forests within the city.

PLAN APPENDICES

APPENDIX A
ADOPTING ORDINANCE

ORDINANCE No. 168154

As Amended

- ✧ Adopt Natural Resource Inventory, ESEE Analysis, and *Skyline West Conservation Plan*; amend Comprehensive Plan and Title 33 of the City Code; amend Official Zoning Maps of the City of Portland (Ordinance; amend Title 33).

The City of Portland Ordains:

Section 1. The Council finds:

General Findings

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 Goal 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 LCDC, the City's Comprehensive Plan was no longer in compliance with 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. The *Skyline West Conservation Plan* updates the city's Comprehensive Plan in compliance with the terms of its Local Review Order (Resolutions 34523 and 34653) concerning Goal 5 natural resources. The plan and its implementing regulations fulfill State Goal 5 requirements to protect significant wetlands, water bodies, open spaces, scenic areas and wildlife habitat areas.
6. An inventory of natural, scenic and open space resources was conducted by Planning Bureau staff and consulting biologists, and reviewed by

citizens, land owners, developers, neighborhood associations and other interested groups and organizations during the planning process.

7. Three resource sites were included in the inventory and evaluated. The resource sites are located west of NW Skyline Boulevard. Each site forms the upper basin of a west slope creek: Rock Creek (north), Bronson Creek (central) and Cedar Mill Creek (south). The combined planning area is 1,750 acres in size.
8. The natural, scenic and open space resources included in the inventory were further examined through the Economic, Social, Environmental and Energy (ESEE) analysis process outlined in the Goal 5 administrative rule to determine the appropriate level of protection. Each site contains resources which warrant full protection (e.g., stream corridors and ravines, wetlands), resources which warrant limited protection (e.g., upland forest and open space), and resources which are not significant or do not warrant protection as a result of the ESEE analysis.
9. The planning area contains locally, and in certain cases regionally, significant resources with a broad range of values. The values include the provision of habitat for plants and wildlife, including sensitive species; purification of water and provision of domestic water supplies; recharge and discharge of groundwater; retention of soils and stabilization of slopes; retention and removal of excess nutrients and chemical contaminants; trapping and filtration of sediments and dissipation of erosive forces of stormwater; storage, conveyance and desynchronization of flood waters; enhancement of neighborhood livability and scenic amenities; and provision of recreational and educational opportunities.
10. These resource values benefit local residents, businesses and visitors throughout the Portland metropolitan area.
11. The *Skyline West Conservation Plan* is the result of a two-year planning effort with the involvement of and input from many citizens, land owners, developers, local interest groups, environmental and economic consultants, neighborhood organizations, as well as Bureau of Planning staff, Planning Commissioners and City Councilors.
12. The Bureau of Planning recommendation on the natural resources inventory, ESEE analysis, and implementing regulations was amended in response to public testimony and adopted unanimously by the Planning Commission on July 26, 1994.
13. Legislative procedure requirements have been met because 30-day notice of the May 25, 1993 Planning Commission hearing was provided to

recognized organizations, affected bureaus, interested persons and was published in the Oregonian. Notice was also mailed to potentially affected owners of record. Subsequent notices were sent to interested and participating persons, including a July 6, 1993 notice indicating that the project would be delayed. Notice of the second Planning Commission hearing on July 12, 1994 was mailed four weeks prior to the meeting to interested and participating persons, to more than 500 owners of record, affected bureaus and neighborhoods, and was published in the Oregonian. At least 10 days prior to each of the Commission hearings, a staff report and recommendation was filed with the Commission and made available for public review.

Notice of the August 31, 1994 City Council hearing was mailed to interested and participating persons at least 14 days prior to the hearing. The Council ordinance was filed on August 26.

14. The State post-acknowledgment requirements were followed in the development of the plan and its implementing actions. A 45-day Notice of Proposed Action was mailed to the Land Conservation and Development Commission on June 20, 1994 along with copies of the proposed plan, the ESEE analysis and the inventory. No comment was received from the Commission by the date of final adoption.
15. It is in the public interest for the *Skyline West Conservation Plan*, including amendments to the Comprehensive Plan, amendments to Title 33 and the Portland Plant List, and amendments to the Official Zoning Maps to be adopted and implemented.

State Goal Findings:

16. Goal 1, Citizen Involvement, requires opportunities for citizens to be involved in all phases of the planning process. Development of the *Skyline West Conservation Plan* meets this goal because it included opportunities for citizen review of all phases of the project, including information on the location, quantity and quality of resources, the analysis of conflicting uses, and the proposals for resource protection.

Meetings with neighborhood, land owners, developers and other interested citizens to discuss the planning process, inventory and analysis began in February 1993. The Planning Commission held a public hearing in May 1993 to receive comment on the preliminary inventory and on the project scope and direction. During the following year, meetings with land owners, developers and other interested parties continued. On June 7, 1994, preliminary plan recommendations were presented at a meeting of the Forest Park Neighborhood Association (for which neighborhood notice was provided). Following this meeting, a

Public Review Draft of the plan was published. Approximately 600 hearing notices were then mailed, informing citizens of the plan's availability. The plan was distributed to the neighborhood association, persons requesting copies, and was made available at the Audubon House, the Portland Building, or by mail. Public comments received on the draft plan were incorporated into the Proposed Draft which was presented to the Planning Commission on July 12. After reviewing public testimony received at this hearing and during the written comment period, the Commission approved the plan with several amendments in response to testimony. The City Council held a public hearing August 31, 1994 and also made amendments to the plan in response to testimony prior to final adoption. Public notices of Planning Commission and City Council hearings were mailed and published in local newspapers as described under Finding 13.

17. 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 Skyline West project conforms to this goal. The *Skyline West Conservation 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 planning area followed established city procedures for legislative actions.
18. Goal 3, Agricultural Lands, provides for the preservation and maintenance of the State's agricultural land, generally located outside of urban areas. A narrow band of land within the Skyline West study area is located outside the urban growth boundary but is generally unfit for agricultural use. Nevertheless, the *Skyline West Conservation Plan* preserves and maintains existing and future opportunities for agricultural use within the urban planning area.
19. Goal 4, Forest Lands, provides for the preservation and maintenance of the State's forest lands, generally located outside of urban areas. Since the *Skyline West Conservation Plan* applies to an urbanized area generally unfit for commercial forest use, this goal does not apply. However, limited forestry opportunities are preserved in the plan.
20. 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 *Skyline West Conservation Plan* implements this goal for areas within northwest Portland (west of Skyline Boulevard) because the process identified in the Goal 5 Administrative Rule (ORS 660-16-000 to 660-16-025) for resource identification and conflicting use analysis was followed in developing this plan.

Specifically, the City inventoried natural resources and identified conflicting uses in the plan area; analyzed the economic, social, environmental, and energy consequences of resource protection; and developed a program to protect Goal 5 resources in the plan area, as detailed in Exhibit A and incorporated herein.

