

FOREST PARK

Natural Resources Management Plan



Portland Parks and Recreation
Bureau of Planning
Portland, Oregon



February 1995

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FOREST PARK NATURAL RESOURCES MANAGEMENT PLAN

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February 1995

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A Vision for Forest Park

Forest Park represents an unparalleled resource where citizens can enjoy the peace, solitude, ruggedness, variety, beauty, unpredictability and unspoiled naturalness of an urban wilderness environment; a place that maintains this wilderness quality while allowing appropriate passive recreational and educational use without degrading natural resources; an urban laboratory for environmental research and resource enhancement and restoration; America's premier urban ancient forest.

*In seven generations,
an ancient forest of
national renown*

Plan Summary and Implementation

This summary provides an overview of the *Forest Park Natural Resources Management Plan* and a discussion of possible implementation methods to accomplish the work that is set out.

Why a Natural Resources Management Plan for Forest Park?

There are two primary reasons for developing a new Management Plan for Forest Park. First, the most recent Forest Park Management Plan was approved in 1976, and it no longer meets the needs of the park or the expectations of the public. Many things have changed since 1976, among them are the following factors:

- Levels of use have increased substantially, new forms of recreation have been introduced to the park, and more development is occurring around the park.
- New problems have arisen, such as the spread of English ivy, external impacts to Balch Creek and other watersheds, conflicts among user groups and with adjoining neighborhoods, and problems with homeless camps, vandalism and related activity.
- Portland citizens now recognize the tremendous community resource that Forest Park is today as well as its future potential.

Satisfy current and future needs of the park and expectations of users

Second, having a City-approved Natural Resources Management Plan (NRMP) provides a streamlined process for project approval. The NRMP replaces the more general environmental regulations in the *Balch Creek Watershed Protection Plan* and the *Northwest Hills Natural Areas Protection Plan* which govern park activities.

Comply with city environmental policy and regulations

A comprehensive and up-to-date plan is needed to protect and enhance important park resources, and to manage recreation use.

Methodology/Structure of the Plan

Park and Planning Bureau staff along with numerous consultants, produced major new information for this plan including:

- Background information on the resources of the park and policies affecting their management
- An inventory of natural resources—both quantity and quality
- Computerized geographic information on topography, ownership, zoning and natural resources
- Descriptions of current use and management
- Information on recreation trends, issues and opportunities

What was, what is, and what could be

- Formulation of goals, strategies and actions
- Compilation of specific projects to achieve goals and strategies.

There was ongoing public participation during this work. Technical Advisory and Citizens Advisory Committees met frequently and numerous neighborhood meetings took place. Public hearings were held before the Portland Planning Commission and City Council between December 1994 and February 1995.

Summary of Specific Problems

In recent years, use of Forest Park has increased dramatically, with detrimental consequences to the park and its resources. Among the major problems are:

- Threats to the natural resources including recreational overuse, invasive non-native plants, off-site development
- Low staffing levels and funds
- Conflicts in recreational use—both between recreational users and between recreational users and local residents
- An increasing need to accommodate additional recreation use in the long- and short-term future

If current levels of staffing, funding, maintenance and management are continued, both the recreation facilities and the natural resources of Forest Park will suffer.

Forest Park Natural Resources Management Plan Goals

The plan presents and seeks to balance two goals which are sometimes in conflict: *to protect Forest Park natural resources, and to enhance Forest Park's recreational and educational resources.*

Conservation Goals

Parks and Recreation has two primary conservation goals:

1. Protect Forest Park's native plant and animal communities, and its soil and water resources while managing the forest ecosystem in order to grow a self-sustaining ancient forest for the enjoyment and benefit of future generations.
2. Design management and restoration efforts to:
 - Maintain and enhance regional biodiversity
 - Provide wildlife habitat and migration opportunities
 - Improve water quality and aquatic habitat
 - Repair damaged and fragmented natural systems.

Recreational and Educational Goals

Parks and Recreation has two primary recreational and educational goals:

Protect and enhance

1. Protect and enhance the value of Forest Park as a regionally-significant recreational and educational resource—a place that can accommodate recreational and educational use at appropriate seasons of the year without environmental damage.
2. Enhance the value of Forest Park as a regionally-significant educational resource—an urban laboratory for environmental research, and resource enhancement and restoration.

A series of strategies designed to help managers and citizens achieve this balance is listed along with specific actions designed to support one or more of the strategies.

Plan Recommendation Highlights

The new *Natural Resources Management Plan* makes many significant recommendations in the following three areas: resources, use and management. Among them are:

Recommendations address resources, use and management

Resources

Sustainable Resources Program. Make the health of natural resources the top priority for park managers. Develop timely management responses geared to address measurable impacts to natural resources.

Management Units. Divide the park into three management units, each having different resource protection standards and appropriate levels of recreation use.

Interior Forest Habitat. Protect and enhance the high quality of Forest Park's interior forest habitat. This large, relatively intact habitat type is unique and supports wildlife not found in any other urban park in the world.

Resource Intervention/Restoration. Take a pro-active approach to improve natural resource values. Several specific recommendations are included: control English ivy; accelerate forest succession to improve quality of interior forest habitat; restore streams and streambanks in Balch Creek.

Biological Connections. Protect and improve biological connections to rural forested areas to the north and west of Forest Park, and to the Willamette River.

Resource Monitoring. In conjunction with recreation use surveys, begin regular monitoring of natural resources to

determine if resources are being sustained, improved or degraded over time.

Land Acquisition. Acquire land for six distinct purposes: preserve interior forest habitat; protect Balch Creek watershed; protect other watersheds; create connections to the Willamette River; improve connections to rural areas to the north and west of the park; and provide better public access.

Advocacy. Portland Parks and Recreation will be an active advocate for protection of Forest Park resources. As the region continues to grow, there will be many opportunities for Park managers to participate in planning processes affecting urban form, transportation facilities and land use. Park managers will advocate at every level for the protection of park resources where Forest Park resources may be affected by the outcome.

Education. Provide information to park users about resource protection stating reasons for particular management actions.

Use

Improved Access. Improve access to support resource protection objectives; minimize conflicts with surrounding residential areas; make Forest Park available to all people.

Recreation Monitoring. Gather information on the types and levels of recreational use in each management unit. Formulate appropriate user policy from this information and that obtained from the natural resource monitoring program.

Other Recreation Opportunities. Support the acquisition and development of other natural area recreation opportunities to reduce user pressure on Forest Park.

Recreation Management. Control recreation use in order to protect and enhance the high quality of this natural resource.

Facility Development. Provide facilities appropriate to the management unit.

Management

Enhanced Management. Increase staffing, especially in the areas of natural resource management, public outreach and liaison work.

Public Involvement. Continue to encourage public involvement especially in the areas of park advocacy, park policy, fundraising and hands-on volunteer activities.

Regional Cooperation. Work with Metro to ensure that recreation needs of the region are addressed and met.

Plan Strategies and Actions—Summary

Implement *Sustainable Resources Program*

Monitor resources; monitor pests; establish core preserves; enhance and restore resources; control exotic vegetation; monitor and manage fire hazards; mitigate outside impacts; perform periodic review.

Divide Forest Park into Management Units

This will coordinate resource protection and recreation activities.

South Unit – Burnside to Fire Lane 1

Central Unit – Fire Lane 1 to Germantown Road

North Unit – Germantown Road to Newberry Road

Acquire and Protect Additional Land

Acquisition of in-holdings and other lands will protect the existing park resources.

Manage Recreation to Protect Natural Resources

Provide appropriate recreation opportunities for people of all abilities; monitor recreation use; manage trails to cause least impact to resources; expand and develop certain recreation facilities; arrange for resident caretakers to perform certain duties.

Improve interpretive, educational and research opportunities

Utilize educational institutions to benefit institutions and the park.

Improve public access

Provide facilities that meet Americans with Disabilities Act standards; provide clear directions, signs and maps; encourage use of public and alternate forms of transportation; improve and expand trailheads and entry points into the park.

Improve park safety

Improve public education, citizen patrols and enforcement programs.

Develop recreation opportunities at other locations

Promote development of similar resource/recreation facilities in the region to reduce dependence on Forest Park.

Improve park staffing and funding

Expand staffing levels; adopt stable funding; promote partnerships to secure additional funds and developments.

Continue public involvement

Work cooperatively with various friends groups, neighborhood associations and individuals to improve Forest Park.

Projects

This plan identifies many projects that will accomplish the goals and strategies. There are Natural Resource Management Projects which will protect, preserve and improve the natural resources and there are Development Projects which will accommodate present and future levels of recreation use.

Natural Resource Management Projects include Resource Protection Projects that give additional protection to critical Forest Park resources through the acquisition of land and conservation easements, and Resource Enhancement Projects designed to improve existing resource values in forest areas, along utility corridors and in and along streams. Development Projects include recreation trail projects, improvements such as trailheads and parking areas, signing and street vacations.

Projects are listed as high, medium and low priority. High priority projects are of critical importance in the short term, medium priority projects are important in the next five years, and low priority projects are needed in the long run. These projects include:

High Priority Projects:

- Conduct a recreation user survey.
- Begin a natural resources/recreation use monitoring program.
- Fund and staff a park ranger position.
- Develop an interpretive and education program.
- Restore Balch Creek.
- Acquire property for development of a new trailhead to serve the South Unit.
- Acquire in-holdings in the park.
- Acquire other natural area parks to serve region.

Medium Priority Projects:

- Protect resource linkages.
- Improve various recreation facilities.
- Implement resource enhancement projects.
- Establish trail connections with other regional trails.

From goals and strategies emerge short-, intermediate-, and long-term park projects

Implementation Opportunities

The plan suggests many projects that are needed to manage, protect and restore Forest Park. If they were all funded as in the usual manner, through the general fund, the cost would be about \$6.6 million. Some projects will still need traditional funding; however, this plan identifies many projects that can be done in an untraditional manner—by forming partnerships with businesses and regional agencies, by combining efforts with volunteers and friends groups, by working with other city bureaus, and by continuing coordination with county and regional agencies.

Suggestions for creative funding are listed below; more will develop over the years as Parks and the citizens work to secure the future of Forest Park as a critical open space and natural resource for the city and the region.

The links that can be forged between open space protection, recreation opportunities, transit/transportation planning and education will work to enhance the lives of all.

Cooperation with Other Bureaus and Agencies

Resource monitoring • Impacts from adjacent development •
Assessment and development of regional recreation facilities •
Development of new trailhead/park at Lower Macleay

Volunteer Projects

Ivy removal, exotic plant removal (in addition to regular programs)

Schools and Universities

Resource enhancement projects • Resource research and monitoring

Friends Groups/Neighborhood Associations

Recreation surveys • Fire hazard assessments • Neighborhood trail connection projects

Area Businesses

Developing and funding new trailheads and related amenities

TriMet

Improve public access to park • Assist in developing new trailheads

City

Fund additional staff • Provide funds for needed acquisitions in partnership with friends groups

User Groups

Donations and labor to improve facilities related to their interests •
Continuation of such projects as bike patrols

Utility Companies

Cooperate on management and restoration of utility corridors • Donate
land/ assist in development of trailhead at Yeon and Kittridge

Not all the funds or the efforts will come from one source—many individuals, groups and agencies have an interest in protecting and enhancing the treasure that is Forest Park. This plan identifies some of those interests and the roles they might play in various projects.

Summary—Most Important Projects

These projects are vital to the continued success of Forest Park's management and development. Additional funding and coordination will be needed to address them. Various methods are suggested to accomplish them.

All Management Units

- Create and staff a Park Ranger position.
This project is the most important element for completing the other projects listed below and for continuing to protect the park into the future. At least one additional staff person to coordinate and monitor projects, work with neighborhood and friends groups and advocate for the park.
- Perform a Recreational Use Survey.
Work with State Parks and local universities to develop a baseline survey; use staff and neighborhood associations to administer and tabulate results.
- Establish a program to periodically monitor natural resources and recreation use impacts.
Work with local resource agencies and universities, as well as high schools and non—profit groups.
- Acquire land for and develop a major new park trailhead/ entry.
Explore the possibility of acquiring land along US 30 at selected sites in conjunction with other projects. For example, work with TriMet to provide transit parking areas at trailheads; look for land donations or shared use parking areas in the industrial area by Yeon and Kittridge. Develop partnerships with local businesses that would benefit from trailhead development.
- Establish a program to acquire in-holdings and other properties.
Work with Metro on property acquisitions; coordinate with county planners on future development plans. Support Friends of Forest

Park in fund raising efforts to acquire land; establish permanent fund for property acquisition.

- Establish an educational and interpretive program that addresses how park users can protect park resources while continuing to use and enjoy the park.

Work with user groups and volunteers to develop and implement interpretation and education programs.

- Increase the rate of ivy removal in all management units, with special attention to the North Management Unit where natural resources are of the highest quality.

Continue the work of the ivy removal team; educate neighbors about the importance of this work which may be the park's highest natural resource management priority.

South Management Unit

- Work with BES on protection and enhancement of Balch Creek and on redevelopment of Lower Macleay Park.

Continue to coordinate with BES as they work on water quality issues and the redevelopment of Lower Macleay Park. Tie this work to development of a new trailhead on US 30.

Central Management Unit

- Begin the natural resource management enhancement programs.

Work with local universities and resource agencies on forest management programs.

- Build the bike trail connections that will broaden the recreation opportunities in that unit.

Work with local neighborhood associations and volunteers on the local trail connections.

North Management Unit

- Build the Wildwood Trail extension.

Work with local neighborhood associations and volunteer groups.

- Protect the watershed, headwater and wildlife areas.

Work with local resource and planning agencies to coordinate protection and to monitor development plans outside the park.

Conclusion

Forest Park is the largest and one of the most important natural resources in the city and in the region. Adoption of this plan and its recommendations will further its protection and enhance its position as America's premier urban forest.

CHAPTER 1. INTRODUCTION

Purpose

Organization of the Plan

Plan Study Area

CHAPTER 1. INTRODUCTION

Purpose

The Forest Park Natural Resources Management Plan (NRMP) presents current information on natural resources in Forest Park and develops a set of goals and actions designed to guide management of natural resources and recreational use.

Develop goals and identify actions for park and ecosystem management

The plan looks beyond park boundaries recognizing its regional context: a rapidly growing metropolitan population, growing interest in and use of parks, an array of political jurisdictions, and a biologically connected landscape. The plan acknowledges that because it is one-of-a-kind, the park will face intense recreational demands—pressure to expand trails and facilities to accommodate greater use. With preservation of natural resources as a primary goal, the plan recognizes that Forest Park is threatened by overuse unless recreational activities are more actively managed and redirected. The development of other open space and natural area park facilities will be necessary to ease this focused demand so that Forest Park can remain a special place for generations to come.

This NRMP is a multi-purpose plan designed to accomplish the following objectives:

1. **Resource Inventory.** Identify Forest Park natural resources and provide quantitative and qualitative assessment of each
2. **Impact Assessment.** Identify all impacts (internal and external, actual and potential) to Forest Park natural resources
3. **Resource Management.** Prescribe how to protect and enhance Forest Park natural resources at a sustainable level
4. **Use Management.** Identify appropriate forms and levels of recreation and education for Forest Park and develop standards for park improvements, management actions and uses
5. **Monitoring Programs.** Implement database and geographic information systems (GIS) for monitoring natural resources and recreational use and for providing day-to-day management and public information
6. **Satisfy Environmental Regulations.** Meet the requirements for legislative adoption and satisfy the approval criteria for Natural Resource Management Plans.



Peregrine Falcon

Organization of the Plan

The Management Plan is organized into the following parts:

Plan Summary and Implementation

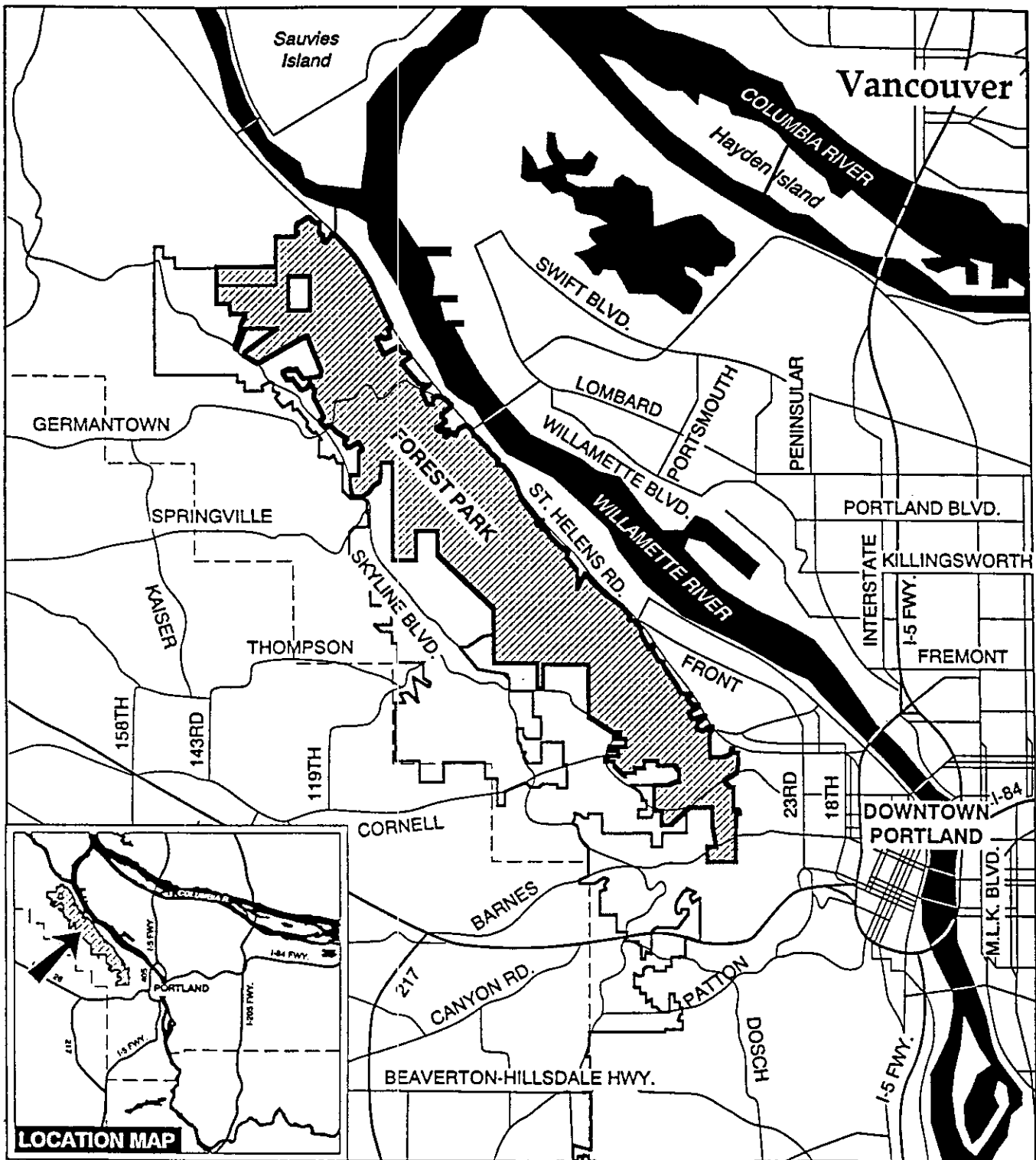
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|------------------|---|
| Chapter 1 | Introduction
Review of plan purpose, process and study area |
| Chapter 2 | Background and Policy Framework
Review of history, prior planning and policy |
| Chapter 3 | Existing Natural Resources and Values
Assessment of Forest Park resources |
| Chapter 4 | Park Use
Review of existing and projected park use |
| Chapter 5 | Park Management
Review of current management and future needs |
| Chapter 6 | Goals, Strategies and Actions
Synthesis of goals, strategies and proposed actions |
| Chapter 7 | Projects
Review of projects proposed to implement goals |
| Chapter 8 | Implementation Procedures
Procedures for quasi-judicial review of projects |


Other elements of the plan—consultant reports, GIS maps and plan appendices—are available from Portland Parks and Recreation.

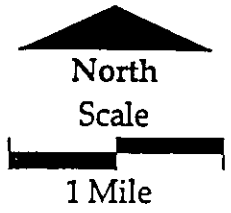
Plan Study Area

Forest Park is generally bordered by St. Helens Road and Skyline Boulevard to the east and west, and by Burnside and Newberry Roads to the south and north. The area is adjacent to urban northwest Portland neighborhoods on the south, rural/suburban lands on the west and north and urban and industrial areas with interspersed residential nodes on the east. Limited areas of agricultural and commercial use are also present along its borders.

Forest Park is the target management area; however, interspersed parks are included and, for the purpose of this plan, considered part of Forest Park. These parks include Macleay, Holman, Clark-Wilson, Adams and Linnton, and Pittock Acres. Areas adjacent to Forest Park were also included in the planning process for the purpose of examining off-site impacts to the park. These areas include the upper watersheds (west of the park), wildlife corridor (north), linkages to the Willamette River (east), land within the Balch and Miller Creek watersheds, and other public and private land bordering the park.



 Management Plan Area



December 1994
Bureau of Planning
City of Portland

FOREST PARK NATURAL RESOURCES MANAGEMENT PLAN

CHAPTER 2.

BACKGROUND AND POLICY FRAMEWORK

Introduction

Landscape Setting

Landscape History

History of Forest Park

West Hills Settlement

Early Planning in Forest Park

Olmsted Plan

Bennett and Moses' Plans

Committee of Fifty - 1944

A Management Plan for Forest Park - 1976

Policy Framework

Portland Planning Policy

The Portland Comprehensive Plan

Northwest Hills Study

Balch Creek Watershed Protection Plan

Scenic Resources Protection Plan

Northwest Hills Natural Areas Protection Plan

Portland Parks and Recreation Policy

Forest Park: One City's Wilderness

Forest Park's Wildlife Corridor: A Position Paper

Park Futures: A Master Plan for Portland's Park System

Forest Park Trails Policy Task Force Recommendations

Multnomah County Planning Projects

West Hills Wildlife Corridor Study: Phase 1

A Study of Forest Wildlife Habitat in the West Hills

Mult. Co. Natural Area Protection and Management Plan

West Hills Planning

Other Agency Plans

Balch Creek Management Plan (BES)

Regional Planning Projects

Metropolitan Greenspaces Master Plan

State Policy

Statewide Planning Goals

Oregon State Parks (SCORP)

Federal Policy

Summary

CHAPTER 2. BACKGROUND & POLICY FRAMEWORK

Introduction

This chapter reviews Forest Park's landscape setting, early human history, and provides a short history of the park itself. The discussion then turns to past planning efforts in the area and the policy framework for the Natural Resources Management Plan.

Landscape Setting

Forest Park covers the entire hillside overlooking the confluence of Oregon's two major rivers: the Columbia and the Willamette. With the Cascades in the distance, two major rivers below, and broad valleys and the Coast Range behind, a more spectacular setting for a park is hard to imagine. The park is a major green spine linking the Portland metropolitan region with natural areas to the north and west and providing a stepping stone for species dispersal within the region. The park is one of the region's most prominent landmarks and has made a major contribution to the region's identity.

The region's green spine

The park is about two miles from the heart of Oregon's largest metropolitan area and, as such, serves as a vital refuge and link in the region's green infrastructure. It provides a place for Portland-area students and residents to learn about and experience a western Oregon coniferous forest ecosystem, which hosts an abundance and diversity of native plants and wildlife similar to that found in the forests of the Oregon Coast Range. Forest Park also contains a network of about 100 kilometers (60 mi.) of recreation trails including the Wildwood Trail—the largest completed section of the 40-Mile Loop. Plans are being developed to link Portland with the Pacific Coast via a "Greenway to the Pacific" trail. If successful, Portland's Wildwood Trail and 40-Mile Loop could one day form integral pieces of a trail connecting the Pacific Crest Trail with trails along the Oregon Coast.

Landscape History

The presence of Native Americans in the Portland area dates back more than 10,000 years. They 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

10,000 years of human habitation

period of drier and warmer conditions (the Alithermal), and the period of the return of a milder climate.

*Early post-glacial
and altithermal
(warmer and dryer)
periods*

The first human populations appearing in this early period found pine, fir, lodgepole pine and alder forests. Later, fir, spruce and hemlock moved into the lowland forests. At the end of the glacial period, the climate changed bringing conditions that were drier and warmer. With the onset of the Altithermal periods, the forests opened further, creating rich grasslands and scattered stands of oak. The surrounding mountains remained forested. Trees that required cooler and moister conditions retreated to the hills and mountains. Douglas fir and oak eventually dominated the lowlands. These were not dense forests but rather more a park land of prairies interrupted by open stands of trees.

These landscape 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. Douglas fir dominated the woodlands whereas hemlock and cedar were characteristic of riparian and swampy areas. Near the end of this second period, the rise in sea level and the subsequent flooding of the lower Columbia valley reduced the amount of riparian habitat available and brought sea water as far inland as the Columbia Gorge. The lower Columbia River contained brackish waters with associated tidal swamps, salt marshes and flats. Flood plains 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.

*Return of the milder
climate*

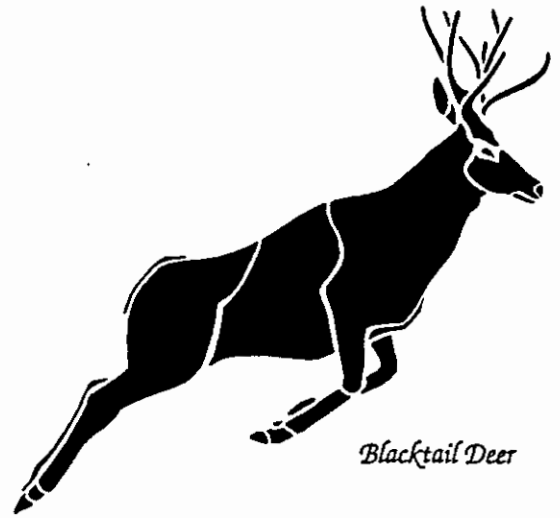
The third period was cooler and moister, creating a setting similar to those found by the first white explorers in the Portland Basin. When the sea level declined, extensive tracts of flood plain suitable for human settlement were created. For the past 3,000 to 4,000 years, the Portland area offered 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 Americans changed very little. What did change was the degree to which they relied upon 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 flood plain 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 used in making

tools, shelters and canoes. Certain medicinal plants grew 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 tangled riparian woodlands. Ash and willow, used in building shelters and making baskets and nets, were more easily found on the flood plains 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.



Blacktail Deer

Early historic accounts of the Tualatin Mountains describe a terrain of steep slopes, deep ravines and a tangle of brush and fallen timber. The hills were drained by many unnamed creeks into the Tualatin River to the west and the Willamette River to the east. The eastern uplands were densely forested in Douglas fir, cedar and hemlock, with thick undergrowth of vine maple, hazel and briars. There were probably some short-lived scattered openings in the forest cover due to fires.

Species composition similar to that found today

Archaeological research has recorded sites in the uplands and at the upland-flood plain 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.

Several branches of Chinookan-speaking people occupied the Columbia valley in the early nineteenth century. The Chinook tribes lived in the Lower Columbia area which includes the Columbia and Willamette River valleys. They consisted of approximately 12 smaller tribes. The Multnomah Chinook occupied Sauvie Island, Scappoose Bay, the Multnomah Channel, and the Vancouver Lake area. The Clackamas Chinook lived near the Clackamas River, at the southern end of the Tualatin Mountains.

A dozen Chinook tribes lived in the valley in the early 1800s.

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 estimated a Native population of approximately 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, on the bluff across the Willamette River from Forest Park. The second village, Neerchokioo, was located on the Columbia River near the present site of Portland International Airport.

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. They believed that mountains and forests were places where humans could contact the spiritual world and that fish, animals and plants were spirits who assisted the human race.

History of Forest Park

West Hills Settlement

Pioneer trails across forested hills are present-day roads

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

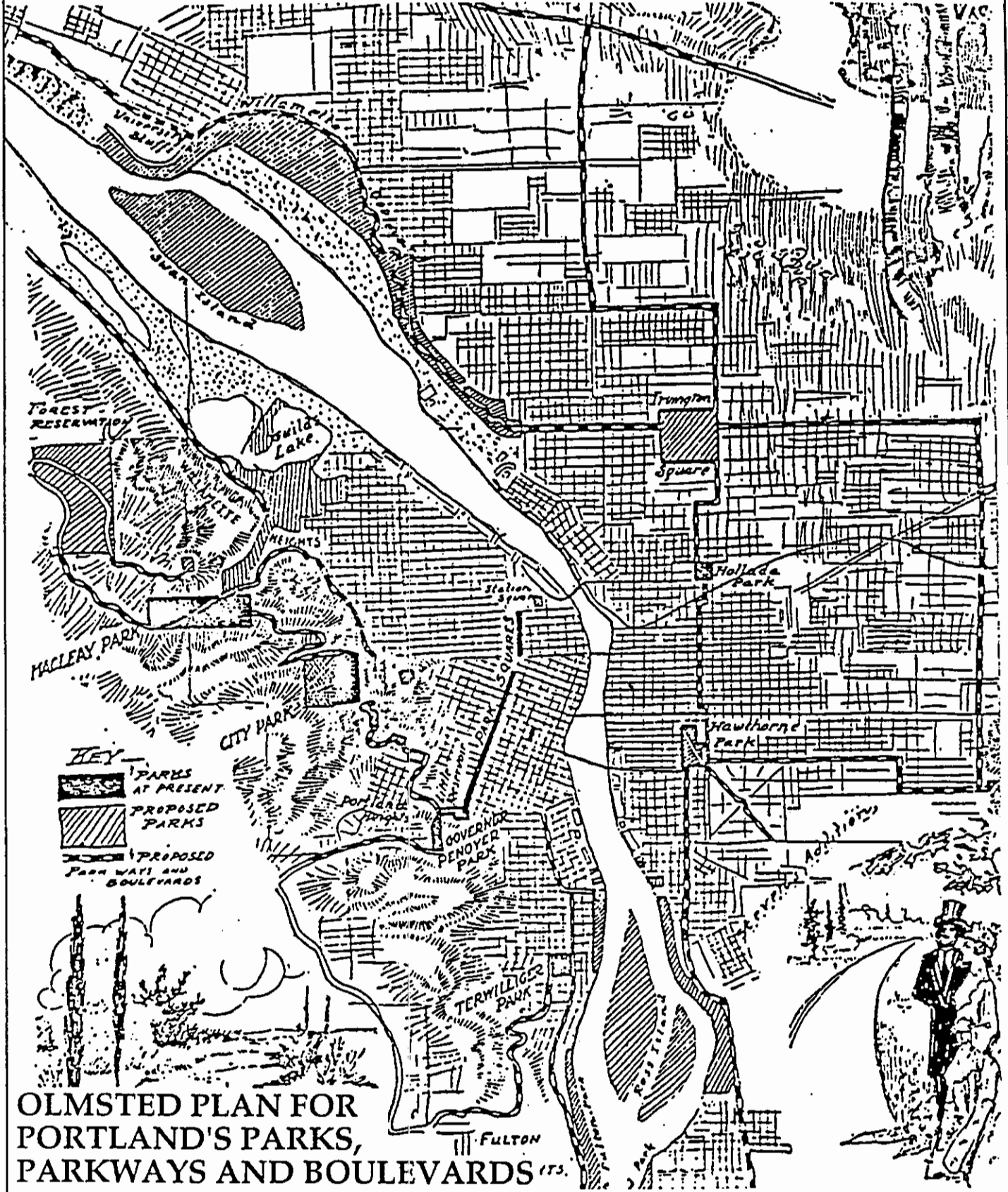
In the 1850s, the Federal government deeded much of the Tualatin Mountain land to settlers under the Donation Land Claims Act. The more level land along the ridge and base of the hillside was soon transformed into farm and residential uses. Development of the steeper, landslide-prone hillsides progressed more slowly.

Early Planning in Forest Park

Olmsted Plan

Olmsted's first to visualize forested park

In 1903, the Municipal Park Commission retained the nationally renowned Olmsted Brothers Landscape Architecture firm. John C. Olmsted came to Portland to conduct a city planning study. The Olmsted Brothers' report proposed a system of parks for Portland and provided a comprehensive framework for the development and maintenance of Portland's parks and parkways. The Olmsted study recommended preserving the eastern slope of the Tualatin Mountains



North

December 1994
Bureau of Planning
City of Portland

**FOREST PARK
NATURAL RESOURCES
MANAGEMENT PLAN**

as a forested park. Little action was taken on the Olmsted recommendations initially. The Lewis and Clark Exposition, for which plans were already underway at the time of the Olmsteds' visit to Portland, drew the citizenry's attention away from the elaborate system of parks and open spaces proposed by the Olmsteds.

Referring to the Forest Park area, the Olmsteds wrote:

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

"Future generations will...bless those wise enough to get such woods preserved."

The Olmsted brothers also noted that, "only recently has it begun to be realized what enormous advantages are gained by locating parks and parkways so as to take advantage of beautiful natural scenery." They concluded: "No use to which this tract of land could be put would begin to be as sensible or as profitable to the city as that of making it a public park or reservation...." (Olmsted 1903)

Bennett and Moses' Plans

Nine years later city planner Edward Bennett echoed the recommendations of the Olmsted Plan. Mr. Bennett devised The Greater Portland Plan of 1912 as an attempt to plan for a predicted population explosion, which was to occur in the upcoming decades. In his campaign for the establishment of a wooded parkway along the West Hills, Bennett emphasized that "the great woodland areas [of Europe] are the life giving elements of the city." He noted that the hills are important elements of the city and that "they will serve a splendid purpose...and form delightful incidents of a ride, walk or drive over the hills, and should be continuously joined by the parked roads...."

Later planners also saw the woods as a special place

Some forty years after the Olmsted report, city planner Robert Moses also echoed the findings of both the Olmsteds and Bennett in his "Portland Improvement" report. He wrote: "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.”

Housing development in the West Hills eventually began to climb the hillside following the construction in 1915 of Hillside Drive (now known as Leif Erikson Drive). The road meandered in and out of ravines along the eastern slope, ultimately connecting Thurman Street with Germantown Road. Several large subdivisions were platted along the scenic drive in anticipation of a major land boom following the Lewis and Clark Exposition. The steep terrain of the hillside, however, made building and road construction difficult. Also, the high cost of road construction prompted substantial protest on the part of many land owners who refused to pay the assessments. Ultimately, much of the land was forfeited to the City of Portland and to Multnomah County and has since remained in public ownership.

Committee of Fifty - 1944

Little action was taken to implement the Olmsted proposals for the hills north of the city until, in 1944, the Portland City Club appointed a committee to study the land use alternatives for the hills. Known as the Forest Park Committee of Fifty, the group was asked to present their findings and recommendations to the Club. The committee’s report strongly supported the creation of a large, forested park “for the benefit of the community.” Two years later, after an extensive publicity effort, the City Planning Commission adopted a report prepared by its Park Committee recommending creation of the park.

On September 25, 1948, dedication ceremonies for the 4200-acre “Forest Park” were held. The Committee of Fifty identified several objectives for the park. The objectives include:

Early objectives still apply

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

Shortly after the park’s dedication, the Portland Park Bureau asked the U. S. Forest Service to prepare an outline of management possibilities for the park. The resulting report, *Management Recommendations for Portland City Forest-Park* (1950), addressed possible recreational development scenarios (campground areas, trails, water facilities), forest protection (from fire, insects, decay, the elements, the public),

The first, little-known management plan

economic forestry (increasing forest productivity, harvesting timber), consolidation of ownership (acquisition proposals), and publicity (public education program). The report also included planting recommendations designed to meet economic forestry, forest protection, recreational and educational objectives.

One proposal set forth by both the Committee of Fifty and the Forest Service report was never effectively implemented. This proposal was "to grow timber which will in time yield an income and provide a demonstration forest." Such timber harvest never came to pass and, in the early 1990s, the Portland City Council unanimously approved plans to protect the natural resources of Forest Park.

Conventional park treatments should be resisted.

In February 1960, the Forest Park Committee of Fifty published the *History of Portland's Forest Park*. Though primarily a historical document the report does provide "A Look Ahead." For example, the report argues that pressures to widen, straighten, pave and build more roads should be resisted. Also, as to anticipated requests for "play equipment, play courts, swimming pools, with accompanying buildings, parking lots, etc.," the report notes that "this is not the place for such active recreational uses."

A Management Plan for Forest Park - 1976

Building on the early work of the Forest Park Committee of Fifty and the Forest Service, the City Council adopted *A Management Plan for Forest Park* in November 1976. The plan's major purpose is "to provide an undisturbed, natural forest and park environment for the quiet recreational enjoyment of the people of the City of Portland." The City Council resolved to minimize the overt, man-made management and development of the area and to adopt an approach stressing conservation and preservation of the naturalness of the resource.

An early, multiple use management plan

The plan recognized the inseparable interrelationships between all of the elements of the park's forest community (plants, animals, water, air and man) and accounted for these elements in planning and execution. The management objectives addressed the following elements:

- Recreation (trails, facilities, users and measurements of use)
- Wildlife (habitat needs, protective measures, interpretative and tour program)
- Forest (plant species, recreational and educational enhancement, and forest product removal)
- Protection (from fire, vandalism, and insects and disease)
- Education (public awareness and volunteer opportunities)
- Land management (update acquisition policy and boundary, implement policy)

- Finances (revenues available for Forest Park)
- General management (volunteers, review of conflicting uses, Leif Erikson Drive, herbicides, annual work program, review and update every five years, and city staff support)

Though the major goal was “an undisturbed, natural forest,” the Management Plan proposed several human disturbances: “removal of...trees to open vistas,” “salvage of damaged trees,” “clearing of rights-of-way,” and “removal [and] sale of forest products.” These recommendations echo those of the Committee of Fifty and the Forest Service and are no longer appropriate for the park given current city policies and regulations. Other recommendations of the plan, such as the construction of sanitation facilities “throughout the park,” also warrant careful review for consistency with current regulations.

Some early objectives no longer apply.

Policy Framework

This section provides a review of past policy planning efforts related to Forest Park. The plans and actions discussed below show an evolving policy, one emphasizing more and more the protection of the park’s natural and scenic qualities through limits on neighboring land uses, measures to preserve fish and wildlife habitat, and efforts to manage park use. Local policy documents are reviewed first, in chronological order, followed by regional, state and federal policy. Where applicable, policy implications for the management plan are identified.

Portland Planning Policy

The 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 goals and policies address metropolitan coordination, urban development, neighborhoods, housing, economic development, transportation, energy, environment, citizen involvement, plan review and administration and public facilities.

The Comp Plan has an environmental goal and an NRMMP policy.

Goal 8, Environment, is particularly applicable to development of the Management Plan. 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.” Ordinances adopted in 1991 recognized the Balch Creek Watershed and the Northwest Hills as “special areas” within Comprehensive Plan Goal 8. Forest Park is located within these two

areas and the applicable policy documents are described in more detail below.

Policy 8.18 of the Comprehensive Plan specifically addresses Natural Resource Management Plans:

The development of natural resource management plans for large parcels or areas is encouraged. Overlapping plan and permit requirements for natural resource management plans and developments therein will be minimized. Plans approved through the regulations of the Environmental zones are deemed to be in compliance with Policies 8.9 through 8.17.

Northwest Hills Study

In November 1985, the City Council adopted the *Northwest Hills Study*. The purpose of the study was to determine appropriate land use densities and patterns west and south of Forest Park in light of the city's and other public agencies' ability to provide adequate urban services to support land development. The plan rezoned certain areas for farm and forest uses and called for the development of standards for hazardous slopes or unique features and specific conditions for subdivisions and Planned Unit Developments.

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 Planning Goal 5 requirements. The purpose of the plan is to protect the natural resources of the Balch Creek Watershed. The watershed area includes Macleay Park, Adams Park and a portion of Holman Park, all of which are contained within Forest Park. To the north, the plan area borders the *Northwest Hills Natural Areas Protection Plan* area (described below).

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 large portions of the basin. The adopted regulations include a development season limitation, special erosion control standards, and a 90 percent forest cover requirement.

One of the issues in the Balch Creek watershed is jurisdiction: about half the basin is located outside the Urban Growth Boundary in unincorporated Multnomah County. Efforts are currently underway at the county to examine Balch Creek. Coordination of resource conservation efforts is ongoing and county staff serve on the Technical Advisory Committee for the Forest Park NRMP.

Balch Creek is at the southern end of the park.

Coordination of resource protection efforts for Balch Creek

Scenic Resources Protection Plan

City Council adopted the *Scenic Resources Protection Plan* in March 1991. The plan is intended to protect specific scenic views, sites and corridors in compliance with Statewide Planning Goal 5.

The plan identifies Forest and Macleay parks as “scenic sites” and Forest Park North, Forest Park South and Inspiration Point as “viewpoints.” The plan also identifies four specific scenic corridors located within or adjacent to Forest Park. These designated scenic corridors are NW 53rd Drive, NW Skyline Boulevard, NW Germantown Road and Leif Erikson Drive. The scenic corridor regulations limit building length and development in side setbacks, screen mechanical equipment, restrict signs and preserve trees.

*Scenic sites,
viewpoints and
corridors*

Northwest Hills Natural Areas Protection Plan

The City Council adopted the *Northwest Hills Natural Areas Protection Plan* in July 1991. This is a Goal 5 plan similar to the Scenic Resources and Balch Creek Plans discussed above. It applies measures to protect forest and watershed resources in the Northwest Hills (including most of Forest Park).

One plan policy deals directly with recreational and educational values of Forest Park:

Policy #2: Recreation and Education

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

Objectives

- 2.1 Retain and enhance the passive recreational and educational values of Forest Park through ecological management practices which enhance the urban wilderness character of the park.
- 2.2 Avoid park development activities which remove forest vegetation, introduce non-native plants or add impervious surfaces.
- 2.3 Preserve indigenous plant and animal communities to retain and enrich opportunities for learning about the western Oregon coniferous forest ecosystem.
- 2.4 Apply ecological management principles to the construction and maintenance of trails; plan future trail extensions which result in the least possible impact to sensitive habitat areas and watershed resources; remove or relocate trails which lead users into sensitive resource areas.

*City policy
recognizing
significance of park
values*

Specific regulations for the area were adopted, including creation of a development season and criteria for habitat protection, erosion and

special treatment of the Miller Creek Watershed. A Parks and Open Space criterion was also adopted: "Overall scenic, recreational, educational and open space values of Forest Park must not be diminished as a result of development activities." The Skyline Plan District was created to allow transfer of development rights for fully protected properties (normally surrounded by the park).