The *Skyline West Conservation 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 *Skyline West Conservation Plan* policies and objectives 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. Amendments to the Comprehensive Plan acknowledge the importance of the area's Goal 5 resources and the need for their protection.
21. Goal 6, Air, Water and Land Resource Quality, provides for the maintenance and improvement of these resources. The *Skyline West Conservation Plan* protects water resources by limiting or prohibiting conflicting uses along the area's streams, wetlands and steep ravines where these resources could be degraded or destroyed, encouraging groundwater recharge in the uplands, and retaining riparian vegetation to provide food and cover for wildlife, control erosion, and trap sediments, nutrients and pollutants. This plan will further help the City meet its water quality obligations in the Tualatin Watershed. Protection of natural resource quality is also consistent with maintaining and improving air and land quality. The plan protects forest vegetation which preserves the land by reducing erosion and stabilizing soils and steep hillside slopes. The plan improves air quality because the preserved forest vegetation helps to control smog and trap airborne particulates. The plan will help the City comply with this goal through the protection of significant forest, soil and water resources within the study area.
22. Goal 7, Areas Subject to Natural Disasters and Hazards, provides for the protection of life and property from natural disasters and hazards. The *Skyline West Conservation Plan* is consistent with this goal because it guides development away from the area's many steep, hazard-prone areas and to more suitable areas through the planned unit development process. The plan also protects wetlands, creeks and flood plains which provide flood storage, conveyance and desynchronization.

23. Goal 8, Recreational Needs, provides for satisfying the recreational needs of both citizens of and visitors to the State. The *Skyline West Conservation Plan* is supportive of this goal because Portland's natural resources contribute to the recreational enjoyment of the City by area residents. The plan preserves forest and other natural features within numerous common open spaces, providing passive recreational opportunities for residents.
24. 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 resources identified in the plan will have limited impacts on development in the City because plan conservation measures have been structured to allow reasonable economic development opportunities on privately-owned parcels containing significant natural resources. The plan is in conformance with this goal because where economic impacts outweigh the value of the natural resource, new regulations limiting economic development are not recommended.
25. Goal 10, Housing, provides for meeting the housing needs of the State. Lands containing steep slopes and flood plains or lands designated for farm and forest use (FF) were not part of the City's inventory of lands needed for housing. In Site 143, all but one acre of land was excluded from the buildable lands inventory; this one acre is not within the proposed Goal 5 resource protection area. All of Site 144 was excluded from the buildable lands inventory. Site 145 contained approximately 435 acres of land zoned R10 and identified in the inventory. Of this land, 20 percent (87 acres) was set aside for rights-of-way leaving 348 net acres buildable (or 1392 buildable units at a designated 4 units/acre). Under the proposed Goal 5 plan regulations there are 2538 approved and/or allowable housing units. Thus, the plan results in no loss of potential housing units.
- The natural resources ESEE analysis has balanced the impact on housing with the protection of each identified natural resource. Where potential housing impacts are significant, the planned unit development provisions of the City's land use regulations allow the transfer of housing densities elsewhere on site.
26. 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 *Skyline West Conservation Plan* conforms with this goal by protecting hillside forests and steep ravines and by guiding development to more suitable areas. On lands with highly-valued natural resource areas,

transfer of residential density is allowed to other areas on site through application of planned unit development provisions where urban services can be provided in a more orderly and efficient manner.

27. Goal 12, Transportation, provides for the development of a safe, convenient and economic transportation system. The *Skyline West Conservation Plan* is supportive of this goal by allowing needed transportation facilities through certain natural resource areas if adverse impacts on resources can be mitigated. Very steep and/or wet resource areas which are unsafe or uneconomical to develop for transportation purposes are protected by the plan in a manner consistent with this goal.
28. Goal 13, Energy Conservation, provides for the distribution of land uses in a pattern that maximizes the conservation of energy. The *Skyline West Conservation Plan* conforms with this goal because the natural resources ESEE analysis addresses the impact on energy conservation. The plan provides limited protection of significant natural resources where preservation would 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 housing, educational and recreational opportunities close to the state's largest population and employment center, reducing energy consumption on transportation and supporting a greater range of transportation modes, including bicycling and walking.
29. Goal 14, Urbanization, provides for the orderly and efficient transition of rural lands to urban uses. The *Skyline West Conservation Plan* conforms to this goal by allowing continued urban development within the City in an orderly and efficient manner. The plan guides urbanization by limiting use of hazardous lands and promoting orderly and efficient development on buildable lands through planned unit developments and similar mechanisms.
30. Goals 16, 17, 18 and 19 deal with the Willamette River Greenway, Estuarine Resources, Coastal Shorelines, Beaches and Dunes, and Ocean Resources, respectively. These goals are not applicable to the *Skyline West Conservation Plan* because the plan does not affect the Willamette River Greenway and no ocean resources are present within Portland.

Comprehensive Plan Findings:

31. The *Skyline West Conservation 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.

32. Goal 1, Metropolitan Coordination, provides for planning activities to be coordinated with federal, state and regional plans. The *Skyline West Conservation Plan* complies with the State's required post-acknowledgment review process and is part of the State-required periodic review of the City's Comprehensive Plan. The plan is consistent with Policy 1.2, Urban Planning Area Boundary, because it inventories and evaluates natural resources within a planning area inside the existing City limits in Northwest Portland.

The Metropolitan Service District (Metro) has developed RUGGOs, or *Regional Urban Growth Goals and Objectives*. These goals and objectives are largely consistent with the City's Skyline West planning efforts. RUGGO Goal II.1, "Natural Environment," states: "Preservation, use and modification of the natural environment of the region should maintain and enhance environmental quality while striving for the wise use and preservation of a broad range of natural resources."

Objective 7, Water Resources, and Objective 8, Air Quality, are supported by the proposed resource protection measures in this plan. Objective 9, Natural Areas, Parks and Wildlife Habitat, directs Metro to acquire, protect and manage (1) open spaces to provide passive and active recreational opportunities, and (2) an open space system providing habitat for native wildlife and plant populations. The development and implementation of the *Skyline West Conservation Plan* addresses this objective by applying environmental overlay zoning to significant open spaces within the planning area.

The Conservation Plan supports the efforts of the Metropolitan Greenspaces Program to identify and protect greenspaces within the metropolitan region. The *Metropolitan Greenspaces Master Plan* (1992) identifies Cedar Mill Creek, Rock Creek, the Tualatin River and nearby Forest Park as regionally significant natural area sites. The Conservation Plan proposes conservation measures that help to protect these basins.

33. 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 *Skyline West Conservation 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 does not reduce needed housing opportunities and 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, water bodies, 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 protecting 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 continued infill development of vacant land.
34. 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 *Skyline West Conservation 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 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 3.5, Neighborhood Involvement, because the local neighborhood association was notified at the onset and at regular intervals throughout the development of this project and solicited for information on potential resources and for comments on plan recommendations. In addition, neighborhood meetings were held on the plan and neighborhood was notified of all public hearings.
 - b. The plan is supportive of Policy 3.6, Neighborhood Plan, because all applicable neighborhood plans are addressed in the ESEE analysis of individual resource sites.
35. 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 *Skyline West Conservation 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 have been reduced in area or not applied to resources in order to preserve housing opportunities. Site development standards mitigate the impact of development rather than prohibit development opportunities. Where housing development is severely restricted, provisions of the planned unit development

- regulations allow the redistribution of residential development to mitigate these impacts.
36. 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 *Skyline West Conservation 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 through natural resource protection the image of Portland as a livable, attractive city which acts as a positive aspect of business recruitment. The plan balances the need for resource protection with that for an adequate supply of developable land.
 - 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. The plan protects natural resources along Skyline Boulevard which is a popular scenic drive with several viewpoints.
37. Goal 7, Energy, provides for increasing the energy efficiency of existing structures and the transportation systems of the City. The *Skyline West Conservation Plan* is consistent with this goal because it has considered the energy impacts of protecting natural resources in the ESEE analysis for each resource. Protection of natural resources will provide a more easily serviced development pattern of clustered housing and open areas and will reduce the need to travel to enjoy or study natural areas, thereby reducing overall energy costs.
38. 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 *Skyline West Conservation Plan* is especially supportive of this goal and is designed to implement the policies of the goal as they relate to natural resources. In addition, the plan modifies an existing policy to further clarify the City's intent in protecting and enhancing the natural resources of the *Skyline West* plan area.
- a. The plan is supportive of Policy 8.8, Groundwater Protection, because it encourages groundwater filtration and recharge by retaining vegetation and minimizing impervious surfaces.
 - b. The plan is supportive of Policy 8.9, Open Space, by providing additional protection for designated open space areas.
 - c. The plan is supportive of Policy 8.10, Drainageways, because it limits or prohibits development within wetlands and drainageways to protect watershed resources and minimize flood hazards.

- d. The plan is supportive of Policy 8.11, Special Areas, because it adopts a new policy setting forth guidelines for the protection and enhancement of unique resource qualities for the Skyline plan area.
 - e. The plan is supportive of Policy 8.13, Natural Hazards, because it protects significant resources in areas of steep slopes, unstable soils and flood plains, and encourages the shifting of development to other portions of lots which are more easily built upon.
 - f. The plan is supportive of and implements Policy 8.14, Natural Resources, by protecting significant natural 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 Portland wetlands, creeks 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 upland forests and meadows which provide wildlife habitat, slope protection and groundwater recharge values.
 - i. The plan is supportive of Policy 8.17, Wildlife, because it protects existing wildlife habitat areas, and encourages retention of vegetation and open space in the plan area for wildlife habitat.
39. 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 Comprehensive Plan. The *Skyline West Conservation Plan* and implementing measures are consistent with this goal for the reasons stated in the finding for Statewide Planning Goal 1.
- 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 required time frames and were provided free of charge. Notice of meetings and hearings were sent to neighborhood associations, property owners and to all interested citizens.
 - b. The plan is consistent with Policy 9.2, Comprehensive Plan Review, because the *Skyline West Conservation 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 reviewed by and received comment from the public.
40. 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 for the reasons stated in the finding for Statewide Planning Goal 11.

NOW, THEREFORE, the Council directs:

- a. The Planning Commission Recommended *Skyline West Conservation Plan* (Exhibit A) and Plan Appendices (Exhibit B) is hereby adopted.
- b. Ordinance No. 150580 is hereby amended by adding to Policy 8.11 of the Comprehensive Plan the following new special area (underlined):

8.11, Special Areas

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

- A. Balch Creek Watershed (no change)
- B. East Buttes, Terraces and Wetlands (no change)
- C. Fanno Creek Watershed (no change)
- D. Johnson Creek Basin (no change)
- E. Northwest Hills (no change)
- F. Skyline West
Conserve wildlife, forest and water resource values of the Skyline planning area through implementation of the Skyline Conservation Plan.
- ~~F.~~ Southwest Hills (re-letter to G; no other change)
- G. Willamette River Greenway (re-letter to H; no other change)

- c. Ordinance No. 163608 enacting Title 33, Planning and Zoning, of the Municipal Code of the City of Portland, is hereby amended as set forth in Exhibit A.
- d. The Official Zoning Maps of the City of Portland are hereby amended as shown in Exhibit B.

Section 2.

This ordinance shall apply to permits, limited land use decisions and zone changes in the manner prescribed by Oregon Revised Statutes 227.178(3).

Section 3.

If any portion of the Comprehensive Plan, Zoning Code or Official Zoning Maps amended by this ordinance is held to be invalid or unconstitutional by a court of competent jurisdiction, that portion is to be deemed severed, and in no way affects the remaining portions.

Section 4.

The Council declares an emergency exists because unprotected natural resources are threatened by immediate degradation in areas within the Skyline West planning area. Natural values will be lost without protection afforded by the plan. The area covered by this plan contains steep, unstable slopes which are susceptible to landslides. Development without the controls required in this plan will result in erosion, landslides and threats to public health and safety. Therefore, this ordinance shall be in force and be effective upon adoption.

Passed by the Council, **SEP 21 1994**

Commissioner Hales
August 26, 1994
Tim Brooks/tb

BARBARA CLARK
Auditor of the City of Portland

By *Britta Olson*
Deputy

APPENDIX B

WILDLIFE HABITAT ASSESSMENT FORM

Selection of the Wildlife Habitat Rating System

The Wildlife Habitat Assessment (WHA) rating system, originally developed for the City of Beaverton in 1983 as part of their Goal 5 update, is acknowledged by the Land Conservation and Development Commission (LCDC) as meeting the Goal 5 inventory requirements. This system is used by many jurisdictions throughout the Portland metropolitan area and by Lane County jurisdictions.

The success of the WHA rating system is due to the participation by biologists from a number of agencies, who developed the system and determined the criteria to be included under each component. The rating system was designed by a technical advisory team consisting of staff from the following agencies:

- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- Oregon Department of Fish and Wildlife
- Audubon Society of Portland
- The Wetlands Conservancy
- Beaverton Planning Bureau

The WHA rating system reviews each identified habitat site in terms of its potential for wildlife. The rating system is based on the fact that all wildlife have three basic requirements for survival: food, water and cover. These form the three major components of the assessment. Each site is evaluated in terms of quantity, quality, diversity and seasonality of food, water and cover offered on the site. Also considered is the degree and permanence of physical and human disturbance on the site, whether there are other usable habitats nearby, and the unique features on the site, including wildlife, flora and rarity of habitat.

Each of these components is discussed in the section, "Discussion of the Rating Sheets." The rating system is not intended to provide a comprehensive analysis of each site, but to allow relative values between habitat areas to be determined and compared. Should an in-depth study of specific sites be required, a more detailed biological analysis would be appropriate.

The City of Portland has modified the WHA form by dropping two elements originally considered as part of the habitat rating. These elements are "scenic" and "educational potential" values. The presence of these elements has no direct relationship to habitat quality. Scenic and educational values are reviewed in other parts of the Goal 5 inventory for resource sites.