Portland Parks and Recreation Policy

Forest Park: One City's Wilderness

In July 1982, biologist Marcy Houle prepared a report on Forest Park's wildlife and habitat interrelationships which several years later was adapted into a guide book by the same name. This report establishes some of the first baseline data collected on Forest Park's wildlife. The report concludes with recommendations which address protection and enhancement of plant and wildlife habitat, protection of the wildlife corridor, and environmental education. These recommendations are incorporated, where appropriate, into the Management Plan.

Forest Park's Wildlife Corridor: A Position Paper

In May 1990, the Portland Parks and Recreation developed a position paper on the wildlife corridor linking Forest Park with natural areas as far away as the Oregon Coast Range. This paper established a goal of ensuring that:

Forest Park remains as effectively linked to the Coast Range and nearby rural areas as it is today (1990) as measured by the diversity, quantity and frequency of wildlife use and penetration on the Park; and as measured by the amount and quality of wildlife habitat and cover within the 'area of concern.'

Though some of the issues identified in the paper have been resolved since 1990, most of the objectives are still applicable today.

Park Futures: A Master Plan for Portland's Park System

The *Park Futures Plan*, completed in November 1991, defined a vision for the city's parks and facilities for the next 50 years. The plan identified issues facing the city parks system and established policies and an action plan to guide park improvements over the next five to 15 years. Strategies to address these issues include the following:

- Improve awareness of trails and other opportunities in natural areas through new and improved maps, brochures, interpretive signs, exhibits, guided walks, etc.
- Foster an attitude of "active stewardship" towards the management of natural areas.

Coast Range link

A 50 year vision

- Establish an environmental education program for school-age children and adults, in cooperation with the school districts and other providers.

The plan presents goals and policies for natural areas and environmental protection, several of which are addressed by the NRMP. Specific actions proposed for Forest Park are (1) prepare a master plan for the park, (2) replace the Macleay Park water line, (3) develop a new brochure on trails, (4) improve and identify trailheads, and (5) develop a self-guided nature trail. To date, Action 2 has been completed; the remaining actions are addressed as part of this Management Plan.

Forest Park Trails Policy Task Force Recommendations

The Forest Park Trails Policy Task Force was convened to examine the bicycle/pedestrian and other user conflict issues on Forest Park trails, firelanes and roads, and to develop policy recommendations. The Task Force recommendations, completed in August 1992, reaffirm a trail management policy contained in the 1976 Management Plan for Forest Park, and provide a set of goals, guidelines and implementation strategies for trails.

The Goals for Trail Management are a crucial element of the overall management plan for the park because, as the recommendations note, "using trails is generally how citizens enjoy Forest Park." The guidelines and implementation strategies may need further review and articulation, particularly where specific standards and thresholds are implied but not established.

Trail recommendations incorporated into plan

The goals developed by the Task Force are as follows:

Goal 1: Protect Flora, Wildlife and Habitat.

Forest Park is unique. In spite of its proximity to an urban center, it remains representative of a natural Western Hemlock forest community. It contains enough biological diversity and ecological structure so that, if allowed to progress naturally, the potential exists for some areas of the park to return to a climax or old growth condition. Every effort should be made to establish and maintain a natural and stable ecosystem within the park and surrounding natural areas. It is vital that flora, fauna and habitat elements remain as free as possible from disturbance related to human activity.

Goal 2: Provide Opportunities for Passive Recreation.

Forest Park should offer the citizens of Portland opportunities for outdoor recreation in keeping with the Park's resource values. Forms of recreation must be appropriate for Forest Park

and must be passive in nature. Examples of passive recreation include walking, running, bicycling, riding horses, walking with pets, and observing fauna, flora, and other natural history features. Opportunities should be created for these activities which implies the need for appropriate facilities as well as controls on the level and location of the allowed uses.

Goal 3: Provide for Quiet, Reflective, Spiritual Experiences.

Citizens need opportunities within Forest Park to escape the urban environment. Forest Park should offer places of solitude for those who seek them out. These special places should provide park users with the feeling that they are alone and that they have entered an environment that is dominated by nature. These places should be reliably free from disturbance and conflicting uses should not be encouraged.

Goal 4: Provide Opportunities for Educational Use.

Forest Park is an educational resource for field study of biology, ecology, geology, forestry and other natural sciences. Educational use should be specifically encouraged. Trail location, design and guidelines for use should accommodate educational use.

Goal 5: Accommodate Use by a Diverse Population.

Forest Park should be readily accessible to a diverse population. Young, old, male, female, urban, suburban, individual, small groups, first time visitor and disabled should all find Forest Park easy to use and enjoy. This implies that facilities should be designed and built to achieve this goal.

Goal 6: Minimize User Conflict.

User satisfaction for Forest Park visitors should be high. Conflicts among various user groups should be avoided through a variety of methods.

Goal 7: Promote User Safety.

Trail management should support and promote safe use of Forest Park by all user groups. All users should feel safe when they utilize the park in a responsible manner.

Goal 8: Minimize Negative Impacts on Neighborhoods.

Forest Park is a regional resource. The park borders on fully developed neighborhoods, both residential and industrial. Impacts to adjoining neighborhoods such as parking, noise, litter, and offensive or illegal behavior should be minimized.

Goal 9: Protect the System of Trails, Road, and Firelanes.

A substantial investment has been made in trail and road systems within Forest Park. The system should be protected from unacceptable negative impacts by users.

Goal 10: Involve Citizens in Trail Management Decisions.

The Bureau of Parks and Recreation should seek input from the general public, user groups, affected neighborhoods, and support organizations during the development or modification of trail management decisions.



Multnomah County Planning Projects

West Hills Wildlife Corridor Study: Phase 1

In April 1990, biologist Marcy Houle, author of the One City's Wilderness report discussed earlier, prepared *Wild About the City: Phase 1 of The West Hills Wildlife Corridor Study*. This report is a summary of current literature on landscape linkages and habitat fragmentation providing a conceptual framework for future planning in the Forest Park area and unincorporated Multnomah County. The report makes recommendations designed to sustain the viability of the wildlife species presently inhabiting Forest Park and the wildlife corridor. Several of the recommendations identify specific areas for further study which were considered as part of the NRMP planning process. Other recommendations address planning and management goals which were also evaluated as part of this process.

A Study of Forest Wildlife Habitat in the West Hills: Final Report

In March 1992, the second phase report of the West Hills Wildlife Habitat study was prepared by biologists Esther Lev, Lynn Sharp and Jerry Fugate. This report identifies existing levels of habitat fragmentation, provides limited baseline information of wildlife usage in the Forest Park area, predicts probable impacts of current development trends, and recommends ways to reduce the risk of species and diversity losses and to maintain the quality of wildlife and habitat. These recommendations and the new baseline information are incorporated, where appropriate, into the NRMP planning process.

County studies provide baseline data.

Multnomah Co. Natural Area Protection & Management Plan

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.

West Hills Planning

In January 1993, Multnomah County amended zoning of forest lands outside the Urban Growth Boundary in response to new state

regulations. In areas near Forest Park, 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 or meet conditional use requirements.

The County has recently implemented new land use controls within the Balch Creek Watershed and designated several other streams and habitat areas in the Forest Park vicinity as significant. New development regulations are proposed for these areas.

Other Agency Plans

Balch Creek Watershed Stormwater Management Plan

The Bureau of Environmental Services (BES) is in the process of developing a management plan for the Balch Creek watershed. The primary objectives of the plan are to reduce flood potential, improve water quality, enhance fish and wildlife habitat, and improve recreational and educational opportunities. Enhancement projects proposed in the draft BES plan are reviewed and incorporated in Chapter 7, Projects.

Regional Planning Projects

Metropolitan Greenspaces Master Plan

Metro initiated the Metropolitan Greenspaces Program to identify and protect natural areas within the Portland metropolitan area and Clark County, Washington. The program is a cooperative effort with cities, counties, special districts, nonprofit organizations and citizens. The goal is to establish a regional system of natural areas, parks and open spaces which are connected by trails and greenways.

Forest Park is a regionally-significant natural area.

The Metropolitan Greenspaces Master Plan (July 1992) identifies Forest Park as a regionally significant natural area and the largest protected natural area in the metropolitan region. The plan notes that the park provides "significant wildlife habitat, providing ecological connection between Columbia River and the Tualatin Valley." The plan also identifies a "Portland to the Pacific Trail" as an inter-regional trail and the 40-Mile Loop/Wildwood Trail as a major part of the "greenspaces regional trail system." Development of the Forest Park NRMP supports Metro's goal of "protection [of regionally significant natural areas] through resource management plans."

State Policy

Statewide Planning Goals

Oregon's statewide land use planning program was established by Senate Bill 100 and adopted by the Legislature in 1973. 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.

There are 19 Statewide Planning Goals. The first goals establish a decision-making process. Others cover topics such as agriculture; forestry; 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. Goal 5 covers natural, scenic and open space resources and is directly tied to the present resource planning effort (several Goal 5 plans are discussed earlier in this chapter). Findings of compliance with each applicable goal are presented in the ordinance for the Forest Park NRMP.

Oregon State Parks

The *Statewide Comprehensive Outdoor Recreational Plan 1988 - 1993* (SCORP) was developed by the Oregon State Parks and Recreation Division as part of a regional effort to identify recreational needs based on the interstate visits for Oregon, Washington and Idaho. The study concluded that the Portland Metropolitan Area was one of two regions of Oregon with the greatest relative need for recreational facility development. The Portland area showed significant disparities in supply for measured use in almost every recreational activity. The study also found that the leading recreational activity in the Portland area was hiking and walking.

Hiking and walking—Portland's most popular recreation

The 1994-99 SCORP provides the following additional information on recreational use and needs:

- Need to provide wildlife and natural education, hiking and wildlife viewing programs.
- Pronounced preference for semi-primitive and primitive recreation settings, especially close to home.
- Need to design and manage facilities to alleviate crowding.
- Need to educate public about location of recreational resources.

Federal Policy

The Clean Water Act applies primarily to water resources in the Forest Park 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 this NRMP is consistent with these objectives.

Summary

Human use of the landscape over the last 10,000 years can be divided into three periods:

1. The early post-glacial setting
2. The period of drier and warmer conditions
3. The period of the return of a milder climate

The Chinook tribes were the first humans to inhabit the area and, during the last 10,000 years, the resources of interest to them changed very little. Change was evident in the degree to which they relied on particular resources and how they shaped their settlement patterns, and was closely tied to the changes in climate over this period.

*Plan builds on
Olmsted legacy*

Past planning efforts within the Forest Park area began in the early 1900s with the proposals of the Olmsted Brothers and emphasized preservation of neighborhood livability, open space, and natural and scenic resources. These elements are present in the Forest Park NRMP, as are measures to balance resource preservation with recreational needs. The policy framework for the plan includes compliance with Statewide Planning Goals and Portland Comprehensive Plan Goals and Policies for the environment. The plan is consistent with federal, state, regional and local resource conservation programs. Over time, City policy relating to management of Forest Park has evolved, emphasizing more and more the protection of the park's natural and scenic qualities through limits on neighboring land uses, measures to preserve fish and wildlife habitat, and efforts to manage park use.

CHAPTER 3.

EXISTING NATURAL RESOURCES AND VALUES

Introduction

Importance of Forest Park Resources

Overview of Natural Resources

Geology

- Geologic Formations
- Seismic Potential
- Geologic Hazards

Soils

- Soil Types
- Existing Soil Conditions & Management Interpretations

Hydrology

- Creeks and Watersheds
- Wetlands

Vegetation

- Findings and Interpretations
- Vegetation - Major Species Maps
- Plant Community Classification
- Vegetative History
- Stand Structure and Species Composition

Landscape Ecology

- Ecological Characteristics
- Existing and Potential Risks and Hazards

Fauna

- Mammals
- Birds
- Amphibians and Reptiles
- Fish
- Habitat Types
- Fragmentation and Habitat Loss
- Fragmentation in Forest Park; A Case Specific Approach

Summary

CHAPTER 3. EXISTING NATURAL RESOURCES AND VALUES

Introduction

This chapter presents a review of natural resources in Forest Park. Appropriate ecological management of these resources is a primary objective of the Forest Park Natural Resources Management Plan. The chapter sets the stage for the related analysis of park use (Chapter 4) and park management (Chapter 5), and provides the basis for the development of plan goals, strategies and actions (Chapter 6) and proposed projects (Chapter 7). The chapter begins with a review of resource functions and values. Forest Park natural resources are then examined, using the findings of resource consultants and other studies.

Importance of Forest Park Resources

Believed to be the largest forested urban park in the country, Forest Park is a landmark. The Natural Resources Management Plan is designed to preserve and manage this unique urban forest and the numerous values it provides. This section describes these values in more detail, beginning with the forest and other natural features, then turning to the snaking paths and panoramic views.

The forest, covering all but a few acres of the park, provides important resource values. 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 streams. By filtering water, the forest maintains good quality drinking water for nearby residents who use wells. By decreasing runoff and increasing groundwater infiltration, the forest protects downstream neighborhoods from flooding. Also, by stabilizing the soil and reducing erosion, the forest protects the community from landslides and other land hazards.

Forest Park provides a good example of the Pacific Northwest's western hemlock forest community. This community is unique among all temperate forests in the world.

The forest provides habitat for local birds, mammals, reptiles, amphibians and insects. The structural components of the forest—the tree canopies, branches, trunks, snags, downed logs, shrubs and herbaceous plants on the forest floor—provide breeding, feeding and

"...A boggling abundance of wood and wildlife, all within the municipal limits of Portland. A lush idyll of luxuriant green, the park has moist dirt paths that snake through rich tangles of bush and branch, giving way to panoramic views of the valley, a thousand feet below." (New York Times, 2/20/94)

Forest

Habitat

refuge areas for many species of wildlife. Particularly important is the substantial habitat territory that the park contains, which far exceeds in size any other forest or non-forest habitat in the city. The forest canopy also helps to maintain stream flows, filter out potential pollutants and moderate stream temperatures, thereby sustaining viable habitat for fish, amphibians and aquatic organisms as well as providing an important upland water source for terrestrial wildlife. Urban 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.

Urban Buffer

The dense, coniferous and deciduous forest acts as a buffer from the sights and sounds of the large urban metropolis. The forest mutes the noise of highways and nearby industrial activities and absorbs certain air pollutants caused by auto and industrial emissions. The forest also serves as the lungs of the city, providing fresh air to the entire region.

Climate

The forest also moderates climate extremes. The microclimate of the forest, created in part by the shade of the vegetation and the transpiration of water from the leaves, keeps surrounding air at an even temperature. The forest thus acts as a natural air conditioner for the city, cooling the air during the day and warming it at night.

Soils

Forest Park soils provide habitat for complex plant and animal communities. Soil microorganisms, seeds and root stocks, nutrients, oxygen and moisture play essential roles in supporting life above the ground. Soil also provides water management functions, effecting water recharge, discharge and storage.

*Wetlands and
Water Features*

Water resources such as wetlands, surface drainages, groundwater reservoirs and precipitation are contributing features of the water cycle. These resources recharge groundwater, control erosion and provide flood storage, desynchronization and conveyance functions. The park's natural water features perform important water quality functions by slowing surface waters, allowing deposition of sediments and associated nutrients, metals and organic contaminants. Water also is essential to plant and animal survival and, like soil, is an irreplaceable resource.

Soil, 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 the neighborhood's scenic, recreational and educational values, and contributes to Portland's high quality of life.

On another level, Forest Park is a major defining element of the Portland landscape. Rising to elevations exceeding 300 meters (1,000 ft.), Forest Park is visible from miles away. The park and adjacent forest provide a backdrop to the city and add visual relief to nearby urbanized areas.

*"The emerald arms
embracing the city"*

Forest Park's resources provide important educational values that 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. In the words of a local tenth grade student, "Greenspaces teach you how to think." Adults use the park and its resources for bird watching, nature study and scientific research. The Portland Audubon Society and the Hoyt Arboretum, located near the lower end of the park, provide an important hub for many of these activities.

*Education and
Recreation*

Forest Park contains locally significant and in certain cases regionally unique 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, sediment and erosion control, flood storage and desynchronization, neighborhood livability and scenic amenities, 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, as well as to out-of-town visitors.

Summary

The Forest Park NRMP addresses these important resource values in a comprehensive manner by planning for resource protection and controlled use over the long term and on a park-wide basis.

Overview of Natural Resources

The natural resources and physical setting of the City of Portland's Forest Park are unique. No other major city in the nation can claim a wilderness-like forest of this magnitude within its boundaries. The size and setting for this natural treasure are a tribute to the farsightedness of early urban leaders, as well as a fortunate set of circumstances that resulted in preservation of these lands in their undeveloped state. This section reviews the existing natural resources of Forest Park: geology, soils, hydrology, topography and slopes, vegetation and wildlife. Additional technical information on these resources is available from Portland Parks and Recreation.

Unique in the country

Geology

Forest Park is located on the east flank of the Tualatin Mountains and extends westward from St. Helen's Rd. along the edge of the Willamette River flood plain to the crest of the Tualatin Mountains along northwest Skyline Boulevard, an average distance of 2.5 kilometers (1.5 mi.). Elevations rise from about 75 feet mean sea level along the Willamette to 850 to 1,100 feet along Skyline.

*Park rests atop relics
of an ancient lava
flood*

The east flank of the Tualatin Mountains was formed by the dipping lava flows of the Columbia River Basalt Group. The park landscape is deeply dissected by streams originating along the crest and draining eastward to the Willamette River. Stream gradients reach as much as 11.5 percent (600 feet per mile), and the slopes of the canyon walls frequently exceed 100 percent. Inter-stream areas range from sharp ridges to narrow elongate plateaus. Benches in the eastward sloping mountain flank are also common. The drainage pattern is predominantly a parallel system with some dendritic modification.

Geologic Formations

Columbia River Basalt Group

The Tualatin Mountains are formed of a thick sequence of basaltic lava flows broadly designated as the *Columbia River Basalt Group*. These lava flows and the underlying older marine sedimentary rocks arch upward into a broad fold (anticline) forming the current mountain feature.

Individual flows may reach 100 feet or more in thickness. The total thickness of the basalt within the park area is in excess of 1000 feet and is made up of several separate flows. Buried soil profiles and weathered rock surfaces that developed between eruptive periods exist between some flows. The fractured nature of these rocks and the existence of permeable zones between flows causes them to transmit water readily, and because of this characteristic they are a source of springs and domestic water supplies obtained from drilled wells.

Portland Hills Silt

*Windblown silt over
basalt*

A thick deposit of yellowish-brown fine-textured soil, the Portland Hills Silt, covers much of the park. These soils are thought to have originated from out-wash deposits along the Columbia River Basin to the east which were later wind-deposited over much of the park.

Portland Hills Silt is a major feature of the Cascade and Goble soil series described later in this report.

Seismic Potential

Fault System

Several geologic faults have been inferred within or immediately adjacent to Forest Park. The extent of these faults and timing of their activity is not totally understood; however, they strongly suggest a significant past crustal movement. Two such faults parallel the Park to the east and west. One extends the length of the Park along the east toe of the Tualatin Mountains (approximately along Highway 30). The second longitudinal fault is to the west of the Park along the edge of the Tualatin Valley. No evidence of recent fault movement has been observed along the traces of these faults.

Fault at the base of the park along St. Helens

Earthquake History

Within recorded history the Portland area has a significant record of seismic activity. Beginning in 1846 seventeen recorded earthquakes with a Richter magnitude in excess of 4.0 have occurred. Since 1961 there have been 7 events ranging in magnitude from 4.3 to 5.8. The recurrent rate in the Portland area for earthquakes of magnitude 5.5 and greater is 100-150 years.

Geologic Hazards

The following kinds of geologic hazards were inventoried in Forest Park: Old Landslides, areas of Portland Hills Silt, Potential Rockfall Areas and Potential Block Landslides.

These areas are presently stable, but could present some level of risk in the event of strong seismic activity or construction. Extremely heavy rainfall could also trigger movement of rock or soil. Old landslide areas are shown on the accompanying maps.

Soils

Three dominant soil types are found in Forest Park: Cascade, Goble and Wauld. Important features and descriptions of these soil types are included in Table 2.

Soil Types

The Cascade and Goble soils, often referred to as Portland Hills silt, have similar physical characteristics, capabilities and limitations. They differ slightly in two basic characteristics: Cascade soils are generally found on the broad rolling ridgetops of the park, formed from windblown silt deposits. The Goble soils, formed from windblown silt and volcanic ash, usually occur on hillsides and ridges.

Different soils on ridgetop, on slopes and along streams

The Wauld soil is substantially different from the Cascade and Goble soils. It contains a higher proportion of clay in the subsoil and is very

rocky. This soil is generally found at the base of steep hill slopes and drainage side-slopes. Its steep, shallow, rocky characteristics contribute to a moderate windthrow hazard.

Other soils found in the park cover less than one percent of the area and have characteristics similar to the Cascade, Goble or Wauld soils.

Table 2. Features of common soil types in Forest Park.¹

Feature	Cascade Soil	Goble Soil	Wauld Soil
Site Index, DF	150-165	145-155	130-145
Fragipan	20-30 in.	30-45 in.	No
Texture	Silt Loam	Silt Loam	Gravel Loam
Root Depth	20-30 in.	30-48 in.	20-40 in.
Erosion Hazard	High	High	Slight-High
Seasonal H ₂ O	18-30 in.	<48 in.	No
Building Site Limitations	Moderate-to-Severe	Severe	Severe
Sanitary Facilities	Severe Limitations	Severe Limitations	Severe Limitations

Existing Soil Conditions and Management Interpretations

Forest Park is generally well-protected from erosion by the almost continuous covering of vegetation and plant litter. The natural background rates of soil erosion in the park are very low, but some minor sedimentation occurs in streams even without disturbance.

Because of the steep terrain and fine-textured soils, a minor amount of accelerated erosion was found in disturbed areas where soil was exposed. This includes firelanes, roads and trails that exist on all soil types. Installing adequate drainage devices on roads and trails could effectively mitigate accelerated erosion.

Hydrology

Creeks and Watersheds

There are some 48 kilometers (30 mi.) of creeks and creek tributaries which dissect Forest Park. All but one of the creeks drain east/northeast into the Willamette River; Miller Creek (at the north end of the park) drains into the Multnomah Channel. The largest creeks—Balch, Saltzman, Doane and Miller—have watersheds of 567, 393, 312 and 308 hectares (or 1400, 970, 770 and 760 acres), respectively.

¹ Refer to the *Soil Survey of Multnomah County, Oregon* for more comprehensive information.

Vegetation protects soils

Forest Park creeks characteristically have well-defined channels with steep gradients, high water velocity and "flashy" flows (quick to peak and recede).

The watersheds are distinguished from others in the city as having virtually full forest cover with only small pockets of private development in the upper basins. The high degree of cover helps to reduce the erosion and flood effects common to creeks with similar hydrologic conditions.



The National Wetlands Inventory classifies Forest Park creeks as either *upper perennial* or *intermittent* components of the *riverine systems*.

In the intermittent subsystem, water flows for only part of the year, while in the upper perennial subsystem, water flows throughout the year.

Wetlands

With the exception of a small wetland near Newton Road, there are no known wetlands in the park. This is primarily due to the steepness of the slopes and the lack of flat benches on which wetlands can develop. Cut slopes along trails and roads sometimes have saturated soils that harbor an occasional clump of wetland plants.

Outside of but near the park are several palustrine wetlands. A large forested wetlands and smaller emergent and scrub/shrub wetlands are located near the juncture of the Multnomah Channel and the Willamette. About 6 kilometers (4 mi.) south and on the east side of St. Helens Road is another wetland, a remnant of Doane Lake (the lake was bisected by railway embankments). And in the abandoned Rivergate quarry above Doane Lake is a smaller emergent and scrub/shrub wetland.

Vegetation

Forest Park contains a wide range of tree species and other vegetation. This section assesses the historic and existing ecological conditions of vegetation in the park. This information was used to (1) project the ecological development of vegetation, including plant succession, (2) assess potential risks from internal and external agents and possible contingency approaches to mitigate these risks, and (3) list potential management activities to meet the long-term objectives for the park. Detailed maps are available at the Parks and Recreation office.

Park vegetation is diverse and abundant

The species, size class and density codes are defined in Tables 3a, 3b and 3c. For example, *PSME4///* would represent a dense stand of large

Douglas fir trees. A more complex, two-storied stand with coniferous and broadleaf trees could be shown as: PSME4/ ACMA3///. This indicates scattered (10-40 percent crown closure) large (1/2 meter (20 in.) dbh+) Douglas fir growing in association with dense (70-100 percent crown closure) small timber (0.3-0.5 m. (12-20 in.) dbh) bigleaf maple. Although there are frequent inclusions of other species and conditions, attempts were made to map the predominant conditions. These same species codes were used in mapping to label plant communities and other vegetation.

Table 3a. Major Species Codes

ALPHA CODE	SCIENTIFIC NAME	COMMON NAME
ABGR	<i>Abies grandis</i>	grand fir
ALRU	<i>Alnus rubra</i>	red alder
ACMA	<i>Acer macrophyllum</i>	bigleaf maple
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir
THPL	<i>Thuja plicata</i>	western red cedar
TSHE	<i>Tsuga heterophylla</i>	western hemlock

Table 3b. Size Class Codes

CODE NUMBER	DESCRIPTION	SIZE RANGES DBH ²
1	saplings	1-6
2	poles	6-12
3	small timber	12-20
4	large timber	20+
5	old growth	60+

Table 3c. Density Class Codes: Percent Crown Closure

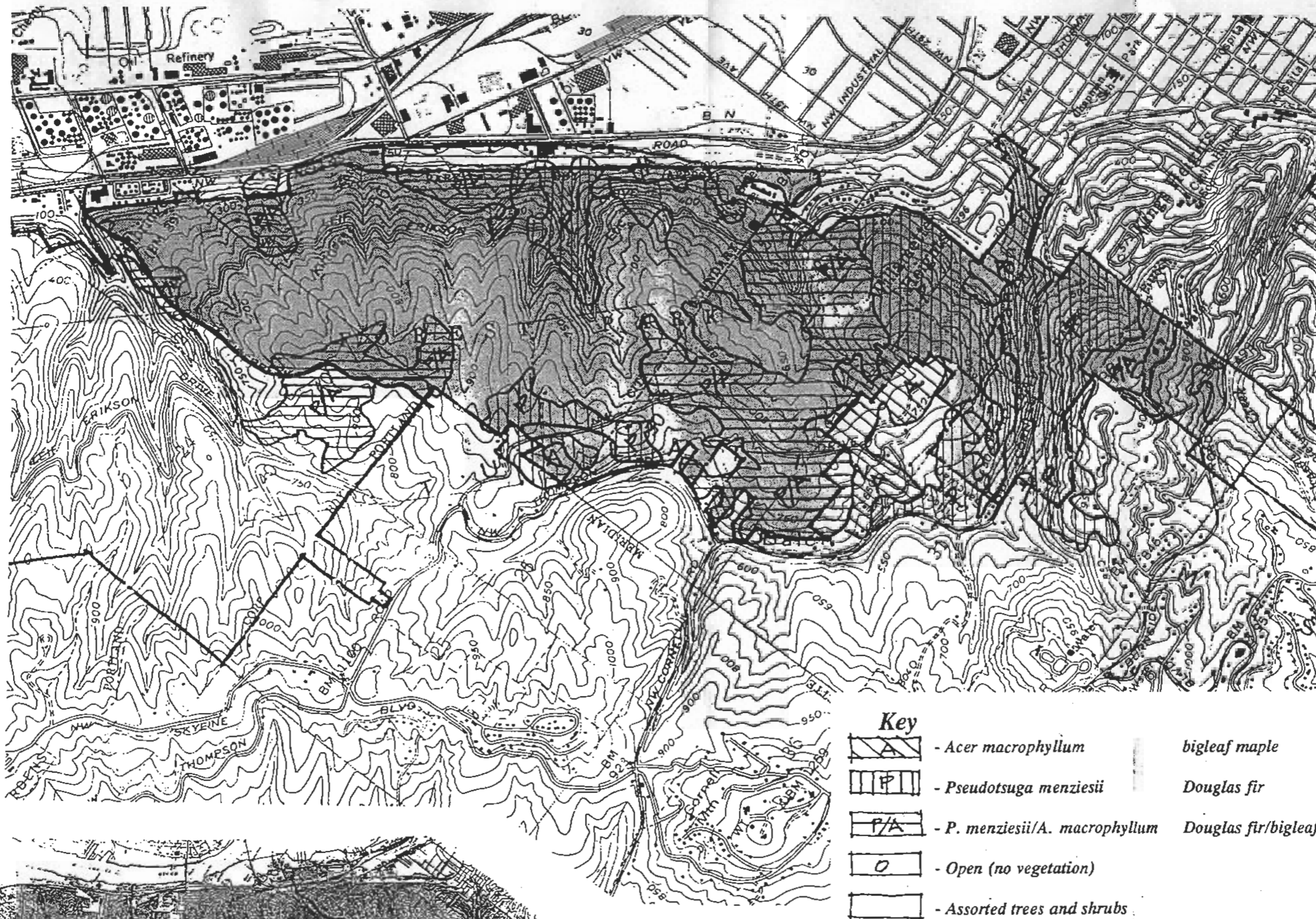
BAR CODE	STOCKING LEVEL - % CROWN CLOSURE
/	10-40% stocking
//	40-70% stocking
///	70-100% stocking

Findings and Interpretations

Stand History and Disturbance Patterns

The diverse flora of Forest Park is the result of the unique natural setting as well as the human and natural history of the area. Records of the vegetation that existed prior to settlement are somewhat sketchy and it is unclear whether the park was ever a continuous area of old

² DBH: Diameter (inches) at breast height, 4.5 ft. above ground level.



Vegetation - Major Species - South Unit

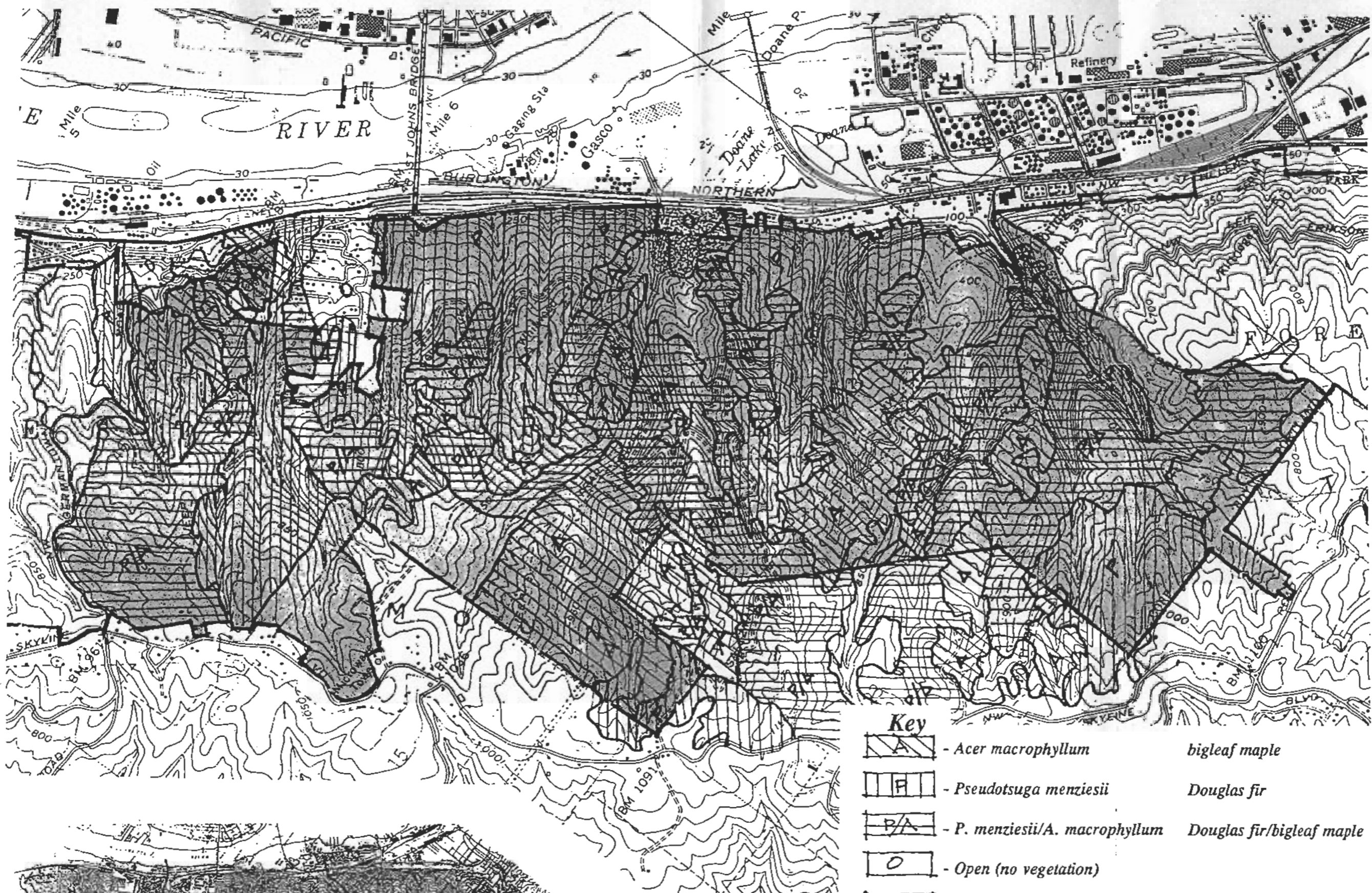
Note: More detailed vegetation maps are available from Portland Parks.

South Management Unit
Burnside to Fire Lane 1.

FOREST PARK
Natural Resources Management Plan



North Unit Central Unit South Unit



North Unit

Central Unit

South Unit

- Key**
- *Acer macrophyllum* bigleaf maple
 - *Pseudotsuga menziesii* Douglas fir
 - *P. menziesii/A. macrophyllum* Douglas fir/bigleaf maple
 - Open (no vegetation)
 - Assorted trees and shrubs

Vegetation - Major Species - Central Unit

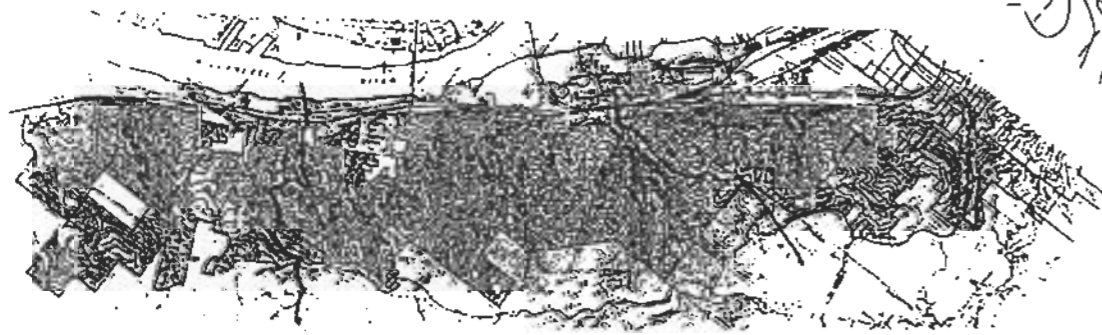
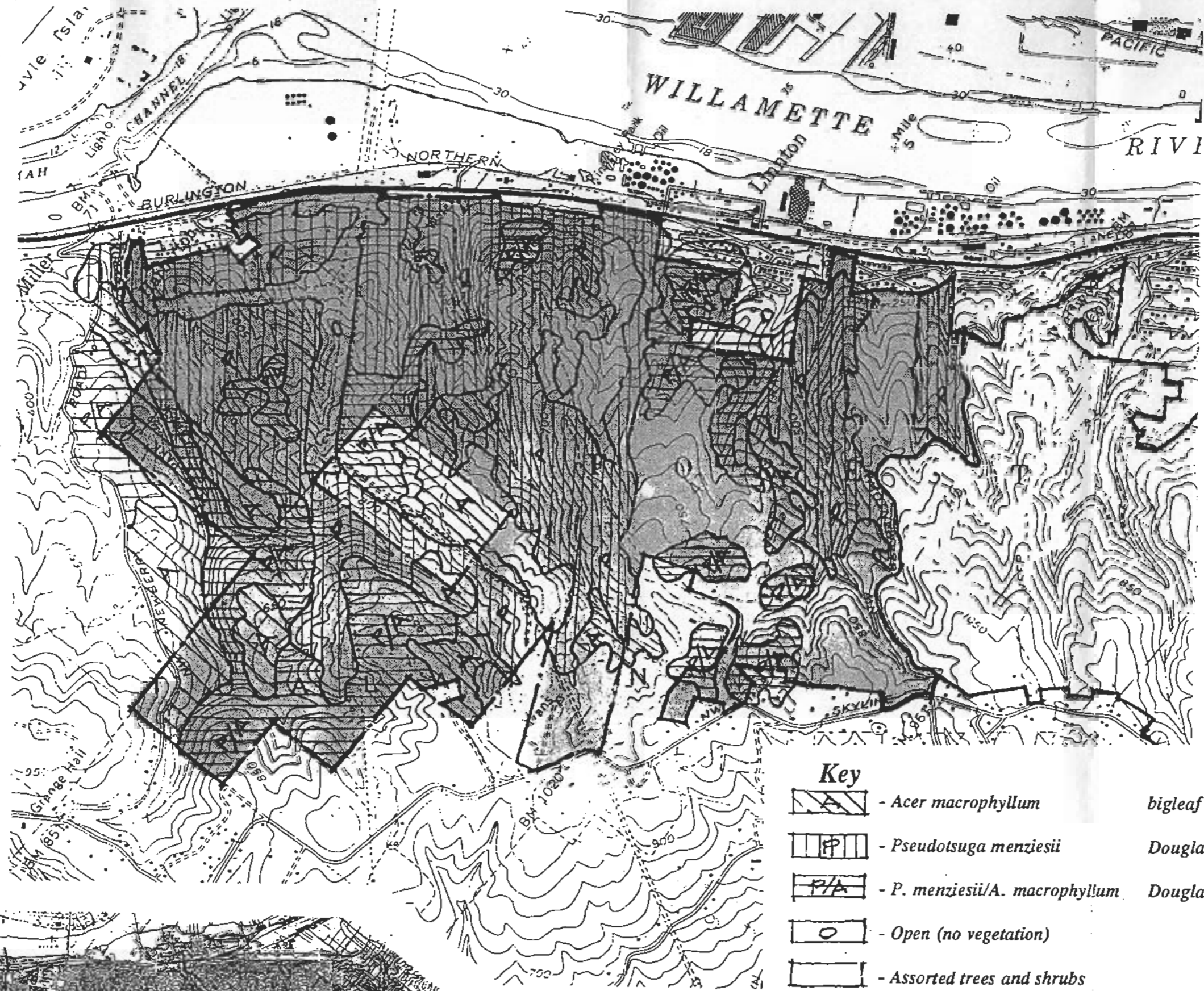
Note: More detailed vegetation maps are available from Portland Parks.

Central Management Unit
Fire Lane 1 to NW Germantown

FOREST PARK

Natural Resources Management Plan





North Unit

Central Unit

South Unit

Vegetation - Major Species - North Unit

Note: More detailed vegetation maps are available from Portland Parks.

North Management Unit
NW Germantown to Newberry

FOREST PARK
Natural Resources Management Plan



growth timber. Ecological interpretations for western Oregon and Washington indicate that historically only 40-60 percent of the landscape at any one time during the past 1,000 years was ever occupied by late succession old growth forests.

The natural fragmentation of large landscapes was undoubtedly due to major disturbances, primarily from fire and wind. The Douglas fir/conifer forests of the West Cascades have shown a natural recurrence interval of 100-400 years. Under such conditions, the older forests would tend to accumulate large amounts of biomass. Understory trees would often begin to grow beneath the crowns of the dominant Douglas fir and other conifers, and their crowns would interlace with the crowns of the large mature and old-growth trees.

*Fire and wind—
cause of early
natural
disturbances*

Because of the build-up of large amounts of fuel, as well as the creation of so-called "ladder" fuels that provide a continuous fuel connection from the forest floor to the tops of the overstory trees, crown fires were likely. These high-intensity fires often destroyed large forested areas and were followed by the creation of a new cohort (trees of generally the same age). With this type of fire regime, it is unlikely that much of the area would reach the so-called steady-state, climax vegetation, where only the most shade-tolerant species (such as western hemlock) would be perpetuated on an on-going cyclical basis.

These patterns of disturbance have important implications for the management of the park:

*Patterns and
projections*

1. Major disturbances are natural, infrequent (at least in this localized environment), and inevitable. Ultimately, if the forest is allowed to grow without human intervention, stand replacement disturbances will occur, and probably on a broad scale. As discussed later, fire and wind are the most likely agents of change, but at the present time, the hazards are low.
2. Because of the generally long period of time between major disturbances in this area, there is a high probability that stand development will have a long duration.
3. Although stand development can follow many pathways, the course will be somewhat predictable. For the most part, species composition of the forest is set at inception. According to the concept of *initial floristics*, most of the species in a stand invaded shortly after disturbance, or they were remnant plants that survived from the previous forest. The stages of structural development will be discussed later.

Plant Community Classification

The assessment found two predominant plant communities in the park: western hemlock/ sword fern (*Tsuga heterophylla/Polystichum munitum*; TSHE/POMU)³ and western hemlock/ dwarf Oregon grape/ sword fern (*Tsuga heterophylla/Berberis nervosa-Polystichum munitum*; TSHE/BENE-POMU). TSHE/BENE-POMU tends to occupy the drier portions of the park, on ridges and steep side hills with southerly or westerly aspects. TSHE/POMU generally occurs in the remaining areas.

Enclaves of other plant communities were also found, including: western hemlock/ vine maple/ vanilla leaf (*Tsuga heterophylla/Acer circinatum/Achlys triphylla*; TSHE/ACCI/ACTR); western hemlock/ vanilla leaf (*Tsuga heterophylla/Achlys triphylla*; TSHE/ACTR); and western hemlock/ dwarf Oregon-grape - salal (*Tsuga heterophylla/Berberis nervosa-Gaultheria shallon*; TSHE/BENE-GASH).

Vegetative History

Most of the park was cut over or burned earlier in this century. After major disturbance, the forest regenerated to a variety of native species, including, in approximate order of occurrence, bigleaf maple, Douglas-fir, red alder, western red cedar, western hemlock, grand fir, black cottonwood and pacific yew.