Conducting the Field Inventory

Biologists from the City of Portland, Planning Bureau staff and occasionally members of the Goal 5 technical advisory committee, inventoried resource sites within the Portland Urban Services Boundary. The original field work was conducted largely in the spring, summer and fall of 1986. Subsequent inventories were conducted between 1989 and

1992. Habitat rating sheets for each site were completed and are on file at the Planning Bureau.

Discussion of the Rating Sheets

This section is a summary discussion of the Wildlife Habitat Assessment rating sheets. An examples of WHA rating sheet is included in this appendix. It needs to be emphasized that this discussion is a summary and not a textbook approach which would allow the reader to duplicate the City's inventory information. For more detailed information on specific procedures, the reader is encouraged to contact the City of Portland. The WHA rating system provides a city-wide basis for comparison of resource sites. The WHA form is one element of the City's Goal 5 resource inventory; other sources of inventory information include published plans, reports and maps, aerial photographs and field sampling.

The WHA rating form is divided into three parts. The first presents general information about the site to facilitate identification. Included here are the site number, location, size, score, field dates, observers and comments.

The second section consists of the water, food and covers values (referred to as habitat components). Each of these components is further divided into a number of aspects.

Water

Four aspects of the water regime on a site were included on the rating form: quantity and seasonality, quality, proximity to cover, and diversity. All of these factors play an important role in the site's significance to wildlife.

The relative value of these aspects compared to the other components (food and cover) are higher. The total number of possible points from the water component is 30 points, while the highest totals for food and cover are 24 and 28 points, respectively. The reason for this weighting of the relative value of the water component is that it is of critical importance to the function of wetlands and riparian zones and the wildlife species that inhabit them.

Quantity and Seasonality: This aspect refers to the amount of water available on site, and its seasonal variability. Seasonal water sources are given a value of four points, and perennial water sources (available year-round) a value of eight.

Quality: Stagnant water sources were given a value of zero, seasonally flushed a value of three, and continually flushed a value of six. Although desirable to have some value included reflecting the quality of the water on site, actual water quality analysis is not always feasible. Therefore, an indirect measure of quality, "flushing," was selected. In actuality, even stagnant water has some wildlife habitat value, but it was decided to assign it a value of zero, as seasonally or continually-flushed water has a higher value for wildlife, and because the presence of stagnant water indicates the probability of other factors which result in lower wildlife values.

Proximity to Cover: Wildlife will use water more readily if it is close to vegetative cover. This allows escape from predators and protection from weather extremes. The closer and more dense the cover, the more important the water source to many species. Dense cover immediately adjacent to a water source yields a site value of eight, nearby cover a value of four, and no cover a value of zero.

Diversity: A site with a mixture of wetland, stream and open pond or lake resources has higher wildlife value than a site with only one of these features. The ranking ranges from a low of two (one water source only) to eight (three or more water sources present).

Food

Food is a basic requirement for any organism. Wildlife cannot survive in one area for any appreciable period of time without food. The greater the variety and quantity of food, the greater the potential for serving the needs of more wildlife species. The three aspects included under food are variety, quantity and seasonality, and proximity to cover.

Variety: The variety of food on a site is rated from a high of eight points to a low of zero.

Quantity and Seasonality: This aspect measures the amount of food and its availability on an annual basis. Sites having large quantities of food available year-round receive a value of eight, and sites with little or no food available receive a value of zero.

Proximity to Cover: As with water, the presence of adjacent cover from which to forage for food and escape predation by other native wildlife or domestic animals is important. Proximity to cover also ranked from zero to eight points.

Cover

The aspects of cover included here (structure, variety, nesting, escape and seasonality) attempt to describe the physical environment of the site from a number of perspectives that are important to wildlife.

Structural Diversity: What is looked for in this category is the vertical stratification of vegetation on a site, i.e., is there only one layer of vegetative cover (herbaceous, shrub or tree), or are there more? The most diverse structural system expected to be encountered would be multi-layered, with a ground layer of herbaceous vegetation (grasses, forbs, wildflowers, etc.), a second layer consisting of shrubs (snowberry, thimbleberry, Oregon grape, Himalayan blackberry, etc.), perhaps another layer of taller plants (red and blue elderberry, Indian plum, serviceberry), a short tree layer (flowering dogwood, hazelnut, saplings of taller species), and finally a tall canopy layer (Douglas fir, western hemlock, bigleaf maple, black cottonwood, Oregon ash, Oregon white oak, etc.). Snags and down woody debris also provide structural diversity. The more layers present, the greater the surface area for more feeding, traveling, and breeding available

to a wider number of wildlife species. Values range from eight points for high structural diversity, to zero for low or no diversity.

Variety: Within any one layer or when considering all layers, if structural diversity is high, there may be a number of plant species which provide a variety of vegetation characteristics. This is important from the standpoints of cover, feeding and reproduction. The greater the variety of vegetation, the more important the habitat. For example, a forested wetland with a mixture of rushes, sedges, smartweed, spirea and willow provides more valuable wildlife habitat than an area with a monoculture of reed canarygrass. Values range from eight points for high variety, to zero for little or no variety.

Nesting: While there may be both good variety and diversity of vegetative cover, the overall nesting potential may vary from site to site. This aspect was added to address the overall nesting potential of the site for a variety of bird and mammal species. Nesting values range from four to zero points.

Escape: This aspect is primarily a function of density of cover and its ability to afford escape from predation. A value of four points is assigned to sites which offer a high possibility of escape, and zero for those with no or low potential.

Seasonality: As with food and water, a habitat site will be less important to wildlife if cover is not present year-round. Regarding cover, this relates primarily to whether all of the vegetation is deciduous or evergreen. If there is some evergreen vegetation, or the deciduous vegetation retains some of its canopy year-round, the site is more valuable. Vegetative cover available year-round receives a value of four, limited cover a value of two, and seasonal cover a value of zero.

The third part of the form addresses values in addition to food, water and cover. The factors examined include disturbance, interspersions and unique features.

Disturbance

Disturbance is examined from two perspectives: physical and human.

Physical: This category was used to assign a higher value to those sites with little disturbance, to reflect the fact that the removal or disturbance of physical components (food, water, cover) is detrimental to wildlife. However, it is also recognized that such a disturbance could be relatively short-lived (such as placement of a sewer line down a creek channel), while others are long-term or permanent. A relatively undisturbed site receives a maximum value of four points, sites with temporary physical disturbance a value of two, and those with permanent or long-term disturbance a value of zero.

Human: Human and human-related (e.g., domestic animals) disturbances can be very detrimental to wildlife. On the other hand, an area that is highly disturbed from a physical perspective may receive little human use. The values range from four points for low human disturbance, to zero for high impact.

Interspersion

Habitats are important to one another in the sense that a number of different habitats adjacent to one another can provide an overall diversity of vegetative cover, food and often water. Therefore, an isolated site surrounded by pavement, buildings, and human activity would receive a lower interspersion value than a similar site surrounded by other habitat sites, such as wetlands, upland forests, shrubby areas, or meadows. The interspersion score ranges from a high of six points, to a low of zero.