3 modes of regeneration

Three modes of regeneration occurred after logging or burning: natural seeding, vegetative reproduction or sprouting, and planting. Most species regenerated from seed. Bigleaf maple was a notable exception; it usually established from vegetative sprouts. These clones most commonly occur in clumps with multiple stems (usually 3 to 8 sprouts to a group), and often in relatively pure stands. In addition, some of the pacific yew and western red cedar probably originated from sprouts or layering, where a branch comes in contact with the soil and takes root. Although red alder and cottonwood can grow from stump sprouts, they appear to have established from seed in the park.

Inclusions of Older Trees

Relatively few areas escaped fire or logging, and as a result, there are no areas of sufficient size to meet the scientific definition of old growth. Remnant patches of large Douglas firs up to 400-600 years old can be found in the park, but are not common. Some of these trees exceed 200 feet in height and six feet in diameter.

³ Plants and plant communities will generally be referred to by common names. The four letter alpha code incorporates the first two letters of the genus with the first two letters of the species name. Table 3a lists the common names, scientific names, and alpha codes for the major tree species discussed in this plan.

Current Condition

Of all the trees in the park, Douglas fir is the most common conifer, and bigleaf maple the most common broadleaf. But there is considerable species diversity; except for pacific yew, all species of the hemlock community are well-represented and widely-distributed. In addition to these species, non-native trees and other plants have been introduced into the park, mostly escaped vegetation from the surrounding urban area. The most common introduced tree is holly (*Ilex aquifolium*), which is mostly found as a large shrub.

Fir and maple most common trees

Stand Development

Four major stages of forest stand development patterns are described by Oliver and Larson (1990). These include:

Four stages

1. Stand Initiation: New plants invade a site following major disturbance.
2. Stem Exclusion: Stand density increases as trees grow larger. The canopy closes, dominant overstory trees begin to crowd out the suppressed trees, and understory vegetation diminishes.
3. Understory Re-initiation: As the overstory grows older, shade-tolerant trees and other plants begin to grow in the understory. Often these trees are surviving on filtered light that barely provides for photosynthesis. These trees may persist for many decades, awaiting a chance to develop.
4. Old Growth: As more overstory trees die, the trees that were established in the *understory re-initiation* stage grow into gaps in the overstory, often forming a complex vertical structure.

The specific successional trends and stand development patterns in Forest Park were identified through analysis of stump ages and condition, determination of tree ages from increment borings, and evaluation of height growth patterns.

The wildfires and logging earlier in the century were followed by the *stand initiation* stage. Initially, shrubs and forbs dominated much of the disturbed area. On many sites, rapid re-sprouting of bigleaf maple allowed that species to dominate. Wherever seed sources were present, conifers and red alder became established, and gradually established dominance over the competing shrubs.

Now most of the park is well into the *stem exclusion* stage. Many of these stands contain mixtures of several species of trees that have different height growth patterns. As a result, some of the slower-growing, more shade-tolerant species such as western hemlock, grand fir, and western red cedar, are now beneath the general canopy. Other species, including the pioneers such as Douglas-fir, red alder and black

Current Condition—2nd stage of stand development

cottonwood, occupy the top position. Although bigleaf maple is more shade-tolerant, it also tends to occupy the top layer. This natural stratification often gives the mistaken impression of an uneven-aged stand, when in fact, the trees are of the same age.

A few areas in the park are in the *understory re-initiation* stage, but this condition is currently relatively uncommon. Still fewer stands are in the *old growth* stage, despite the presence of very large trees in scattered areas. These final two stages are still ahead for most stands in Forest Park, unless major disturbance again disrupts the sequence.

Future Stands

The structure and composition of Forest Park stands provide clues as to the future. The distinct forest types discussed earlier are grouped into broad categories in Table 4 (see page 36 for codes). Any combination of overstory and understory species would qualify for a given category.

Table 4. Composition of Forest Types

Categories	Overstory	Understory
Conifer w/Conifer Understory	ABGR-PSME-THPL-TSHE	ABGR-THPL-TSHE
Conifer w/No Understory	ABGR-PSME-THPL-TSHE	
Mixed Conifer and Hardwood	ABGR-PSME-THPL-TSHE	ACMA-ALRU or ABGR-PSME-THPL-TSHE-ACMA-ALRU
Hardwood w/Conifer Understory	ACMA-ALRU	ABGR-THPL-TSHE
Hardwood w/No Understory	ACMA-ALRU	

Lack of structural diversity

The development of vertical structural diversity is a primary objective for the park because it will benefit wildlife and accelerate the development of old-growth characteristics. At the present time, Forest Park has limited vertical structural diversity in the tree canopy. Stands are dominated by essentially even-aged canopies, with little differentiation in height. As stands age, they will tend to develop more vertical and horizontal diversity. Thinnings that liberate small conifers within hardwood stands accelerate the development of vertical structure.

Conifer with Conifer Understory:

Douglas fir will continue to grow rapidly and occupy the top position of the stand in situations where it is now dominant. These stands have

begun to stratify vertically. Because of inter-tree competition, the Douglas-firs in lower crown positions will grow more and more slowly, their crowns will diminish, and since they are shade-intolerant, they will eventually die.

This suppression-related mortality will create snags and large woody debris useful for wildlife. However, since the mortality is concentrated in the smaller trees, few of the snags will provide nesting or roosting habitats for birds such as pileated woodpeckers (*Dryocopus pileatus*). Opportunities for creating larger snags will be discussed later.

The shade-tolerant conifers (western hemlock, grand fir, and western red cedar) growing in the understory beneath Douglas fir or hardwoods will persist in the stand. Some of these small trees are the same age as the overstory, but grew at different rates (see Figure 1). Others have begun to infiltrate the stand as it enters the *understory re-initiation* stage. These trees will grow at a very slow rate as long as they are overtopped. If space becomes available (for instance, when an overstory tree dies), the understory conifers will grow faster, and may eventually reach the top of the stand. In some parts of the park, trees of these species grow in the open, and are already dominant.

Conifer with No Understory:

These stands will ultimately develop an understory as shade-tolerant conifers infiltrate the stand (the *understory re-initiation* phase). Without management this is a slow process, extending over many decades. The process of developing an understory stratum is delayed or prevented by dense growth of English ivy. This condition should be monitored to determine problem areas and ivy eradicated in those areas.

*Ivy will retard
succession*

Mixed Conifer and Hardwood:

These are mixed stands of timber-sized conifers and hardwoods where either hardwood or coniferous species predominate. The pioneer broadleaf trees, primarily red alder, will begin to show major changes during the next two to four decades. Red alder is relatively short-lived, and begins to drop out at about age 60-70, but occasional specimens live to 100 years. Black cottonwood may grow to a somewhat older age. Alders or cottonwoods that become overtopped by conifers will not survive. In many of these mixed stands, bigleaf maple is the most common hardwood. As the stands develop further, the maple clones will self-thin. Some of the stems within the clumps will die, and the strongest will persist for many decades, even when overtopped. Bigleaf maple is longer lived than the other hardwoods in the park, occasionally reaching ages in excess of 200 years.

In mixed conifer-hardwood stands, the conifers eventually overtop the maples as the stand develops. Even when overtopped, the maples will persist in the form of weak-crowned remnants that struggle toward the available sunlight. If gaps occur in the forest canopy, bigleaf maple is well-suited to rapid growth response from regrowth of the main stem or from stump sprouts.

Bigleaf maple is more common than usual

Few areas as large as Forest Park and its contiguous areas are dominated by bigleaf maple. This species usually occurs as a minor or incidental species, but in Forest Park it is the predominant tree. The most likely explanation is that the bigleaf maple trees were present prior to logging, and in areas that did not burn, their stumps were sufficiently vigorous to re-sprout. The other species that would have initially dominated the site in more typical situations include red alder, Douglas fir and other conifers. Since it is likely that much of the area burned lightly or not at all, there were probably large areas without exposed mineral soil. With minor exceptions, the conifers and alder regenerate best on a mineral seedbed. It is also likely that logging and burning during the first half of this century reduced the seed source for conifers over much of the area. Consequently, the maples had little competition during their early development.

In addition to their other effects on the park ecosystems the hardwoods undoubtedly influenced the soils. Red alder fixes atmospheric nitrogen, which can increase both nitrogen content and its availability in the soil. Both red alder and bigleaf maple tend to increase the biomass turnover rates, nutrient cycling and soil organic carbon. The presence of these species throughout the park is likely beneficial to the soil, and could have positive effects on the later growth of conifers.

Habitat advances with succession

With all of the broadleaf trees, decay and branch die-back will create natural cavities that attract numerous wildlife species. As the hardwoods lose vigor and begin to die, these habitats will become more available. This could be particularly beneficial to secondary cavity users, those animals that do not excavate their own cavities.

Hardwood with Conifer Understory:

In stands where the hardwoods dominate a conifer understory, the hardwoods will grow according to the patterns described above. As the hardwoods begin to die out, the tolerant conifers will tend to occupy the gaps. This conversion to a coniferous stand will be very gradual, taking from several decades to more than a century. As a side note, Douglas fir or hardwood tree understories seldom occur in the park, due to their relative shade intolerance.

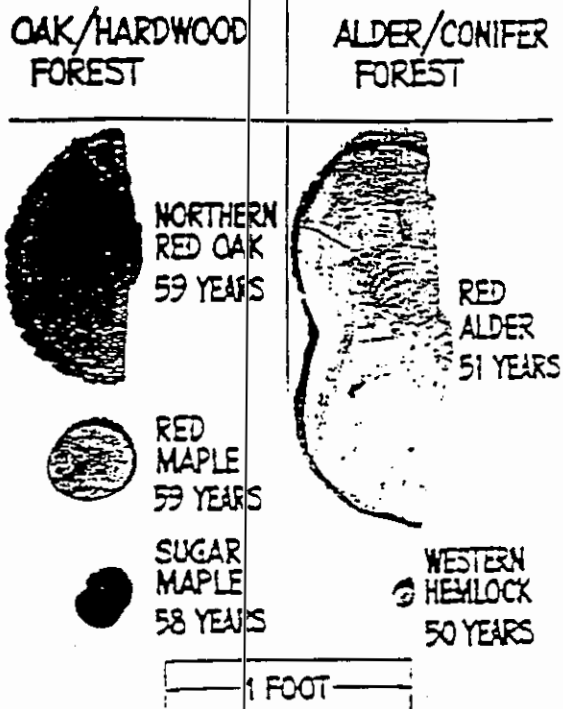


Figure 1. Comparison of different tree sizes for trees of the same age.

Hardwood with No Understory:

Again, the hardwoods will develop as described above. However, without the coniferous understory, several possibilities are presented. The conifers could seed into the stands from adjacent areas. This may be a slow or uncommon course of development, since some areas are far from a seed source and the favored mineral seedbed is absent. Dense cover of English ivy could also prevent the conifers from re-establishment on the site.

As the hardwoods die out, the shaded, moisture-laden decaying logs and stumps will provide a medium for establishment of shade-tolerant conifers, especially western hemlock and western red cedar. Douglas fir will not compete well in any of these environments; it will establish and grow best on exposed mineral soil with at least moderate sunlight.

Old trees become nurse logs

Introduced vegetative species are likely to affect subsequent development of trees as well as understory vegetation. The most damaging of these species is English ivy which forms dense carpets that exclude other vegetation. This could cause the long-term decline of trillium and other native herbaceous plants, as well as interfere with the regeneration of trees such as Douglas fir that favor bare ground or open conditions for their regeneration. Other invading species of

Damage from non-natives, especially English ivy

lesser concern are holly (*Ilex aquifolium*) and Himalayan blackberry (*Rubus discolor*).

Stand Structure and Species Composition

Snags and Large Woody Debris: There is a notable scarcity of standing dead trees (snags), and large woody debris on the forest floor. This condition is attributable to several factors:

1. Logging removed much of the potential material that could have produced snags and large woody debris.
2. Much of the material that remained after logging was probably consumed by wildfires that burned over large areas of the park. In addition, controlled fires were purposely set following logging to reduce the amount of slash and hazardous materials.
3. Much of the park is covered with deciduous trees. When these species die, they decompose rapidly, compared with native conifers. Although this dead wood is biologically active, it does not persist long enough to meet the needs of many organisms.

Landscape Ecology of the Park

The broad, landscape-level ecological characteristics of the park are important considerations for guiding future actions. This section addresses fragmentation, connectivity, interior habitat and dynamics.

Ecological Characteristics

*Relatively low
habitat
fragmentation*

Fragmentation within the park is minimal at the stand or landscape level from the perspective of vegetative ecology, but could be an important factor affecting wildlife. Fragmentation occurs at utility line clearings, roads, trails and meadows. Some of the utility line clearings have closed tree canopies growing beneath them, and these areas should not be considered fragmented. However, some of the larger clearings associated with utility lines are maintained in an open condition. These areas are linear features that allow both plants and animals that normally inhabit openings to penetrate closed forest habitats. The roads and firelanes within the park are overtopped by trees in most locations. Meadows or other natural openings are very uncommon in the park, and appear to have little or no effect on fragmentation because of their small size and infrequent occurrence. Few gaps are large enough to allow direct sunlight to reach the forest floor, and many of the smaller, shade-tolerant trees are growing very slowly.

*The park is
increasingly becoming
an ecological island*

Connectivity is generally defined as the tie between areas with similar characteristics. In an ecological context, the entire park is interconnected—but only to itself. It is increasingly becoming an ecological “island,” unconnected to forests outside its bounds. This is

most notable at the northwest boundary of the park, where connections to the Oregon Coast Range have been severed by timber harvest and urban development. Presumably, the harvested areas will regrow and once again form forest cover that connects with the park. However, the urban development represents a permanent change. The extent and importance of ecological isolation will depend on the requirements of plant and animal species, particularly their adaptability and mobility. The ecological and, to some degree, genetic implication is that Forest Park is becoming an isolated block.

Interior habitat is the area within the forest that is not affected by the forest/non-forest edge. Because of the relative scarcity of this type of habitat in the Portland urban area, it is a highly important habitat attribute. Recent ecological research in the Pacific Northwest indicates that the microclimatic effects associated with edge extends up to two tree lengths inside a forested patch (Franklin and Forman 1987). In Forest Park, this would mean that the microclimate is likely to be different for a distance up to 250-350 feet from the edge of the forest.⁴ This can affect both animal and plant habitats and populations. For example, parasitic birds such as brown-headed cowbirds or exotic, aggressive invaders such as starlings are favored along forest edges. Likewise, exotic plants, such as English ivy and holly, disperse from the inhabited edge into the forested interior. It is important to note that the definition of interior habitat is different for various plants and animals, and is dependent upon their habitat needs. Because of the importance of interior habitat and its scarcity in the urban area, its protection is a primary objective for the management of the park.

Interior habitat is critical for certain species and is something that few other forests in the region can provide

Primary objective: interior habitat protection

Landscape and stand dynamics are undergoing subtle changes in the park. As noted earlier, most stands are now in the *stem exclusion* stage. As they grow, they will enter the *understory re-initiation* stage. Because of the age and density differences between stands, this is likely to take place over a fairly long time, perhaps up to a century. Once the stand enters the *understory re-initiation* stage, it could persist in that condition for many years. For example, under natural conditions, it could take 200 years or more to move into the *old growth* stage.

Under natural conditions, the old growth stage could be 200 years away

Management Strategies and Options

Management can choose to let such events progress naturally, or to accelerate the development of old growth types of structures while at the same time creating habitat for cavity-using animals. This could be achieved by selectively killing trees where snags are lacking. Topping of trees has been shown to be the most effective approach for creating

Natural or accelerated succession, or a combination of the two...

⁴ Based on height of dominant trees, as suggested by site indices developed in conjunction with the soil survey (Table 2). Distances from edge are measured on a horizontal plane.

snags; they persist longer and are more heavily used by wildlife. Growing space made available from creating snags will be used by the remaining live trees. They will grow faster, and are capable of reaching very large diameters in a short time.

*Structural
diversity—old
growth characteristic*

The key feature in developing a diverse stand that contains some of the features associated with the old growth state is *vertical structural diversity*. If the stand objective is to increase the vertical diversity, the greatest benefit can be achieved in hardwood stands with scattered or grouped conifer understories. In many cases, these understories are the same age as the overstory hardwoods; different height growth patterns usually result in the stratification. The height growth of the shade-tolerant understory conifers can be increased if more growing space is created. And the most direct method of creating this growing space is by thinning out the overstory hardwoods.

As previously noted, most of the hardwood stands are dominated by maple clones. Removing entire clones results in greater release of the tolerant conifers. Thinning within the clones merely releases the remaining maple stems with little or no benefit to the conifers.

Conifer Release

Both root and crown competition between the conifers and hardwoods need to be considered when determining what clones to remove. The most direct approach is to remove the clones that immediately overtop (or threaten to overtop) the conifer. In general, the tendency is to remove or kill too few trees, not realizing the rapid regrowth of the maple crowns. The conifers probably need at least two decades of full release in order to develop into the upper canopy of the stand. The objective in some cases would be to grow the conifers into a dominant position, and in other cases, to move the conifer crowns higher into the canopy to provide more continuous foliage layers from the ground into the top of the stand.

Conifer Planting

Planting of conifers can also be an effective strategy to reintroduce species beneath hardwood canopies. In all cases, only the shade tolerant conifers (western red cedar, western hemlock, grand fir and perhaps Pacific yew) should be planted, and only where sufficient light and moisture exist for good growth. This can be achieved by utilizing natural openings or by creating them.

In situations where English ivy is controlled (or control is attempted), the site can be prepared for planting of the conifers. The planted trees will need to have good growing conditions, generally free from competing vegetation, for at least five years and as long as several decades following planting.

Since planting requires considerably more effort to achieve the desired stand structural results, it should be a lower priority than thinning, if considered strictly from an economic and ecological standpoint. However, planting of trees is strongly supported by the public, and thus a mix of treatments, including both thinning and planting, could offer the greatest combination of on-the-ground results and public support for park programs.

Thinning and Release Methods

Several methods of thinning or release could be used in the park. Cutting of the stems is effective if the conifers are large enough to immediately respond; otherwise, re-sprouting of the maples could again overtop the conifers. Chemical herbicides could be used to kill the maple clones while standing, or to treat stumps to prevent re-sprouting.

Girdling (cutting through the bark and cambium layers) is not generally effective in killing big leaf maple. It would, however, slow the growth of the stem, allowing other stems or the conifers to gain a growth advantage. A new girdling technique that uses nylon banding straps to slowly kill the stem is being studied on the Gifford Pinchot National Forest. Although this method is not yet proven, preliminary results show some promise. A modification of this technique, using untreated steel banding straps that would eventually rust through, might be effective. As noted earlier, girdling of conifers to create snags is not recommended.

Existing and Potential Risks and Hazards

Potential threats to the vegetation of Forest Park include wildfire, wind, damage from insects and diseases, and the risk of human-caused fires. Other threats include ice storms, volcanism, vandalism, damage from mammals and birds, and global climate change.

Fire Hazard

The current and short-term projection of wildfire hazard is low, due to the lack of snags, large woody debris and fine fuels as compared with natural forest residues in similar forest types.

Some general conclusions can be made from these comparisons:

1. Residue fuels in the park are considerably less than in the representative samples
2. Hardwood types and mixed hardwood-conifer types in the park have less residue fuel than the coniferous types
3. The anticipated spread rate, flame length, and resistance to suppression for all types is low throughout the park.



Big Brown Bat

Threats to vegetation

In addition, the large area of deciduous forests tends to make the area more resistant to wildfire. Compared with coniferous forests, these areas tend to have higher fuel moisture and humidity near the ground, conditions that tend to resist fire starts.

Humans present the greatest fire risk

The risk of natural wildfire ignition from lightning is low, since thunderstorms are infrequent in this geographic area. However, the risk of human-caused fires is considered high, and is likely to increase. The reasons, of course, are obvious: the increasing urban density and resulting use of the park. Fires from transient camps, vandalism or adjacent domestic or industrial sources pose serious threats.

The park is currently dissected by a series of fire lanes and roads. The firelanes provide access in the event of wildfire. The fire lanes are generally oriented up-and-down the slopes of the park. A fast-running wildfire is likely to move uphill, and thus the fire lanes would only be useful as a flanking fireline in most situations. Cross-slope roads and clearings, while not recommended due to resource impacts, could provide effective anchors for control of low-intensity, slow-moving mid-slope fires of the type most likely in the park. Under extreme burning conditions, faster-moving fires are possible, especially in conifer stands. If these conditions occur, the most likely control points would be at the top and bottom of the park.

The concept of a shaded fuel break is applicable to many parts of the park. A shaded fuel break requires a high forest canopy that shades the ground and keeps moisture and humidity levels high. The ground is usually cleared of both flash fuels and heavy fuels to facilitate fire control. Under moderate burning conditions, a shaded fuel break would not support a crown fire, and ground fires would tend to be controlled by direct attack.

Maples and alders can reduce fire hazard

The hardwood stands in the park actually accomplish many of the same functions as a shaded fuel break. The closed canopy shades the ground during the fire season, providing high humidity microclimate near the soil surface. Because of high organic matter turnover rates, there is little accumulation of fuels, and those that are present tend to have high moisture content, due to shading. Fires are unlikely to reach tree crowns, and ground fires will generally be of low intensity. Thus, most of the objectives of a shaded fuel break will be met by the present conditions in hardwood stands. Although conifer stands are somewhat more susceptible to wildfire, there is generally a low fire risk at present, and fuel breaks are not recommended. These conditions should be reassessed periodically for change on the same 10-year schedule as recommended for monitoring vegetative change in the park.

Wind Hazard

Despite the large windstorms of the past, including the 1962 Columbus Day storm, relatively little windthrow has occurred within the park.

*Low threat of
windthrow*

Several factors contribute to this:

- Topography: An easterly aspect, with few gaps or passes to funnel winds, shelters the park from prevailing westerly storms.
- Species: Shallow rooted deciduous trees that are vulnerable to windthrow have shed their leaves prior to the severe winter storms. As a result, they provide less surface area for catching the wind. However, decadent deciduous trees are subject to windthrow at any time because of stem and branch decay.
- Density: Few of the conifers are presently growing in crowded conditions, and thus they have been able to develop rooting systems and crowns that are generally wind firm.

Despite these mitigating factors, trees growing on silty soils that have become water saturated are more vulnerable to windthrow. A major storm that occurs after a prolonged rainy period is probably a worst-case scenario that could result in considerable losses in these areas. Strong east winds could also have adverse effects. In addition, the fragipan that occurs on some soils within the park can result in shallow rooting, which increases windthrow susceptibility.

In the longer term, susceptibility to windthrow is likely to increase as the stands become more dense and trees are crowded. This will be a more significant factor in pure stands of shallow-rooted species, such as western hemlock. However, many stands within the park are diverse in both species composition and crown structure, and this will substantially mitigate the effects of wind. Nevertheless, some windthrow is natural and ecologically desirable in providing gaps, structural diversity, and micro-topography. Major windstorms have occasionally uprooted conifers, but decadent red alder is increasingly vulnerable, even after leaf fall.

Ice Storms

Ice storms are a fairly common occurrence in western Oregon. Areas affected by the weather conditions within the Columbia River Gorge may be particularly vulnerable. The effects of ice storms are more insidious than other hazards. Tree branches are broken out, and often the tops of trees are snapped off. The result is not stand replacement, but rather, a change in its structure.

Different species react in distinct ways to ice storms. For example, Douglas fir is quite resistant to ice damage, compared with associated

species. Its branches tend to droop, and the ice accumulates at the end of the branches, where the flexible foliage sloughs from the tree, ridding it of much of the ice load. At the other end of the spectrum, red alder is highly vulnerable to ice damage, despite the fact that the tree is bare in the winter. The twigs and branches accumulate ice rather than shed it, and the brittle branches snap readily under the accumulated weight. This differential response to ice damage could be an adaptive mechanism that allows Douglas fir to gain dominance over red alder in mixed stands.

Native Insects and Diseases

Native "pests" part of ecosystem

Native insects and diseases are not a serious problem in the park at the present time. The resource assessment of Forest Park did not detect any outbreaks. From an ecological point of view, the forests of the Pacific Northwest co-evolved with the native insects and diseases. Although native pests can devastate entire forest regions, the trees, insects and diseases are part of the forest ecosystem, and they will continue to coexist.

Of all the native tree diseases in the park, laminated root rot, caused by the fungus *Phellinus weirii*, deserves special mention. Douglas-fir, grand fir and western hemlock are highly susceptible, but western red cedar is highly resistant, and hardwoods are immune to this disease. Because of the current low incidence of laminated root rot in the park and the widespread distribution of hardwoods, no significant problems are anticipated for many years. There are, however, some long term considerations: laminated root rot will probably increase in the future, as the number of susceptible conifers increases. The infected trees will become more vulnerable to windthrow, which will become a safety consideration along trails and in developed areas.

Native insects could affect the trees in Forest Park under severe conditions. If large areas of Douglas fir are windthrown or killed by wildfire, there could be an outbreak of Douglas fir bark beetles (*Dendroctonus pseudotsugae*). Prolonged drought also increases the susceptibility to attack. These insects build up in weakened or dead trees, and can eventually attack and kill groups of live, mature Douglas-firs. But the likelihood of large-scale tree mortality from wildfire or windthrow is low, and there is little risk of bark beetle outbreak at present. As these risks increase in the future, so too will the risk of bark beetle outbreak. If and when an outbreak occurs, control measures are straightforward: cut and remove the infested trees.

Exotic Insects and Diseases

Exotic insects and diseases are possibly the most serious threat to the trees in Forest Park. Insect pheromone attractant traps are currently being monitored to determine if European or Asian gypsy moths are present in the area. The trees in Forest Park did not co-evolve with exotic pests, and consequently, they are likely to be more severely impacted if an introduced insect or disease takes hold in the area. There are many examples of decimation of entire tree species resulting from introduction of exotic insects and diseases. Because of the serious risk from escaped insects and diseases, it is crucial to monitor insect and disease conditions in the park and surrounding areas, using the pheromone traps described later. Control operations for the gypsy moth apparently were successful in 1992, but there is a continued threat of new infestations. The increase of trade to the Pacific Rim, the influx of new residents from eastern United States to the Pacific Northwest, and other sources yet unknown, all add to the probability.

Exotic insects and diseases pose most serious potential threat to Forest Park vegetation

Pathologists and entomologists from the Pacific Northwest Regional Office of USDA-Forest Service, Bureau of Land Management and the State of Oregon should be consulted for recommendations regarding exotic insects and diseases. Key questions and suggested approaches to answering them are presented below:

Which insects or diseases are the most serious threats?

Without doubt, insects and diseases introduced from Asia or Europe are the greatest threat to Forest Park. The Asian gypsy moth, which inhabits the forests of Siberia, is the most immediate and serious pest. Its egg masses have survived transport on ocean-going ships, and the hatched insects have already infested parts of western North America. Although the known infestations have been controlled, this insect continues to pose a serious threat to the forests of the Northwest. The Asian gypsy moth is uniquely adapted to survive and flourish in this new environment. Its natural controls, the predators and parasites that dampen moth populations in its native habitat, are not present here. The larvae feed on a wide range of conifers and deciduous trees. The adult disperses much more rapidly than its cousin, the European gypsy moth, since the gravid female moths can fly considerable distances. The European gypsy moth, which has already decimated extensive forest areas in the eastern United States, is also a potential problem, but spreads less rapidly and is generally less voracious.

Asian gypsy moth is most serious threat

Numerous other insects and diseases have the potential for importation from Siberia and other parts of the near East, but unless raw, untreated logs are imported from infested areas, the risk is moderate.

Pest control plans are important

What plans and analysis need to be done ahead of time?

The City of Portland should work with the USDA Forest Service and the State of Oregon to develop plans for the control of exotic pests, particularly insects introduced from Asia or Europe. Plans should be developed prior to an outbreak to ensure timely action to protect trees in the park. These plans should address the legal and regulatory aspects of a gypsy moth control program, coordination with state and federal agencies, and involvement of the public.

Fauna

Mammals

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

For the purpose of the mammal survey, the park was divided into three geographic sections: North, Central and South. These sections correspond to the Management Units discussed elsewhere in this plan.

*South Unit—
Burnside to
Firelane 1*

The south end of the park is directly adjacent to urban northwest Portland and receives the largest number of human visitors. The south section is defined for our purposes to begin at the southern end of the forested area from approximately W Burnside Rd., along the boundaries of Macleay Park north to Firelane 1.

*Central Unit—
Firelane 1 to
Germantown*

The central section extends from Firelane 1 to NW Germantown Road and includes some wildlife habitat just outside the Forest Park boundary. These areas outside the park are considered significant habitat for certain species which inhabit the park proper. The remnant of old Doane Lake which lies directly across St. Helens Road to the east is recognized in the *Northwest Hills Natural Area Protection Plan* as important. This area contains habitat for beaver (there is abundant sign of beaver activity), raccoon, deer, pocket gopher, a range of small rodents and small carnivores. The area of the old Rivergate quarry

behind the Portland Police Bureau automobile impound lot held signs of bobcat, deer, elk, raccoon and coyote.

The north section of the study area extends from NW Germantown Road to the northern boundary of Forest Park (near Newberry Road). This area includes the Miller Creek Drainage, including the length of Miller Creek that flows under St. Helens Road and into the Multnomah Channel. There is not enough data collected in a controlled manner to justify a statistical analysis of the section data at this time.

Results

Significant positive correlations were found between the number of mammal species (richness) and distance from edge, slope and number of tree species. This means that the number of mammal species observed increased as the distance from the nearest forested edge and with an increase in the number of tree species present. Also, the number of mammal species increased as the slope of the terrain increased.

The mammal survey for this study found 14 species of mammals in the south section, 19 in the central section, and 17 in the north section.

Discussion

It is very likely that edge effects such as more human activity, increased penetration by predators and changes in microclimate limit the number of species that can take advantage of edge habitat. The increase in mammal species number with tree species number also could have a sound ecological basis. An increase in tree species could indicate an increase in habitat diversity, thus providing more structural niches to accommodate more mammal species. It is interesting to note that the increase in tree species is also correlated to the increased slope. This may be what accounts for the correlation between slope and number of mammal species.

There is insufficient data at this time to determine a relationship between geographic section and mammal species richness (number of species observed) or abundance of any particular species.



Beaver

*North Unit—
Germantown to
Newberry*

*Wandering shrew
Pacific jumping mouse
Western pocket gopher
Beechey ground squirrel
Northern flying squirrel
Short-tailed weasel
Little brown bat
Long-eared bat
Roosevelt elk
Black bear
Bobcat*

*The more
fragmentation, the
fewer bird species*

Birds

Studies of relationships between composition of bird communities and habitat structure show that the degree of habitat fragmentation is a key factor in determining avian diversity. These studies show that as the degree of habitat fragmentation increases avian species diversity decreases. Most of these studies have been conducted either in coniferous or mixed conifer-hardwood forests of eastern and north central North America or in riparian communities of the deserts of the southwestern United States. The goal of this study is to see if habitat fragmentation and avian diversity are similarly related in the forested area near Portland.

Results

Tree species richness, ground cover species richness and percent ground cover were not significantly correlated to the factors of stand size and distance from edge. Shrub species richness was found to be significantly correlated with distance from edge but not with percent shrub cover. Both shrub species richness and percent shrub cover were found to be positively correlated with stand size.

Stand size was significantly correlated both with bird species richness and Shannon's Index. Distance from edge was significantly correlated only with avian species richness. A significant correlation was also found between Shannon's Index and percent shrub cover and between percent shrub cover and bird species richness.

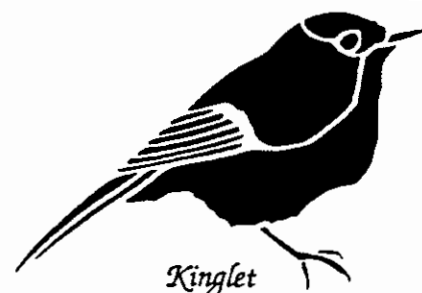
Discussion

The results suggest a three-way relationship between bird species diversity and richness, stand size and shrub layer that may have ecological significance. The correlation of certain avian and shrub layer values with stand size may reflect an interaction between these three parameters.

As predicted from work elsewhere, it appears that a clear positive correlation exists between forest stand size and both avian species richness and diversity. The degree of this relationship may be related to certain vegetation factors. It is probable that the importance of vegetation in predicting bird diversity varies with seasonal changes, as well, though there is no data on this for the Tualatin Mountains.

The investigators found that interior species richness was related to area factors and that vegetation factors were significant predictors of interior-edge species richness. In fact, interior edge species richness appeared to be negatively associated with stand area. The authors concluded that stand area ("patch size") is the best predictor of avian

species abundance and richness and that this is due, in part, to the decrease in numbers of interior species in smaller patches combined with the complete absence of certain "area sensitive" species in patches below a threshold area. According to edge effect studies, microclimatic effects penetrate for up to 160 m. (525 ft.) into a forest stand. Nest parasitism by brown-headed cowbirds and predation eggs and nestlings by small mammals, snakes, raptors and other birds increases for as much as 600 m. (1,970 ft.) from the edge. Therefore smaller patches can be considered all "edge" depending on their configuration.



Several long range migrants (interior species) occur in the study area. A partial list of these species is provided in Table 5.

Table 5. Partial List of Long Range Migrants known to occur in the Tualatin Mountains

Rufous Hummingbird	<i>Selaphorus rufus</i>
Olive-sided Flycatcher	<i>Contopus borealis</i>
Pacific slope Flycatcher	<i>Empidonax difficilis</i>
Western Wood Peewee	<i>Contopus sordidulus</i>
House Wren	<i>Troglodytes aedon</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Western Tanager	<i>Piranga ludoviciana</i>
Blackheaded Grosbeak	<i>Pheucticus melanocephalus</i>

Ambuel and Temple (1983) cited guidelines embodying four major principles for managing fragmented landscapes for avian diversity: (1) one large island is superior to many small islands of the same area, (2) a compact island is superior to many small islands, the reasoning being that this reduces the ratio of edge to interior, (3) islands should be close together, and (4) islands which are linked by narrow corridors are superior to isolated islands.

Conclusions

In this study of seven forested patches, stand area was consistently the primary predictor of avian species diversity and richness. There is much agreement between this finding and those from similar national studies. This study also showed significant positive correlations between stand size and both shrub species richness and percent shrub cover as well as between percent shrub cover and bird species richness.

Amphibians and Reptiles

This section addresses the amphibian and reptile fauna of Forest Park and provides guidelines for the management of this segment of the fauna. In this context, it presents: a) a summary of historical data on the amphibian and reptile fauna; b) a summary of data collected during recent surveys; c) an interpretation of the historical and recent data; d) a summary of probable impacts to this segment of the fauna; and e) a series of recommendations that focus on minimizing the negative impacts to this segment of the fauna.

Results

Summary of historical data

Eight amphibians (six salamanders and two frogs) and four reptiles were historically recorded from Forest Park. Excluding the numerous records from Macleay Park and vicinity, only five amphibians (four salamanders and one frog) and two reptiles are historically recorded from Forest Park. Notably, all four amphibians (two salamanders and two frogs) recorded outside the boundaries of Forest Park are still-water or pond-breeding species. Moreover, three of the four salamanders recorded in Forest Park develop without undergoing an aquatic larval stage.⁵ Finally, egg-laying species are conspicuously absent from the reptile fauna of Forest Park.

Summary of current data

Nine amphibians (seven salamanders and two frogs) and two reptiles were recorded from Forest Park during current surveys as well as from scattered records made over the past two years.

Red-legged frog
Pacific treefrog
NW salamander
Dunn's salamander
Long-toed salamander
Pacific giant salamander
Red-backed salamander
Rough-skinned newt
Ensatina

The current survey revealed eight species of amphibians and reptiles, but several species were found only in certain areas. Northern red-legged frogs were found in Forest Park (several juveniles were observed in lower Miller Creek just upstream from Highway 30 and a single juvenile was seen in the extreme upper reach of the Doane Creek watershed), but evidence of their reproduction and that of long-toed salamanders was found only outside Park boundaries at two locations (the Doane Pond remnant and the marshy area next to the base of Miller Creek). Several sub-adult bullfrogs were seen in the Doane Pond remnant which is also the only site near Forest Park where painted turtles were observed. Searches also revealed Pacific giant salamander larvae in Balch and Miller Creeks, and Dunn's salamander in Miller Creek; no amphibians were found in the stream

⁵ Development without undergoing a larvae stage, termed direct development, means that the young hatch as miniatures of their parents directly from eggs laid in a moist terrestrial site. No free-living aquatic larval stage exists; any larval stage takes place within the egg before hatching.

search of Doane Creek. About five times as many Pacific giant salamander larvae were observed in Miller Creek as were observed in Balch Creek for the same search effort. Search of the Audubon Preserve pond in the Balch Creek system was the only site at which newts (rough-skinned) and northwestern salamanders were found during this study. Pacific treefrogs and their egg masses were observed in the Audubon Preserve Pond, the Doane Pond remnant, and the Miller Creek marsh.

Other searches revealed two species of salamander, six ensatina and one red-backed salamander. Both salamanders were observed only in the native understory-dominated plots; no amphibians or reptiles were encountered in the ivy-dominated plots. Moreover, no amphibians or reptiles were seen in ivy-dominated patches crossed during any of the area-constrained searches. The species composition of arthropods and other invertebrates in ivy and native understory plots appeared to differ markedly. Three aspects were prominent: a) the number of small invertebrates that could serve as food in the ivy litter appeared to be far less abundant than in the native-dominated litter, b) springtails, a group of small insects well known to serve as the primary food of several of the terrestrial salamander species observed in Forest Park (for example, ensatina and red-backed salamander) and typically abundant in forest leaf litter, were almost absent in the ivy litter, but were common in the native-dominated litter, and c) most of the few invertebrates that were present in the ivy-dominated litter were exotic, armored species (pillbugs and sowbugs) known to be unattractive, poor quality, or distasteful prey for most species.

*Poor habitat in
English ivy*

Interpretation of the Data

The survey revealed little evidence of changes in species composition. Only the spotted frog is believed to be extirpated in the region. Notably, three amphibians associated with the coldest waters of stream and springs, and all of which have a strong association with old-growth (Kezer's seep salamander (formerly Olympic salamander), the tailed frog, and Cope's salamander) appear to be absent from the park.

*Few changes in
species composition*

Beyond this comparison, several patterns are evident that reflect the habitat characteristics of Forest Park and adjacent areas. These are:

Mesic, mixed conifer-deciduous forest on moderate-to-high gradient slopes characterizes most habitat in Forest Park. No shallow-gradient, unforested areas of any size occur within Forest Park. Two consequences of this pattern exist: a) The amphibians most common in the park are terrestrial-breeding salamanders that lack an aquatic larval stage and require moist habitat, but are not dependent on a free surface-water source (that is, the ensatina salamander and the red-back

salamander), and b) The few reptiles found in Forest Park are live-bearing⁶ species that exploit open edges because the cool, moist conditions, encouraged by the generally north- and east-facing aspect provide unfavorable nesting conditions for egg-laying species. Records for egg-laying species of reptiles are rare in the region, but the only records near Forest Park come from the southwest-facing slope of the Tualatin ridge, where the greater insulation likely provides suitable nesting conditions.

Few permanent streams

Relative few permanent streams exist in Forest Park. Stream-associated amphibians, especially those with larval stages that must remain in the water more than one year, may be restricted to the permanent streams in Forest Park. Two stream-associated species exist in Forest Park, the Pacific giant salamander (which has lengthy aquatic larval stage) and Dunn's salamander (which has direct development, but requires a rocky, stream edge in which to nest). Balch and Miller Creeks probably harbored both species historically, and may currently; however, Dunn's salamander was not detected in the former. In addition, a record exists for an adult Pacific giant salamander in the upper reach of Doane Creek, so the species may occur there.

Lack of stillwater habitat

Stillwater habitats are rare or absent in Forest Park. Most stillwater habitat of any significance in the area occurs in the bottomland strip along the Multnomah Channel and the Willamette River, outside park boundaries. Only the Audubon pond next to Macleay Park is of a sufficient size and depth to support pond-breeding amphibians. Except for this pond, no reproductive habitat exists within Forest Park for the five native pond-breeding amphibians in the region (that is, rough-skinned newt, northern red-legged frog, long-toed salamander, northwestern salamander and pacific treefrog) as well as for the sole exotic amphibian (the bullfrog). Moreover, the lack of pond-breeding amphibians also limits pond-breeding amphibian predators like the common garter snake. Similarly, lack of bottomland stillwater habitat excludes the western painted turtle from Forest Park. Most habitat for this suite of amphibians and reptiles exists along the Willamette River, an area in which stillwater habitat was historically extensive, but which has been reduced largely to two key fragments, the remnant of Doane Lake and the Miller Creek marsh.



Assessment of Trends

Besides these general patterns, several trends are of concern regarding the future of the amphibian and reptile

⁶ Live-bearing means that a species does not lay eggs, but rather gives birth to fully formed young.

fauna in and around Forest Park. These trends are listed below, but the order does not imply decreasing importance:

Progressive loss of lowland stillwater habitat associated with the outflows of the stream systems from Forest Park. Stillwater systems so limited in Forest Park are becoming increasingly scarce in bottomland habitats next to the park. The lowland pond and marsh associated with the Balch Creek system has entirely disappeared. The strip along the Willamette River-Multnomah Channel retains only two significant ponded areas, both of which have been modified. These are:

Habitat loss

1. The Doane Lake remnants. These consist of only three small fragments of the historically relatively large bottomland lake, Doane Lake. Two painted turtles were observed in the eastern fragment. The southern fragment is isolated on three sides by railroad beds and is the only fragment with significant amphibian and reptile habitat. Several factors threaten amphibian and reptiles that may use this fragment, which include:
 - a. Pollution. Diesel oil was observed and threatens red-legged frogs or other amphibians dependent on skin respiration. The extent of other pollutants is unknown.
 - b. Exotic aquatic predators. Bullfrogs present in this fragment will continue to threaten the native amphibians and reptiles. Only stickleback (a native fish) was observed in this pond, but undetected exotic fishes may also threaten amphibians and reptiles.
 - c. Exotic wetland species. Purple loosestrife, a highly invasive exotic, was observed near this pond. This species is capable of taking over aquatic habitats and excluding the native wetland plant species important to the survival of native amphibians and reptiles.
 - d. Human activity. An itinerant camp near this pond is degrading available habitat and may affect the survival of amphibians and reptiles in the area.
2. The Miller Creek marsh. This consists of a large, partially diked overflow marsh adjacent to Multnomah Channel. Water enters this system from Miller Creek during wet season flows and from precipitation. Under high water conditions, flow from the Willamette River through Multnomah Channel also backs into this marsh. The same factors that threaten amphibians and reptiles in the Doane Lake remnants threaten amphibians and reptiles in this system. In addition, the connectedness of the marsh to the Miller Creek system is threatened by the pattern of complete vegetation removal by Fred's Marina personnel over a large segment of the creek between Forest Park and the marsh.