Unique Features

This component is intended to take into account other factors which might make the site unique to plants, animals or humans. Aspects included are unique or locally rare or sensitive flora or fauna, and the rarity of habitat within the City.

Flora and Fauna: If there is a particular species of plant or wildlife which is sensitive or unique in some way, then the site would receive a value ranging from one to four points.

Habitat Type: This refers to whether the site has any plant or animal species considered rare from a regional or national perspective, or in terms of scarcity within the City, or within a particular Management Unit. The highest value which can be received is four points.

WILDLIFE HABITAT ASSESSMENT

for sites with surface water features

SITE NUMBER	TOTAL HABITAT SCORE AS EXISTING	POTENTIAL HABITAT SCORE IF ENHANCED	TOTAL ACRES
SITE LOCATION	FIELD DATES	FIELD OBSERVERS	

GENERAL COMMENTS

HABITAT COMPONENT		DEGREE PRESENT			SCORE EXISTING	SCORE ENHANCED	SPECIFIC COMMENTS
		NONE	SEASONAL	PERENNIAL			
WATER	QUANTITY & SEASONALITY	0	4	8			
	DIVERSITY <small>STREAMS, PONDS, ETC.</small>	2	4	8			
	PROXIMITY TO COVER	0	4	8			
	QUALITY <small>FLUSHING FREQUENCY</small>	0	3	6			
FOOD	QUANTITY & SEASONALITY	0	4	8			
	VARIETY	0	4	8			
	PROXIMITY TO COVER	0	4	8			
COVER	STRUCTURAL DIVERSITY	0	4	8			
	VARIETY	0	4	8			
	SEASONALITY	0	2	4			
	NESTING <small>DENNING, ETC.</small>	0	2	4			
	ESCAPE	0	2	4			
OVERTHRESHOLDS	PHYSICAL DISTURBANCE	0	2	4			
	HUMAN DISTURBANCE	0	2	4			
	INTERSPERSION WITH OTHER HABITATS	0	3	6			
UNIQUE FEATURES	HABITAT TYPE	0	-	4			
	FLORA	0	-	4			
	FAUNA	0	-	4			



WILDLIFE HABITAT ASSESSMENT

for sites with surface water features

SITE NUMBER	TOTAL HABITAT SCORE AS EXISTING	POTENTIAL HABITAT SCORE IF ENHANCED	TOTAL ACRES
WEATHER ON DAY OF FIELD OBSERVATION			
PRECIPITATION PRESENT		WIND SPEED	
KIND OF PRECIPITATION		WIND DIRECTION	
CLOUD COVER	%	TEMPERATURE	° F

PHYSICAL ENVIRONMENT	
GENERAL DESCRIPTION OF TOPOGRAPHY	
ORIENTATION OF SLOPE	
DEGREE OF SLOPE	°
TYPE OF WATER FEATURES PRESENT	
PORTION OF SITE INUNDATED BY WATER	%
MAJOR STRUCTURES OR ROADS PRESENT	

VEGETATION			
LIST OF HERB SPECIES			
LIST OF SHRUB SPECIES			
LIST OF TREE SPECIES			
TYPES OF PLANT COMMUNITIES			
SERIAL STAGES OF PLANT COMMUNITIES			
GENERAL HEALTH AND VITALITY OF PLANT COMMUNITIES			
CANOPY CLOSURE IN HERB ZONE:	%	SHRUB ZONE:	%
		TREE ZONE:	%
ESTIMATED NUMBER OF SNAGS PER ACRE:		DIAMETER OF LARGEST SNAGS IN FEET:	
AQUATIC VEGETATION FLOATING:	%	EMERGENT:	%
		INUNDATED:	%

Page Two of Four



City of Portland, Oregon
Bureau of Planning

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WILDLIFE HABITAT ASSESSMENT

for sites with surface water features

SITE NUMBER	TOTAL HABITAT SCORE AS EXISTING	POTENTIAL HABITAT SCORE IF ENHANCED	TOTAL ACRES
FISH AND WILDLIFE			
INVERTEBRATE SPECIES OBSERVED			
FISH SPECIES OBSERVED			
AMPHIBIAN SPECIES OBSERVED			
REPTILE SPECIES OBSERVED			
BIRD SPECIES OBSERVED			
MAMMALIAN SPECIES OBSERVED			
<p>SPECIES NOT OBSERVED BUT KNOWN TO BE PRESENT AND SOURCE OF INFORMATION</p>			



**WILDLIFE HABITAT ASSESSMENT
for sites with surface water features**

SITE NUMBER	TOTAL HABITAT SCORE AS EXISTING	POTENTIAL HABITAT SCORE IF ENHANCED	TOTAL ACRES
HABITAT FUNCTIONS			
FOOD SOURCES			
ROOSTING PLACES			
PERCHING PLACES			
NESTING PLACES			
OTHER FUNCTIONS			
RARE SPECIES			
SENSITIVE SPECIES			
PROTECTED SPECIES			
UNIQUE FEATURES			
HUMAN USES			
HUMAN USES			
DOMESTIC ANIMAL USES			
PROXIMITY TO RESIDENCES			
EXISTING COMPATABLE USES			
EXISTING CONFLICTING USES			
INTERSPERSION WITH OTHER NATURAL AREAS			
MANAGEMENT MEASURES THAT COULD BE CARRIED OUT TO IMPROVE HABITAT VALUES			



APPENDIX C

STATEWIDE PLANNING GOAL 5

5

OPEN SPACES, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES

GOAL: To conserve open space and protect natural and scenic resources.

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. The location, quality and quantity of the following resources shall be inventoried:

- a. Land needed or desirable for open space;
- b. Mineral and aggregate resources;
- c. Energy sources;
- d. Fish and wildlife areas and habitats;
- e. Ecologically and scientifically significant natural areas, including desert areas;
- f. Outstanding scenic views and sites;
- g. Water areas, wetlands, watersheds and groundwater resources;
- h. Wilderness areas;
- i. Historic areas, sites, structures and objects;
- j. Cultural areas;
- k. Potential and approved Oregon recreation trails;
- l. Potential and approved federal wild and scenic waterways and state scenic waterways.

Where no conflicting uses for such resources have been identified, such resources shall be managed so as to preserve their original character. Where conflicting uses have been identified the economic, social, environmental and energy consequences of the conflicting uses shall be determined and programs developed to achieve the goal.

Cultural Area — refers to an area characterized by evidence of an ethnic, religious or social group with distinctive traits, belief and social forms.

Historic Areas — are lands with sites, structures and objects that have local, regional, statewide or national historical significance.

Natural Area — includes land and water that has substantially retained its natural character and land and water that, although altered in character, is important as habitats for plant, animal or marine life, for the study of its natural historical, scientific or paleontological features, or for the appreciation of its natural features.

Open Space — consists of lands used for agricultural or forest uses, and any land area that would, if preserved and continued in its present use:

- (a) Conserve and enhance natural or scenic resources;
- (b) Protect air or streams or water supply;
- (c) Promote conservation of soils, wetlands, beaches or tidal marshes;
- (d) Conserve landscaped areas, such as public or private golf courses, that reduce air pollution and enhance the value of abutting or neighboring property;
- (e) Enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open space;
- (f) Promote orderly urban development.

Scenic Areas — are lands that are valued for their aesthetic appearance.

Wilderness Areas — are areas where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. It is an area of undeveloped land retaining its primeval character and influence, without permanent improvement or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) may also contain ecological, geological, or other features of scientific, educational, scenic or historic value.

GUIDELINES:

A. Planning:

1. The need for open space in the planning area should be determined, and standards developed for the amount, distribution, and type of open space.
2. Criteria should be developed and utilized to determine what uses are consistent with open space values and to evaluate the effect of converting open space lands to inconsistent uses. The maintenance and development of open space in urban areas should be encouraged.
3. Natural resources and required sites for the generation of energy (i.e., natural gas, oil, coal, hydro, geothermal, uranium, solar and others) should be conserved and protected; reservoir sites should be identified and protected against irreversible loss.
4. Plans providing for open space, scenic and historic areas, and natural resources should consider as a major determinant the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.
5. The National Register of Historic Places and the recommendations of the State Advisory Committee on Historic Preservation should be utilized in designating historic sites.
6. In conjunction with the inventory of mineral and aggregate resources, sites for removal and processing of such resources should be identified and protected.
7. As a general rule, plans should prohibit outdoor advertising signs except in commercial or industrial zones. Plans

should not provide for the reclassification of land for the purpose of accommodating an outdoor advertising sign. The term "outdoor advertising sign" has the meaning set forth in ORS 377.710(23).

B. Implementation:

1. Development should be planned and directed so as to conserve the needed amount of open space.
2. The conservation of both renewable and nonrenewable natural resources and physical limitations of the land should be used as the basis for determining the quantity, quality, location, rate and type of growth in the planning area.
3. The efficient consumption of energy should be considered when utilizing natural resources.
4. Fish and wildlife areas and habitats should be protected and managed in accordance with the Oregon Wildlife Commission's fish and wildlife management plans.
5. Stream flow and water levels should be protected and managed at a level adequate for fish, wildlife, pollution abatement, recreation, aesthetics and agriculture.
6. Significant natural areas that are historically, ecologically or scientifically unique, outstanding or important, including those identified by the State Natural Area Preserves Advisory Committee, should be inventoried and evaluated. Plans should provide for the preservation of natural areas consistent with an inventory of scientific, educational, ecological and recreational needs for significant natural areas.
7. Local, regional and state governments should be encouraged to investigate and utilize fee acquisition, easements, cluster developments, preferential assessment, development rights acquisition and similar techniques to implement this goal.
8. State and federal agencies should develop statewide natural resource, open space, scenic and historic area plans and provide technical assistance to local and regional agencies. State and federal plans should be reviewed and coordinated with local and regional plans.
9. Areas identified as having non-renewable mineral and aggregate resources should be planned for interim, transitional and "second use" utilization as well as for the primary use.

APPENDIX D

GOAL 5 ADMINISTRATIVE RULE

DIVISION 16

REQUIREMENTS AND APPLICATION
PROCEDURES FOR COMPLYING
WITH STATEWIDE GOAL 5

Inventory Goal 5 Resources

660-16-000 (1) The inventory process for Statewide Planning Goal 5 begins with the collection of available data from as many sources as possible including experts in the field, local citizens and landowners. The local government then analyzes and refines the data and determines whether there is sufficient information on the location, quality and quantity of each resource site to properly complete the Goal 5 process. This analysis also includes whether a particular natural area is "ecologically and scientifically significant", or an open space area is "needed", or a scenic area is "outstanding", as outlined in the Goal. Based on the evidence and local government's analysis of those data, the local government then determines which resource sites are of significance and includes those sites on the final plan inventory.

(2) A "valid" inventory of a Goal 5 resource under subsection (5)(c) of this rule must include a determination of the location, quality, and quantity of each of the resource sites. Some Goal 5 resources (e.g., natural areas, historic sites, mineral and aggregate sites, scenic waterways) are more site-specific than others (e.g., groundwater, energy sources). For site-specific resources, determination of location must include a description or map of the boundaries of the resource site and of the impact area to be affected, if different. For non-site-specific resources, determination must be as specific as possible.

(3) The determination of quality requires some consideration of the resource site's relative value, as compared to other examples of the same resource in at least the jurisdiction itself. A determination of quantity requires consideration of the relative abundance of the resource (of any given quality). The level of detail that is provided will depend on how much information is available or "obtainable".

(4) The inventory completed at the local level, including options in subsections (5)(a), (b), and (c) of this rule, will be adequate for Goal compliance unless it can be shown to be based on inaccurate data, or does not adequately address location, quality or quantity. The issue of adequacy may be raised by the Department or objectors, but final determination is made by the Commission or the Land Use Board of Appeals as provided by law.

(5) Based on data collected, analyzed and refined by the local government, as outlined above, a jurisdiction has three basic options:

(a) Do Not Include on Inventory: Based on information that is available on location, quality and quantity, the local government might determine that a particular resource site is not important enough to warrant inclusion on the plan inventory, or is not required to be included in the inventory based on the specific Goal standards. No further action need be taken with regard to these sites. The local government is not required to justify in its comprehensive plan a decision not to include a particular site in the plan inventory unless challenged by the Department, objectors or

the Commission based upon contradictory information;

(b) Delay Goal 5 Process: When some information is available, indicating the possible existence of a resource site, but that information is not adequate to identify with particularity the location, quality and quantity of the resource site, the local government should only include the site on the comprehensive plan inventory as a special category. The local government must express its intent relative to the resource site through a plan policy to address that resource site and proceed through the Goal 5 process in the future. The plan should include a time-frame for this review. Special implementing measures are not appropriate or required for Goal 5 compliance purposes until adequate information is available to enable further review and adoption of such measures. The statement in the plan commits the local government to address the resource site through the Goal 5 process in the post-acknowledgment period. Such future actions could require a plan amendment;

(c) Include on Plan Inventory: When information is available on location, quality and quantity, and the local government has determined a site to be significant or important as a result of the data collection and analysis process, the local government must include the site on its plan inventory and indicate the location, quality and quantity of the resource site (see above). Items included on this inventory must proceed through the remainder of the Goal 5 process.

Stat. Anth.: ORS Ch. 183 & 197

Hist.: LCD 5-1981(Temp), f. & ef. 5-8-81; LCD 7-1981, f. & ef. 6-29-81; LCDC 3-1990, f. & cert. ef. 8-8-90

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Identify Conflicting Uses

660-16-005 It is the responsibility of local government to identify conflicts with inventoried Goal 5 resource sites. This is done primarily by examining the uses allowed in broad zoning districts established by the jurisdiction (e.g., forest and agricultural zones). A conflicting use is one which, if allowed, could negatively impact a Goal 5 resource site. Where conflicting uses have been identified, Goal 5 resource sites may impact those uses. These impacts must be considered in analyzing the economic, social, environmental and energy (ESEE) consequences:

(1) Preserve the Resource Site: If there are no conflicting uses for an identified resource site, the jurisdiction must adopt policies and ordinance provisions, as appropriate, which insure preservation of the resource site.