*Doane Lake:
significant habitat*

*Excessive
maintenance
threatens amphibian
passage*

The exposure of this segment of the creek puts any amphibians that move from the marsh into Forest Park at risk. All stillwater breeding species except for rough-skinned newts are at risk because of the loss of lowland stillwater habitats.

*Increased mortality
on roads and trails*

Increased activity along boundaries, roads and trails fragments populations of amphibians and reptiles using the park.

1. Boundaries increasingly act as barriers to movement of some species. An adult female northern red-legged frog was found road-killed at the junction of Skyline Boulevard and NW Springville Road. Traffic levels have especially increased along Skyline Boulevard and Germantown Road. Increased use of Germantown during evening hours increases the risk to nocturnal organisms crossing this road from adjacent portions of Forest Park. Mortality also occurs on trails in the Balch Creek system with heavy human use. Slow-moving diurnal salamanders such as rough-skinned newts are especially vulnerable to heavy foot traffic. Regardless of type of boundary or thoroughfare, increased use increases the risk of crossing such boundaries to relatively slow-moving amphibians and reptiles.
2. Activity along the boundaries of, or thoroughfares through, Forest Park have a region of influence that extends some distance into the park from those boundaries and thoroughfares. Greater disturbance along such edges places amphibians and reptiles in those areas at greater risk.

*Intrusion of exotic
plants*

Intrusion of selected exotic plants into the Forest Park system probably contributes significantly to the low numbers of some amphibians and reptiles. Although several exotic plants are established within Forest Park, English ivy is the most widespread. The survey suggests that the differences between ivy- and native vegetation-dominated areas are related to the invertebrate food base. This base is poor in the ivy-dominated areas, which may explain the low numbers of salamanders found there. The lack of salamanders is striking because the ensatina, perhaps the most abundant terrestrial vertebrate (not just salamander) in Pacific Northwest ecosystems, is rare or absent in ivy-dominated areas. Effects of other exotics on local amphibians and reptiles are not known. Based on their known negative effects on native species, these exotics are likely to similarly affect native amphibians and reptiles in Forest Park.

*Clearing and
development in
headwaters a major
threat*

Upstream modifications impact the water quality of various drainages in the Forest Park system. Development in a significant portion of the upstream portion of the Balch Creek system resulted in high levels of siltation through that system, including the Audubon Preserve, during

the 1993-4 wet season. Similarly, portions of the Lakota and smaller developments caused relatively high levels of siltation in the Doane and immediate adjacent creek systems. The low numbers of stream-associated salamanders in the Balch and Doane Creek systems may reflect cumulative upstream impacts in recent years. The Miller Creek system, with relatively intact headwaters, had much higher numbers of larval Pacific giant salamanders.



Cutthroat Trout

Fish

Only two streams in Forest Park are known to contain fish: Balch Creek and Miller Creek. Though similar in their vegetative cover and land use characteristics, the two basins (and their respective fisheries) are quite distinct. The Balch basin is twice the size of the Miller basin and a substantial portion of the stream flows year-round whereas only the lowest reaches of Miller Creek are perennial.

Balch Creek supports a substantial year-round but isolated population of 2000 to 4000 cutthroat trout (1987 estimate). The construction of a storm sewer has isolated the fish from the Willamette River since 1921. Because of this, the population may present unique genetic values.

The main stem of Miller Creek supports sea-run cutthroat trout which move freely to and from the Multnomah Channel. The two primary limiting factors for these fish runs are surface flow levels and adequate pool habitat. Coho salmon, cutthroat trout and steelhead were also identified in Miller near the outfall east of St. Helens Road. Culverts under St. Helens Road and the Burlington Northern rail line appear to impede the movement of the coho and steelhead into the upper basin. Miller is one of a small and diminishing number of free-flowing streams which provide spawning habitat for these anadromous fish.

Coho salmon
Cutthroat trout
Steelhead

Habitat Types

As stated earlier, Forest Park is best described as a Western Hemlock Zone forest. This designation is based upon the predicted dominant climax tree species. However, since the park was logged during the past 100 years, the vegetation is at one of several successional stages. This is important because many wildlife species are associated with certain successional categories.

General habitat types occurring in Forest Park can be classified as forested, shrub/scrub, meadow, and wetland/riparian. Under each of these habitat types there are sub-categories, described below.

Forested

Young: Mostly hardwood trees with some young conifer, 10-35 years following disturbance.

Deciduous: Mostly hardwood, primarily bigleaf maple. Some stands with very old trees and few conifers in understory.

Mixed Deciduous/Coniferous: Young conifers overtopping hardwoods. Hardwoods include red alder as well as bigleaf maple with some black cottonwood, 30-80 years following disturbance.

Mid-Aged Coniferous: Almost all conifers make up canopy. Mature trees between 80 and 250 years. Understory thinner.

Old Growth: Many trees over 250 years old, sparse understory, many dead trees both downed and standing.

Meadows

Open fields: Mowed areas, grassy areas maintained under powerlines.

Shrub/scrub: Areas dominated by brush, blackberry thickets, vine maple thickets, mostly along edges.

Wetland/Riparian

Forested Wetland: Areas with saturated soils, wetland plants and standing water for part of the year, within forest canopy.

Riparian: Areas along creeks.

Ponds: Open standing water.

Wet Meadows: Grassland areas with saturated soils, some open water, and not covered by tree canopy.

Urban/Farm

Agricultural and residential lands and their surroundings.

Table 6. Relative Abundance of Habitat Categories

Mixed deciduous/ conifer	55 %
Coniferous	29 %
Urban/ farmland	6 %
Deciduous	5 %
Meadow	3 %
Old Growth	1 %

Notes: 1) Mixed deciduous/ conifer and young mixed are combined.
2) All other categories compose less than 1% of the park area.

Fragmentation and Habitat Loss

Edge Effect

Edge effect is defined as the harmful effects of increased edge to area ratios due to human activity on plant and animal communities.

Potentially, one of these effects is competition between edge and interior species where species that use both edge and interior habitat can have a competitive advantage over species that are more dependent on the forest interior.

Too much edge is detrimental

It was once thought that the creation of edge effect and the adjacency of highly contrasting plant communities like pasture and forest enhanced the wildlife habitat value of an area. Recent studies have shown that creation of sharp edges and maximum contrast (such as clearcuts next to old growth forest) may cause serious losses of the biological health of the old growth stand due to losses of tree cover to wind throw (trees blown down in wind storms) and increased populations of nest parasites (birds that lay their eggs in the nests of other species and allow the host species to raise their young, usually to the detriment of the offspring).

Edge habitats provide different character and properties than forest interiors. For some species, the mortality rate will be greater along the edge because of increased exposure to predation, nest parasites, sun, wind, or limited cover from rain and snow. Other species, including many predators, prefer ecotones (areas where different habitat types grade into one another). Generally the narrower the corridor (for Forest Park, "peninsula" of habitat is a better description) the higher the ratio of edge to interior species. Interior species will predominate in the center of a wider corridor. Examples of species tending to occur in portions of forest far from edges (interior areas) in the study area include the varied thrush, Townsend's warbler, sharp-shinned hawk and goshawk as well as red fox, white-footed vole and bobcat. Disturbance tolerant species are often abundant in habitats with paths and roads, as well as those adjacent to agricultural fields and residential development. Long range migratory songbirds nesting in forests are particularly impacted by clearing and edge creation. Nest parasitism and predation increases for as much as 600 m. (1,970 ft.) into a stand, effectively eliminating functional interior in small stands.

Forest Park's edge effect is significant due to neighboring development

Animals leaving a forest stand to forage or explore dispersal possibilities may succumb to predation. In this regard the edge of the stand may be termed an unidirectional filter in that the net "flow" of animals is out of the stand and population, rather than being balanced by dispersing animals entering the stand from elsewhere. This is not true of all edges, but is the case for systems where edge predominates.

Changes in microclimate due to edge effect significantly alter plant communities. This is due to light penetration, higher wind velocities and drier conditions. In Pacific Northwest forests, evidence indicates that this effect extends up to 160 meters (525 ft.) in a stand.

A conservative estimate of the area of "edge" in Forest Park is 300 hectares (740 acres). Therefore, if the area encompassed by the "resources line" is approximately 2000 hectares (5000 acres) then the park is roughly 15 percent edge. However, it is likely that the edge area is actually between 1.5 to 2 times this area.

Roads

Roads can be barriers to both large and small animals

Roadways present problems to many wildlife species for a variety of reasons. The movements of large mobile mammals may be inhibited or disrupted by roads. Noss (1987) reports that carnivores, particularly large ones, will avoid roads whenever possible. Harris and Scheck (1991) report that some predators opportunistically follow roadsides and other linear habitat features while searching for carrion and prey. Predators following roadsides would be exposed to higher risk of mortality from automobile collisions, and this effect extends for a distance of at least 1 km. into adjacent natural areas.

Smaller vertebrates like forest rodents and amphibians may find roads a nearly impassable barrier, while reptiles seeking to absorb heat from warm roads are killed in large numbers in some areas of the United States. Increased numbers of roads accompanying development and the subsequent increase in automobile traffic tend to further fragment habitat and disturb use by wildlife by interfering with foraging and dispersal of many species. This would be in addition to losses due to harmful edge effects created by road construction and clearing.

Residential Development

Domestic animals

Residential development poses some particular conflicts with forest wildlife. Domestic dogs and cats, prey on small vertebrates including shrews and woodpeckers. Additionally, dogs form packs which chase black-tailed deer (*Odocoileus hemionus*), elk (*Cervis elaphis*) and other large and medium-sized mammals.

Invasive non-native plants

Another concern is the establishment of non-native ornamental species of plants. Non-native ornamental plants can become the seed source for introduction of escaped exotic plant species into natural plant communities. Lawn care and garden products such as pesticides and chemical fertilizers can adversely affect water quality. Some pesticides are toxic to wildlife and native plant species. Many garden crops will attract wildlife, and conflicts develop when crops are not

sufficiently fenced or otherwise protected from wildlife depredation. This problem can increase in situations where natural habitats are declining in quality and quantity in an area, forcing displaced animals to overcome their reluctance to avoid humans in order to get enough food to survive.

These concerns are acute in regard to Forest Park where much of the park is bordered by residential development. In these areas, invasive exotic species such as English ivy and clematis spread into the adjacent forest. Ivy in particular is of great concern as it alters the understory by out competing native ground cover and shrub species and covers the trunks of trees. In doing so, a great deal of food and cover is lost for both birds and small mammals.

Logging

Though Forest Park is not being considered for commercial logging, private logging operations near the park have potential impacts on the park's natural resources. An area of concern is the portion of Multnomah County directly north of Forest Park. Much of the land that lies north of Forest Park between St. Helens Road and the Multnomah County line is zoned for commercial forestry (CF). Clear-cut logging causes temporary declines in the amount of contiguous forested habitat. Problems arise when cuts over large areas deplete adjacent habitat by creation of great lengths of edge as well as "punching holes" in contiguous forest in the relatively narrow peninsula that connects Forest Park to larger forests to the west. This leaves wildlife with fewer options for dispersal, fewer chances for contact with other populations and decreasing area for maintaining required home territories.

Impacts from private lands

In conjunction with other land uses, there are several areas where the contiguous habitat is disrupted. This is a temporary situation if the cut-over area is allowed to regenerate. However, the quality of the regenerated area as habitat will be lowered if certain practices are not followed. Logging practices in Pacific Northwest Douglas fir forests have included suppression of successional plant species via herbicide application followed by subsequent replanting using a single desired species (usually Douglas fir). Limiting size and configuration of cuts and replanting with a mix of natural species are practices that would limit some conflicts associated with use of timber resources.

Agriculture

Roughly six percent of the land within the resource line is Urban/Farm land. There are also agricultural lands near Forest Park outside of the resource line as well as some small scale agricultural activity (horses,

sheep, goats, chickens, gardens, orchards and Christmas trees) taking place on land designated as residential.

Conflicts between human uses and wildlife survival arise from fencing, pesticide use, wild carnivore predation on livestock and poultry, and crop damage by a variety of birds and mammals. Species that will prey on poultry include skunks, bobcat, coyote, raccoon, great horned owl and several hawks. However, these predators control rodent populations that may also be harmful to crops.

Stream damage

Riparian areas are susceptible to great damage by livestock, particularly cattle, horses and swine. This is especially important to note since there is activity of this type in the headwater areas of streams on properties along Skyline Blvd. and Thompson Road.

Quarry expansion is threat to wildlife

Angell Brothers Quarry

Angell Bros. Quarry is located on St. Helens Road about 2.5 kilometers (1.5 mi.) north of Forest Park. Though the quarry is not directly connected to Forest Park, its potential impact on habitat adjacent to the park is of concern. Proposed quarry expansion poses a real threat to wildlife populations of Forest Park by creating a very narrow corridor of forest in an area that is already highly fragmented by logging and increasing residential development. The end result could be the isolation of Forest Park from wildlife populations of the Coast Range.

Mineral aggregate extraction (quarrying) has obvious and permanent impacts on the landscape and habitat of surrounding areas. The removal of topsoil inhibits the regeneration of native vegetation similar to the original forests of the site. Blasting and/or low frequency vibration in the ground from heavy equipment may disturb moles and pocket gophers, among other animals. These fossorial animals play an important role in maintaining soil viability and fertility. The quarry headwall itself is a formidable barrier, forcing animals downslope toward St. Helens Road or upslope toward a very narrow remaining strip of trees. The noise and human activity at the quarry may also be avoided by many wildlife species if alternative habitat is available.

Isolation

If isolation were to occur it could have a variety of negative effects on wildlife, particularly small mammals.

Limited gene pool

1. The flow of genetic information would be reduced or eliminated. Remaining populations in the park would thus be susceptible to problems that arise from a limited gene pool. These include the increased possibility of mutations (those that lead to reduced reproductive success) occurring in a small population and becoming "fixed." This occurs when the

possibilities for breeding with members of other populations with differing genetic compositions is no longer frequent enough to counteract the negative effects of the mutations. When options for “outbreeding” are reduced, the likelihood of a genetic disorder increases with resulting reduced immunity to viral disease, sterility or reduced reproductive success.

2. Reduction of habitat area to support a genetically viable population. The above genetic effects are avoided if an isolated population is large enough to contain sufficient variety among its members’ genes. For a population to be viable it must, of course, occupy an area large enough to support its members. Each species has its own area requirements.
3. In many cases, populations of species undergo local extinction. These may be caused by natural forces, such as fire, drought or flood or biological forces, such as disease. If the area covered by the catastrophe is near and accessible to areas of similar habitat not affected by the event, then eventually animals from these surrounding areas will re-colonize the affected area.

Corridors

There is debate regarding corridors and their role in landscape ecology and wildlife habitat management issues. The term “landscape ecology” refers, in part, to the influence of pattern on process. The theory deals with the concept that the size and geometric shape of areas of distinctly different habitat types and the responses of organisms in an ecosystem to these patterns are interrelated.

Landscape patterns

A very important element in the analysis of a given landscape is the presence or absence of corridors that link patches of similar habitat. How well these corridors function to connect these patches depends very much on the dimensions of the corridor. Short, wide corridors function much better than long narrow ones, and are used by a greater diversity of species.

Forest Park constitutes more a peninsula of forested habitat than a corridor. Human activities have fragmented this habitat. Corridors are functioning within the overall landscape of this region, particularly in the areas of greatest fragmentation outside of Forest Park. One of the characteristics that distinguishes Forest Park from other west hills habitats is its large scale and high level of connectivity in the regional landscape. Forest Park’s location at the tip of the peninsula places it in a position where it is dependent upon corridors throughout the rest of the regional landscape but is not itself part of a corridor.

Possible management tool

Intervention in Current Forest Succession

Currently much of Forest Park is in the "stem exclusion" stage of forest stand development discussed earlier. Strategies have been proposed to speed the succession to a more conifer-dominated forest. These include killing maples in places where young conifers are present in the understory, thus allowing the conifers to grow up into the canopy. Also, planting of fast growing shade-tolerant species such as grand fir in places where they might overtake the current deciduous trees has been proposed. There also is a shortage of downed and standing dead wood. To remedy this, snags and downed logs may be created.

Controlled experiments

This all reflects concerns voiced over the perception that currently there is a lack of "vertical structure" in the understory that is reducing the quality of habitat. This is possible, particularly in case of birds. However, there are many questions to answer before intervention of this type can become a major management goal. Which methods of eliminating maples are effective and how well understory conifers respond to the openings in the canopy are as yet unknown. Therefore, controlled experiments used as "working hypotheses" should be conducted using selected sites in the central section of the park to investigate some these issues.

Such experiments should include at least one control plot where vegetation changes and wildlife populations are monitored concurrently with several "treatment" sites where one of the methods of intervention in question is initiated. It would probably take a period of at least 10 years before the preliminary results are available so this would be a long term commitment.

Fragmentation in Forest Park; A Case Specific Approach

Powerlines, roads and firelanes fragment park to varying degrees

Though Forest Park acts as a contiguous forested patch in many ways, there is some degree of fragmentation within the park. This fragmentation is created from clearings under powerlines, along certain roads and, to a lesser extent, along the firelanes. These different features have some of the characteristics that contribute to habitat fragmentation as previously discussed. It is important to remember that habitat fragmentation is not an absolute condition. Fragmentation exists in degrees and at different intensity for species with differing vulnerability. Also, a variety of physical factors determine degree of fragmentation. Among these factors are degree of isolation, shape of the habitat fragment, canopy closure and vegetation.

Powerlines

Clearings under powerlines usually have meadow and/or shrub/scrub habitat types with no canopy. Though the break in canopy is usually

only measurable in meters or tens of meters, it does constitute a sharp contrast in vegetation types and opens the adjacent forest understory to some of the changes due to edge effect. The towers also offer a superior roost for predators (especially red-tailed hawks and great horned owl). If the clearing is long enough, these areas can constitute a barrier for small ground dwelling animals. These clearings also allow edge species to penetrate the park along the clearing's length. However, these openings in the forest do account for much of what meadow habitat exists within the park.

In order to reduce the fragmenting effects of these powerline corridors, it would be necessary to alter the manner in which they are maintained. The following actions are recommended:

Methods of reducing fragmentation

1. Re-establish native vegetation wherever possible. This includes allowing some trees to grow underneath powerlines. Since conifers will eventually grow too tall, deciduous trees are preferred. In places with inadequate clearance, native shrubs such as vine maple are preferable to grasses and blackberry.
2. Keep corridors as narrow as possible. This reduces the break in canopy cover and reduces the barrier to animal movement.
3. Work with other agencies. Coordinate maintenance with other agencies to minimize effects on vegetation and wildlife. Time maintenance activities to avoid the spring breeding season and the wet season when soils are vulnerable to erosion. Avoid the use of heavy vehicles where possible. Educate maintenance personnel about potential damage.

Roads

Roads present a particular impediment to small terrestrial animals and some carnivores. Perhaps the prime example of this in Forest Park is NW Germantown Rd. The traffic volume, embankments and road cuts pose a barrier to small rodents, insectivores, amphibians and reptiles even though the large, mature trees growing along its shoulders provide a canopy of vegetation over it for much of its length between St. Helens Road and Skyline Blvd. There is little that can be done about this (short of closing the road) with the exception of providing culverts under the road at several places along its route.

Habitat fragmentation

Northwest Leif Erikson Drive (along with the much of NW Saltzman Rd.) is also responsible for breaks in the vegetation at all structural levels (canopy, understory and ground cover) over much of its length; however, it does not represent a problem with automobile traffic. Solely from a wildlife habitat standpoint, it would be desirable to allow vegetation to encroach along its edges, allowing the forest canopy to close as much as possible.

The system of firelanes throughout the park may also cause some difficulty for smaller vertebrates. Since firelanes tend to be narrower than the other roadways mentioned and generally have at least some canopy closure over most of their length, they should be considered a lower priority. More specific study would be needed to verify this.

Summary

*Inventory provides
groundwork for
planning and
management*

This chapter reviewed current and historic data on Forest Park natural resources. These resources are of regional significance and have received national attention. The forest ecosystem as a whole was recently described by a local legislator as "the emerald arms embracing the city." The findings of project consultants, advisory committees and staff point to the tremendous potential and challenges that lay ahead in the management of park resources. This chapter sets the stage for the related analysis of park use and park management (Chapters 4 and 5), and provides the basis for the development of plan goals, strategies and actions and proposed implementation projects (Chapters 6 and 7).

CHAPTER 4. PARK USE

Introduction

Current Park Uses

- Types of Recreational Use
- Organized Recreational Activities
- Areas of Recreational Use
- Trail Systems in Forest Park
- Trail Systems Map
- Recreational Use Conflicts
- Educational and Research Uses
- Undesirable Park Uses

Recreation Trends and Needs

- Statewide Comprehensive Outdoor Recreation Plans
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- Balancing Resource Protection with Recreation Use
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- Recreation Management
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Resource Carrying Capacity

- Description
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- Need for Surveys/Monitoring
- Types of Surveys/Monitoring

Summary

CHAPTER 4. PARK USE

Introduction

A basic principle of this plan is that recreational uses must be compatible with the protection of resource functions and values. At present, some of those resources are being affected by increased use in certain areas of the park. The type, level and location of recreational activities must be carefully considered and monitored so that the resource functions and values are not compromised.

This chapter examines current park use; conflicts between various user groups; local recreation trends, opportunities and issues; the impacts of recreational use on the park's natural resources; the ability of the resource to accommodate recreational uses (also known as the carrying capacity); and the need to develop a monitoring program to measure the effects of park use on the resources.

Chapter looks at current uses and trends, resource conflicts and needs

Current Park Uses

Types of Recreational Use

Recreational use at Forest Park is passive; that is, walking, running, hiking, biking and equestrian trail use. There are no developed sports fields or picnic areas. However, there are minor facility improvements at trailheads where parking and some restrooms are provided. The heaviest use occurs on pleasant weekends in spring, summer and fall. Heavy use also occurs on summer week days after school and work when daylight extends into the evening hours.

Organized Recreational Activities

Occasionally, special uses are permitted in the park such as organized runs or cycling events. Staff screens these for conflicts or problems prior to issuing permits. The permitted group is responsible for monitoring the event and correcting any problems. If problems persist, the activity is discontinued. Other organized events consist of occasional field trips from schools or nature groups.

Areas of Recreational Use

The park was divided into three natural resource management areas that generally correspond to the recreational use patterns.

*Burnside to
Firelane 1*

South Unit: Heaviest use occurs in the south unit of the park, closest to the more densely populated areas of the city. Users consist primarily of walkers, runners and hikers, many of whom come from other parts of the city or even other parts of the state. Many cyclists access the bike trails from the southern section but often they disperse into the central unit of the park where they ride on the fire lanes.

*Firelane 1 to
Germantown*

Central Unit: A moderate amount of use occurs in the central unit of the park, consisting mostly of mountain bikers with some equestrian use. Hikers also use this area and local residents access the park from their neighborhoods to use the walking trails.

*Germantown to
Newberry*

North Unit: The north unit of the park is lightly used by equestrians, hikers and walkers. Generally the natural resources in this area show the least effects from human activity, partly because there is less recreational use.

Trail Systems in Forest Park

Trails in Forest Park have evolved over time to become a comprehensive system for pedestrians, cyclists and equestrians.

Before 1979, the 11.22 miles of Leif Erikson were open to vehicular traffic. Illegal dumping became such a problem that the road was closed to vehicles and opened to all recreational trail uses. In 1982, Springville Road was closed and in 1987, Saltzman Road was closed to vehicular traffic.

As a result of the popularity of mountain biking in the 1980s, many fire lanes in the park have been opened up for cyclists. Since 1986 when cycling was allowed only on Leif Erikson, Springville and Saltzman, the number of miles of track available to cyclists has gone from 15.15 to 25.86 and is proposed to increase to 29.23 when projects identified in the NRMP are completed.

Because of the various needs of the recreational trail users, it is necessary to restrict some trails to single uses only. Other trails are wide enough and have adequate site distance for all uses to share the trail.

Shared Recreation Use

Leif Erikson, Saltzman Road, Springville Road, Newton Road, and BPA Road and Fire Lanes 1, 10, 12, and 15 are open to all recreational trail use—pedestrians, cyclists and equestrians.

The following trails are also for shared use, but only between two kinds of uses that are compatible—either pedestrians and cyclists or

pedestrians and equestrians. Trails for pedestrians and cyclists are Holman and Fire Lane 3. Fire Lane 7 is open to pedestrians and equestrians but not to cyclists.

Bikes Allowed

Mountain bikers are allowed on most fire lanes where there is sufficient sight distance for the safety of other trail users. One-way bike traffic is allowed on Holman Lane; cyclists are allowed to go up only. Many trail loops are available for cyclists.

Bike access is primarily from Thurman at the south end of Leif Erikson. With the construction of new trailheads on Highway 30, better and less congested access will be provided.

A new loop will be created for mountain bikers in the Central unit with the construction of the trail connection between FL 5 and Leif Erikson.

Horses Allowed

Horses are allowed on the shared recreation listed above as well as on FL 7 in the Central unit. Minor improvements for parking horse trailers are proposed to make them easier to use.

Pedestrians Only

Pedestrians have access to all the trails in Forest Park. In addition to the major trails, there are many small trails that provide access from various neighborhoods.

Trail Use by Management Unit

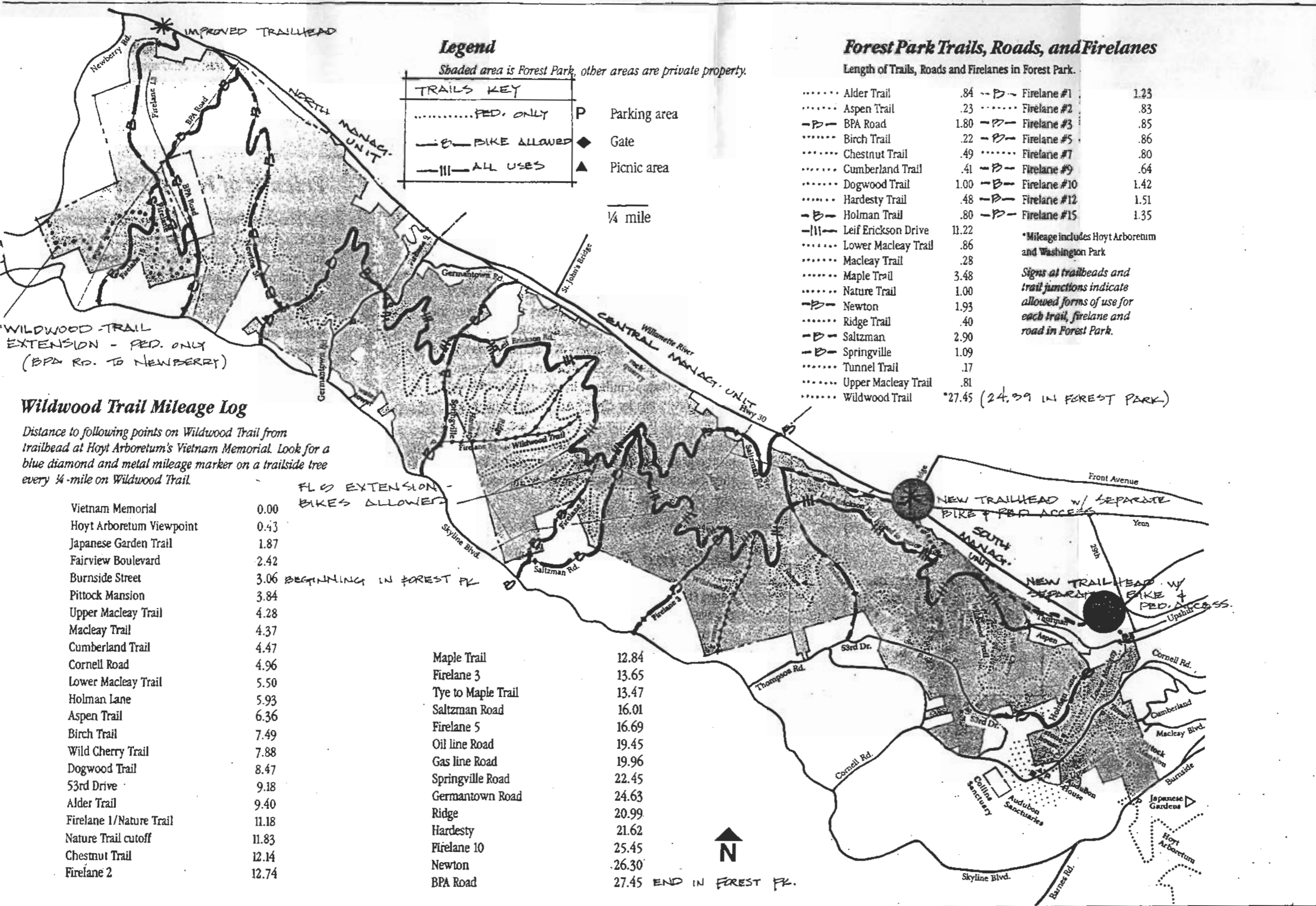
When all proposed trails are built, there will be 22 miles of trail in the 1100 acres of the South Management Unit, or one mile of trail for every 50 acres of land; 37 miles of trail in the Central Management Unit, or one mile of trail for every 60 acres of land; and 16 miles of trail in the North Management Unit, or one mile of trail for every 90 acres of land. This is in keeping with the strategies for managing the resources and the recreation opportunities in the various management units.

Summary

The following summary (on pages 76 and 77) is by management unit with names, mileage and type of use. Proposed trails are listed in italics.

TRAILS SUMMARY

Management Unit	Pedestrians	Bikes Allowed	Horses Allowed	
South	Alder	0.84		
	Aspen	0.23		
	Birch	0.22		
	Cumberland	0.41		
	Dogwood	1.00		
	Holman	0.80	Holman 0.80	
	Leif Erikson	3.06	Leif Erikson 3.06	Leif Erikson 3.06
	L. Macleay	0.86		
	Macleay	0.28		
	Tunnel	0.17		
	U. Macleay	0.81		
	Wild Cherry	0.87		
	Wildwood	8.13		
	Upper FL 1	0.86	Upper FL 1 0.86	Upper FL 1 0.86
	Total	18.54	Total 4.72	Total 3.92
	<i>South Trailhead @ US 30 to L. Macleay</i>	<i>0.25</i>		
	<i>South Trailhead @ US30 to Leif Erikson</i>	<i>0.75</i>	<i>South Trailhead @ US30 Leif Erikson 0.75</i>	
	<i>North Trailhead @ Yeon to Leif Erikson</i>	<i>0.50</i>		
	<i>North Trailhead @ Yeon to Lower FL 1</i>	<i>1.49</i>	<i>North Trailhead @ Yeon to Lower FL 1 1.49</i>	
	<i>RT-4S Cornell to Birch</i>	<i>0.50</i>		
	<i>RT-5S @ Pittock</i>	<i>0.20</i>		
	Total	3.69	Total 2.24	
Grand Total	22.23	Grand Total 6.96	Grand Total 3.92	
Central	Chestnut	0.42		
	Hardesty	0.48		
	Leif Erikson	8.16	Leif Erikson 8.16	Leif Erikson 8.16
	Maple	3.54		
	Oil Line	0.35		
	Nature	1.00		
	Ridge	0.40		
	Saltzman	2.90	Saltzman 2.90	Saltzman 2.90
	Springville	1.03	Springville 1.03	Springville 1.03
	Water Line	0.77		
	Wildwood	13.44		
	FL 2	0.83		
	FL 3	0.85	FL 3 0.85	
	FL 7	0.98		FL 7 0.98
	Total	35.15	Total 12.94	Total 13.07
	<i>RT-4C Wildwood/Leif connection</i>	<i>0.50</i>		
	<i>Ridge - extension</i>	<i>0.60</i>		
<i>FL 5 w/extension</i>	<i>1.14</i>	<i>FL 5 w/extension 1.14</i>		
Total	2.24			
Grand Total	37.39	Grand Total 14.08	Grand Total 13.07	



Legend

Shaded area is Forest Park, other areas are private property.

TRAILS KEY	
..... PED. ONLY	P Parking area
-B- BIKE ALLOWED	◆ Gate
- - ALL USES	▲ Picnic area

1/4 mile

Forest Park Trails, Roads, and Firelanes

Length of Trails, Roads and Firelanes in Forest Park.

..... Alder Trail	.84	-B- Firelane #1	1.23
..... Aspen Trail	.23 Firelane #2	.83
-B- BPA Road	1.80	-B- Firelane #3	.85
..... Birch Trail	.22	-B- Firelane #5	.86
..... Chestnut Trail	.49 Firelane #7	.80
..... Cumberland Trail	.41	-B- Firelane #9	.64
..... Dogwood Trail	1.00	-B- Firelane #10	1.42
..... Hardesty Trail	.48	-B- Firelane #12	1.51
-B- Holman Trail	.80	-B- Firelane #15	1.35
- - Leif Erickson Drive	11.22		
..... Lower Macleay Trail	.86		
..... Macleay Trail	.28		
..... Maple Trail	3.48		
..... Nature Trail	1.00		
-B- Newton	1.93		
..... Ridge Trail	.40		
-B- Saltzman	2.90		
-B- Springville	1.09		
..... Tunnel Trail	.17		
..... Upper Macleay Trail	.81		
..... Wildwood Trail	*27.45 (24.39 IN FOREST PARK)		

*Mileage includes Hoyt Arboretum and Washington Park
 Signs at trailheads and trail junctions indicate allowed forms of use for each trail, firelane and road in Forest Park.

Wildwood Trail Mileage Log

Distance to following points on Wildwood Trail from trailhead at Hoyt Arboretum's Vietnam Memorial. Look for a blue diamond and metal mileage marker on a trailside tree every 1/4-mile on Wildwood Trail.

Vietnam Memorial	0.00
Hoyt Arboretum Viewpoint	0.43
Japanese Garden Trail	1.87
Fairview Boulevard	2.42
Burnside Street	3.06
Pittock Mansion	3.84
Upper Macleay Trail	4.28
Macleay Trail	4.37
Cumberland Trail	4.47
Cornell Road	4.96
Lower Macleay Trail	5.50
Holman Lane	5.93
Aspen Trail	6.36
Birch Trail	7.49
Wild Cherry Trail	7.88
Dogwood Trail	8.47
53rd Drive	9.18
Alder Trail	9.40
Firelane 1/Nature Trail	11.18
Nature Trail cutoff	11.83
Chestnut Trail	12.14
Firelane 2	12.74

FL EXTENSION - BIKES ALLOWED

BEGINNING IN FOREST PK

Maple Trail	12.84
Firelane 3	13.65
Tye to Maple Trail	13.47
Saltzman Road	16.01
Firelane 5	16.69
Oil line Road	19.45
Gas line Road	19.96
Springville Road	22.45
Germantown Road	24.63
Ridge	20.99
Hardesty	21.62
Firelane 10	25.45
Newton	26.30
BPA Road	27.45

END IN FOREST PK.

Trails - All Management Units

FOREST PARK
 Natural Resources Management Plan



North	BPA Road	2.00	BPA Road	2.00	BPA Road	2.00
	Linnton/FL 10	0.50				
	Newton	1.93	Newton	1.93	Newton	1.93
	Wildwood	2.82				
	FL 8	0.17				
	FL 9	0.64				
	FL 10	1.42	FL 10	1.42	FL 10	1.42
	FL 12	1.51	FL 12	1.51	FL 12	1.51
	FL 13	0.51				
	FL 14	0.27				
	FL 15	1.33	FL 15	1.33	FL 15	1.33
	Total	13.10	Total	8.19	Total	8.19
	<i>Wildwood extension</i>	<i>2.20</i>				
<i>Linnton connection</i>	<i>0.75</i>					
Total	2.95					
Grand Total	16.05	Grand Total	8.19	Grand Total	8.19	
ALL UNITS	Pedestrians	75.67	Bikes	29.23	Horses	25.18

Recreational Use Conflicts

Conflicts between user groups

In recent years, increased use of the park has resulted in some conflicts between user groups. The Forest Park Trails Policy Task Force (August 1992) was convened to examine the bicycle/pedestrian and other user conflict issues on Forest Park trails, firelanes and roads, and to develop policy recommendations for Parks and Recreation.

Pedestrian: Their report found that in the 1970s, recreational use in Forest Park increased due to the popularity of running for fitness. This created conflicts with the existing use of the park by automobiles and motorcycles. Those conflicts were resolved by the closure of most roads to all but official vehicles.

Biking: In the 1980s, recreational use increased again because of the development and subsequent popularity of the mountain bike. This use causes conflicts in certain areas with pedestrian and equestrian use in the park.

The Trails Task Force listed a number of guidelines and strategies for controlling conflicting uses. These are included in the management section of this plan and reflected in specific project proposals.

Conflicts between recreational users and local residents

In some areas there are conflicts between local residents and park users which have been identified but not resolved. These conflicts occur because there is too much recreational use and too few facilities to accommodate that use, or because there is inadequate supervision of park facilities. Some examples are:

Leif Erikson trail at Thurman Street: The most serious conflicts occur at the entrance to Leif Erikson trail in the residential area at NW Thurman Street. There is inadequate parking and no restroom facilities. Local residents are disturbed by noise, traffic and lack of respect for private property. It is anticipated that development of other park entrances will take some of the pressure off of this area. Further information is provided in the Projects chapter of this plan.

Stone Castle: This remnant of a restroom building is a gathering place for young people who disturb the neighbors with late night parties, drinking and noise. They also cause vandalism in the area with fires and graffiti. Similar conflicts occur in other areas from late night parties and noise.

Educational and Research Uses

Growing school and scientific use

The proximity of the city to the rich natural resources of Forest Park increasingly makes the park an educational resource for field study of biology, ecology, geology, forestry and other natural sciences.

Educational activities in Forest Park for the general public are generally based out of the Audubon facilities or Hoyt Arboretum. These activities include bird watching, nature hikes, plant or animal identification walks, fish or water quality sampling. Interest in these activities is growing and projected to increase with the development of new interpretive materials and programs such as those currently coordinated by the Metropolitan Greenspaces Program.

Although the current school funding crisis is likely to limit special “non-essential” programs such as hands-on education programs, local educators at all levels of schooling are increasingly interested in utilizing this resource. Environmental research in Forest Park is becoming increasingly common among students from Portland State University, Reed College and other schools for both undergraduate and graduate thesis projects, with additional research planned for the coming years. This research provides an important source of needed baseline information and may be useful as an element of an ongoing monitoring program for Forest Park. Portland Parks and Recreation is interested in accommodating these uses and sharing in the results of research conducted on the use and resources of the park.

Undesirable Park Uses

As in other public areas, there are some undesirable activities and uses that occur in Forest Park. These consist of some transient camping with campfires and occasional rowdy partying. Cars are occasionally broken into in the more isolated parking lots. Parks staff work with police and neighborhood groups to alleviate and resolve these problems.

Recreation Trends and Needs

Although new recreation activities are difficult to forecast, it is reasonable to assume that any new trends will involve more, rather than less, use of the park. This will no doubt encourage more people to go farther into the park, harming natural resources. The most recent recreation trends of running and mountain biking have already done that. Additionally, the fact that the Portland metropolitan area is growing means that more people will be looking for various kinds of recreation opportunities, especially those found in Forest Park.

The Portland region has a great need for expanded recreational facilities.

Statewide Comprehensive Outdoor Recreational Plans

The Oregon State Parks and Recreation Division has documented recreational needs for the state. Their study concluded that the Portland Metropolitan Area was one of two regions of the state with the greatest relative need for recreational facility development. The Portland area showed significant disparities in supply for measured use in almost every activity, including hiking trails, designated bike trails, and designated bridle trails, which serve the three primary recreational uses in Forest Park. The study also found that the leading recreational activity in the Portland area was hiking and walking. Additional studies projected a substantial increase in the recreational use of natural areas within the city, such as Forest Park.

The draft of the Oregon Outdoor Recreation Plan - 1994-1999 supports the above findings with survey information showing continued high interest and participation in trail walking, hiking and wildlife viewing. Additionally, there is a pronounced preference for more semi-primitive and primitive recreation sites along with the decrease in the availability of these sites close to home. The plan notes that greater emphasis is needed to protect those scenic qualities and opportunities.

Park Futures Plan

The 1990 *Environmental Scan* report in the *Park Futures Plan* found that "natural areas will be popular attractions in the future but will require a dramatic shift in management and an increased level of financial resources to accommodate the increased use."

Some of the associated recreational use trends relevant to Forest Park were the following:

- Natural areas will increase in popularity as baby boomers age and look for activities that are less physical and more relaxing.
- Because over 60 percent of Portland's park acreage is wildlife habitat, much of this demand can be met through the city's 5,000+ acres of natural areas (most of which is Forest Park).
- Opportunities to visit and learn about natural areas are limited because improvements such as signage, maps, interpretive exhibits and trails are inadequate. Also, most of the existing programs are sponsored by private nonprofit groups.
- Natural area management is not adequately coordinated. A group of 24 cities, 3 counties and Vancouver is studying options for regional coordination.

Observation of recent park use in Forest Park shows that the so-called "passive recreation uses" such as walking, hiking and wildlife observation are increasing. The expected increase in Portland's population will increase the use of and demand for trails and recreation facilities in the park.



Chipmunk

Recreation Issues

The 1991 *Park Futures Plan* identified issues facing the city parks system and established policies and an action plan to guide park improvements over the next 5 to 15 years. Among other findings, the study found walking for pleasure to be Portland's most popular recreational activity. The study also made several recommendations:

- Improve awareness of trails and other opportunities in natural areas through new and improved maps, brochures, interpretive signs, exhibits, guided walks and other appropriate measures.
- Foster an attitude of active stewardship towards the management of natural areas.
- Establish an environmental education program for school-age children and adults, in cooperation with school districts and other providers.

Walking is Portland's most popular recreational activity.

Specific actions proposed for Forest Park include (1) prepare a master plan for the park (this document), (2) replace the Macleay Park water line (completed 1990-91), (3) develop a new brochure on trails, (4) improve and identify trailheads, and (5) develop a self-guided nature trail. The latter three actions are addressed in Chapter 7 of this plan.