(2) Determine the Economic, Social, Environmental, and Energy Consequences: If conflicting uses are identified, the economic, social, environmental and energy consequences of the conflicting uses must be determined. Both the impacts on the resource site and on the conflicting use must be considered in analyzing the ESEE consequences. The applicability and requirements of other Statewide Planning Goals must also be considered, where appropriate, at this stage of the process. A determination of the ESEE consequences of

identified conflicting uses is adequate if it enables a jurisdiction to provide reasons to explain why decisions are made for specific sites.

Stat. Auth.: ORS Ch. 183 & 197

Hist.: LCD 5-1981(Temp), f. & ef. 5-8-81; LCD 7-1981, f. & ef. 6-29-81

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Develop Program to Achieve the Goal

660-16-010 Based on the determination of the economic, social, environmental and energy consequences, a jurisdiction must "develop a program to achieve the Goal". Assuming there is adequate information on the location, quality, and quantity of the resource site as well as on the nature of the conflicting use and ESEE consequences, a jurisdiction is expected to "resolve" conflicts with specific sites in any of the following three ways listed below. Compliance with Goal 5 shall also be based on the plan's overall ability to protect and conserve each Goal 5 resource. The issue of adequacy of the overall program adopted or of decisions made under sections (1), (2) and (3) of this rule may be raised by the Department or objectors, but final determination is made by the Commission, pursuant to usual procedures:

(1) **Protect the Resource Site:** Based on the analysis of the ESEE consequences, a jurisdiction may determine that the resource site is of such importance, relative to the conflicting uses, and the ESEE consequences of allowing conflicting uses are so great that the resource site should be protected and all conflicting uses prohibited on the site and possibly within the impact area identified in OAR 660-16-000(5)(c). Reasons which support this decision must be presented in the comprehensive plan, and plan and zone designations must be consistent with this decision.

(2) **Allow Conflicting Uses Fully:** Based on the analysis of ESEE consequences and other Statewide Goals, a jurisdiction may determine that the conflicting use should be allowed fully, not withstanding the possible impacts on the resource site. This approach may be used when the conflicting use for a particular site is of sufficient importance, relative to the resource site. Reasons which support this decision must be presented in the comprehensive plan, and plan and zone designations must be consistent with this decision.

(3) **Limit Conflicting Uses:** Based on the analysis of ESEE consequences, a jurisdiction may determine that both the resource site and the conflicting use are important relative to each other, and that the ESEE consequences should be balanced so as to allow the conflicting use but in a limited way so as to protect the resource site to some desired extent. To implement this decision, the jurisdiction must designate with certainty what uses and activities are allowed fully, what uses and activities are not allowed at all and which uses are allowed conditionally, and what specific standards or limitations are placed on the permitted and conditional uses and activities for each resource site. Whatever mechanisms are used, they must be specific enough so that affected property owners are able to determine what uses and activities are

allowed, not allowed, or allowed conditionally and under what clear and objective conditions or standards. Reasons which support this decision must be presented in the comprehensive plan, and plan and zone designations must be consistent with this decision.

Stat. Auth.: ORS Ch. 183 & 197

Hist.: LCD 5-1981(Temp), f. & ef. 5-8-81; LCD 7-1981, f. & ef. 6-29-81

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Post-Acknowledgment Period

660-16-015 (1) All data, findings, and decisions made by a local government prior to acknowledgment may be reviewed by that local government in its periodic update process. This includes decisions made as a result of OAR 660-16-000(5)(a), 660-16-005(1), and 660-16-010. Any changes, additions, or deletions would be made as a plan amendment, again following all Goal 5 steps.

(2) If the local government has included in its plan items under OAR 660-16-000(5)(b), the local government has committed itself to take certain actions within a certain time frame in the post-acknowledgment period. Within those stated time frames, the local government must address the issue as stated in its plan, and treat the action as a plan amendment.

Stat. Auth.: ORS Ch. 183 & 197

Hist.: LCD 5-1981(Temp), f. & ef. 5-8-81; LCD 7-1981, f. & ef. 6-29-81

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Landowner Involvement

660-16-020 (1) The development of inventory data, identification of conflicting uses and adoption of implementing measures must, under Statewide Planning Goals 1 and 2, provide opportunities for citizen involvement and agency coordination. In addition, the adoption of regulations or plan provisions carries with it basic legal notice requirements. (County or city legal counsel can advise the planning department and governing body of these requirements.) Depending upon the type of action involved, the form and method of landowner notification will vary. State statutes and local charter provisions contain basic notice requirements. Because of the nature of the Goal 5 process as outlined in this paper it is important to provide for notification and involvement of landowners, including public agencies, at the earliest possible opportunity. This will likely avoid problems or disagreements later in the process and improve the local decision-making process in the development of the plan and implementing measures.

(2) As the Goal 5 process progresses and more specificity about the nature of resources, identified conflicting uses, ESEE consequences and implementing measures is known, notice and involvement of affected parties will become more meaningful. Such notice and landowner involvement, although not identified as a Goal 5

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requirement is in the opinion of the Commission, imperative.

Stat. Auth.: ORS Ch. 183 & 197

Hist.: LCD 5-1981(Temp), f. & ef. 5-8-81; LCD 7-1981, f. & ef. 6-29-81

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Policy Application

660-16-025 [LCD 5-1981(Temp),
f. & ef. 5-8-81;
LCD 7-1981, f. & ef. 6-29-81;
Repealed by LCDC 3-1990,
f. & cert. ef. 6-6-90]

Mineral and Aggregate Resources

660-16-030 (1) When planning for and regulating the development of aggregate resources,

local governments shall address ORS 517.750 to 517.900 and OAR Chapter 632, Divisions 1 and 30.

(2) Local governments shall coordinate with the State Department of Geology and Mineral Industries to ensure that requirements for the reclamation of surface mines are incorporated into programs to achieve the Goal developed in accordance with OAR 660-16-010.