Critical Issues to Address

Balancing Resource Protection With Recreation Use

The overriding issue at Forest Park is how to protect the natural resources in the park while providing quality recreation use. This document addresses this issue and all the management, resource and recreation recommendations found here are in response to it.

Accommodating Additional Recreation Use

Closely tied to the issue of balancing resource protection with recreation use, is the issue of how to deal with more recreation use. Management, design and education need to be applied to this problem.

*Other forest parks
needed to distribute
use*

Overuse

All uses in the park have some impact on the natural resources. In many cases, they are compatible with the resources and have little damaging effect. However, increased use of the park by greater numbers of people is causing more deterioration. Trails that are used year-round become wider as people try to avoid the wet, muddy spots that form during the rainy season. Plants are trampled as people create their own trails down to the creeks and waterfalls. Dogs run loose, trample vegetation and harass wildlife, causing them to retreat farther into the park. These problems can be solved through a variety of management techniques, improvements and facility design.

Park Access/Neighborhood Impacts

Inadequate facilities at park access points is disruptive to some local neighborhoods. New facilities with adequate parking and restrooms are needed. New trailheads need to be on or near public transit routes to provide access for all and to reduce vehicular travel.

Funding and Staffing

Present staffing and funding is not adequate to handle the present and projected use levels. This must be addressed soon if protection and enhancement of Forest Park is important to the city and the region.

Regional Resource

Forest Park is a regional resource that is supported by City of Portland taxpayers. Metro has identified the park as a regional resource in its Greenspaces Plan. Since the park serves the entire region, its support should come from a regional coalition of taxpayers.

Recreation Surveys/Monitoring

Park managers and users know that there is a lot of recreational use in the park, but there is little objective data on it. Baseline data needs to be gathered to assess park use. Future use assessments will be needed periodically to address increases in the locations and kinds of use.

Recreation Opportunities

Although many areas of the park show signs of overuse and there are areas of conflict between recreation groups, opportunities still exist to accommodate additional recreation use and to provide necessary facilities while offering more protection to the resources.

Recreation Management

Techniques such as seasonal trail closures, trail realignments, trail hardening, and improved signing will help reduce damage to resources

*Close poorly situated
or unplanned trails*

while improving the recreation experience. The trail along Balch Creek is an area where recreation management would combat the present degradation from overuse. Paving the trail would help keep people on the trail; providing specific overlooks would reduce the number of places where people make their own paths down to the creek; signing would educate them about the need to stay on the trails and the reasons for protecting the creek.

Facility Development

Even in the more heavily-used southern part of the park there are opportunities to provide additional recreational facilities. Trail connections with other intensively used areas such as Washington Park, the Metro Washington Park Zoo and Hoyt Arboretum can be made. Development of new access areas will relieve pressure on neighborhoods and improve the recreation experience for park users.

Develop new access areas

Education

Providing information to park users about resource protection, stating the reasons for particular management actions will help them to use the park wisely and to appreciate its unique value.

Regional Cooperation

Parks and Recreation is presently working with Metro and other area recreation providers to ensure that the recreational needs of the region are being addressed. This needs to be encouraged and continued.

Creative Partnerships

Since it is not realistic to expect the taxpayers to provide for all the needed improvements in the park, the continued use of partnerships with friends groups and volunteer organizations is necessary. Additionally, there will be opportunities to work with local businesses as new trailhead/access points are developed.

Resource Carrying Capacity

Description

For purposes of this management plan, resource carrying capacity is defined as having two aspects:

Sustainability and quality of experience

1. The ability of natural resources to accommodate the use or intended use without compromising resource quality. (Limits of acceptable change to a resource may be established.)

2. The quality of the recreational experience from the user's point of view, which often depends more on social factors than on wildlife habitat or soil conditions.

Different kinds of use will consume the resource at different rates. But it is clear that recreation use can cause excessive impacts on resources and that, at some point, active management and restrictions on further use may be needed to protect a given resource or type of recreation.

What is the threshold?

One of the first steps is to either determine how much recreational use can be accommodated without any adverse effects or to determine the amount of deterioration that is acceptable. This is done through observation, research, baseline inventories of vegetation and wildlife habitat, consultation with experts, and periodic monitoring of the resources. Some of this information was gathered during preparation of this plan and will be used to determine an interim baseline carrying capacity for various areas in the park. Other information needs to be gathered on an on-going basis in order to keep track of park use and resources and to make needed adjustments in park management.

Allowed use needs to be consistent with maintaining both the ecological and social conditions specified in an area's management plan. The key to this definition is the presence of clear objectives that allow measurement of what a recreation setting should be like in terms of the physical-biological environment (for example, level of water quality and vegetative disturbance) and the social environment (types of activities allowed, levels of interaction among visitors).

Because carrying capacity is both objective and subjective, it will serve as a working hypothesis in this plan. That is to say, certain levels of recreation use will be allowed in specific areas. Then use will be monitored to see if resources are negatively affected and if users are satisfied with the recreation experiences. Carrying capacity can then be modified, influenced or changed by such techniques as education of park users through signs and brochures, barriers, permanent or seasonal closure of trails, or enforcement.

Developed recreation areas and facilities also have carrying capacities beyond which use cannot be accommodated without harming the facility, the natural resource around it or the recreation experience. In this plan, those areas are primarily trailheads/park entrances and major trails. Proposed projects will address these problems.

Interim Baseline Carrying Capacity

A first step in establishing the carrying capacity is to know the present levels of use in various areas of the park. Information from park managers, park users and consultants hired to work on this plan gives a good idea of the present conditions in the park and where the park shows signs of overuse. This is mostly in the South Management Unit, along the Balch Creek and other trails, and at the Thurman Street entrance at the south end of Leif Erikson.

Need to understand current use levels

At present, management practices can deal with these particular problems through minor design changes to trail surfaces and alignments and through acquisition and development of a new park entrance/trailhead for the South Management Unit.

This plan recommends that the present use levels be determined by completing a Recreation Survey in the very near future. This survey will establish the numbers of park users, the areas where they recreate, the frequency of their visits, where they are coming from and what they perceive as problems. Also monitor the number of pets, especially dogs, for impacts on resources and control methods.

Future directives need to establish limits of acceptable change within the management units. Limits can be put on the numbers of users in a unit if certain predetermined levels of resource quality show signs of deterioration, or when use levels create overcrowded conditions.

Surveys/Monitoring Program

Need for Surveys/Monitoring

In order to use the recreational carrying capacity as a management tool, it is necessary to monitor both park use and the health of the natural resources. This monitoring needs to consider kinds of use, use frequency and location, and associated resource impacts.

The first objective is to collect baseline data on recreational use in Forest Park and then to periodically re-survey the same areas in the future to see if use is increasing or decreasing and what the effect is on the natural resources. These recreational use surveys should coincide with wildlife and vegetation monitoring to determine appropriate actions in each management unit. It is critical to begin this work as soon as possible to establish the present level of use. The results of the survey

Collect baseline data then monitor periodically

should reveal the kind and levels of use, by season, in all areas of the park. Once a survey is designed, volunteers can administer it.

Types of Surveys/Monitoring

Because of the nature of Forest Park with its wilderness qualities and numerous entry points, a comprehensive use survey is difficult.

The necessary steps are as follows:

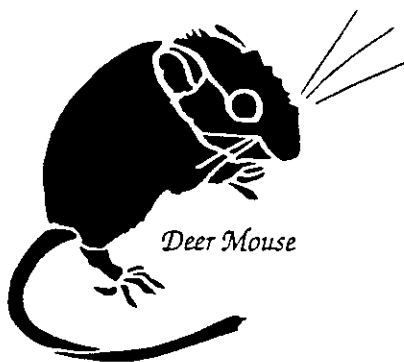
1. Determine the most effective survey method
2. Conduct a brief pilot study to ensure that the system works and that the right information is being gathered
3. Conduct surveys and monitoring at trailheads and at established resource monitoring transects to get data that correlates use to resource impacts
4. Plan and budget to ensure this remains a priority, and to assess the effectiveness of the actions recommended in this plan.

Summary

*Planning, education
and funding needed*

Use at Forest Park has been increasing steadily over recent years and is projected to increase more over the coming years. Management of park recreation resources will need to be adjusted to meet these new demands. Dependable funding sources need to be secured to provide for additional uses and to ensure that the natural areas will be preserved for future generations. Cooperative work with other regional recreation providers needs to be pursued to ensure the best use of all resources and the protection of those that are irreplaceable.

If Forest Park is to remain a valuable natural resource for the Portland metropolitan region and fulfill the vision of becoming America's premier urban ancient forest, it must be protected from unintentional damage. Planning, education and funding are required.



CHAPTER 5. PARK MANAGEMENT

Introduction

Current Park Management

Staffing

Work Load

Natural Resources Management

Recreation Management

Funding and Budget

Consequences of Continuing Current Management

Future Needs

Staffing

Budget and Funding

Summary

CHAPTER 5. PARK MANAGEMENT

Introduction

This chapter looks at current park management, the present level of staffing and funding, and the growing demands on Forest Park to provide regional recreational opportunities and resource values. It assesses the impact of increased park use on staffing and funding issues. Also, it addresses the lack of time, money or personnel to carry out the natural resource and recreation improvements necessary to keep the park in good condition.

Current Park Management

Staffing

Staffing for Forest Park has historically been very low, but it is lower now than it was 20 years ago. The present level just provides basic maintenance. Annually, Forest Park is staffed by 0.4 of an arboriculturist position and 0.9 of a utility worker position. One additional seasonal worker works for 5 months in the summer.

The park has long been understaffed

Over the past ten years, outside assistance has been provided by citizen volunteers and temporary programs funded by or through many different organizations and agencies: the Private Industry Council, Oregon Youth Conservation Corps, Metro Greenspaces, Metro Solid Waste, West Multnomah County Soil Conservation District, Bureau of Environmental Services, Multnomah County Alternative Community Service, Oregon Department of Agriculture, Oregon State Prisons, Federal Emergency Management Administration, Neighbors West/Northwest and the Friends of Forest Park. The Oregon Department of Fish and Wildlife and the USDA Soil Conservation Service have provided technical support.

Work Load

The Arboriculturist performs the following work at Forest Park under the supervision of the Natural Resources Supervisor:

- Directs regular maintenance and operations activities
- Coordinates volunteer projects
- Acts as liaison to Friends of Forest Park and neighborhoods
- Directs improvement projects and ivy removal work.

The Utility Worker does basic park maintenance—cleaning restrooms, picking up litter at park entrances and on major trails, and taking care of trail and road work. The seasonal worker assists the Utility Worker.

Parks and Recreation provides other assistance in the form of personnel, heavy equipment and materials to do some trail work for a couple of weeks each year. Parks mowing crews clear the fire lanes each summer.

Volunteer efforts

Aside from those basic items, volunteers from various sources perform most other work. Friends of Forest Park, youth crews, scouting groups, other volunteer organizations and inmate labor crews do various projects. Some of these groups do construction projects. Others, such as the Friends of Forest Park, are also involved in land use issues and fund raising for property acquisition to protect and enhance the natural resources of the park.

Much other work is accomplished by leveraging funds and volunteer workers through grant programs and programs such as Alternative Community Service, the Youth Conservation Corps and the Northwest Service Academy. Metro's Central Enhancement Fund funded a special program for ivy removal. Without these additional sources of help, Forest Park would not be in as good a condition as it is.

While the work done by these groups is a great help, it is not a stable, dependable resource. Programs change from year to year, skill levels vary greatly from young inexperienced workers to seasoned adults, and the amount of time and effort put forth varies greatly from year to year.

Natural Resources Management

Current Maintenance

The natural resources in Forest Park have been maintained remarkably well and quite inexpensively for many years, often by leaving them alone—both by design and because of lack of personnel. Active resource management and protection has not been feasible because of lack of time, money and personnel.

On-going Projects

A few on-going projects exist but could be improved. These projects include:

- Removing English ivy in the areas of heavy infestation and replanting with native vegetation
- Restoring riparian and fish habitat in Balch Creek
- Removing hazardous trees from along trails
- Participating actively in land use decisions that affect Forest Park's resources.

Impacts to the resources come from inside and outside the park. Inside the park they come primarily from overuse and from invasive non-native plants.

Overuse: Heavier recreational use affects resources within the park. Park users cut new trails around wet trail areas and create short cuts through the forest; they make trails down to creeks; they allow dogs to run off trails, causing damage to wildlife habitat. This causes steady deterioration of the resources.

Non-natives: Other aspects of natural resource management include dealing with invasive non-native species of plants that threaten Forest Park's valuable natural ecology and habitat. With the exception of the English ivy removal which is a critical management issue, no programs address invasive species.



Forest Park needs staff and funds to deal with these problems and with other resource enhancement projects that would improve the health of park resources. Such projects include:

- Successional acceleration to reach a more mature forest stage
- Stream restoration
- Habitat restoration
- Management of utility corridors.

Outside impacts come from development that occurs adjacent to the park or around the headwaters and upstream of the creeks that run through the park.

Outside impacts

Adjacent Development: Adjacent development greatly increases risks to the park from non-native invasive plants, from domestic animals harassing, killing and displacing wildlife, and from fire danger from backyard burning and cooking.

Up-stream Development: Construction activities can cause siltation and damage to streams and watersheds and to fish, amphibians and other aquatic animals.

Strong land use planning and resource protection tools such as conservation easements are an excellent way to gain protection from outside impacts with relatively little outlay of funds, but knowledgeable staff are needed who understand zoning and land use issues. Increasing pressure from additional development around the park requires additional staff and stable funding in order to address these problems and use these tools effectively.

Many natural resource projects are implemented on an 'ad hoc' basis as staff is available or as emergencies arise. Instead of reacting to crises, careful planning and adequate staffing would prevent them.

Recreation Management

Current Management

As park use increases, staff is less and less able to keep up with basic maintenance. At present, cleaning and maintenance are at a bare minimum. Trail maintenance and improvements are regularly deferred and new projects generally cannot even be considered. As recreational use increases, these conditions will worsen unless there are increases in staffing and funding.

On-going Projects

Presently, recreation management consists of working with various user groups to ensure that they use the park trails and resources properly; working with friends groups, neighborhoods and local residents; keeping the park clean and maintained; keeping trails repaired; and placing informational signs along trails.

Impacts on the recreation facilities come from overuse, lack of staff and funds to maintain facilities, and natural aging and deterioration.

Funding and Budget

Forest Park operates on a very limited budget. The 1993-94 budget was \$81,500, broken down as follows:

- \$65,500 for personnel costs
- \$6,700 for equipment and materials to do minor improvements
- \$9,300 for support items—mostly vehicles.

Funding for these items comes from the General Fund. Some minor grants and in-kind assistance have been obtained over the years to support small projects. Overall, a very low budget is available to maintain a park of this size and importance.

Although there are no parks comparable to Forest Park, looking at the costs to maintain the grounds for other parks provides some perspective. In 1992-93, the city spent the following approximate figures on maintenance of other parks:

- \$70,000 to maintain 60 of the 90 acres at Gabriel Park
- \$114,000 for 16 of the 31 acres at Laurelhurst
- \$150,000 for 64 of the 196 acres at Mt. Tabor
- \$88,000 for 40 of the 66 acres at Pier Park
- \$89,000 for 36 of the 47 acres at Westmoreland.

These parks do require a different kind of maintenance and there is no suggestion that these parks receive too much money, but it is striking that it costs as much or more to maintain these smaller parks as it does to maintain the nearly 5,000 acres of Forest Park.

Forest Park is of such size and value that Metro considers it to be a regional resource. City taxpayers and private contributors solely support the park. This inequity needs to be addressed.

Regional resource

Consequences of Continuing Current Management

In the recent past, use of Forest Park has increased dramatically, with detrimental consequences on the park and its resources. Foot traffic on and off trails causes more compaction and damages the native understory plants. Entry points at the edges of the park are overused and under maintained. Interpretation, education and facility improvements need additional funding. If current levels of staffing, funding, maintenance and management are continued, both the recreation facilities and the natural resources of Forest Park will suffer. Inevitably, more people will be using the park, creating a greater need for staff, funds and facilities.

Resources will suffer if current levels of maintenance continue

Future Needs

As park use increases, the need to provide additional recreation facilities becomes greater and the need to protect the resources becomes greater, too. Successful recreation management relates directly to successful natural resource management. Keeping park users on trails and in appropriate areas protects fragile resources and wildlife habitat. This pro-active management requires additional staff and increased, stable funding.

Increased need to protect resources

Staffing

At a minimum, the park needs two full-time staff members: (1) an Arboriculturist for park management, project direction and neighborhood coordination (this could include supervision of Marquam Nature Park); and (2) a Park Attendant with experience in natural resource management and volunteer coordination.

A natural resource enhancement crew of 6 to 10 people is needed seasonally to handle natural resource improvement projects. Another crew needs to just handle ivy removal, which is a serious and growing problem in many areas. A third crew, a trail crew, is needed for three

months each summer to make trail improvements and keep trails in good repair.

The addition of caretakers living in or near the park would help with routine maintenance and park security. Their housing would be supplied at reduced cost in exchange for work done in the park.

Future natural resource staffing should include the addition of a grants/resources coordinator for the whole system, and a natural resource supervisor to handle the west side.

Budget and Funding

As in the past, managing Forest Park will be as efficient as possible. This means utilizing available grant programs, volunteer organizations, friends groups and neighborhoods. It also means supporting land use decisions that protect resources and using conservation easements where possible in place of land purchases.

In the near future, it means looking for new funding opportunities such as contributions and/or user fees from the principle user groups, working with new businesses that depend on Forest Park for much of their income, and establishing a dedicated funding source to support the management of the park. It will also mean working with Metro so that Forest Park, which is a regional resource, is supported more equitably by the region's taxpayers, and not solely by the city's taxpayers.

Forest Park is the largest and one of the most important natural resources in the city and in the region. Adoption of this plan and its recommendations will further its protection and enhance its position as America's premier urban ancient forest.

Summary

Over the years, Parks and Recreation has managed Forest Park with remarkable efficiency and excellent results. Parks has acquired land, protected resources and provided recreation opportunities. This frugal and conservative approach will be continued, but without additional staff, information and equipment, it will not be possible to protect the park as in the past. New demands will require more active management to accommodate increased use and to protect natural resources. Parks and Recreation needs additional staff and stable funding to do this.

CHAPTER 6. GOALS, STRATEGIES AND ACTIONS

Introduction

Management Plan Vision

Vision Statement

Management Plan Goals

Conservation Goals

Recreational and Educational Goals

Management Units and Goal Balancing

Management Plan Strategies

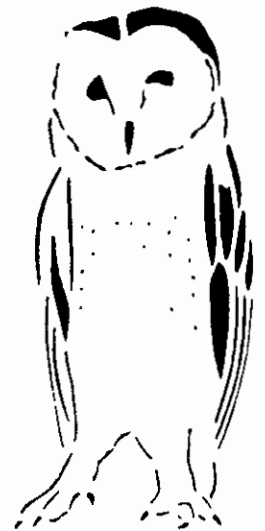
Strategies 1 through 10

Summary

CHAPTER 6. GOALS, STRATEGIES AND ACTIONS

Introduction

This chapter presents plan goals, strategies and specific actions for management of Forest Park. The chapter begins with a vision statement that projects an enduring image for the park and defines its place in the hearts and minds of Portlanders. Two goal statements identify what is of overriding importance and provide orientation for all management actions. Strategies and specific actions to achieve the management goals follow these statements. Detailed information on the actions is in Chapter 7 - Projects.



Barn Owl

Management Plan Vision

The vision statement builds on that found in the *Forest Park Management Plan* adopted in 1976, with new references to recreation, education and research, and a vision of Forest Park becoming an ancient forest over time. The vision statement and the goals respond to the public expectation for stewardship of natural and recreational resources.

Vision Statement

Forest Park represents an unparalleled resource where citizens can enjoy the peace, solitude, ruggedness, variety, beauty, unpredictability and unspoiled naturalness of an urban wilderness environment; a place that maintains this wilderness quality while allowing appropriate passive recreational and educational use without degrading natural resources; an urban laboratory for environmental research and resource enhancement and restoration; America's premier urban ancient forest.

*In seven generations,
an ancient forest of
national renown*

Management Plan Goals

Like Oregon's statewide land use goals, the two goal statements present an ongoing challenge for park managers: conformance with goals and balancing one goal against another. The goals and strategies are derived from an array of past planning studies, from past and present resource inventory and from analysis work outlined in preceding chapters.

Conservation Goals

Parks and Recreation has two primary conservation goals:

Grow an ancient forest

1. Protect Forest Park's native plant and animal communities, its soil and its water resources while managing the forest ecosystem in order to grow a self-sustaining ancient forest for the enjoyment and benefit of future generations.
2. Design management and restoration efforts to:
 - Maintain and enhance regional biodiversity
 - Provide wildlife habitat and migration opportunities
 - Improve water quality and aquatic habitat
 - Repair damaged and fragmented natural systems.

Recreational and Educational Goals

Parks and Recreation has two primary recreational and educational goals:

Protect and enhance

1. Protect and enhance the value of Forest Park as a regionally-significant recreational resource—a place that can accommodate recreational and educational use at appropriate seasons of the year without environmental damage.
2. Enhance the value of Forest Park as a regionally-significant educational resource—an urban laboratory for environmental research and resource enhancement and restoration.

Management Units and Goal Balancing

Implicit in the plan's vision statement and more obvious in the goal statements is the adoption of preservation of natural systems as its top priority. The plan now introduces a recommendation to break Forest Park into three management units. Earlier discussions about wildlife (page 52) and recreational use (page 74) acknowledge the proposed management units and begin to show how they might be used in the carrying out of strategies.

In terms of degree of recreational use and in terms of existing and potential quality of natural resources, Forest Park varies significantly from south to north. Over its 7-1/2 mile length, the level of use recedes dramatically from south to north. In the last 10 years mountain

bicycling has increased recreational use in the middle of the park. This existing *gradation of recreational use*, and the resulting *gradation of user impacts* should allow different outcomes from the goal balancing process to occur within each unit. Prospects for the continuation of this gradation of use are good. Residential development to the west of the park will gradually increase the levels of use in the middle unit and later in the north. Levels of use in the south are likely to remain high or continue to climb.

The plan should take advantage of the south to north gradation of human use and impacts. The northern units have *significant values* not found in the south. The vision statement mentions the "peace, solitude, ruggedness, variety, beauty, unpredictability of an urban wilderness." The plan can most effectively advocate for the protection of these important values where they are the greatest.

This plan recognizes that Forest Park's *interior forest habitat* is truly unique in an urban area. It recognizes that the potential value of this unique resource is even higher. It recommends several resource enhancement projects and management practices to protect and improve interior forest habitat. The plan's recommendations for development of public access are intentionally more conservative in the north unit.

The alternative is to continue to use a blanket approach for the entire park. A probable outcome of the blanket approach is the gradual degradation of interior forest habitat throughout the park. Management actions developed to protect or improve interior forest habitat and applied with a blanket approach would be less effective. Policies developed to manage recreational use would result in universal accommodation. An increment of nature's unpredictability would be lost to a blanket of sameness imposed over the whole of the park.

In short, balancing goals within each management unit will help park managers make better decisions. This management approach will help the park retain or improve its most valuable natural resources, retain important values, and reduce conflicts. In general, the approach will result in the acceptance of more impacts in the south unit than the middle, and the acceptance of more impacts in the middle than the north. Looking at the park in terms of the three management units proposed provides the framework for more accurate monitoring and detection of natural resource and recreation trends. Significant management actions such as development of park infrastructure, application of user policies, and restoration of resources can be applied more precisely and with greater public support by taking the management unit approach. Importantly, this approach will promote

a greater understanding and appreciation of Forest Park's natural resources and its value to the community. The plan recommends the management unit strategy as both realistic and achievable today and into the future.

Management Plan Strategies

This section develops major strategies to advance Forest Park toward the preceding goals. These strategies are designed to respond to the recommendations of resource specialists and the needs of compatible public use. The type, level and location of specific projects under each strategy are presented in Chapter 7.

Strategy 1. Implement *Sustainable Resources Program*.

*Protect natural
resources*

Protection of natural resources is a top priority and will be implemented through a new *Sustainable Resources Program* (SRP) for Forest Park. The essence of the program is regular monitoring of natural resource functions and values coupled with effective management response aimed at sustaining resources over time. Elements of the program are monitoring of resources and pests, core preserves, resource enhancement and restoration, exotic vegetation control, fire management, impact mitigation and periodic review.

Monitor Resources.

*Coordinate wildlife
and recreation
monitoring*

1. Monitor resources to determine their overall condition and to determine the effects of management actions.
2. Take the following actions:
 - Establish permanent wildlife monitoring stations
 - Develop monitoring protocol
 - Monitor stations on an annual basis
 - Conduct periodic nighttime wildlife censuses
 - Coordinate with recreation monitoring program.
3. Continue the following on-going efforts:
 - Monitor forest canopy on a periodic basis
 - Refine monitoring of groundcover and understory plants
 - Use the Geographic Information System to develop a comprehensive natural resource database
 - Enlist university students in detailed research projects
 - Establish resource benchmarks.

Monitor Pests.

1. Track information on introduced pests.

2. Cooperate pro-actively with other agencies responsible for monitoring and controlling introduced insect pests.

Core Preserves. Interior forest habitat is Forest Park's most unique and valuable asset. *No other urban park in the United States offers anything comparable in quantity and quality.* This and other important natural resource assets will receive special management consideration.

1. Develop a system of core preserves in which human use and intervention are limited to ecological management activities.
2. Include the following preserve areas:
 - Areas of interior forest habitat
 - Areas within the Balch and Miller Creek Watersheds
 - The Newton Wetlands and Doane Lake
 - Rare plant and animal communities.

Enhance Resources. Most of the park is in good condition, but many opportunities exist for improvement.

1. Intervene to improve resource functions and values.
2. Enhancement actions include creating snags and downed logs, increasing forest structure by accelerating conifer growth, and reducing gaps in forest canopy along utility corridors and roads.

Restore Resources. Restore damaged areas of the park through actions such as:

1. Create nesting and feeding habitat for wildlife
2. Create spawning and rearing areas for fish
3. Plant native vegetation
4. Remove exotic or invasive plants
5. Remove intrusive, damaging or hazardous trails, roads, utilities and other facilities.

Control Exotic Vegetation.

1. Continue and increase efforts to control invasive vegetation (control of English ivy is critically important; address other species as well).
2. Monitor the location and spread of exotics and the efficacy of control measures.

Manage Fire Hazards. Probability of fire at Forest Park is a function of fire hazard and risk of ignition. The fire hazard at present is low due to low levels of fuel buildup, a relatively high percentage of less hazardous hardwood trees, the low incidence of areas with conifer

overstock and ladder fuels. Without intervention, fire hazard will increase over time, although not very rapidly. Fire hazard should be evaluated at regular intervals.

1. Monitor significant risk factors including illegal camps, ignition from adjacent areas, overhead utility lines and arson.
2. Take appropriate action to eliminate or reduce risk factors.

Mitigate Outside Impacts. Avoid or mitigate negative impacts to park resources caused by human activities outside the park. Parks and Recreation staff should track activities that affect park natural resource functions and values within an area bounded by the watershed-based *Forest Park Resource Line* as shown on the attached map.

1. Monitor and participate in land use applications, comprehensive plan updates, legislative actions and transportation plans and projects affecting or potentially affecting park resources.
2. Pay special attention to:
 - Balch Creek watershed
 - NW Skyline Boulevard
 - Willamette Greenway below and north of the park
 - Rural areas north and west of the park.

Review Periodically.

1. Review components of the SRP on a periodic basis.
2. Use information from resource monitoring programs to determine effectiveness of management actions and policies and to modify actions taken and policies adopted.

Strategy 2. Divide Forest Park Into Management Units.

Three management units

The character of Forest Park changes from south to north. Levels of use are high in the south, moderate in the center, and low in the north. With the exception of Balch Creek, habitat values tend to be greater in the north. This plan is organized with the assumption that the park would be divided into three units to provide a framework for improving resource protection and recreation management.

Burnside to Firelane 1

South Unit. Bounded on the south and north by W Burnside Street and Firelane #1, the South Unit is impacted by its proximity to densely populated northwest Portland. The highest levels of use occur here. Public access into the park from the South Unit is poor with parking areas troubled by conflicts with residential areas, poor security, and lack of facilities. The trail system is well developed, but in places is quite steep and includes crossings of heavily traveled W Burnside and NW Cornell Road. Major resource features in the South Unit are Balch

Creek and Balch Canyon, the mixed forest in the Macleay Park area with some very large trees, and intermittent streams. Significant impact to resources occurs from a number of sources: human and domestic animal use of the park, edge effect from adjacent residential and industrial areas, traffic on adjacent streets, stormwater from developed and developing areas outside the park, off-trail traffic along Balch Creek, illegal camping, and English ivy.

A Vision for the South Unit: In the year 2195 the South Unit has the look and the feel of a forest approaching an old growth condition. Recreational use is high, but conformance to park rules and user protocol have kept a lid on conflicts. The park's major entrance is located one block off St. Helens Highway and includes a fully-staffed education center, ranger station, and accessible facilities. Walking and bicycle tours are guided by Friends of Forest Park volunteers several times a week. After a winter storm, nearby Balch Creek tumbles out of the park on its way to the Willamette River. It meanders through the adjacent industrial area, its daylighted course restored just over a 100 years ago. Fish enjoy the creek's clean gravel beds, recruited from the fully protected, steep slopes of Balch Canyon. English ivy is still a problem but historic records indicate there is only 10% of what there was 200 years ago in the year 1995. The South Unit entertains 1.5 million visitors each year.

Important forest and stream resources in the South Unit should be protected and restored. Because of high levels of use, wildlife habitat quality will be limited to species tolerant of impacts. The South Unit should be the focal point for casual and special events compatible with surrounding neighborhoods. Environmental education and interpretation programs and facilities should be located here. Public access should be improved with entrances developed with improved parking and other facilities including facilities for handicapped. User conflicts should be avoided here through separation of user groups, public information and education. Park safety should be improved through police enforcement, citizen patrols, and better designed facilities. Resource impacts that should be addressed are English ivy, streambed and streambank damage from stormwater flows, off-trail use along Balch Creek, trail erosion, and illegal use. Land acquisition is needed to develop better public access. Participation in the land use process and selective acquisition is critical in the Balch Creek Watershed.

Central Unit. The Central Unit is bounded by Firelane #1 on the south and NW Germantown Road on the north. Level of use is now moderate with a substantial increase over the past 10 years from runners and bicyclists. Primary users are runners, bicyclists, hikers, and

*Firelane 1 to
Germantown*

neighbors. General public access is fair with both developed and informal parking opportunities around the unit. The trail system is varied and nearly fully developed. Important natural resources are the mixed forests, intermittent streams, and good quality wildlife habitat. The primary impacts to resources are previous disturbances (i.e., logging and fire), increasing use, illegal use, illegal dumping, and traffic on NW Germantown Road. There is potential for development impacts in upper watershed areas and in the lower Springville Road area.

A Vision for the Central Unit: In 2195 the Central Unit is a middle-aged mixed forest that offers improving wildlife habitat qualities and good recreation opportunities. An early 21st Century effort to improve forest habitat and continuing efforts to protect and enhance amphibian habitat along St. Helens Highway are providing significant results. Good trail design and regular patrols are important strategies to protect these important resources. Each year 500,000 hikers, bicyclists, and runners use the trails in this unit.

Wildlife habitat quality in forested areas in the Central Unit should be improved. Higher quality interior forest habitat should be restored and protected. Human impacts and English ivy are immediate threats that should be monitored and addressed. With one exception, only minor improvements to trail systems and access points should be made to accommodate use. (Lower Firelane #1, at the boundary between the South Unit and the Central Unit should be improved and an access point at St. Helens Road should be developed.) Park users should know that the Central Unit is well suited for bicycling, distance running, and long hikes provided that established protocols are followed. Wetland and riparian areas along St. Helens Road should be protected and biological linkage to the Central Unit should be improved through land use protection and selective acquisition. The headwall at the closed Rivergate Quarry should be protected. Critical areas with potential for development impacts should be addressed through the land use process and through selective acquisition. If development and user impacts can be controlled, there is potential for significant improvement in wildlife habitat quality in the Central Unit.

*Germantown to
Newberry*

North Unit. NW Germantown Road on the south and the north property line near NW Newberry Road on the north are the boundaries of the North Unit. This unit has high resource qualities and low levels of use. Proximity to rural residential and forested areas to the north and west account for high resource qualities and low levels of use. The primary resources are good quality mixed forest habitat in recovery from disturbance (i.e., logging, but no major fires), some small patches of old growth trees, intermittent streams, and Miller Creek. Current impacts are past disturbance, forest

fragmentation by utility corridors, some development in upper watershed areas, illegal dumping, culverts on lower Miller Creek, and some English ivy. Primary threats to resource quality are development of in-holdings and upper watershed areas, development to the north and west of the park, spread of English ivy, and increasing levels of use. Impacts from dogs (leashed and unleashed) deserves study.

A Vision for the North Unit: In 2195 the North Unit is an intact forest approaching an old growth condition. Annual wildlife monitoring confirms that at least 75% of the North Unit provides high quality interior forest habitat, comparable to similar sized blocks of undisturbed forest habitat along the Lower Columbia River. Strategies to prevent, reduce, and mitigate fragmentation have been successful. The Portland-Vancouver Urban Growth Boundary, a series of successful greenspace acquisition programs, and the Pacific Greenway initiative have helped protect Forest Park's connection to rural areas north and west of the park. Miller Creek runs clear, clean and cool into a riparian marsh edge at the upper end of Multnomah Channel. Monitoring and studies have led to other strategies to keep recreational use impacts within acceptable limits. Forest Park's reputation as a true urban wildlife reserve is earned from the condition of the North Unit.

Above all, wildlife habitat in the North Unit should be protected. Improvement of forest habitat is possible but should proceed cautiously. English ivy should be eradicated. Habitat improvement in the Miller Creek watershed should be considered and, if feasible, pursued. Development in the upper watershed areas and in the adjoining rural residential and forested areas should be monitored. Special attention should be given to development which may threaten wildlife migration in and out of the North Unit. Threatened land considered critical for wildlife passage or for watershed protection should be acquired or protected with conservation easements. Access improvements should be limited to making existing roadside parking areas safer, minor improvements to existing trails and paths, and the completion of Wildwood Trail to Newberry Road. At this time use of the North Unit should not be actively discouraged, but neither should it be promoted beyond the publication of trail information. Organized use for groups and classes up to 40 people should be permitted, but the North Unit should not be used for large scale organized events. Park users should be well aware that the North Unit has high resource values and should willingly abide by protocols and rules that protect those resources. Monitoring of use and resources in the North Unit is a high priority.

Strategy 3. Acquire and Protect Additional Land.

Protect through acquisition

Additional land needs to be acquired for the purpose of protecting the park's existing natural resources, to allow improvement of certain critical natural resources, and to improve public access where appropriate. Acquire land through fee purchase or through the purchase of conservation easements that limit development.

1. Acquire land in the following areas:
 - Park in-holdings
 - Upper watershed areas
 - Willamette River connections
 - Wildlife corridor
 - Balch Creek watershed
 - Public access and facility areas.
2. Establish a stable source of acquisition funding to protect the resources in Forest Park from the development that is or will be occurring in the near future.

Over the past 5 years most acquisitions were funded by private sources. This kind of funding is inadequate for the magnitude of acquisition and protection projects identified by this management plan. The city must consider including Forest Park land acquisition and protection in its regular capital improvement program.

Strategy 4. Manage Recreation to Protect Natural Resources.

Control recreational use

Types and levels of recreation have increased significantly over the last 10 years. An increasing population, the introduction of mountain bikes, the continuing popularity of running and walking, and an increasing awareness of Forest Park's trail system are major factors in this increase. The increase in use has created conflicts with neighboring residents and has caused perceptible damage to park resources. Recreational use needs to be better understood in order to develop user policies with effective controls.

Provide appropriate recreation use for people of all abilities

1. Restrict recreation use to that which is appropriate for each management unit and the seasonal conditions in the park.
2. Continue current passive recreation use in the park.
3. Improve recreation facilities and trails as needed, when consistent with natural resource values.
4. Construct appropriate facilities to accommodate use which is compatible with natural resource values.

5. Provide recreation opportunities for people of all abilities.
 - Retrofit existing facilities to meet ADA standards
 - Construct new facilities and trails to meet ADA standards.

Monitor recreation use.

1. Coordinate with resource monitoring program to determine impacts to resources and, when needed, to change or develop recreation policies.
2. Establish baseline recreation use survey to determine type of use, user destination, size of group, trip duration and frequency, user residence and mode of travel to park.
3. Re-survey recreation users periodically.
4. Monitor adjacent development for impacts on recreation use.
5. Coordinate with other agencies to track adjacent residential development and subsequent use of and need for recreation facilities.

Manage Trail Systems.

1. Apply ecological management principles to the construction and maintenance of trails.
2. Plan future trail extensions which result in the least possible impact to sensitive habitat areas and watershed resources.
3. Remove or relocate trails which lead users into sensitive resource areas.
4. Connect park trails to regional trails in area.

Plan trails with least impact

Expand and develop appropriate facilities.

1. Keep development of recreation facilities within limits of resource protection.
2. Work with Friends of Forest Park, general public, city bureaus and resource agencies to assess needs and impacts.
3. Provide new facilities and improvements after maintenance needs are identified.

Resident Caretakers.

1. Arrange for certain park caretaking responsibilities to be performed in a cost-effective manner by people living in or adjacent to Forest Park. (Caretakers need not be employees, but may perform duties in exchange for housing provided at below market rates.)
2. Assign caretaker the following tasks:
 - Providing information or assistance to park users
 - Providing security for park facilities

Caretakers in or near the park

- Checking or managing gates
- Reporting problems to park, police or fire officials
- Maintaining garbage and restroom facilities
- Storing tools and equipment.

Strategy 5. Improve interpretive, educational and research opportunities.

Forest Park is a unique resource located close to residential and educational facilities in the metropolitan area. This presents many opportunities to educate citizens about the natural resources in their backyards.

Interpretation.

1. Provide new or improved maps, brochures and interpretive signage.
2. Develop special events such as guided walks, bird watching and bike rides.
3. Improve press coverage and develop a periodic newsletter.

Education.

1. Promote Forest Park as a unique environmental laboratory.
2. Establish an environmental education program for school-age children and adults, in cooperation with the school districts, Audubon and other providers.

Research.

1. Promote Forest Park as a unique environmental laboratory.
2. Work with local universities to encourage use of park for natural science research projects.
3. Develop student/citizen monitoring programs.

Strategy 6. Improve Public Access.

Create new entry areas

While Forest Park is close to the metropolitan area, public access points are inadequate. The major entry point into the park is at the end of a residential street with no transit service.

Americans with Disabilities Act (ADA) Facilities. ADA standards for outdoor recreation facilities are expected in 1995. The park has no facilities that will meet the new standards. Specific projects are proposed; correction of this deficiency is a high priority.

Directions.

1. Provide clear directions to park facilities and trails.
2. Sign trails and install maps and directions to various facilities at trailheads.

Transit Access.

1. Encourage use of transit, pedestrian and bicycle access to park.
2. Provide adequate transit stop, parking and trailhead facilities.
3. Develop trailheads on transit lines.

Trailheads.

1. Provide safe and easy access to park recreation facilities.
2. Improve existing (and develop new) trailheads to provide local access points, reduce congestion, and allow separation of bicycle and pedestrian uses
3. Reduce visitor impacts on neighbors of the park.

Strategy 7. Improve Park Safety.

Although Forest Park is generally safe for recreational use, there are areas that can be improved. Public information, user education and enforcement programs can reduce unwanted and illegal use.

Public Information and User Education.

1. Develop a public information program.
2. Inform the public about what uses are appropriate and why.

Citizen Patrols.

1. Develop a volunteer Forest Park Citizen Patrol to:
 - Report hazardous conditions
 - Inform and educate the public about appropriate use
 - Work cooperatively with the Police Bureau, the Fire Bureau and other park safety programs.

Park Rangers.

1. Assign personnel from the new part-time Park Ranger program to Forest Park.

Enforcement.

1. Rewrite sections of City Code to make enforcement easier.
2. Conduct a pilot enforcement program in cooperation with the Police Bureau.

Prevent Illegal Dumping.

1. Continue installation of physical barriers to prevent dumping.
2. Work with transportation engineers to assure public safety.

Strategy 8. Develop Recreation Opportunities at Other Sites.

Create other recreation opportunities outside Forest Park

Development of other recreation areas and facilities will relieve the pressures on Forest Park. This is a critical strategy for protection of natural resources in Forest Park and for reduction of user conflicts. This strategy requires near-term action, since land acquisition opportunities for these developments will decrease and population will increase substantially over the next 20 years.

Regional Recreation Facilities.

1. Acquire other open space and natural area parks in the Portland-Vancouver area.
2. Develop other parks with recreation opportunities similar to those at Forest Park to slow the increase in use of the park.

Strategy 9. Improve Park Staffing and Funding.

Increase staff and budget

Forest Park is managed with low staffing levels and a small budget. Increased pressures to protect resources and provide improved recreation opportunities will necessitate increased staff and development of a stable funding source.

Parks and Recreation Staffing.

1. Provide well-trained staff to maintain natural resources and recreational facilities in safe and healthy manner.
2. Create and staff full-time natural resource specialist position.
3. Create and staff a full-time park ranger position to be shared with other park areas.
4. Hire additional permanent and seasonal staff as needed.

Special Programs. Staffing and funding for special resource management programs has been erratic. Resources are currently pooled from a variety of sources including the Private Industry Council, Oregon Youth Conservation Corps, Bureau of Environmental Services, NW Service Academy, Metro's Central Enhancement Fund, Multnomah County Alternative Community Service and Columbia Regional Corrections Institution.

1. Develop a stable funding source for special programs.
2. Commit additional city staff time to the programs.

Funding.

1. Adopt a long-term stable funding mechanism for facility expansion, restoration and monitoring.
2. Establish an ad-hoc committee to investigate and identify possible funding sources.
3. Continue to work with business community, Friends of Forest Park and other interested groups to acquire in-kind money and labor.
4. Continue to identify and implement cost savings methods for managing the park.

Managing Entity. A recent City Club report suggests that the new regional park agency now established at Metro should manage Forest Park, thus transferring the responsibility and management costs to all citizens of the region.

At the present time, Metro Parks and Greenspaces does not have a region-wide funding source and there are no regionally generated funds available to manage Forest Park even at the present level. Until Metro and local jurisdictions can identify and develop stable regional funding sources capable of providing significant benefits for Forest Park in terms of operating budget, capital improvements and management expertise, the park would not benefit from a transfer to Metro. This situation should be monitored as conditions change in the area of regional parks funding.

Strategy 10. Continue Public Involvement.

Public involvement literally created Forest Park. Sparked by a City Club report in 1944, the City and County responded to citizen interest to consolidate and acquire the land that became Forest Park.

*Public is vital part of
management plan*

Since then, public interest and involvement has driven the protection of resources critical to the health of Forest Park, funded acquisition of land, provided resources for restoration projects, and raised awareness of the park in the community. Neighborhood associations, organized user groups, individual citizens and local businesses continue to be involved with Forest Park in a variety of supportive ways.

1. Continue to work cooperatively with the Friends of Forest Park, the Friends of Balch Creek, and with organized user groups to encourage participation and support of the park.
2. Work cooperatively with neighborhood organizations in the areas of facility development, land acquisition and ongoing management programs.

3. Continue to encourage individuals and organized groups to participate in park management programs as volunteers.
4. Continue to consult with the Friends of Forest Park and with neighborhood and user groups on policy issues.

Summary

*Balance
protection and
use*

At the heart of this document is the need to balance natural resource protection and enhancement with appropriate recreational use and educational opportunities. This involves complex interactions between the public agencies, private interests, developers, preservation groups, volunteers and elected officials. This chapter presented the range of goals and strategies needed to balance those interests, keeping the protection of the irreplaceable natural resources foremost.



Great Blue Heron

CHAPTER 7. PROJECTS

Introduction

Project Codes

Forest Park NRMP Projects - tables and maps

Project Cost Breakdowns

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City of Portland - Other Bureaus (COP)

Management Projects - All Units

Summary - Most Important Projects

Recommendations for Future Work

CHAPTER 7. PROJECTS

Introduction

Many projects are proposed in Forest Park, ranging from natural resource management and interpretation to recreational facility development to street vacations and property management. All of these projects are needed now or in the near future. Some projects can be handled by the present low level of staffing; however, improving the park facilities to accommodate heavier use in the near future will bring requires additional staffing and additional budgeted funds.

Natural Resource Management Projects: These are intended to protect, preserve and improve the natural resources of the park, in order to realize the vision of Forest Park as America's premier urban forest.

Protect resources

Development Projects: The kinds and levels of development that are proposed are designed to accommodate appropriate levels of use as well as future population growth without harming natural resources. They will be compatible with the three management units in the park. More intensive use and development will occur in the South Management Unit; moderate use and development will occur in the Central Management Unit; and light use and development will occur in the North Management Unit.

Provide appropriate recreation opportunities

Because of the nature of the park and its physical characteristics, recreation use in the park is primarily passive including various kinds of trails, and support facilities such as trailheads, interpretive and directional signing, benches and overlooks. There are no developed recreation facilities such as active playfields or developed picnic grounds.

ADA Standards: Handicapped accessibility is provided in all areas of the park within the limits of topography. Accessibility generally corresponds to the management units—facilities in the South Unit will be most accessible, those in the Central Unit will be moderately accessible and those in the North Unit will be least accessible.

Project Codes: Detailed descriptions of each project are provided. The alpha-numeric code for each project indicates the kind of project and the management unit where it is located. The project code also locates the project on the maps which follow.

Chapter Organization: A summary table of all the projects is provided which lists all the projects by management unit and priority, as well as initial installation costs and annual maintenance costs. Projects that affect the whole park are listed first, followed by natural resource management projects and the development projects for each unit. Development Guidelines/Standards are provided prior to development projects. A list of the most important projects is at the end of this chapter.

Project Codes

Projects are grouped into major categories and each is given an alphanumeric code to identify it by type and management unit. For example, RT - 1N is the first Recreation Trail project in the North management unit.

Project Types

Natural Resource Projects

- RP Resource Protection
- RE Resource Enhancement

Development Projects

- RT Recreation Trails
- PI Park Improvements
- S Signing
- SV Street Vacations
- WB Water Bureau
- BES Bureau of Environmental Services

Management Projects

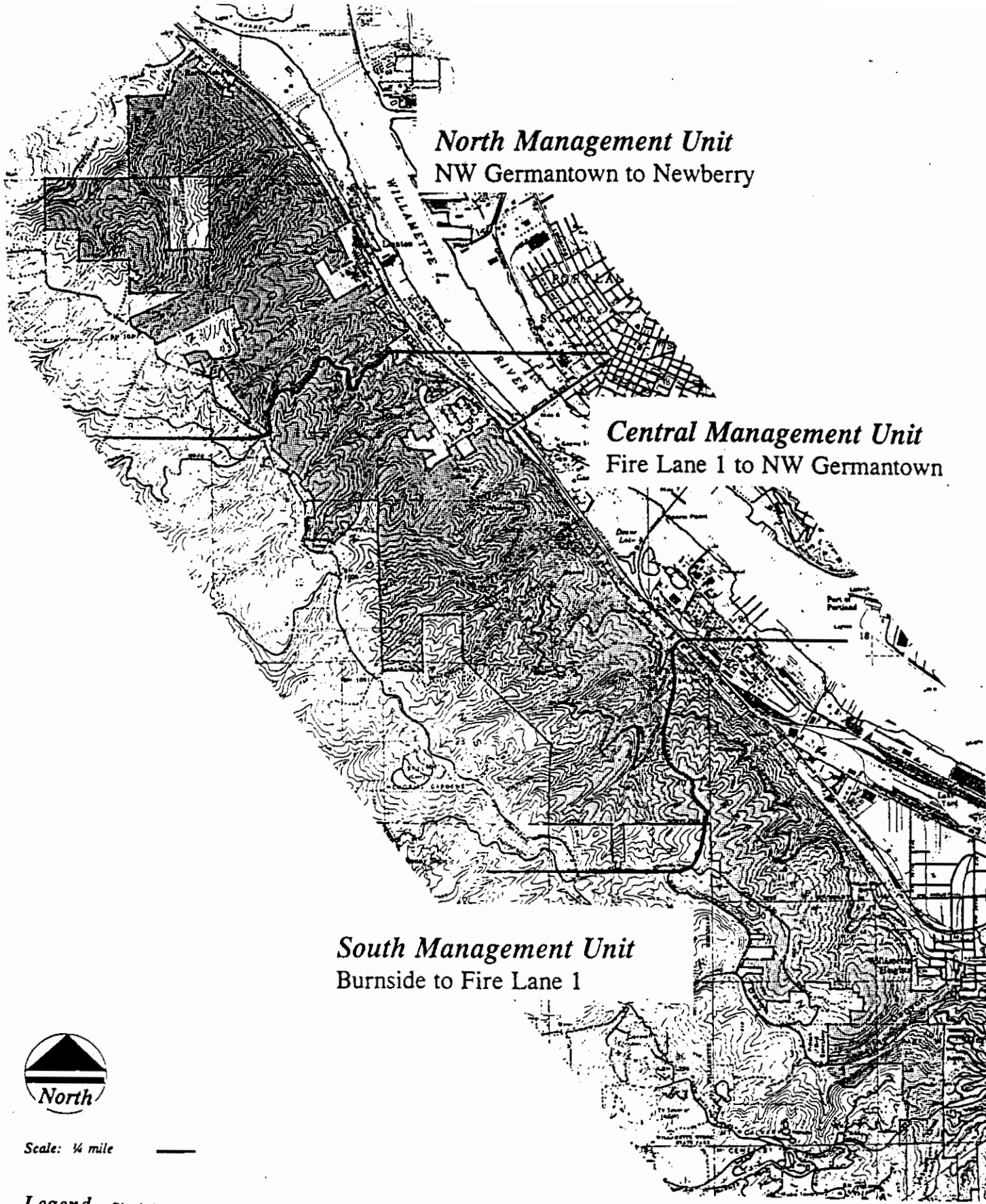
- M Management

Management Units

- N North
- C Central
- S South

Priorities

- High: within 5 years
- Medium: 5 to 10 years
- Low: 10 years or as possible



North Management Unit
NW Germantown to Newberry

Central Management Unit
Fire Lane 1 to NW Germantown

South Management Unit
Burnside to Fire Lane 1



Scale: 1/4 mile ———

Legend Shaded area is Forest Park; other areas are private property.

FOREST PARK MANAGEMENT UNITS

FOREST PARK NRMP PROJECTS

The following projects are listed by management unit and by priority from high to low.

ALL MANAGEMENT UNITS <i>Project Type and Description</i>	<i>Priority</i>	<i>Initial Cost</i>	<i>Annual Cost</i>
<i>Natural Resource Protection Projects</i>			
RP - 1All page 128 Acquisition of In-Holdings	High	total - \$5 million - all acquisitions	
RP - 3All page 133 Acquisition and Protection of Willamette River Linkages	Med High		
RP - 4All page 135 Acquisition and Protection of Headwater Areas	Med High		
RP - 5All page 136 Acquisition and Protection of Wildlife Corridor	Med High		
RP - 6All page 138 Acquisition for Development of Park Access	High		

<i>Natural Resource Enhancement Projects</i>				
RE - 4All page 148 English Ivy Removal	High	50,000	50,000	
RE - 5All page 150 Exotic Plant Removal	High	50,000	50,000	
RE - 7All page 156 Natural Resource Monitoring	High	25,000	25,000/5 years	

<i>Park Improvement Projects</i>				
PI - 1All page 195 Provide Seasonal Restrooms At Various Locations	High	500/site	100	
PI - 2All page 195 Animal Waste Disposal At Various Locations	Med	30/site	50	

<i>Signing Projects</i>				
S - 1All page 197 Trail Identification System	High	30,000	2,000	
S - 2All page 197 Interpretive Signs	Med	5,000	1,000	

Street Vacations				
SV - 1All page 199	Platted Roads in Interior of Park Both uncontested and those needing research	High	13,000	---
SV - 2All page 200				

Management Projects				
M - 1All page 205	Create and Staff Park Ranger Position	High	50,000	50,000
M - 2All page 206	Perform Initial Baseline and Periodic Recreational Surveys and Monitoring	High	25,000/ survey	25,000/ survey
M - 3All page 206	Coordinate with Other Resource Regulatory Agencies	High	---	staff time
M - 4All page 207	Work with Police Bureau	High	---	staff time
M - 5All page 207	Work with Fire Bureau	High	---	staff time
M - 6All page 207	Encourage and Facilitate Volunteer Foot and Bike Patrols, Other Volunteer Projects	High	---	staff time
M - 7All page 208	Rewrite Portions of City Code	High	---	staff time
M - 8All page 208	Adopt Ordinances to Deal with Domestic Animals in the Park	High	---	staff time
TOTAL - ALL MANAGEMENT UNITS -			\$5,252,150	

SOUTH MANAGEMENT UNIT		Priority	Initial		Annual	
<i>Project Type and Description</i>			Cost	Cost		
Natural Resource Protection Projects						
RP - 2S page 130	Protection of Balch Creek Watershed	High	cost included in total for all management units			

Natural Resource Enhancement Projects						
RE - 2S/C page 143	Maple Thinning/Conifer Planting	High	for costs see Central management units			
RE - 3S/C page 146	Conifer Thinning/Snag Creation	High				
RE - 9S page 164	Streambank Restoration Balch Creek	High	15,000	5,000		
RE - 10S page 167	In-Stream Restoration Balch Creek	High	15,000	5,000		

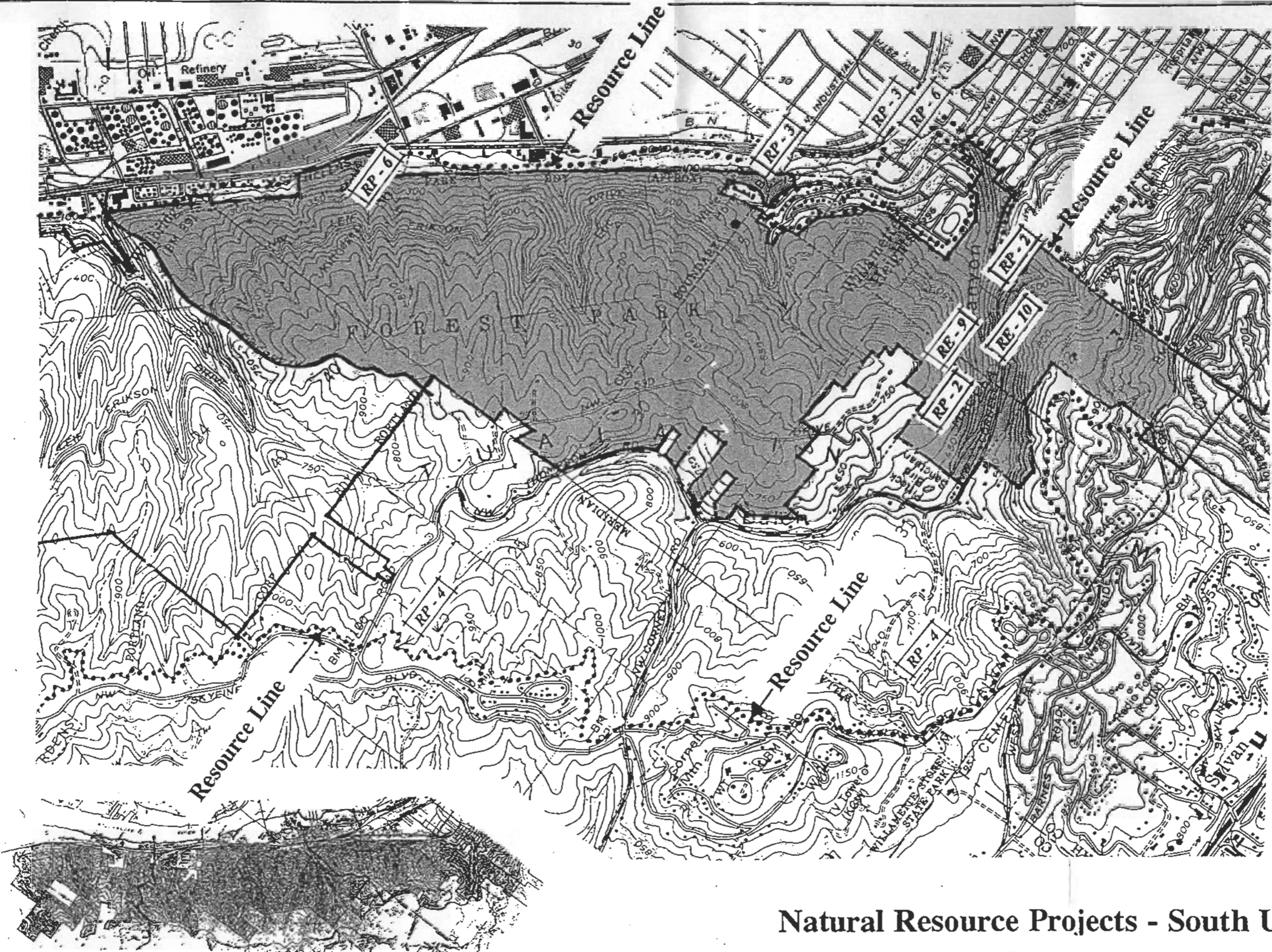
Recreation Trail Projects						
RT - 2S page 185	Balch Creek/ADA Accessible Interpretive Trail	High	20,000	5,000		
RT - 3S page 184	Bike Trail Connection US 30 and 30th St.	High	75,000	3,000		
RT - 6S page 186	Trail Removal Old gas line trail off Leif Erikson	High	500	---		
RT - 1S page 183	40 Mile Loop Trail Connection Overpass over Burnside Street	Med	350,000	5,000		
RT - 4S page 180	Trail Connection Between Cornell Rd. and Birch Trail	Low	1,500	200		
RT - 5S page 180	Trail Connection Below Pittock Mansion	Low	500	200		

Park Improvement Projects						
PI - 7S page 192	New Park Trailhead At US 30 and 30th	High	350,000	15,000		

PI - 6S <i>page 192</i>	Lower Macleay Park Trailhead BES Water Quality Project	High	needs study	---
PI - 4S <i>page 191</i>	Thurman Street Trailhead Improvements/Reductions in congestion/noise	High	needs further study	---
PI - 5S <i>page 191</i>	Thurman Street Trailhead ADA Access to Park			
PI - 8S <i>page 193</i>	Construct New Park Trailhead On US 30 at Yeon St.	High	250,000	10,000
PI - 1S <i>page 194</i>	53rd Drive - Nightly Closure	High	10,000	1,000
PI - 2S <i>page 190</i>	Improve Parking Lot Upper Macleay - near Audubon Soc.	Med	50,000	2500
PI - 9S <i>page 195</i>	Modify Stone Castle Study and Modify	Med	10,000	1500
PI - 3S <i>page 194</i>	Improve Access to Community Garden	Low	5,000	---

<i>Signing Projects</i>				
S - 2S <i>page 198</i>	Interpretive Signs Along Balch Creek Trail	Med	1,000	150
S - 1S <i>page 198</i>	Information Sign Pittock Mansion	Med	2,000	---

<i>Street Vacations</i>				
SV - 1S <i>page 200</i>	Street Vacation - Alexandria Street Near the White Shield Home	High	cost included in total for all management units	
SV - 2S/C <i>page 200</i>	Leif Erikson Drive From Thurman Street to terminus at Germantown	High	3,000	---
TOTAL - SOUTH MANAGEMENT UNIT			\$1,161,000	



North Unit

Central Unit

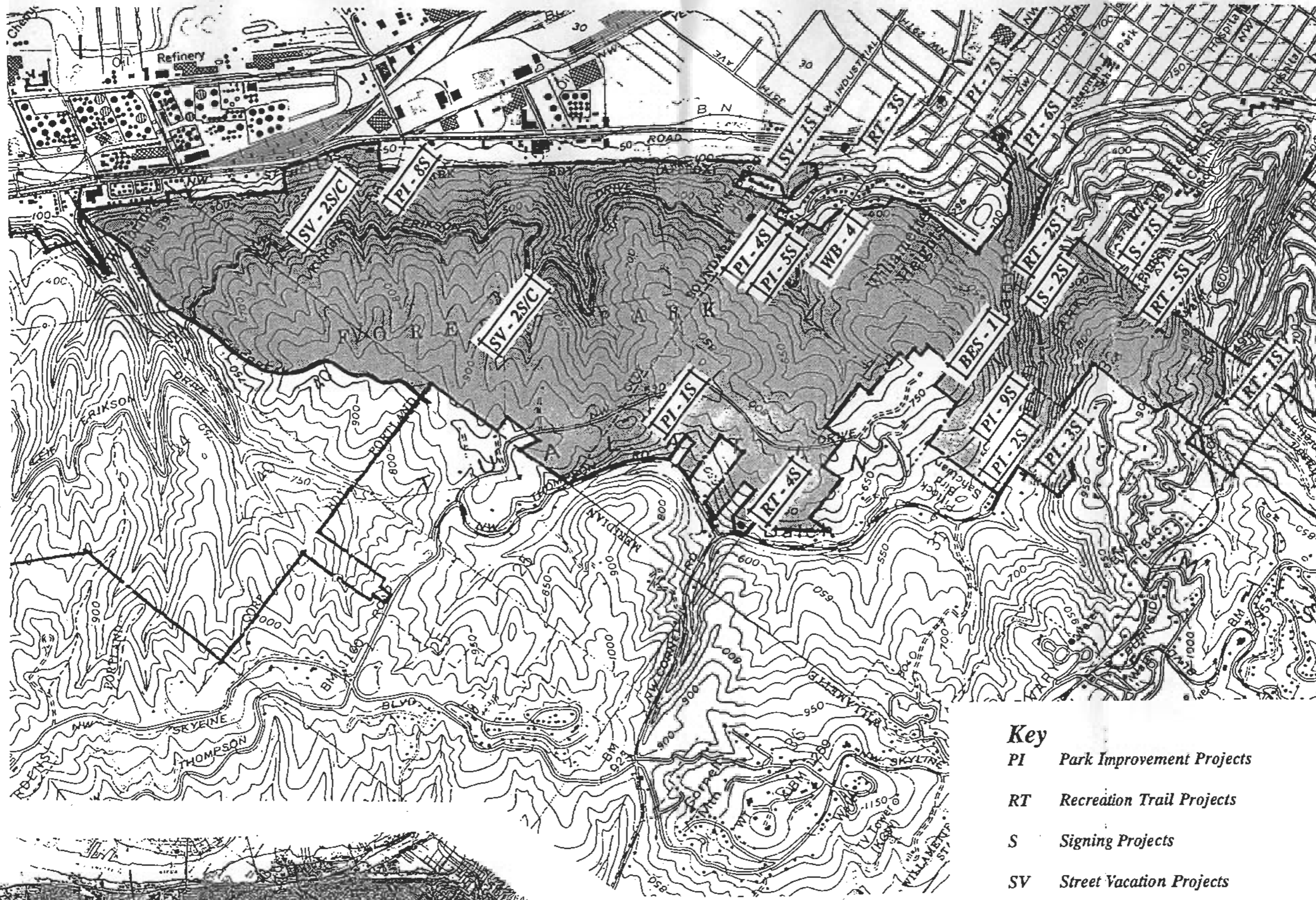
South Unit

Natural Resource Projects - South Unit
 Forest Park Resource Line

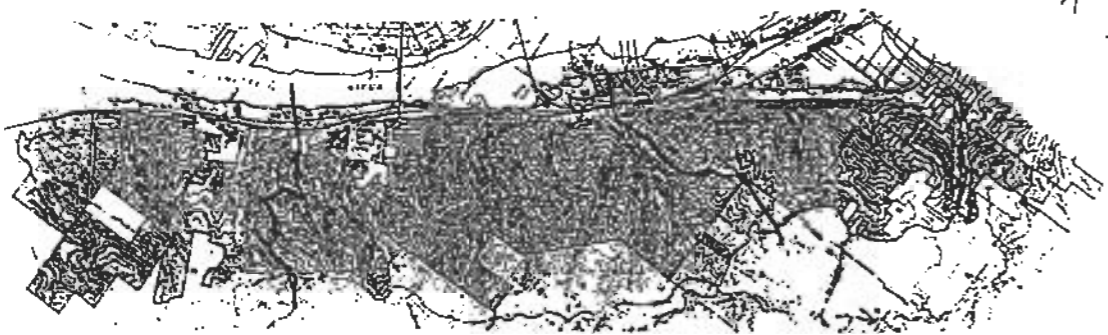


FOREST PARK
 Natural Resources Management Plan

South Management Unit
 Burnside to Fire Lane 1



- Key**
- PI Park Improvement Projects
 - RT Recreation Trail Projects
 - S Signing Projects
 - SV Street Vacation Projects



North Unit Central Unit South Unit

Recreation Projects - South Unit

South Management Unit
Burnside to Fire Lane 1

FOREST PARK
Natural Resources Management Plan



CENTRAL MANAGEMENT UNIT <i>Project Type and Description</i>		<i>Priority</i>	<i>Initial Cost</i>	<i>Annual Cost</i>
Natural Resource Enhancement Projects				
RE - 1C/N <i>page 140</i>	Maple Thinning/Conifer Release	High	15,000/year projects will be done gradually and assessed for effectiveness before continuing with other work	
RE - 2S/C <i>page 143</i>	Maple Thinning/Conifer Planting	High		
RE - 3S/C <i>page 146</i>	Conifer Thinning/Snag Creation	High		
RE - 6C <i>page 154</i>	Maple Thinning/Conifer Seeding	High		
RE - 8C/N <i>page 159</i>	Utility Corridor Management	High		

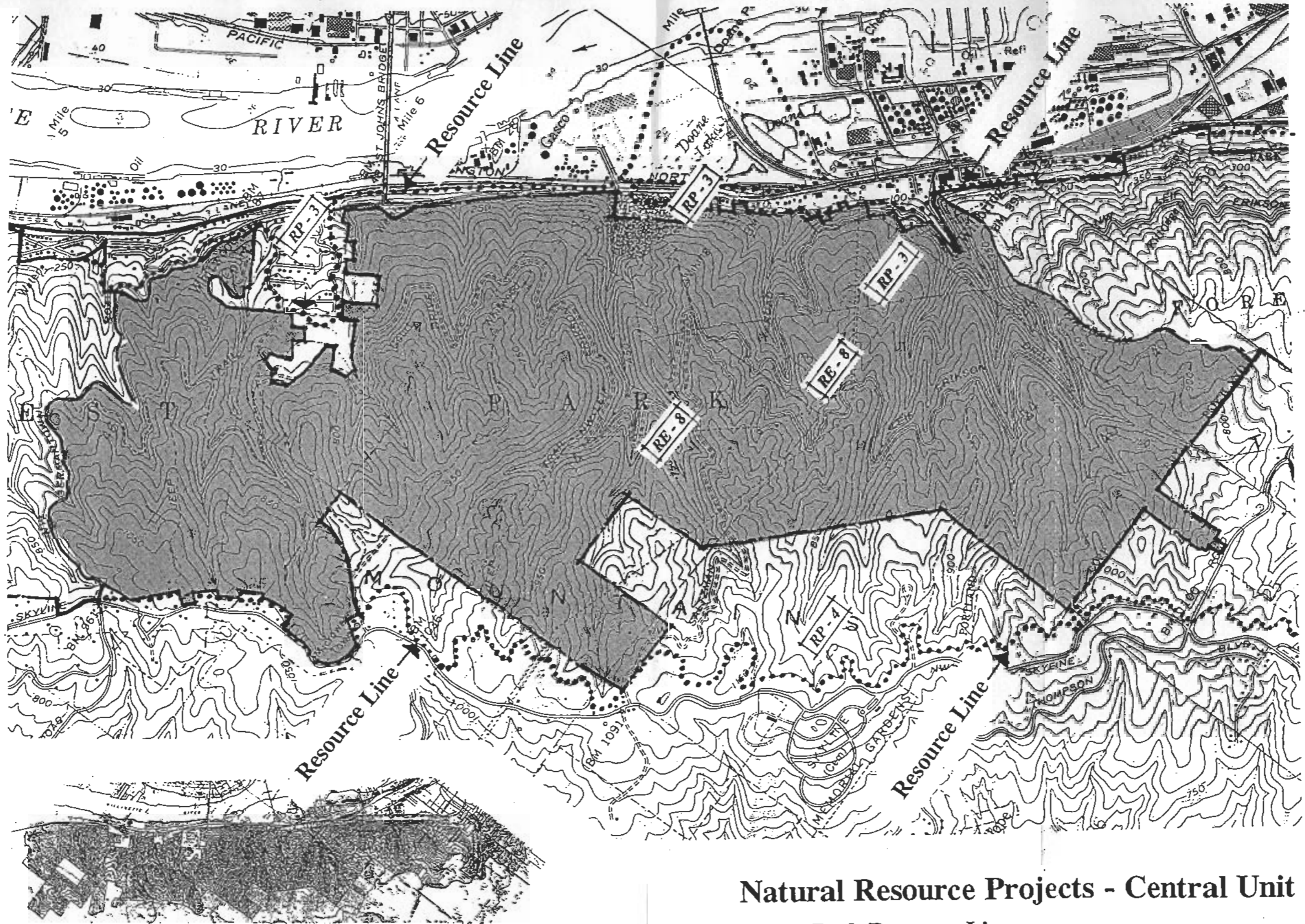
Recreation Trail Projects				
RT - 3C <i>page 184</i>	Bike Trail Connection FL 5 to Leif Erikson	High	6,000	500
RT - 5C <i>page 186</i>	Leif Erikson Culverts Maintenance Study	High	20,000	1500
RT - 4C <i>page 180</i>	Trail Connection Between Leif Erikson and Wildwood Trails	Med	1,000	200
RT - 2C <i>page 183</i>	40 Mile Loop Trail Connection At St. Johns Bridge	Med	15,000	1000
RT - 1C <i>page 182</i>	40 Mile Loop Trail Connection to Greenway Trail At Doane Lake	Low	30,000	2000

Park Improvement Projects				
PI - 1C <i>page 189</i>	Improve Parking Lot At Germantown Road and Leif Erikson	High	15,000	2500
PI - 2C <i>page 189</i>	Improve Parking Lot At Saltzman Road and FL 15	High	10,000	2000

Signing Projects				
S - 1C <i>page 197</i>	Bike Trail/Fire Lane Signing	High	500	---

Street Vacations				
SV - 1C <i>page 201</i>	NW Springville Road Through park	High	3,000	---
SV - 2C <i>page 201</i>	NW Saltzman Road Through park	High	3,000	---

TOTAL - CENTRAL MANAGEMENT UNIT			\$129,000	
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North Unit

Central Unit

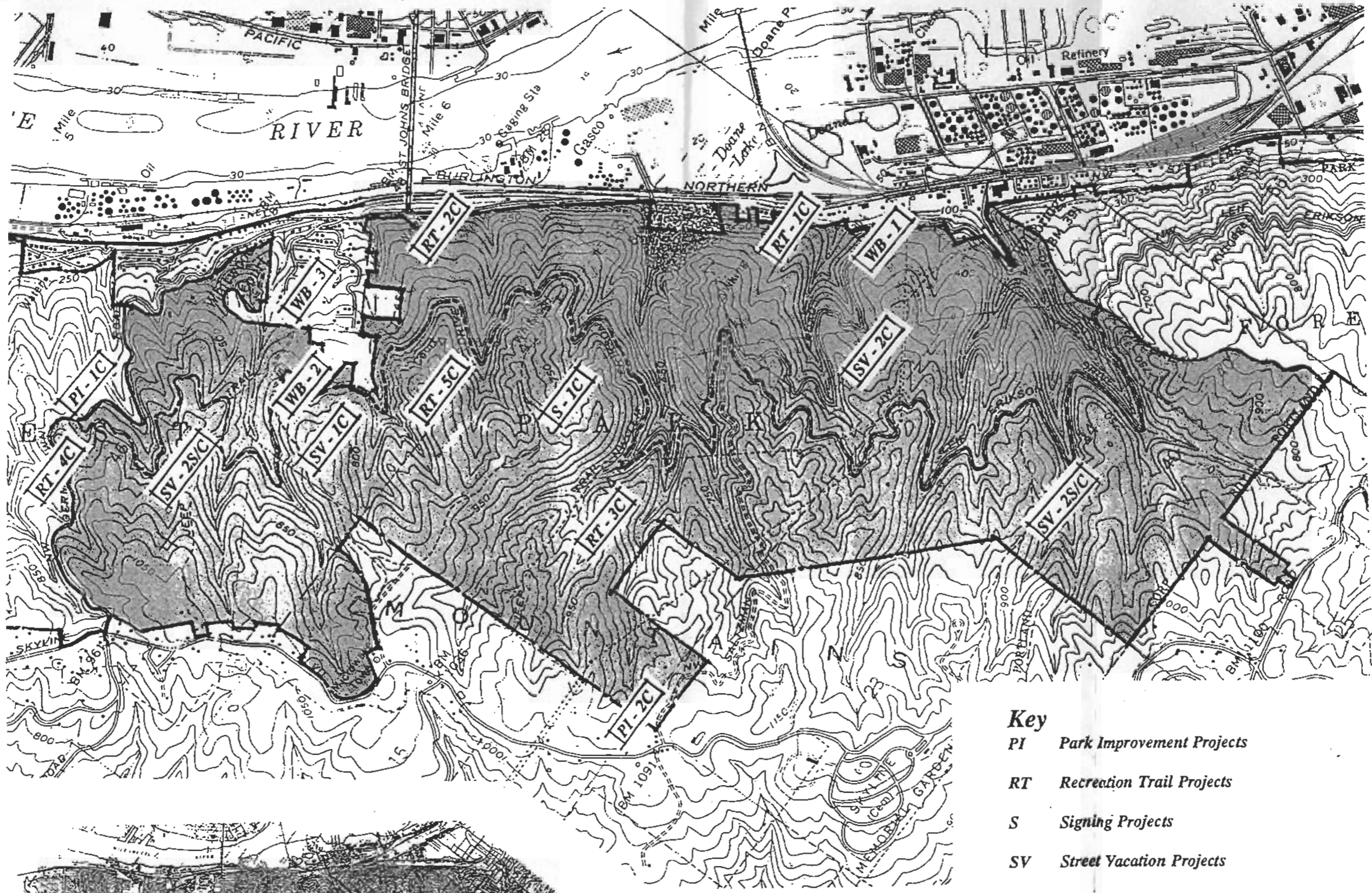
South Unit

Natural Resource Projects - Central Unit
 Forest Park Resource Line

Central Management Unit
 Fire Lane 1 to NW Germantown

FOREST PARK
 Natural Resources Management Plan





North Unit

Central Unit

South Unit

Recreation Projects - Central Unit

- Key**
- PI Park Improvement Projects
 - RT Recreation Trail Projects
 - S Signing Projects
 - SV Street Vacation Projects



FOREST PARK

Natural Resources Management Plan

Central Management Unit
Fire Lane 1 to NW Germantown

NORTH MANAGEMENT UNIT <i>Project Type and Description</i>	<i>Priority</i>	<i>Initial Cost</i>	<i>Annual Cost</i>
<i>Natural Resource Enhancement Projects</i>			
RE - 8C/N <i>page 159</i> Utility Corridor Management	High	by others	staff time
RE - 11N <i>page 171</i> Newton Wetlands	Med	5,000	500

<i>Recreation Trail Projects</i>			
RT - 3N <i>page 181</i> Wildwood Trail Extension	High	40,000	3,000
RT - 4N <i>page 185</i> Kwonesum Trail Removal	High	250	---
RT - 1N <i>page 179</i> Neighborhood Connector Trail Improve in Linnton Area	Med	7,500	500
RT - 5N <i>page 181</i> 40 Mile Loop Trail Connection to Greenway Trail At Fred's Marina	Low	50,000	2000
RT - 2N <i>page 179</i> Neighborhood Connector Trail In Linnton Area	Low	3,000	200

<i>Park Improvement Projects</i>			
PI - 3N <i>page 188</i> Improve Parking Lot At BPA Road and Skyline Drive	Med	6,000	1000
PI - 2N <i>page 188</i> Improve Parking Lot At FL 15 and Skyline	Low	2,000	200
PI - 1N <i>page 188</i> Improve Parking Lot At US 30 and FL 12 at Harborton	Low	3,000	300
PI - 4N <i>page 189</i> Improve Parking Lot Newton Road to Accommodate Horse Trailers	Low	3,000	300

Signing Projects				
S - 1N <i>page 198</i>	Traffic Signs Germantown Rd and Wildwood Trail	High	200	---
Street Vacations				
SV - 1N <i>page 201</i>	Newton Road	High	3,000	---
TOTAL - NORTH MANAGEMENT UNIT				\$118,200

MISCELLANEOUS PROJECTS - not prioritized

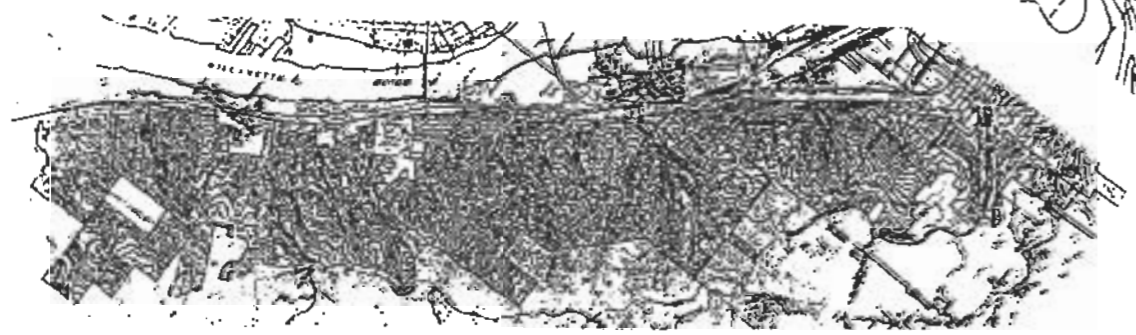
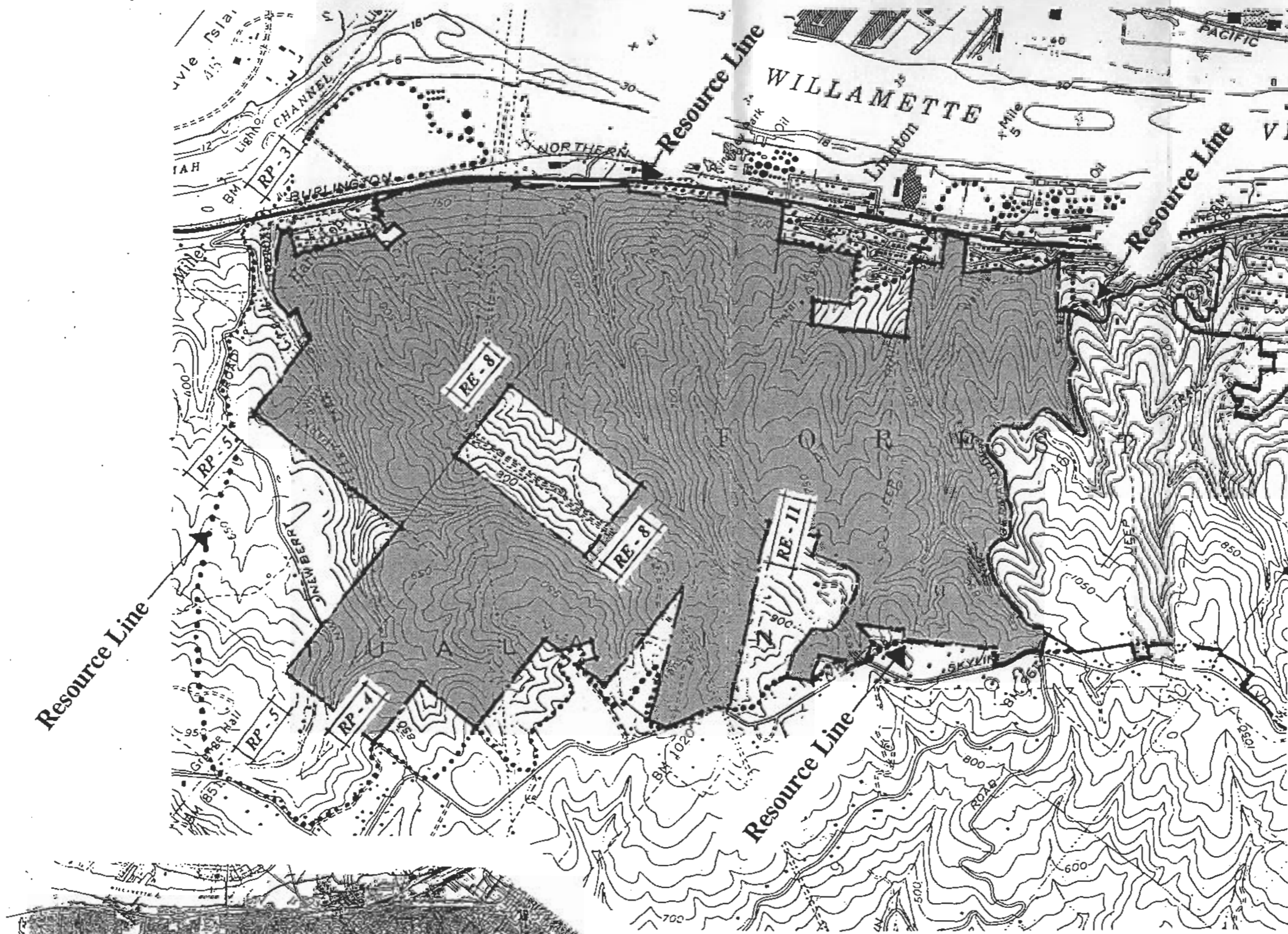
CITY OF PORTLAND PROJECTS

WATER BUREAU PROJECTS - pages 202-3

- WB - 1 Saltzman Tank Replacement**
Location: At southeast end of Saltzman Road, above Hwy. 30
- WB - 2 Springville Main Replacement**
Location: Along Springville Road through center of park.
- WB - 3 Springville Tank Replacement**
Location: At east end of Springville Road
- WB - 4 Mayfair Pump Main/Access Road**
Location: Near intersection of Leif Erikson and Thurman Street
- WB - 5 Mayfair Pump Station**
Location: Not precisely located at this time, may be within park.