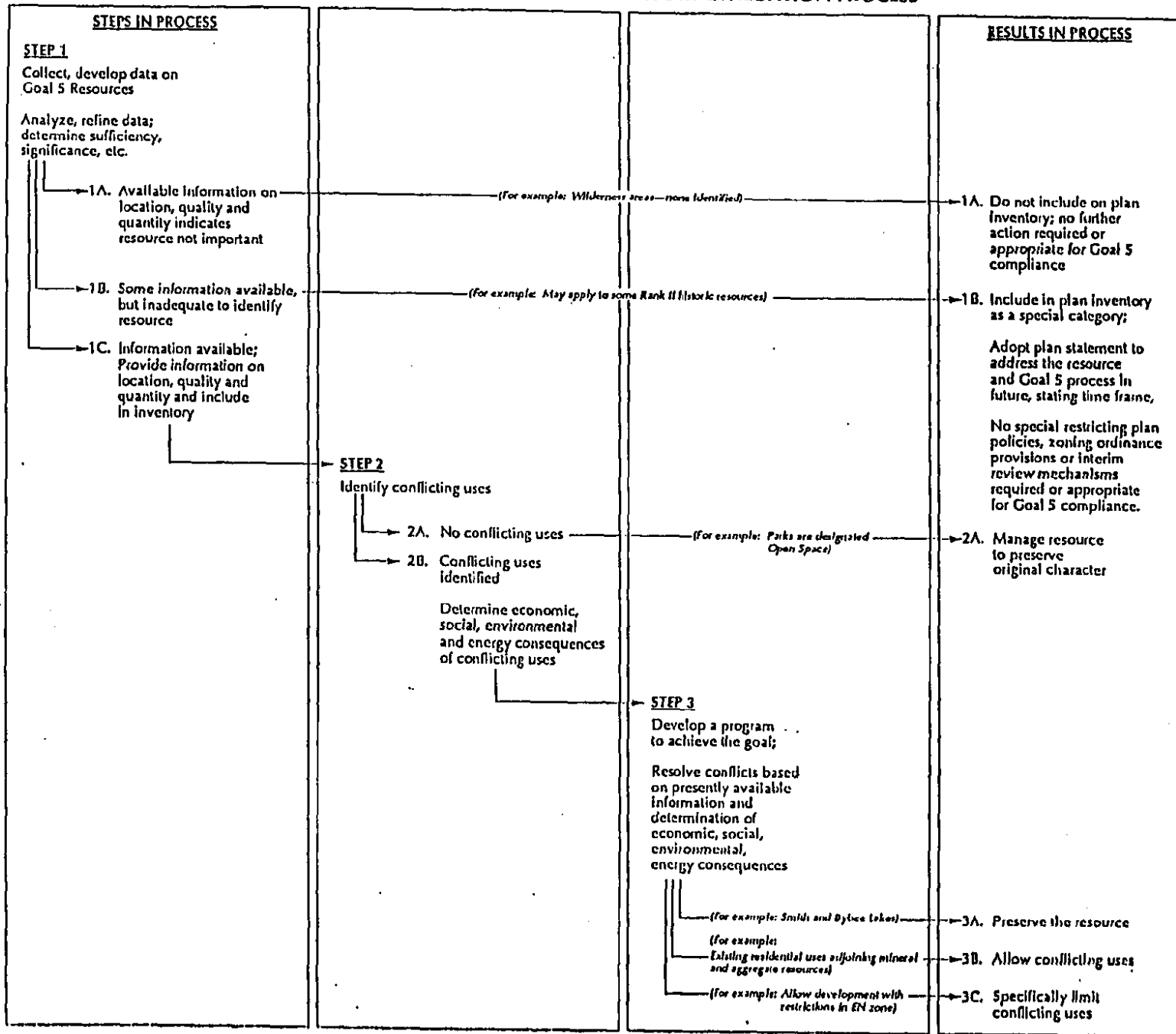
(3) Local governments shall establish procedures designed to ensure that comprehensive plan provisions, land use regulations, and land use permits necessary to authorize mineral and aggregate development are coordinated with the State Department of Geology and Mineral Industries. Local governments shall amend comprehensive plans and land use regulations, as necessary, no later than January 1, 1993.

(4) The provisions of this rule shall be effective immediately.

Stat. Auth.: ORS Ch. 183 & 197

Hist.: LCDC 3-1992, f. & cert. ef. 6-10-92

GOAL 5 OPEN SPACES, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES INVENTORY EVALUATION PROCESS



APPENDIX E

GLOSSARY

Glossary

AQUIFER	A water bearing layer of permeable rock, sand or gravel.
BANK	The rising ground surrounding a lake, river, or other water body.
CHANNEL	An area demonstrating evidence of the passage of water.
COVER	Vegetation that serves to protect animals from excessive sunlight, drying, or predators.
DESYNCHRONIZATION	Modification of the timing of stormwater runoff from various parts of a watershed through water retention, which will result in a decrease in flood elevations.
EMERGENT VEGETATION	Various aquatic plants usually rooted in shallow water and having most of their vegetative growth above water, such as cattails and bullrushes.
ENDANGERED OR THREATENED SPECIES	Those species which are likely or in danger of becoming extinct within the foreseeable future.
ENHANCE	To raise to a higher degree; improve quality or available capacity; intensify; magnify.
FRAGIPAN	A hard, slowly permeable silt loam soil layer that normally develops 2.5 to 4.5 feet below the ground surface in the Portland West Hills.
GOAL 5	A portion of the Oregon Land Conservation and Development Commission land use goals, dealing with the protection and conservation of open spaces, scenic and historic areas, and natural resources.
HABITAT	Place where a plant or animal species naturally lives and grows; its immediate surroundings.
IMPERVIOUS SURFACE	Any surface that is incapable of being directly penetrated by stormwater.
INDICATOR SPECIES	The presence or absence of such a species predicts whether an area of habitat is suitable for a variety of species having similar habitat requirements.

INTERSPERSION	The proximity and interaction of one natural area to other adjacent areas.
LACUSTRINE	Related to or within lakes.
MITIGATE	Reduction of adverse effects of a proposed project by considering, <i>in the following order</i> : <ul style="list-style-type: none"> a) Avoiding the impact altogether by not taking a certain action or parts of an action; b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation; c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment; d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action by monitoring and taking appropriate corrective measures; and e) Compensating for the impact by replacing or providing comparable substitute resources or environments.
PALUSTRINE	Wetlands dominated by trees, shrubs, persistent emergent herbs, emergent mosses or lichens.
RIPARIAN	Relating to, living, or located on the bank of a natural water course (stream, river, etc.).
RIVERINE	Related to, formed by, or resembling a river.
SATURATED	Soaked, impregnated, or imbued thoroughly (soils).
SERAL STAGE	A characteristic association of plants and animals during succession and before climax.
SMALL MAMMALS	Fur covered animals that bear their young alive and nurse, those of the Orders Rodentia and Insectivores (mice, voles, shrews, etc.).
STATE LISTED SENSITIVE SPECIES	Naturally reproducing native vertebrates which are likely to become threatened or endangered throughout all or a significant portion of their range in Oregon.
STRUCTURAL	Different habitat types within a Natural Area (i.e., Diversity; grasslands, forest, open water, etc.).

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.
VECTOR CONTROL	The control of organisms, such as insects, that transmit pathogens.
WATERFOWL	Birds of the Family Anatidae. Aquatic, web-footed, gregarious birds ranging from small ducks to large swans, including geese.
WATERSHED	A region or area bounded peripherally by a water parting and draining ultimately to a particular watercourse or body of water.
WETLANDS	Lands transitional between terrestrial and aquatic where the water table is usually at or near the surface or the land is covered by shallow water. Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

APPENDIX F

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