BES PROJECTS - page 204

- BES - 1 Balch Creek Water Quality Improvements**
Location: All along Balch Creek



North Unit

Central Unit

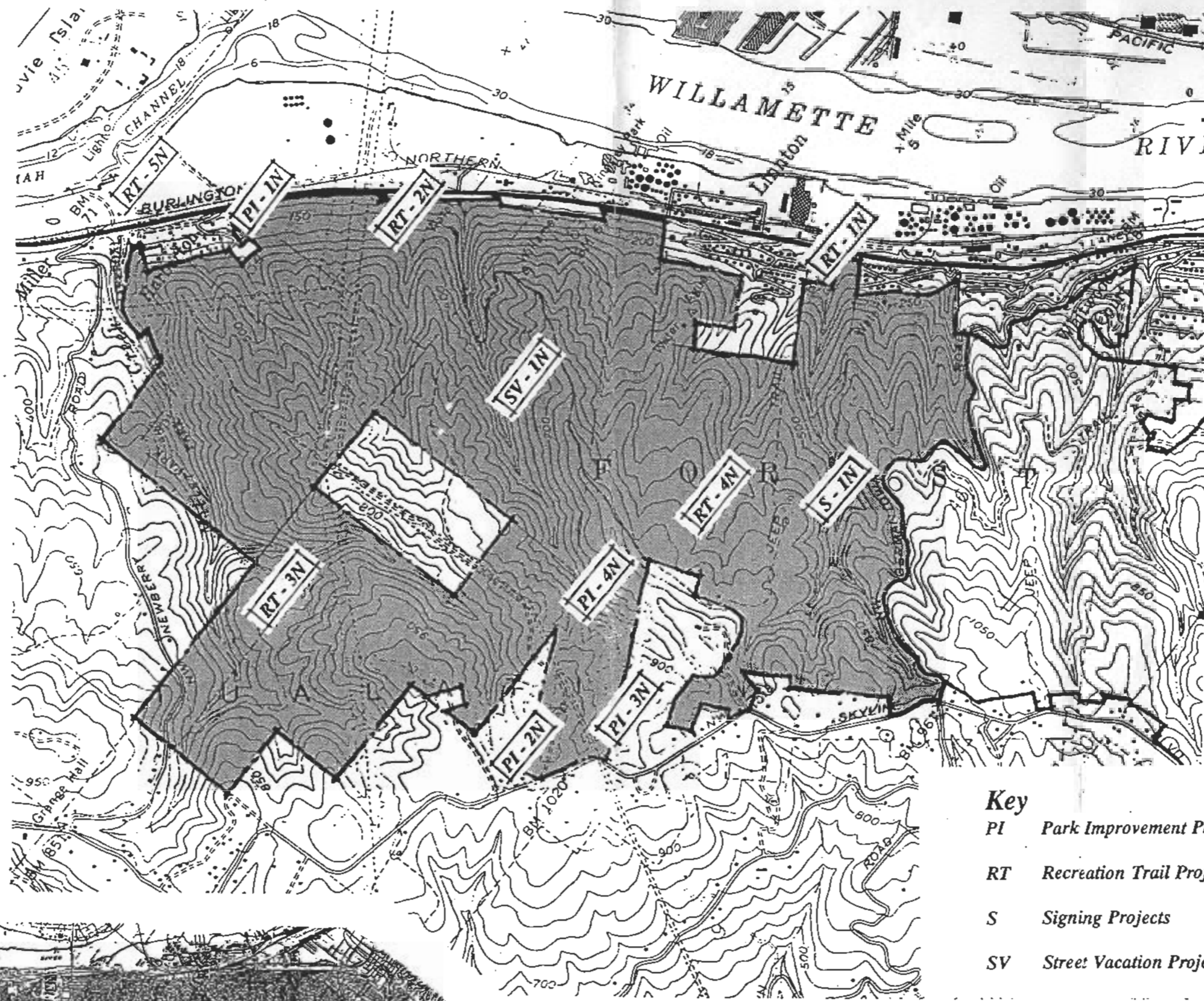
South Unit

Natural Resource Projects - North Unit
 Forest Park Resource Line



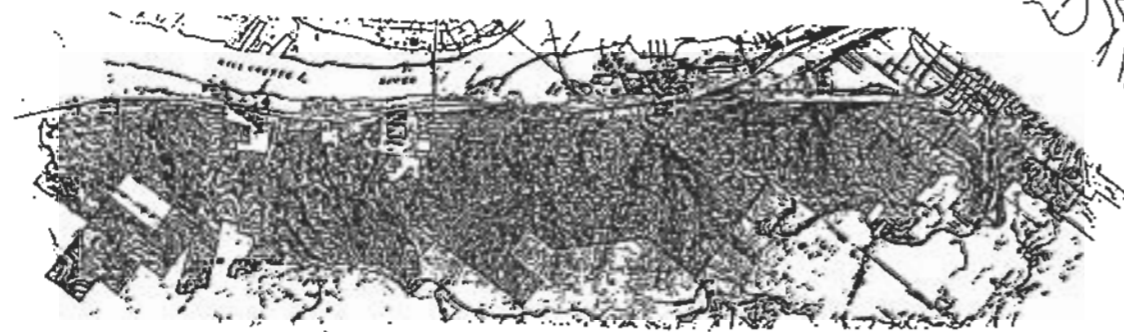
FOREST PARK
 Natural Resources Management Plan

North Management Unit
 NW Germantown to Newberry



- Key**
- PI Park Improvement Projects
 - RT Recreation Trail Projects
 - S Signing Projects
 - SV Street Vacation Projects

Recreation Projects - North Unit



North Unit

Central Unit

South Unit

North Management Unit
NW Germantown to Newberry

FOREST PARK
Natural Resources Management Plan



PROJECT COST BREAKDOWNS

For 10 year period, using 1994 cost estimates

COST BY PROJECT TYPE

Natural Resource Protection	\$5,000,000
Natural Resource Enhancement	170,000
Recreation Trail Projects	630,500
Park Improvement Projects	718,150
Signing Projects	38,700
Street Vacations	28,000

COST BY PRIORITY

High Priority Projects	\$4,114,700
Medium Priority Projects	447,650
Low Priority Projects	98,000

COST BY MANAGEMENT UNIT

Projects for All Management Units	\$5,252,150
South Management Unit	1,161,000
Central Management Unit	129,000
North Management Unit	118,200

TOTAL COSTS FOR ALL PROJECTS \$6,650,350

Natural Resource Protection Projects



A set of resource protection projects are recommended which will provide additional protection for critical Forest Park resources. The projects accomplish this through the acquisition of land and the acquisition of conservation easements.

RP-1All: Acquisition of In-Holdings

Goal:

Protect wildlife habitat value.

Objectives:

Preserve valuable interior forest habitat.

Preclude habitat disturbance.

Resolve property in-holdings in a fair and cost-effective manner.

Acquire caretaker housing opportunities.

Recommendation:

Acquire all Forest Park in-holdings. Consider in-holdings having any development potential as very high priorities.

Units:

All units.

Rationale:

Development of in-holdings, or private land that is totally or substantially surrounded by Forest Park will fragment existing intact interior forest habitat. Acquisition of in-holdings on a pro-active basis is generally more cost effective and less problematic than waiting until the property is threatened by development.

In-holding acquisition is the surest and most effective way to minimize impacts to Forest Park's interior habitat areas. Generally, the acquisition of privately owned "islands" within the park and "peninsulas" at the edge of the park effectively reduces the edge effect noted earlier in this report. In some cases, this includes acquiring land already developed with single family housing.

Most of the land identified for this project is steep and not served by sewer, water and developed streets; some of the land, although platted, is not accessible. Development would be

inconsistent with other City policies such as protection of State Goal 5 resources, appropriate residential infill, reduction of vehicle miles traveled, and provision of urban services in a cost effective manner.

Although prioritizing the list of private in-holding properties is somewhat helpful, development proposals are sometimes submitted that cause low priorities to become high. In addition, opportunities for acquisition from private parties are largely unpredictable.

An adequate fund for acquisition of in-holdings is critical and well justified by the additional costs of acquiring land after development is proposed, permitted or built. Without it, prioritizing is meaningless, opportunities are lost, City staff time is consumed dealing with development proposals, and eventual costs of acquisition are high.

Considerations:

Willing Seller Basis. The City will attempt to acquire land on a willing seller basis, but the City will not exclude the possibility of use of the eminent domain process.

Cost. The estimated cost of this project is \$4 million which can be met in a variety of ways including the following: private support for acquisition of Forest Park in-holdings; receiving property by donation; partial funding from Environmental Services within the Balch Creek watershed may be available; partnership with the Friends of Forest Park; additions to Forest Park are a priority if Metro gains voter approval for Greenspaces acquisition. However, due to the uncertainty of these sources, it is critical that the City commit funds to acquiring these in-holdings.

Acquisition of Housing. In some cases the project recommends acquiring developed land. In all such cases the housing is isolated in otherwise undeveloped or lightly developed areas. City investment in street, sewers, and water service is light. If acquired, the City would realize efficiencies in service delivery. Housing could be razed, moved, rented, or in 2 or 3 situations used as housing for park caretakers.

Follow-Up:

Funding. If funds are unavailable through Metro Greenspaces, the City needs to commit capital funds to assist with this project.

RP-2S: Protection of Balch Creek Watershed

Goal:

Protect wildlife habitat value.

Objectives:

Preserve and improve Balch Creek fisheries and riparian habitat.

Preserve and improve Balch Creek water quality.

Preserve forest habitat near city center.

Prevent stormwater impacts to the creek system and to developed areas in the lower watershed.

Preserve future opportunities for passive recreation.

Acquire property in a fair and cost-effective manner.

Recommendation:

Implement a program to protect critical Balch Creek watershed resources through acquisition of land and conservation easements on a willing seller or willing donor basis, and through application of adequate land use safeguards.

Unit:

South Unit, Balch Creek watershed only.

Rationale:

Balch Creek is one of Forest Park's most valuable assets. It is the Park's largest creek and one of only two (some years three) year-round streams. It is within minutes of downtown Portland and, to a substantial degree, its original natural resource qualities are intact including a native population of 2,000-4,000 cutthroat trout.

The creek system including tributaries is 5 to 6 miles in length, with the lower 1.1 miles lying within Forest (Macleay) Park. The Balch Creek watershed is steep and relatively small at about 1400 acres of which approximately 310 acres are within Forest Park. Additionally, 109 acres are within sanctuaries and 67 acres are in open space (cemetery). Jurisdiction of the watershed is split between the City of Portland and Multnomah County with somewhat less than half of the watershed within Portland. Approximately half of the watershed is within the region's Urban Growth Boundary (UGB). Urban services such as sewers, water service, and public roads are minimal. Residential development is light with (as of 1990) 113 units or 1 unit per every 12 acres. Non-residential development is also light, with multiple use forestry and open space zoning predominating.

Predicting a long term picture of the Balch Creek watershed is difficult. It's clear that residential development and deforestation are the most significant threats to watershed viability. The extent to which that will occur is unclear as is the adequacy of land use, building, and forestry regulations designed to limit or mitigate impacts to natural resources. Possible scenarios include the following:

1. Residential development will continue to some degree. As a scenic, substantially forested, lightly developed enclave near the center of the Portland-Vancouver area, the Balch Creek watershed is increasingly rare. Although it is and will be a very desirable place to live, residential development is constrained by steep terrain, lack of water and sewer service, and stormwater management difficulties. The type and extent of future residential development is unclear but could be any of the following:

- Development at current zoning.
- Development and build-out at densities higher than current zoning.
- Less than full development and build-out with implementation of voluntary development constraints.
- Less than full development and build-out due to mandatory constraints.

2. Community's desire to preserve and enhance the watershed. As a relatively intact natural resource area, the Balch Creek watershed is recognized as an increasingly valuable community asset. Efforts to preserve and enhance the watershed will continue to be strong as long as the watershed remains viable. It is highly probable that citizens will continue to express concern about the watershed and will take steps to protect and enhance it. Portland applied environmental conservation and protection overlay zones to the city portion of the watershed in early 1991. Multnomah County is currently (1994) proposing protection measures, but only for narrow bands along stream corridors and no limitations to development are proposed.

3. Urban services are unlikely to be extended into the watershed in the foreseeable future. The cost of extending sewers and water service is substantial and public opposition to the extension of these services is high. This means that only private water systems and relatively minor extensions of water lines and sewers from peripheral areas will be built to support development.

4. The City's Balch Creek stormwater management program will continue to develop. The program includes building facilities to moderate the impacts of stormwater and developing capacity for controlling 100 year storm events. Facilities and programs to improve water quality and to protect and enhance Balch Creek natural resources are part of the program.

5. Increasing impact from transportation use. NW Cornell Road, and to some extent NW Thompson Road, have heavy traffic at peak commuter times. Both natural resources and human uses of the watershed are negatively impacted by heavy traffic. Future traffic and traffic system development may be constrained by citizens concerned about impacts. Transportation agencies may need to implement other strategies, such as controls on the amount of traffic through the watershed at peak times.

6. Incorporation into the City of Portland. Continuing efforts by Multnomah County and City of Portland to consolidate services and reduce duplication will make the Balch Creek watershed a likely candidate for annexation. Land use, building, and forestry regulations differ between City and County areas. Resource protection needs to be maintained and enhanced.

Conclusion: The unique and valuable nature of the Balch Creek watershed; the absence of roads, sewers, and water; the opportunities for multiple benefits; and the presence of citizen and political will justify a significant effort to protect natural resources in Balch Creek.

Considerations:

Acquisition of a high percentage of land in the Balch Creek basin is too expensive to consider at this time. However, an approach that combines fee simple acquisition with a conservation easement program and with mandatory resource protections could protect the basin.

Specific Projects:

Conservation Easements.

Implement a program of acquiring conservation easements through purchase and through voluntary donation. Conservation easements run with the land forever and must be assigned to a legal entity, such as a non-profit organization or a local government agency. Direct conservation easements at limiting the number and extent of residential units; limiting or

prohibiting disturbance to the forest canopy; allowing resource restoration projects; and limiting uses that degrade resources.

Land Acquisition.

Consider land along tributaries and land that is very steep as high priority for acquisition.

Give serious consideration to any land in the watershed available at a reasonable price. Even though the resulting public ownership pattern may include isolated patches of public property, the long term benefits for watershed viability are more important.

Acquire land designated as open space within Planned Unit Developments if offered by the developer or by the homeowner organization.

Mandatory Resource Protection.

Parks and Recreation will advocate for the maximum allowable resource protections within the watershed. This will reduce negative impacts to Balch Creek natural resources and protect the City's substantial investment in resource management. In addition, storm water management problems requiring expensive and environmentally damaging solutions will be minimized or avoided.

RP-3All: Acquisition and Protection of Willamette River Linkages

Goal:

Protect wildlife habitat value.

Objectives:

Preserve critical wildlife habitat for fish and amphibian species.

Improve certainty of critical habitat protection through acquisition of property rights.

Acquire opportunities for restoration of critical habitat.

Acquire opportunities for trail linkages between Forest Park and the Willamette Greenway.

Acquire parkland along the Willamette River.

Acquire property or conservation easements in a fair and cost-effective manner.

Recommendation:

Implement a program to acquire, by fee simple acquisition or conservation easement, riparian linkages from Forest Park to the Willamette River.

Unit:

All units.

Rationale:

The protection or improvement of habitat areas for fish, reptiles and amphibians will protect existing small populations which are important components of a diverse wildlife resource in Forest Park.

All amphibian and some reptilian species have specific riparian or aquatic habitat requirements which is rare within the present boundaries of Forest Park. Such sites do exist just outside the park along US 30.

Fish habitat is rare in Forest Park. At present Balch Creek is the only viable fish habitat area within the park. There is potential for improving fish habitat in the lower sections of Miller Creek.

The City's environmental zone provides some protection for these areas, but they are not actively managed to guard against detrimental impacts and public awareness is low. Incorporation into the park will help assure protection over the long term.

Considerations:

The protection of riparian areas is expected to be consistent with recommendations included in the Linnton Neighborhood Plan.

Metro has included the Willamette Greenway on its list of regionally significant resources. Coordinate protection of areas that fall within the Greenway with Metro.

The Bureau of Environmental Services (BES) has several watershed management programs. Coordinate with BES to ensure that stormwater management is consistent with resource protection in these lower watershed areas.

Follow-Up:

Study the watershed linkages to the Willamette. Identify specific parcels in need of protection. Continue efforts to coordinate with the Linnton Neighborhood Plan, Metro Greenspaces, and BES.

Specific Projects:

- Balch Creek linkage.
- Saltzman Creek linkage.
- Doane Creek linkage.
- Miller Creek linkage.

RP-4All: Acquisition and Protection of Headwater Areas**Goal:**

Protect wildlife habitat value.

Objectives:

- Preserve and buffer valuable interior forest habitat.
- Preclude habitat disturbance.
- Protect stream water quality.
- Prevent or limit erosion.
- Acquire property or conservation easements in a fair and cost-effective manner.

Recommendation:

Implement a program to acquire fee simple or conservation easement headwater areas above Forest Park. Support mandatory resource protection for upper watershed resources and participate in the land use process to encourage their application.

Unit:

All units.

Rationale:

Protection of natural resources in the upper watershed is needed to protect existing park resources. Upper watershed areas are zoned for residential and rural residential use. Other activities include farming and logging. Some of these areas are inside City limits, some are outside. Some are inside the Urban Growth Boundary, some are outside.

Park resources are subject to impacts from development and from existing uses. Watershed impacts come from erosion, poor water quality, pollution from chemical and septic systems, decreased summer flows, increased edge effect produced by clearing, human activity, and presence of domestic animals.

The surest way to protect resources is through acquisition. Second surest is through the acquisition of conservation easements. At a minimum these two methods should be applied to areas directly adjacent to intermittent streams in the upper watershed.

In addition, acquisition of property rights to allow resource restoration projects to occur in the upper watershed will help protect natural resources within Forest Park.

Considerations:

Upper watershed areas are developing, generally as low density housing. Parks participation in the land use process is critical and can lead to conditioned land use approvals that include watershed protection measures.

Make property owners in the upper watershed areas aware of potential impacts of property management and recruit as partners in the protection of resources.

RP-5All: Acquisition & Protection of Wildlife Corridor

Goal:

Protect Forest Park's linkage to the Coast Range and rural areas to the north and west of the park.

Objectives:

Develop and implement a conservation easement program to protect natural resources on forested and rural lands to the north and west of Forest Park.

Develop public awareness of the benefits of resource protection in this area.

Acquire conservation easements in a fair and cost-effective manner.

Recommendation:

Monitor development and the quality and quantity of wildlife habitat in areas north and west of Forest Park.

Participate in land use and transportation decision making processes as an advocate for protection of wildlife linkages and natural resource protection in areas north and west of Forest Park.

Develop and implement a cooperative program with Metro and the Friends of Forest Park to acquire conservation easements on land north and west of Forest Park.

Consider acquisition of land north and west of the park if the prospective land is contiguous with the park or if prospects for a future direct connection to the park appear to be good.

Participate actively in the Pacific Greenway program.

Participate in the Burlington Northern rails-to-trails study and any subsequent action.

Rationale:

Maintaining an effective biological link to the Coast Range is important to protect Forest Park wildlife resources. Concern about Forest Park becoming a biological island is legitimate. This is a special concern for wildlife species whose diversity and numbers depend on intact forest canopy or uninterrupted surface migration routes.

The community has recently demonstrated its support for protecting natural resources in this area with an investment of over \$600,000 to purchase a 38-acre parcel including a 29-acre old growth forest.

At the present time, Metro's "preferred alternative" for its *Region 2040* plan for regional growth is very supportive of protection of areas north and west of Forest Park. The preferred alternative calls for the bulk of the land to be designated as "rural reserves" or areas with low density development. Areas further out are designated "exclusive farm use."

The cost of acquiring land to achieve this goal is perhaps too high for serious consideration, but conservation easements might be obtained for much lower costs with some potential for obtaining them at no cost. Conservation easements allow continued private use of the land, but provide certainty for natural resource protection.

Conservation easements have already been granted to the Friends of Forest Park by Crown Pacific Ltd. on eleven lots in this area. These easements may serve as a model for conveyance of additional easements in the future.

In addition, as a condition of the 38-acre old growth sales agreement, conservation easements were granted to the Friends of Forest Park by Agency Creek Lumber Co. on 332 acres limiting the number of residential units to 25, limiting fencing, regulating domestic animals, and defining the size of the "homestead" portion of the lots.

At some point in the future, the rock quarry owned by Angell Bros. will close. Presumably subsequent development opportunities for the site will be limited. Conservation easements may be a cost effective tool in this situation.

Considerations:

Conservation easements providing for continued private use may succeed where acquisition may not.

Follow-Up:

The Friends of Forest Park, Metro Greenspaces, and Portland Parks and Recreation will define roles and responsibilities for a conservation easement program in this area.

RP-6All: Acquisition for Development of Park Access

Goal:

Improve public access to Forest Park and reduce conflicts with residential areas.

Objectives:

Acquire land for development of two new access points and new access routes for bicyclists and pedestrians into the south and middle units.

Reduce park generated traffic in residential areas (especially NW Thurman St.).

Reduce on-street parking generated by park visitation.

Secure long-term access to Firelane #15 from Skyline Blvd.

Mitigate habitat disturbance.

Acquire property and access in a fair and cost-effective manner.

Recommendations:

Work cooperatively with other agencies, user groups, neighborhoods, and property owners to identify and acquire land well-suited for development of park entrance facilities (i.e., parking lot, restrooms, dressing rooms, information center) and access routes into the park for bicyclists and pedestrians. Two locations on US 30/St. Helens Highway are recommended (see

project descriptions). Acquire a perpetual public access easement to Firelane #15 from Skyline Blvd.

Unit:

All units. One new access will serve the south unit. A second new access will serve both the south and middle units. Firelane #15 serves the north unit.

Rationale:

Over the last decade, use of Forest Park has risen substantially while park entrance facilities have not increased. The most popular park entrance is at the end of NW Thurman St. which is adjacent to a fully developed and established residential neighborhood. Conflicts with the neighborhood are well documented and cannot be resolved until attractive access points are developed elsewhere.

Improved access to the south unit will help protect natural resources in other units. Needed is about 25,000 sq. ft. for 100 off-street parking spaces (includes both locations), restrooms and changing rooms, landscaping and orientation facilities.

Considerations:

Develop an access point away from residential areas, on a public transit route, and adjacent to a major road (e.g., US 30/St. Helens Highway).

Design and build a safe, attractive, and easy to use bicycle route into the park from each new access point. Develop a different or same route for walkers and runners from each new access.

Provide sufficient area for facilities (e.g., parking lots, restrooms) to accommodate general levels of use as well as special events. It would be advantageous to acquire land at or near recognizable natural features such as a creek.

Pursue projects in cooperation with other agencies to provide multiple benefits and cost efficiencies where possible.

Natural Resource Enhancement Projects



As already documented by this plan, Forest Park natural resource functions and values are very high. However, opportunities do exist for improvement. The plan recommends a set of specific projects designed to enhance resource values in forested areas, along utility corridors, and in and along streams.

RE-1C/N: Maple Thinning/Conifer Release

Goal:

Improve wildlife habitat value.

Objective(s):

Improve vertical structure (advance stem exclusion stage).

Improve vegetation diversity.

Recommendation (or Working Hypothesis):

Thin maple stands to release existing shade tolerant conifers (THN-B2). Remove entire clonal cluster (THN-B3). Select clones nearest existing overtopped conifers (THN-B4). Band (or cut) maples to release conifers when existing conifers are large (THN-B5). Apply systemic herbicide to maples to release conifers when existing conifers are small (THN-B5). (Numbers refer to forestry consultant's technical report.)

Unit:

Middle and North.

Target Areas:

ACMA3-4// -///. Stands or small patches dominated by large big-leaf maple trees having 70-100 percent or 40-70 percent crown closure which also have conifers in the understory.

Rationale:

Intervention will accelerate improvement of wildlife habitat.
May accelerate process by approximately 100 years.

Excellent benefit for effort.

This is a limited intervention in terms of total park area.

Considerations:

Working hypothesis approach. Start slowly and evaluate results before accelerating.

Areas selected for treatment. Select areas for treatment which have mature maple clones and conifer understory. Removal of mature clones will minimize chance of adjacent clones closing the canopy before conifers are released.

Size of treatment area. Avoid removal of large contiguous blocks of maples. This will minimize aesthetic impacts and may minimize resource impacts. Also, same overall results can be obtained by a dispersed approach. Remove no more than 1/2 of canopy in any one treatment area.

Scope of project. When combined with other intervention projects, no more than 50 percent of total area of stand type (e.g., ACMA3/ / /) should be affected. Given the few identified understory conifer patches, this will not be a problem.

Minimize hazard exposure. Cutting trees is hazardous work. Treated maples should not be cut down unless standing tree is itself a hazard.

Distance from trails. Minimize visual impact of standing dead trees and minimize risk of falling dead trees by working at least 100' away from trails and firelanes.

Distance from English ivy and Himalayan blackberry infested areas. To minimize invasion of exotics, stay clear of Himalayan blackberry seed sources and English ivy areas. Maintain 1,000 foot minimum distance.

Herbicide use. Minimize herbicide use. Use appropriate (legal, low risk) herbicides when conifers to be released are under 10 feet in height. (Conifers over 10 feet in height may be able to outgrow re-sprouting maple clones.)

Timing. Treat in late fall or early winter. Treated trees will not leaf out the following spring. Aesthetic impact is minimized.

Follow-Up:

Locate conifer understory. Locate patches or scattered conifers under mature maple stands for this project.

Invasive species. Remove invasive species as they appear.

Fertilize. Fertilize understory conifers early in the second spring after release.

Hardwood seedling control. Follow-up control of hardwoods which seed in with manual removal methods, if done before hardwood seedlings get too large.

Adjacent hardwood removal. Adjacent maples (and alders) may need to be removed as released conifers grow.

Monitoring. Monitor results (before accelerating this project).

Specific Projects:

Locations:

1. Middle Unit. Above Leif Erikson near Firelane 7. PSME4/-ACMA3/// with TSHE understory. Apply (inject) herbicide, band, or fall ACMA3.
2. Middle Unit. Above Leif Erikson near Germantown Road. PSME-ABGR3/-ACMA3/// and PSME4/-ACMA3/// with TSHE-ABGR-THPL understory. Extends slightly north of Germantown Road. Apply (inject) herbicide, band, or fall ACMA3.
3. Middle Unit. Just above Leif Erikson about halfway between Firelane 3 and Saltzman Road. ACMA3/// with THPL understory, in two pieces. Also extends below Leif Erikson. Apply (inject) herbicide, band, or fall ACMA3.
4. Middle Unit (south) and South Unit (north). Just above Leif Erikson at Firelane 1. PSME4/-ACMA3/-ALRU with ABGR understory and THPL understory. Apply (inject) herbicide, band, or fall ACMA3. Leave ALRU to grow old and die.
5. Middle Unit. In the ALRU2/// patch in the lower Maple Trail and Saltzman Road area, locate scattered understory conifers. Cut or girdle ALRU adjacent to existing understory conifers.
6. Middle Unit. In the ACMA4/// patch above Wildwood Trail north of Saltzman, locate scattered understory conifers. Apply (inject) herbicide, band, or fall ACMA4 adjacent to existing understory conifers.
7. North Unit. Just north of BPA road. PSME4/-ACMA3/// and ACMA3/// with large patch of THPL understory. Apply (inject) herbicide, band, or fall ACMA3.

8. North Unit. Just north of Newton Road at Newton Meadow. THPL-TSHE3/ACMA-ALRU3/// with ABGR understory. Apply (inject) herbicide, band, or fall ACMA3, leave ALRU to grow old and die.

Scope:

Implement up to two identified projects every two years. Select plots at a maximum 0.8 h. (4 ac.) each. Continue with other plots only after evaluation and if release is successful.

Target Density or Other Target:

Create 33 to 50 percent hole in canopy.

When:

Late fall, early winter.

RE-2S/C: Maple Thinning/Conifer Planting

Goal:

Improve wildlife habitat value.

Objective(s):

Improve vertical structure (move out of stem exclusion stage).

Improve vegetation diversity.

Recommendation (or Working Hypothesis):

Thinning maple stands combined with planting mixed conifer species (THN-B2, REF-B6). Remove entire clonal cluster (THN-B3). Apply systemic herbicide to maples to release newly planted conifers (THN-B5). Plant only shade tolerant conifers (i.e., red cedar, western hemlock, grand fir, and Pacific yew)(REF-B6). Plant containerized trees (REF-B7).

Maple thinning combined with conifer planting is a second priority (after thinning maples where conifers exist in the understory) due to extra effort and costs (REF-B8).

Unit:

Middle and South.

Target Areas:

ACMA4///. Stands or small patches dominated by large big-leaf maple trees having 70-100 percent crown closure which do not have a conifer understory.

Rationale:

Intervention will accelerate improvement of wildlife habitat.
May accelerate process by approximately 150 years.

Good benefits for effort.

Planting presents a good opportunity for public involvement.

This is a limited intervention in terms of total park area.

Do not plant Douglas fir. Fir would not grow well as an understory planting even if released.

Considerations:

Working hypothesis approach. Start slowly and evaluate results before accelerating this project.

Areas selected for treatment. Select areas for treatment which have mature maple clones. Removal of mature clones will minimize chance of adjacent clones closing the canopy before conifers are established.

Size of treatment area. Avoid removal of large contiguous blocks of maples to minimize aesthetic impacts and other resource impacts. Also, same overall results can be obtained by a dispersed approach. Remove no more than 1/2 of canopy in any one treatment area.

Scope of project. When combined with other stand intervention projects, no more than 50 percent of total area of stand type (ACMA4//) should be affected.

Herbicide use. Use appropriate (legal, low risk) herbicide.

Minimize hazard exposure. Cutting trees is hazardous work. Do not cut down maples unless necessary.

Planting distance. Plant conifers a minimum of 15-20 feet from existing live trees. Other native vegetation will compete with planted conifers. Need to clear vegetation 3 feet around newly planted tree.

Distance from trails. Minimize visual impact of standing dead trees and minimize risk of falling dead trees by working at least 100' away from trails and firelanes.

Distance from English ivy and Himalayan blackberry infested areas. To minimize invasion of exotics, stay at least 1,000' from blackberry seed sources and ivy areas.

Seed source. Plant conifer seedlings from local sources.

Timing. Treat in late fall or early winter. Treated trees will not leaf out the following spring. Aesthetic impact is minimized. Planted conifers will have greatest chance of success if planted in late fall or early winter.

Follow-Up:

Invasive species. Remove invasive species as they appear.

Fertilize. Fertilize planted conifers with slow release fertilizer at planting time and with early spring fertilizer applications in the 2nd through 6th seasons.

Hardwood seedling control. Follow-up control of hardwoods which seed in with manual removal methods, if done before seedlings get too large.

Adjacent hardwood removal. Adjacent maples (and alders) may need to be removed as planted conifers grow.

Monitoring. Monitor results (before accelerating this project).

Specific Projects:

Locations and Scope:

1. Middle Unit. Above Wildwood Trail, north of Saltzman. ACMA4/// where no understory conifers exist. Project #1 should begin with 1.2 hectares (3 acres). Thin maples with herbicide application (injection). Plant TSHE, THPL, and ABGR in openings created.
2. Middle Unit. Above Leif Erikson along Maple Trail to Wildwood Trail at Mile 13.5. ALRU3///-ACMA patch of about 4 hectares (10 acres). No hardwood thinning needed. Plant TSHE, THPL, and ABGR. Project #2 could address all 4 hectares (10 acres).
3. South Unit. Very large acreage of PSME4/-ACMA3// -ALRU above and below Leif Erikson. Plant TSHE, THPL, and ABGR beneath ALRU where ivy is not a current threat. Project #3 could cover hundreds of hectares. Accomplish as volunteer

opportunities allow and as good planting opportunities beneath ALRU allow.

4. South Unit. Stenzil property along upper Holman Lane. ACMA3///. Apply (inject) herbicide or band maples. Plant TSHE, THPL, and ABGR. English ivy must be controlled. (Project #4 should begin with about 2 hectares (5 ac.), which is approximately 20 percent of Stenzil property. This limited start will help assure that ivy can be controlled in project area.)

Target Density or Other Target:

Where thinning needed, achieve 25-50 percent canopy opening. Plant trees at rate of 250 per hectare (100/ac.).

When:

Late fall to mid-winter.

RE-3S/C: Conifer Thinning

Goal:

Improve wildlife habitat value.

Objective(s):

Improve health and longevity of conifer stands.
Add cavity nesting opportunities.

Recommendation (or Working Hypothesis):

Thinning of overly dense conifer stands (TRE-B1).

Unit:

Middle and South.

Rationale:

Creation of snags will improve cavity nesting habitat quickly.

Snags are relatively rare in Forest Park.

Thinning will improve the health of remaining conifers resulting in improved vertical structure for a longer period.

Good immediate and long-term benefit for effort.

This is a limited intervention in terms of total park area.

Considerations:

Working hypothesis approach. Start slowly and evaluate results before accelerating this project.

Technique. On large conifers, remove the entire top of tree down to approximately a 40 foot height. Topping combined with side limbing may be preferred techniques to thin smaller conifers.

Safety. Topping large conifers to create snags is hazardous work. Work should be done by qualified personnel.

Avoid over-thinning. Minimize risk of hardwood species establishing in treatment area.

Distance from trails. Minimize risk of falling dead trees by working at least 150' away from trails and firelanes.

Distance from English ivy and Himalayan blackberry infested areas. Minimize invasion of exotics by staying at least 1,000' from blackberry seed sources and ivy areas.

Follow-Up:

Invasive species. Remove invasive species as they appear.

Hardwood seedling control. Follow-up control of hardwoods which seed in with manual removal methods, if done before hardwood seedlings get too large.

Additional thinning. Additional thinning of conifers may be required over time.

Monitoring. Monitor results (before expanding this project).

Specific Projects:

Locations and Scope:

1. Middle Unit. South of Saltzman Road, below Wildwood Trail, above Leif Erikson. PSME3/// is healthy, young, but substantially overstocked. One plot, 0.4 hectare (1 acre) in size. Girdle the conifers to be thinned.
2. North Unit. Newton Road, below Wildwood Trail. PSME4/// is overstocked. Two plots, each 0.4 h. (1 ac.). In one plot, simply top the conifers to be thinned. In the other, girdle or top and side limb the conifers.

When:

Anytime except mid to late summer (fire season). Fall to early winter may be ideal. Girdling should be done during fall so that needles will fall before the following fire season.

RE-4All: English Ivy Removal

Goal:

Preserve and improve wildlife habitat.

Objective(s):

Reduce area infested with English ivy.

Recommendation (or Working Hypothesis):

Continue and substantially expand the *Forest Park English Ivy Removal Program*. Locate areas of English ivy infestation more precisely using Global Positioning System (GPS)(MON-A2). Identify and experiment with treatment methods for removal of English ivy (MON-A3). Plant understory conifers (REF-B6).

Units:

North Unit: Eradicate isolated patches. Arrest and reclaim the growing edge. Eradication from this unit should be a priority.

Middle and South Units: Remove from trees throughout. Arrest and reclaim the growing edge. Control in these units should be achievable.

Rationale:

Extremely serious negative impacts to wildlife populations occur from the spread of English ivy. Macroinvertebrate populations plummet, amphibians are absent, and native vegetation is unable to re-seed or spread. Although changes in numbers of wider ranging species (e.g., birds) have not yet been noted, reductions are reasonably expected to occur over time. In short, the ecology of ivy infested areas is changed substantially through a dramatic reduction in habitat diversity.

The current ivy removal program is very aggressive by comparison to what was occurring only three to four years ago, but the nature of the problem requires that it be increased substantially. In the long run, combating English ivy in Forest Park is an all or nothing proposition. A poorly supported effort will only prolong the transformation of Forest Park to a 5,000

acre "ivy desert." Ivy removal is probably the park's highest natural resource management priority.

Arresting the spread of English ivy is important in all units, but it is critical in areas such as the North Unit where the level of infestation is relatively light. It is equally critical to combat ivy at its aggressive front line. At the growing edge, when ivy is removed from the ground, still existing native plants can recolonize. In all areas it is also important to kill ivy growing on trees to prevent seeding.

Considerations:

Methods. May wish to try different approaches. For example:

- Removal from trees only as a minimum effort.
- Removal from trees combined with uprooting at the growing edge.
- Removal from trees combined with uprooting at the growing edge and herbicide treatment of first 15 m. (50 ft.) width of solidly infested area.

Herbicide application. If herbicides are applied, use an appropriate (legal, low risk) herbicide.

Replacement planting. Replant with appropriate native plants as needed.

Timing. To avoid damage to other vegetation, pulling and digging should not occur during the spring. Apply any herbicides in the fall to avoid damage to native vegetation (more likely to be dormant in fall).

Isolated patches. Isolated patches require special attention. Patches may be small, but they threaten areas that are otherwise ivy-free. Total eradication should be the objective when working in patches.

Follow-Up:

Monitoring. Monitor to determine effectiveness of various control methods. Monitor isolated patches to prevent spread of ivy into new areas.

New plantings. Keep new plantings free of ivy.

Specific Projects:

Locations and Scope:

1. South Unit. Remove English ivy from Holman Meadow up to and above Wildwood Trail and out to and just beyond Aspen Trail. Patch is PSME4/// but includes noticeable amounts of ALRU and ACMA. Project #1 is 8 to 12 hectares (20-30 acres).
2. South Unit. Remove English ivy from Lower Macleay area. Do before or concurrent with removal of other non-native plants in the Lower Macleay area (see project list). Patches are ACMA4/// and PSME4///. This project should start at 0.4 h. (1 acre) and expand to 4 h. (10 acres).
3. South and Middle Units. Establish an English ivy "front line." Remove ivy at front edge of growth into Forest Park which is generally parallel to St. Helens Rd. (US 30). Identify, mark, and reclaim a 10 meter (33 ft.) wide band. Overall distance of front line is about 16 kilometers (10 mi.). Remove by hand and follow up with foliar herbicide applied by a licensed applicator during the early fall. Project #3 is a rough equivalent of 14.6 hectares (36 acres).
4. All Units. Eradicate isolated ivy patches as discovered. Remove by hand and follow up with foliar herbicide applied by a licensed applicator during the early fall. Project #4 may be 0.4 to 2 hectares (1-5 acres) per year.

Target Density or Other Target:

Eradicate ivy from specific project areas. Stop spread of ivy into Forest Park along ivy "front line," that is the area of heaviest ivy infestation.

When:

Hand remove ivy from late spring to early fall. Follow up with herbicide application during early fall. Monitor during late spring or early summer.

RE-5All: Exotic Plant Removal

Goal:

Preserve and improve wildlife habitat.

Objective(s):

Reduce or eradicate exotic vegetation other than English ivy (e.g., Himalayan blackberry, Scot's broom, English holly, wild clematis, vinca minor, vinca major).

Recommendation (or Working Hypothesis):

Locate areas of exotic infestation (distribution patterns differ with species; holly and clematis are scattered within forest whereas others are common along forest edges). Identify and experiment with treatment methods for removal of exotics (MON-A3). Plant understory conifers (REF-B6).

Unit:

All units. North Unit is a priority area.

Rationale:

Open areas are rare in Forest Park. At forest edge areas, and notably in the Macleay Park area, clematis is now a substantial problem and has potential for increase. Habitat quality is negatively impacted by Himalayan blackberry and Scot's broom in open areas.

In forested areas, English holly and vinca species have potential for substantial increase.

Considerations:

Powerline corridors. Change vegetation management in powerline corridors to reduce Himalayan blackberries and Scot's broom. Promote improved vegetation management with powerline companies. May require waiting until improved management practices can be negotiated into easement agreements.

Herbicides. Weigh negative impacts of blackberries against negative impacts of herbicides. If herbicides are applied, use an appropriate (legal, low risk) herbicide.

Methods. May wish to try different approaches. For example:

- Hand removal of Scot's broom. Special tools needed for large plants.
- Herbicide treatment of vinca species.
- Mow or cut Himalayan blackberries. Then treat with herbicide when some vegetation regrows. This will result in less herbicide use due to smaller foliage area.
- If possible, pull English holly. English holly too large to pull should be cut down and an herbicide applied to freshly cut stumps since it will easily re-sprout.

Replacement planting. Replant with appropriate native plants in areas where exotic plant coverage has been extensive (typical for blackberries and Scot's broom colonies).

Timing. Apply herbicides in the fall also to avoid damage to native vegetation (more likely to be dormant in fall). Pull Scot's broom in late April-early May when in bloom. Mature plants can be easily seen at this time and moist ground permits hand pulling of small and moderate size plants.

Isolated patches. Isolated patches require special attention. Patches may be small, but they threaten areas that are otherwise exotic plant-free. Total eradication should be the objective when working in patches.

Visual impacts. When dead, English holly is noticeable and unsightly. Temporary signs that explain the holly removal program could be placed at locations where dead holly plants are visible.

Follow-Up:

Monitoring. Monitor to determine effectiveness of various control methods. Monitor isolated patches to prevent spread of exotic plants into new areas. Educate public about problems with invasive non-native plants.

Exotic plant seedlings. Blackberries, holly, and Scot's broom are heavy seeders. Follow-up visits to pull or chop out seedlings is strongly advised.

New plantings. Keep new plantings free of exotic plants which may regrow or come from seed.

New control methods. Oregon State University and Oregon Department of Agriculture are working on new methods of control using biological agents. Staff should stay abreast of new developments.

Education. Nearby property owners should be informed regarding impacts from invasive exotic plants. Removal of invasive exotics from nearby properties should be encouraged.

Specific Projects:

Locations and Scope:

1. South Unit. Remove English holly between Burnside and Cornell Roads, in Macleay, Pittock and Adams parks. Patch is PSME4///, otherwise high quality habitat. Holly should be cut down, cut up into pieces, and stumps should be treated with herbicide by licensed applicators. Small plants can be dug out. Project #1 is approximately 40 hectares (100 acres).
2. South Unit. Remove non-native plants in Lower Macleay area and replace with native plants. Patches are ACMA4/// and PSME4///. Non-natives consist primarily of holly, ivy, laurel, chestnut trees and Scot's broom. Blackberry regrowth and larger holly, laurel and chestnut stumps will require herbicide application by a licensed applicator. Project #2 should start with 0.4 h. (1 ac.) and expand to 4 h. (10 ac.).
3. South Unit. Remove non-native plants in Holman Meadow area and replace with native plants. Patch is ACMA4///. Non-natives consist primarily of holly, laurel, Himalayan blackberries and Scot's broom. Blackberry regrowth and larger holly, laurel, and chestnut stumps will require herbicide application by a licensed applicator. Project #3 began in 1993 and should expand to up to 4 h. (10 ac.).
4. North Unit. Remove English holly along new Wildwood Trail alignment just before crossing Firelane 15. Patch is PSME4// -ACMA3//, otherwise good quality habitat. Holly should be cut down, cut up into pieces, and stumps should be treated with herbicide by licensed pesticide applicators. Small plants can be dug out. Project #4 is 0.8 to 2 hectares (2 to 5 ac.).

Target Density or Other Target:

Eradicate all English holly, English laurel, chestnuts, wild clematis and vinca from Forest Park. Eradicate Himalayan blackberry and Scot's broom from specific project areas.

When:

Remove English holly and English laurel during late fall and early winter when the evergreen plants can be more easily spotted.

Remove Scot's broom during May when plants are in bloom and can be easily spotted. Also, adequate soil moisture at that time allows easier removal by hand pulling.

Remove English ivy, chestnut trees, and Himalayan blackberries anytime from late spring to fall.

Plant replacements from late fall to mid-winter.

RE-6C: Maple Thinning/Conifer Seeding

Goal:

Improve wildlife habitat value.

Objective(s):

Improve vertical structure (move out of stem exclusion stage).
Improve vegetation diversity.

Recommendation (or Working Hypothesis):

Similar to thinning maple stands to release existing shade tolerant conifers (THN-B2). Remove entire clonal cluster (THN-B3). Select clones nearest existing mature conifers. Same rationale as applying systemic herbicide to maples to release conifers when existing conifers are small (THN-B5).

Unit:

Middle.

Target Areas:

PSME4/ and ACMA3///. Stands or small patches dominated by large big-leaf maple trees having 70-100 percent crown closure which also have mature conifers in the overstory.

Rationale:

Intervention will accelerate improvement of wildlife habitat.
May accelerate process by approximately 100 years.

If successful, this approach will help improve vegetation structure despite lack of existing understory conifers. It is less labor intensive, potentially more cost effective than planting, and assures conifer replacement with existing genetic stock.

Possibly excellent benefit for effort.

This is a very limited intervention in terms of total park area.

Considerations:

Working hypothesis approach. Start slowly and evaluate results before accelerating.

Areas selected for treatment. Select areas for treatment which have mature maple clones and mature (seed bearing) conifer overstory. Remove mature clones to minimize chance of adjacent clones closing the canopy before conifers are released.

Size of treatment area. Avoid removal of large contiguous blocks of maples. This project is a trial to be evaluated carefully 5 years after treatment before expanding to other areas. Start with no more than a 4 hectare (10 ac.) plot and remove no more than 25 percent of the maple canopy.

Scope of project. Scope of project to remain at 4 hectares (10 ac.) or less until evaluated. If successful, expansion should be cautious since different site conditions may affect results. However, it should be noted that there are large areas in Forest Park where this treatment could potentially be applied.

Minimize hazard exposure. Cutting trees is hazardous work. Treated maples should not generally be cut down.

Distance from trails. Minimize visual impact of standing dead trees and minimize risk of falling dead trees by working at least 100' from trails and firelanes.

Distance from English ivy and Himalayan blackberry infested areas. Minimize invasion of exotics by staying at least 1,000' from blackberry seed sources and ivy areas.

Herbicide use. Use appropriate (legal, low risk) herbicides.

Timing. Treat in late fall or early winter; trees will not leaf out the following spring. Aesthetic impact is minimized.

Follow-Up:

Invasive species. Remove invasive species as they appear.

Fertilize. Fertilize understory conifers early in the second spring after germination.

Hardwood seedling control. Follow-up control of hardwoods which seed in with manual removal methods, if done before seedlings get too large.

Adjacent hardwood removal. Adjacent maples (and alders) may need to be removed as conifers seed in and grow.

Monitoring. Monitor results (before accelerating this project).

Specific Projects:

Location:

1. Middle Unit. Between Wildwood Trail and Leif Erikson at Ridge Trail. Patch is PSME4/-ACMA3///.

Scope:

In the short term, select 1 plot of 2 to 4 hectares (5-10 ac.). After 5 year evaluation and if conifer seeding is successful, continue with other plots of up to 10 acres within the same patch (PSME4/-ACMA3///).

Target Density or Other Target:

Create 25 percent hole in maple canopy. Look for 250 trees per hectare (100/acre) seedling density.

When:

Late fall, early winter.

RE-7All: Natural Resource Monitoring

Goal:

Improve wildlife habitat value.

Objective(s):

Monitor natural resources (including plant and animal pest species) in support of goals and management strategies.

Establish predictive models for vegetation change.

Establish and maintain working relationships with US Forest Service, and Oregon Departments of Agriculture and Forestry to ensure that exotic pests and other potential threats to natural resources are appropriately monitored.

Revise GIS data-base periodically.

Recommendation (or Working Hypothesis):

Pursue recommended planning (PLN), monitoring (MON), modeling (MOD), and geographic information system (GIS) actions identified by the forestry consultant (A1-A11).

Conduct wildlife monitoring on a periodic basis.

Unit:

All Units.

Target Areas:

This set of recommendations is diverse in nature. See specific project descriptions.

Rationale:

There are few absolutes in the area of resource management. Monitoring resources over time will provide information needed to determine if and to what extent management actions are helping or harming Forest Park resources. Such information is essential for informed policy making. Also, the working hypothesis approach recommended as part of nearly all the natural resource management projects demands that resources be closely monitored.

Forest Park has an obvious role to play as a natural resource learning laboratory. By having in place up-to-date systems for monitoring resources and for predicting change, Forest Park will be available for use by students at all levels.

Considerations:

Start-Up Costs. The first step was taken with the GIS program for Forest Park established as part of the management plan. Additional start-up costs, such as a color plotter, a more powerful computer, and software may be shared among departments in Parks and Recreation. Portland's Department of Transportation (PDOT) is the lead for a city-wide GIS system which may provide technical support.

Staffing, Training, Technical Support. Personnel with specialized skills are needed, and/or consultants. Parks and Recreation staff will acquire additional skills and knowledge in the area of resource monitoring, modeling and GIS.

Technical Advances. Over time, additional investment will be required to take advantage of technical advances in the area of GIS and resource modeling.

Networking Benefits. By actively participating in the field of resource monitoring and modeling, Parks and Recreation will secure benefits from networking, including the additional information from studies performed as student exercises,

additional attention to Forest Park resources from agencies such as the US Forest Service, US Fish and Wildlife, as well as state resource agencies.

Specific Projects:

1. Pest Control Coordination with US Forest Service and Oregon State Dept. of Agriculture. Establish an active relationship with these agencies to identify potential pests, to help with early detection, and to establish pre-approved plans for implementing control measures.
2. Use a global positioning system (GPS) to determine more precisely the location of invasive and nuisance plant species monitor the spread of invasive plants and the efficacy of control efforts. GPS can be used to locate property lines, trails and other park features. GPS should initially be acquired by the City and shared among several agencies.
3. Monitor all resource management interventions using a formal monitoring program which is incorporated into the Forest Park GIS. The monitoring program should allow accurate evaluation of resource management programs.
4. Perform periodic wildlife monitoring focusing on populations of birds, small mammals, amphibians and reptiles, and fish. Maintain consistent techniques over time. Monitor at least every 5 years.
5. Monitor park use. Track levels, types, and location of park uses. Provide accurate information and identify impacts to natural resources caused by users.
6. Monitor broad-scale vegetative change. Use remote sensing techniques to evaluate vegetation at least every 10 years.
7. Monitor small-scale vegetative change. Run on-the-ground vegetation transects at least every 10 years. Transect locations should coincide with wildlife monitoring stations. Plots should be established now to provide needed baseline data and to confirm current broad-scale information.
8. Apply ORGANON stand simulation modeling to predict change in vegetation (tree layer). ORGANON is available from Oregon State University.

9. Apply GIS related Scheduling and Network Analysis Program (SNAP) developed by Oregon State University to integrate information from other sources (e.g., wildlife database, trail use) and model against landscape scale vegetation to address overall trends.

10. Complete "BES topographic series" for park; add to GIS.

11. Develop geology maps from GIS topographic data which highlight areas with slopes in excess of 200 percent and slopes of mantled with Portland Hills silt.

12. Develop more complete information on vegetation layers using the groupings and species codes utilized in the current management plan; add the information to GIS. Additional information about understory and groundcover vegetation is needed. This information would be valuable for assessing diversity of habitat, for determining sites for intervention, and for predictive modeling of vegetation change.

13. Using GIS and SNAP, quantify the amount of interior habitat and the effect on habitat quantity if various strategies (e.g., acquisition, management intervention) are pursued.

RE-8C/N: Utility Corridor Management

Goal:

Improve wildlife habitat value.

Objective(s):

Reduce fragmentation of interior forest habitat.

Replace non-native vegetation with native plants having higher wildlife habitat value.

Reduce disturbance and erosion.

Add cavity nesting opportunities.

Avoid expansion or addition of utility easement areas.

Recommendation (or Working Hypothesis):

Interior forest habitat is one of the most valuable habitat types. It is rare in the Portland-Vancouver area. Avoid or reduce fragmentation of this habitat.

Manage powerline corridors to maximize forest canopy, to maximize diversity of native plant species, to minimize invasive non-native plants, and to minimize disturbance and

erosion. Allow large tree species to grow as close to powerlines as possible. Top conifers interfering with powerlines rather than removing them. Where conifers are not practicable, native small trees and shrubs should be grown. Remove non-native shrubs, notably Himalayan blackberry and Scot's broom, and replace with native conifers, small trees or shrubs.

Unit:

Middle and North Units.

Rationale:

Powerline corridors are significant interruptions of Forest Park interior forest habitat. Significant review of vegetation management of powerline corridors has not occurred within the past 20 years. Management opportunities exist which will reduce habitat fragmentation, disturbance, and erosion.

Management recommendations will not result in additional use of herbicides and may result in reductions in use.

Good long-term benefit for effort.

Creation of snags will improve cavity nesting habitat quickly. Snags are relatively rare in Forest Park.

This is a limited intervention in terms of total park area.

Considerations:

Working hypothesis approach. As with other resource enhancement projects, adopt a working hypothesis approach and evaluate results periodically.

Scale of Project. The area that could be included in this project is significant. Overall easement area granted to overhead powerlines is estimated at 60 hectares (150 ac.). While restoration potential has not been assessed, improvement of only 20 percent would total 12 hectares (30 ac.).

Technique. Where practical and within the limits of safety set by the National Electrical Safety Code, plant conifers in and adjacent to powerline corridors. Plant natives as appropriate in the rights-of-way.

As a first priority, tall growing conifer species should be grown in and adjacent to powerline corridors. Where full-grown conifers are too tall, conifers should be topped by removing the

tree down to approximately a 40 foot height. This should be an effective technique for dealing with conifers in ravines out of reach of powerline sag and alongside corridors where "danger trees" are a problem.

Remove Himalayan blackberry and Scot's broom and replace with medium height and low growing native species (i.e., vine maple, pacific yew, ocean spray, Indian plum, red flowering current, serviceberry, cascara, salal, western crabapple, Oregon grape, California hazel, red huckleberry, blue or red elderberry, Douglas spiraea, ninebark, mockorange, rosa gymnocarpa, willow, snowberry, shinyleaf spiraea, and western wahoo). Mow blackberries and broom and treat stumps with systemic herbicides. Follow up with hand pulling of Scot's broom and additional herbicide application to blackberries as needed. Address relatively small areas (on the order of 4 hectares (10 ac.)) at a time until all powerline corridors are improved.

Safety. Topping conifers to create snags can be hazardous work. Work should be done by qualified personnel.

Distance from trails. Minimize risk of falling dead snags by working at least 150' away from trails and firelanes. Plant native shrubs and small trees to replace blackberries and Scot's broom in these areas.

Disturbance and Erosion. Maintenance of lines and structures appears to be intermittent, driven by condition of facilities as determined by inspectors. Replacement of structures creates a significant disturbance to vegetation and wildlife and causes erosion. Schedule regular maintenance to minimize these impacts. Perform work involving heavy equipment on a preventative basis at times other than the rainy season, nesting season, and periods of fire danger.

Service Roads. Service roads to utility structures are necessary for periodic maintenance and can provide critical access for fire crews. Service roads that transect the park or that link firelanes are used by hikers, bicyclists, and equestrians. These roads need to be built to a minimum service road standard and maintained in that condition.

Design and Consolidation. Address fragmentation and unwanted impacts as a design objective during redevelopment of powerline facilities. Consolidation of facilities can be addressed at the same time. For example, if taller, more

substantial structures are built, the resulting additional line clearance would provide opportunities to restore forest canopy. Structures with longer life would reduce frequency of disturbance. Consolidation of corridors, such as the “dog-legged” Keeler-Pennwalt corridor with the Keeler-Yeon corridor would result in fewer acres impacted by vegetation management and roads.

Underground Utilities. Underground utilities have similar issues regarding service roads and, to a degree, vegetation management. Risks exist from potential breaks in gas and petroleum transmission lines. Maintenance of underground utilities is infrequent, but disturbance could be substantial.

Responsible Party. This project proposes a standard of utility corridor management that differs from existing practices and standards specified in easement agreements. When easement agreements need to be modified, insert the new recommended management practices as updated conditions of the agreements. In the meantime, ask utility companies to implement improved management practices on a voluntary basis.

Follow-Up:

Invasive species. Remove invasive species from restored areas as they reappear. An annual effort is required due to presence of seed sources.

Hardwood seedling control. Follow-up control of hardwoods (ALRU, ACMA, POTR) which seed in. Such follow-up should be frequent enough that slash accumulation is minimal. Use manual removal methods if done before seedlings get too large. Maples and poplars could be controlled with basal herbicide application by licensed applicators. Intervals between control efforts should not exceed 3 years. Work should be done during fall or early spring before trees leaf out.

Conifer seedling control. Where powerline clearance precludes conifers altogether, follow-up with control of conifer seedlings (PSME, TSHE, ABGR, THPL). Use manual removal methods (cutting off at base) on conifers if done before seedlings get too large. Intervals between control efforts should not exceed 3 years. Frequent intervals result in less overall work and more rapid decay of slash. Work should be done during late fall.

Monitoring. Some monitoring is needed to test working hypothesis, although there is a high degree of certainty of benefits from this project.

Specific Projects:

1. Ross-Keeler (BPA). Large metal structures. 230 kv. Easement width is 38 m. (125 ft.) on west end of park, widens to 42 m. (137.5 ft.), then to 53 m. (175 ft.) at east end which is unused on the south half. Service roads in good condition. Restoration potential should be evaluated.

2. St. Marys-Trojan (PGE). Large metal structures. 230 kv. Leg to St. Marys is parallel and immediately north of BPA's Ross Keeler on a 38 m. (125 ft.) wide easement. Leg to Trojan is on east half of 76 m. (250 ft.) wide easement shared with Trojan-Harborton. West half of Trojan easement is unused. Service roads in good condition except (possibly) line to Trojan. Restoration potential should be evaluated.

3. Trojan-Harborton (PGE). Large metal structures. 230 kv. Leg to Trojan is on east half of 76 m. (250 ft.) wide easement shared with St. Marys-Trojan. West half of easement is unused. Harborton leg is short, but 114 m. (375 ft.) wide. Uses north edge of this easement. South edge is not used. Service roads in good condition except (possibly) line to Trojan. Restoration potential should be evaluated.

4. St. Johns-Astoria (BPA). Wood structures. 115 kv. 30.5 m. (100 ft.) wide easement. Some service roads in poor condition. Consolidation with PGE's Trojan powerline should be explored.

5. Vancouver-Eugene #1 and #2 (BPA). Parallel lines share a 30.5 m. (100 ft.) wide easement. Both have wood structures. Both are 115 kv. #1 has been "de-energized." If there is no future need, the de-energized line should be removed and forest canopy restored. Otherwise, consolidation should be considered.

6. Keeler-Pennwalt (BPA). Should be removed and consolidated with PGE's Keeler-Yeon. No easement exists for this transmission line. Some service roads are in bad repair.

7. Keeler-Yeon (PGE). PGE owns rights to additional easement area immediately south of this powerline. PGE should be encouraged to replace wooden structures with taller structures when and if expansion is needed. PGE should be encouraged to

consolidate with BPA's Keeler-Pennwalt corridor. Public access needed along service road between Leif Erikson and St. Helens Hwy. (US 30). Restoration potential should be evaluated.

Specific Policies:

Franchise and Easement Revenues. Dedicate city revenues generated by utility transmission across Forest Park to Parks and Recreation's Forest Park Land Acquisition Trust Fund. Pro-rate franchise revenues using the City-wide rate applied to the distance the utility crosses Forest Park. Annual payments adjusted for inflation are better than one time lump sum payments for easement rights.

Underground Utilities. Underground utilities transecting the park should follow built public roads. Park roadways may also be considered for underground utilities. Underground utilities transecting the park via natural areas should be avoided.

Residential and Commercial Hook-Ups. Evaluate requests for crossing portions of Forest Park to connect to water, telephone, electric, cable TV, natural gas, sanitary sewer, and storm drainage systems on a case by case basis and, if approved, allow by revocable permit issued by Parks and Recreation with appropriate conditions.

RE-9S: Streambank Restoration

Goal:

Improve wildlife habitat value.

Objective(s):

Stabilize streambanks to reduce erosion.

Increase habitat and cover for riparian area wildlife species.

Recommendation (or Working Hypothesis):

Develop appropriately "hardened" areas along Lower Macleay Trail and Wildwood Trail for viewing Balch Creek. Following this development, restore areas where foot traffic or flows have damaged or destroyed streambank vegetation. Correct several currently eroding streambanks. To maximize the benefit to amphibians and reptiles, remove ivy as recommended elsewhere in the management plan.

Unit:

South Unit (Balch Creek only). Assess streambank restoration needs in other streams in South Unit and assess streams in Middle and North Units.

Rationale:

Balch Creek is a unique feature in Forest Park and, as a relatively healthy urban stream, is an increasingly rare and valuable feature in the Portland-Vancouver metropolitan area. Maintain and enhance Balch Creek's natural resources components as its overall value increases.

Before streambank restoration can succeed, some forms of use must change. Reduce off-trail foot traffic by pedestrians and unleashed dogs. As described elsewhere, Balch Creek resources need to be interpreted to users of Lower Macleay Trail and Wildwood Trail along the creek. Interpretive facilities at discrete points along the trail should inform and educate park users about resources and impacts from inappropriate use. Without interpretive information and facilities, restoration attempts may be unsuccessful due to continued trampling.

Some areas where the trail is close to the streambank and is subject to erosion need attention soon, or substantial repair work will be needed later.

Considerations:

Working hypothesis approach. Start slowly and evaluate results before accelerating this project. This is especially important to see reductions in off-trail use before extensive streambank restoration efforts are made.

Amphibians and Reptiles. Historical records are abundant for Balch Creek in and near Macleay Park and contain 8 amphibians and 4 reptiles. Current survey found 9 amphibians and 2 reptiles.

Vegetation Damage. As already noted, vegetation damage is significant at locations along the creek. People and unleashed dogs are attracted to creek features such as pools and waterfalls. Shrub and groundcover vegetation damage ranges from moderate to total. Some vegetation damage exists above the trail, again from off-trail foot traffic. Vegetation loss reduces over-stream cover, de-stabilizes streambanks, and reduces riparian habitat.

Trail as Non-Point Source. Unless the entire trail bed is threatened by the flow of the creek itself, erosion from the trail is generally insignificant. Cross and surface drainage does need to function well enough to keep the surface dry and compacted. Erosion problems will occur when foot traffic goes off-trail, breaking down and eroding the outer edge of the trail.

Camping. Transient camping near the stream causes erosion, and campfires consume precious forest litter as well as threaten the forest with wildfire.

Technique. Use existing native plants found along Balch Creek for revegetation. Add more forest litter to the riparian areas. Remove ivy. Plant shade tolerant conifers such as Western red cedar and hemlock as a source of litter in the long term. Reduce streambank erosion using root wads and large boulders to deflect and slow stream flow. Block and sign unauthorized trails to the streambank

Design. A "natural" look should be an objective of restoration projects. Plants should be randomly arranged, root wads should be secured to eroding banks, and natural materials should be selected for built facilities.

Coordinate with In-Stream Modifications. In-stream work should direct flows to the center of the channel, in part to avoid streambank erosion. In-stream obstacles which deflect or pool the stream in a manner that erodes the streambank should be removed or adjusted. See Project RE -10.

Safety. Moving large debris into the riparian area can be hazardous. Personnel should be well trained and accident response should be prearranged.

Follow-Up:

Invasive species. Remove invasive species as they appear.

Monitoring. Monitor results. Adjustments may need to be made. Expanded efforts should be based on evaluation of results. Wildlife monitoring (esp. fish, amphibians) should be conducted approximately every 5 years.

Specific Projects:

1. Streambank Erosion Repair. Numerous locations were identified by consultants for the Balch Creek Watershed

Management Plan. These should be addressed using the techniques outlined above. Strongly recommend the use of qualified consultants to provide technical assistance until staff gain sufficient knowledge and experience. Only identified projects located within Forest Park are approved.

2. Balch Creek Interpretive Trail. An interpretive trail which develops up to four access to points of interest along the stream and which includes information about Balch Creek resources and the need to protect them should be built. Each access development must disturb less than 1,500 sq. ft. of land and must not disturb trees greater than 10" dbh.

3. Revegetation of Streambank Areas. After interpretive trail is completed, streambank areas needing revegetation should be replanted with native plants found in other Balch Creek streambank areas. Specific areas can be identified when the trail is planned.

4. Tree Planting. As a longer term project, plant shade tolerant conifers (i.e., western red cedar, hemlock) in the Balch Creek watershed to provide a source of forest litter and large organic debris in the future.

5. English Ivy Removal. As described elsewhere in the management plan. This is a priority for amphibian and reptile habitat improvement.

6. Eliminate Camping. Camp sites should be eliminated as soon as reported.

RE-10S: In-Stream Restoration

Goal:

Improve wildlife habitat value.

Objective(s):

Increase pool habitat for fish.

Increase in-stream structure and cover for fish.

Deflect current to center of stream to deepen water and to reduce streambank erosion.

Reduce fish passage barriers.

Reduce human impacts.

Recommendation (or Working Hypothesis):

With technical assistance, manipulate rocks and large woody debris (LWD) in Balch Creek to deepen flowing water, to deepen and create pools, to divert flow from streambanks, and to add in-stream structure and cover.

Discourage inappropriate use of creek. Keep people and dogs out of the creek.

Higher tech projects requiring stream profile modeling or bedrock modification should be considered later.

Unit:

South Unit (Balch Creek only).

Rationale:

Balch Creek is a unique feature in Forest Park and, as a relatively healthy urban stream, is an increasingly rare and valuable feature in the Portland-Vancouver metropolitan area.

The cutthroat trout population is viable and should be preserved.

Simple, in-stream modifications using existing native materials are very cost effective and visually unobtrusive.

In-stream modifications of flow to protect streambanks are very cost effective.

Considerations:

Working hypothesis approach. Start slowly and evaluate results before accelerating this project. Critically assess the stream profile to identify erosion and habitat problems at various flows, postulate improvements, use native materials to try a correction, observe the effects. Start with simple improvement projects.

Native Fisheries. Balch Creek contains a small but viable population of coastal cutthroat trout, *Oncorhynchus clarkii*, isolated since construction of a storm sewer connection to the Willamette River in 1921. Population is estimated to be 2,000 to 4,000. Size range is from 1 to 9 inches. It is unknown if the population was resident or anadromous prior to 1921. Also observed have been sculpins, crayfish, and Pacific Giant salamanders. Angling is prohibited by ODFW.

Steep Gradient. Over the 1.8 kilometer (1.1 mi.) length from the storm sewer intake at Lower Macleay Park to the Audubon bridge, the average gradient is 6 percent.

High and Low Flows. The creek has very low flows in late summer and early fall (.5 to 1 cfs). High flows (125 to 448 cfs) during winter storms create risk of fish displacement. Past high flows have scoured stream channel, creating wide, flat profiles that are very shallow during low flow periods. High flows are expected to increase (to 170 to 507 cfs) when upper watershed is developed to zoning limits.

Fish Migration Barriers. In the Macleay Park reach, fish migration barriers include waterfalls, steep bedrock drops, shallow (under 5 inches) flow areas in riffles and over bedrock, stream velocity, and lack of jumping pools. However, even in its pristine state, Balch Creek probably had some fish migration barriers. The removal of migration barriers is a lower priority than other habitat modifications.

Lack of Adequate Pools. Only 16 percent of overall Balch Creek stream volume consists of pools. In the Macleay Park reach, fast water areas predominate (84 percent of stream length, 82 percent of wetted area, 78 percent of stream volume). In addition, pool depth is shallow throughout. In the Macleay Park reach, the average residual depth of 19 pools was only 9 inches. The few large woody debris pools are dammed pools located at mid-channel, unanchored, offering limited habitat.

Width of Wetted Area. Width of stream is excessive during low flows. This product of scouring high flows causes insufficient depth for fish passage during low flow periods.

Water Quality. Water quality is relatively good. Problems are nutrients, suspended solids and sediment loading during rainstorms. Probable source of phosphorous and solids is eroding soil; probable source of nitrogen is septic tanks.

Gravel. Gravel quantities and gravel recruitment appears to be good. Patch gravels sufficient for spawning are generally downstream of boulders.

Sedimentation. Sediments are a significant problem in the upper watershed, above Macleay Park. Sources are landslides, residential development, and road runoff. Potential exists for additional sedimentation from commercial logging occurring

outside the city limits and from residential development in city and county areas in the watershed.

Upper Watershed Problems. Substantial problems in the upper watershed include sedimentation, fish passage barriers (culverts), lack of adequate pools, and channel downcutting (adjustment to higher flows).

Design. A "natural" look should be an objective of restoration projects. Logs, root wads and rocks should be selected and placed to avoid any "built" appearance.

Technique. Take a simple, low-tech approach. Use rocks, logs, and root wads to narrow channel width, to deepen flowing water, to catch gravel, and to add in-stream structure and cover in wide channel, shallow depth areas. Use the same materials to protect streambanks by deflecting flows away from cut banks and eroding trail cribbing. Add large rock to bedrock chutes create pools and catch gravel. Use vortex rock weirs (in-stream rock structures, arched upstream, somewhat larger rock on ends, uneven rock size, lower in middle) to deepen and create pools, increasing the residual pool depth, and deflecting water to mid-channel. (Avoid using full-spanning log weirs which flatten stream flow.) Add or enhance in-stream cover in pools by adding rocks and LWD at pool margins. To create in-stream cover at all flows, add LWD to stream margins by pulling large logs part way in from streambanks, leaving mass on streambank and setting in water at an angle. Remove or relocate boulders and LWD if causing erosion by deflecting flows to banks or by pooling and flooding of benches.

Streambank Modifications. Coordinate streambank restoration with in-stream work. For example, in-stream obstacles which deflect or pool the stream in a manner that erodes the streambank should be removed or adjusted. Flows should be directed to the center of the channel.

Safety. Moving large rocks and logs into the streambed can be hazardous. Personnel should be well trained and equipped, and accident response should be prearranged.

Follow-Up:

Monitoring. Monitor results and adjust as needed. Expand efforts based on evaluation of results. Measure fish population, pool number and volume, percentage habitat type, percentage fast vs. slow water periodically, perhaps every 5 years and

monitor other factors such as erosion, in-stream structure, and inappropriate use. Check pools for sediment collection. Operate monitoring equipment such as a stream gauge and a "hydro-lab" in the Macleay Park reach.

Specific Projects:

1. **In-Stream Restoration Projects.** Numerous locations were identified by consultants for the Balch Creek Watershed Management Plan. These should be addressed using the techniques outlined above. Use qualified consultants to provide technical assistance until staff gain sufficient knowledge and experience. Work during the summer low flow periods with youth crews directed by knowledgeable city staff and assisted by professionals from local resource agencies or consulting firms. Only identified projects located within Forest Park are approved.
2. **Appropriate Behavior.** Develop on-site interpretive information about Balch Creek resources and encourage appropriate use. Provide limited access to the edge of the creek. (These projects are described more extensively elsewhere in the management plan.)
3. **Monitoring.** In cooperation with the Bureau of Environmental Services, monitor fisheries, stream habitat conditions, in-stream restoration projects, water quality, stream flow, and public use.
4. **Land Use.** Participate actively in land use planning and review of development applications within the Balch Creek watershed area. Support regulations providing adequate protection of natural resources in the watershed, avoid or mitigate negative impacts to quality of Balch Creek resources, and encourage natural resource protection and enhancement.

RE-11N: Newton Wetland Enhancement

Goal:

Improve wildlife habitat value.

Objectives:

Increase size of forested wetland.

Reduce impact to wetland from Newton Road.

Recommendation (or Working Hypothesis):

(Approximately) double the size of the Newton Wetland by increasing the grade of the berm or rise on the outfall side. Relocate a short segment of Newton Road to higher ground.

Unit:

North Unit.

Rationale:

Identified as a core preserve, the "Newton Wetland" is an exceptional resource area within Forest Park. Thought to be the Park's only forested wetland, it provides valuable habitat for amphibians and macroinvertebrates. There is evidence that grading was done to reduce the wetland's size to accommodate the building and use of Newton Road. Restoring the wetland to its former (approximate) size would require only minor regrading of a small berm and creating a short bypass route.

Considerations:

The area will be disturbed during this project. Erosion should be controlled through the use of silt fencing or bio-bags. The project should include revegetation of disturbed areas with appropriate native plants.

Follow-Up:

After the project and until the site stabilizes, the site should be monitored for unwanted construction impacts. As part of the Sustainable Resources Program strategy, natural resources at this core preserve should be monitored on an ongoing basis.

Development Projects

Development Guidelines/Standards

Guidelines and standards are given below for various kinds of recreational facilities. The guidelines are performance standards which indicate the appropriate level of development while the standards are specific measurements that are the minimum acceptable development for that kind of facility.



Park Roads and Trails

Circulation in and around Forest Park ranges from paved roads through the park to narrow trails. Major public city streets and roads such as St. Helens/ US 30, Cornell, Skyline, and Newberry provide access to the park from the surrounding area.

Public Roads within the Park - Paved: Portland Department of Transportation is responsible for the development and maintenance of these roads. The following paved public roads go through the park—Germantown, Cornell, 53rd and Newberry.

Guidelines:

- Parks has a strong interest in keeping these roads at the present level of development with no changes in design that would increase pavement width or traffic speed.

Private Roads/Fire Lanes within the Park - Graveled: A number of graveled roads in the park (Leif Erikson, Saltzman and Springville) are closed to the general public for vehicular use, but they are accessible to park vehicles, or others as needed (such as the Fire and Water Bureaus and utility companies). Vehicular use by the general public is only allowed with special permission.

Guidelines:

- Maintain in good repair to allow year-round travel.

Graveled fire lanes are maintained to provide access for the Fire Bureau during fire season. These fire lanes also provide hiking and biking opportunities in the park. In general, fire lanes are the only trails where mountain bikes are allowed.

Guidelines:

- Maintain to be passable by 4-wheel drive, 1/4 ton pickups during the months of July, August, September and October.

Standards:

- Surface with either hard packed dirt or gravel.
- Minimum width - 3.7 meters (12 ft.).
- Clear trail to minimum height of 3.4 meters (11 ft.).

Equestrian Trails: Equestrian trails are located in the north management unit where they provide for a small but consistent number of horseback riders. Equestrians are allowed on the following roads and firelanes: FL 1, 7, 10, 12, 15, Newton, BPA Road, Springville, Saltzman, and Leif Erikson.

Guidelines:

- Maintain parking for horse trailers at Newton, BPA Road, Germantown at Leif Erikson, and Springville and Saltzman Roads at Skyline.
- Provide handicapped accessible transfer platform in at least one equestrian parking area.

Standards:

- Same as Fire Lanes. See above.

Bicycle Trails: Cyclists in Forest Park are almost exclusively mountain bikers. They are allowed on the paved roads, most of the fire lanes (see below) and on Leif Erikson Drive. One-way trail use is in effect on Holman Lane—uphill bike traffic only.

Guidelines:

- Allow cyclists on all roads and fire lanes with the following exceptions: FL 9 because of steepness; FL 8 because it is a short lane that connects directly to Wildwood Trail where bikes are not allowed; FL 5 because there is no good terminus at present—FL 2 and FL 7 due to user conflicts.

Standards:

- Trail surface - hard packed dirt or gravel
- Width - minimum 2.4 meters (8 ft.).
- Clear trail of vegetation to width of 3.7 meters (12 ft.) and height of 3.4 meters (11 ft.).
- Signs - Install "no bike" signs on the pedestrian trails where bike and pedestrian trail cross.

Pedestrian Trails: Forest Park has an extensive network of pedestrian trails for hikers, walkers and runners. There are two kinds of pedestrian trails—major foot trails which provide access through the park for large numbers of visitors and collector trails which connect surrounding neighborhoods to the major foot trails.

Guidelines - All Trail Construction:

- Construct trails on packed earth using positive drainage. On a trial basis, use subsurface drainage in areas of cuts to approximate natural drainage conditions. Harden trails with gravel, asphalt or other materials as needed to protect the resources and keep the trail to the desired width.
- Avoid placement of trails through power line corridors; vegetation regrowth in these areas causes increased maintenance to keep trails open.
- Route trails around conifer trees over 7.7 cm. (3 inches) in diameter and around deciduous trees over 31 cm. (12 in.).
- Align trails on the uphill side of significant vegetation to avoid cutting roots.
- Remove minimum amount of brush during initial clearing process.
- In general, construct trails in the South Management Unit with a 5 percent (or less) average grade to an 8 percent maximum grade and a cross slope of 3 percent.
- In general, construct trails in the Central Management Unit with an 8 percent (or less) average grade to a 12 percent maximum grade and a cross slope of 5 percent.
- In general, construct trails in the North Management Unit with a 12.5 percent (or less) average grade to a 20 percent maximum grade and a cross slope of 8 percent.

Major Foot Trails

Major foot trails are those which provide pedestrian access through large areas of the park and accommodate large numbers of users.

Standards:

- Trail width on ground is 1.8 meters (6 ft.); trail building process may result in initial clearing of up to 4.6 m. (15 ft.).
- Clear vegetation to width and height of 3 meters (10 ft.).
- Sign with major sign boards and maps at trail heads and as needed along trail.

Neighborhood Collector Trails

Neighborhood collector trails provide pedestrian access from local residential areas into the park where they join the major foot trails.

Guidelines :

- Provide local collector trails where there is enough use to justify the disturbance to the natural resources.

Standards:

- Trail width on ground is 0.6 meter (2 ft.).
- Trails are cleared to a height of 2.4 meters (8 ft.) and width of 1.8 meters (6 ft.).
- Sign with small signs at the entries to the trails.

Bridges/Culverts

Bridges and culverts are needed where trails and roads cross permanent or seasonal streams.

Guidelines:

- Use bridges over all streams that have water in them for at least 5 to 6 months of the year, since bridges cause less environmental damage than culverts.
- Use culverts for small, rain-fall created streams.

Standards:

- Install erosion control methods and stream bank protection for a minimum of 15 meters (50 ft.) back from the edge of the stream when bridges or culverts are installed.

ADA Accessibility

Wherever possible, Parks will provide trails and facilities that are accessible to the maximum number of park users. Because many parts of Forest Park have steep terrain, many areas are not accessible to persons with limited mobility. In and around trailheads and in other areas where opportunities are available, Parks will construct accessible trails and related support facilities.

Guidelines:

To the extent possible -

- Construct all new trailheads to be accessible.
- Construct facilities in the South Management Unit to meet "easier" accessibility standards.
- Construct facilities in the Central Management Unit to meet at least "moderate" accessibility standards.
- Construct facilities in the North Management Unit to meet at least "difficult" accessibility standards.

Standards:

- Consult the latest USDA Forest Service Design Guidelines for specific information on accessibility.

Trailheads

Trailheads are the staging areas for entry into the parks and should provide the basic facilities for an enjoyable visit to the park to all park users. At a minimum, they should provide parking and signing for the facilities to be found near that trailhead. Major park entrance trailheads should provide parking, signing, accessible restrooms, benches and drinking fountains.

Parking Facilities

Numerous parking lots are provided at trail heads around the park. Existing facilities are graveled. New, major parking facilities will be paved or graveled, depending on their particular conditions.

Guidelines:

- Keep parking lot size to the minimum necessary to accommodate recreational use.
- Install bumper logs to restrict enlargement of the lot over time and to organize vehicles in the lot.
- Provide stable, firm, slip-resistant parking lot surfaces

Standards:

- Provide one handicapped accessible parking spaces for 25 regular parking spaces.

Signage:

Signs are needed to give directions and provide information to park users.

Guidelines:

- Install signs appropriate to the trailhead. Provide major signs and more information at the large park entries; provide small unobtrusive signs at less developed parking areas.

Standards:

- Consult the National Center for Accessibility's Handbook of Universal Interpretation for specific information on design, location and sizes of signs.

Restrooms:

Restroom facilities, either permanent or seasonal, are needed at more park entries.

Guidelines:

- Provide accessible restrooms at new major park entry trailheads and other locations where appropriate.

Standards:

- Consult the latest USDA Forest Service Design Guidelines for specific information on accessibility standards.

Miscellaneous Trailhead Facilities:

Other facilities (e.g., drinking fountains, benches, trash receptacles and picnic facilities) are needed to make park use enjoyable.

Guidelines:

- Provide facilities that are accessible to as many park users as possible.

Standards:

- Consult the latest USDA Forest Service Design Guidelines for specific information on accessibility standards.

Park Signage

Although there are many signs in Forest Park, there is no systematic plan for their design and installation. In future, standards and guidelines will be developed. Sign types to be included are informational, interpretive, regulatory, and directional.

RT - RECREATION TRAIL PROJECTS

Goal:

Accommodate recreation trail activities while causing little or no impact on the park's natural resources.

Objectives:

Provide additional foot trail connections between neighborhoods and park; provide more recreational trails within the park; provide connections between park trails and other regional trail systems outside the park.

Recommendations:

Construct new, extend and improve existing foot, bike and horse trails where desirable; remove unused trails; provide connections to nearby regional trails; construct new connections between existing trails to extend usefulness of trails.

Discussion:

The primary recreation use of Forest Park is trail use of various kinds. Use is heavy in some areas now and demand is expected to increase in the future. Foot and bike trail use in particular

will increase. Most existing trails are in good condition but there is room for many improvements and additions to accommodate present and future levels of use. Regional trails exist or are being planned near the park. Additional connections and extensions will make the existing system more usable now and in the future.

Maintenance activities and minor improvements will continue as at present. These consist of drainage, grade and surfacing corrections which may impact small trail segments.

Alternatives:

If no action is taken, use will still continue to grow and trails will become crowded and overused. Recreational experiences will be less pleasant and natural resources will be impacted.

TRAIL CONNECTIONS

<u>RT - 1N</u>	<u>Improve Neighborhood Connector Trail in Linnton Area</u>
Location:	Between Linnton Trail and FL 10
Priority:	Medium
Cost Estimate:	\$7,500.
Recommendation:	Modify and improve existing neighborhood connector trail from bus turnaround at US 30 to FL 10; distance - 0.8 kilometer (1/2 mi.); width - 0.76 meters (30 in.); 1 bridge; no parking.
Discussion:	Neighborhood access exists, but needs improvement. There will be no appreciable impacts on natural resources.
<u>RT -2N</u>	<u>Provide Neighborhood Connector Trail in Linnton Area</u>
Location:	Water Bureau reservoir/pump station
Priority:	Low
Cost Estimate:	\$3,000.
Recommendation:	Construct new 0.75 meter (30 in.) connector trail between Newton Street and Water Bureau facility within the park. Trail will be pedestrian only, since grade averages about 8 percent. Some brush clearing will be needed.

Discussion: This foot trail connection would provide additional local access to the park for the Linnton neighborhood. Impacts to the natural resources will be minimal.

RT - 4C **Trail Connection between Leif Erikson and Wildwood Trails**

Location: Near Germantown Road between parking lots for Leif Erikson and Wildwood trails.

Priority: Medium

Cost Estimate: \$1,000.

Recommendation: Provide short foot trail connection so trail users can make a loop between the parking lots for the main trail parking lots on Germantown Road. Trail length is less than 0.8 kilometers (1/2 mi.).

Discussion: The two parking lots are located close to each other but there is no trail connection. There will be minor impacts to natural resources, mainly from shrub removal.

RT - 4S **Trail Connection between Cornell Road and Birch Trail**

Location: Cornell at Thompson Rd. to Birch Trail

Priority: Low

Cost Estimate: \$1,500.

Recommendation: Provide neighborhood trail connection from Cornell at Thompson Rd. to Birch Trail on 53rd - 0.75 meter (30 in.) wide; provide small sign; no parking needed.

Discussion: Neighborhood needs additional foot trail connection for local access. Impacts to natural resources will be minor. Parking at Cornell will be restricted to areas where cars can legally park.

RT - 5S **Trail Connection below Pittock Mansion**

Location: Below Pittock Mansion at Wildwood Trail

Priority: Low

Cost Estimate: \$500.

Recommendation: Improve neighborhood trail connector from the end of NW Valley Vista Terrace to Wildwood Trail at Mile 3 1/4.

Discussion: An old road grade exists that is used by the neighborhood. Some brush cutting will make it more usable. Impacts will be minor.

TRAIL EXTENSIONS

RT - 3N

Wildwood Trail Extension

Location: From north end Wildwood Trail to Newberry
Priority: High
Cost Estimate: \$40,000.

Recommendation: Construct a pedestrian-only trail from the north end of Wildwood Trail to Newberry Road for a total of 3 km. (2 mi.). The trail from BPA to FL 15 will be the standard width with 3 bridges; from FL 15 to Newberry it will be a neighborhood connector trail, 0.75 meter (30 in.) wide with 2 bridges. The trail entry at Newberry will be identified with bumper logs and a small sign.

Discussion: Wildwood Trail, a main north-south trail in the park, stops at the BPA Road in the North Unit of the park. A gravel lot with parking for 1 - 2 cars exists at the north end of the proposed new trail extension on Newberry Rd. This trail connection will provide access to people who live near the northern end of the park.

The north unit of the park has the least development and the best natural resources. Wildlife habitat protection is very important. It is anticipated that this trail will have little impact on that value. In order to protect wildlife and preserve the habitat, no additional trails will be built in this management unit.

REGIONAL TRAIL CONNECTIONS

RT - 5N

40 Mile Loop Trail Connection to Greenway Trail at Fred's Marina

Location: Area around Fred's Marina at north end of park.
(Note: This area is outside the park.)
Priority: Low
Cost Estimate: \$50,000.

Recommendation: Provide an additional local connection between Forest Park and the Willamette Greenway for the Linnton neighborhood. Preserve the area through Open Space zoning. Construct the trail on filled areas and elevated walkways; provide overlook opportunities to the wetlands.

Discussion: There is a need for an additional trail connection to the park from the Linnton neighborhood. This is a good habitat area and would provide a good connection to the Willamette Greenway Trail.

This area is also desirable for canoe/kayak access to the Willamette River along the Willamette Channel in the Linnton area.

Impacts to the natural resources will be minor since the trail will be built on filled lands. Further study and investigation are needed.

RT - 1C

40 Mile Loop Trail Connection to Greenway Trail at Doane Lake

Location: Doane Lake Area - east of park
(Note: This area is outside the park.)

Priority: Low

Cost Estimate: \$30,000.

Recommendation: Study alignment for a possible connection from the Maple Trail in Forest Park to the Willamette Greenway Trail through the Doane Lake area and a possible future connection across the Willamette River to the North Peninsula Crossing Trail and Smith and Bybee Lakes. Coordinate with other agencies and landowners.

Discussion: Doane Lake is landlocked. This is a good habitat and good wildlife viewing area but there is no access to the lake itself because rail lines surround the lake. Some access is possible northeast of the lake where there is also good habitat. Trails and access need to be built so that any impacts to resources are minor. Further study and investigation are needed.

RT - 2C **40 Mile Loop Trail Connect at St. Johns Bridge**

Location: Ridge Trail to St. Johns Bridge
Priority: Medium
Cost Estimate: \$15,000.

Recommendation: Construct a new pedestrian-only trail connection from St. Johns bridge to Ridge Trail which would connect to Leif Erikson and Wildwood trails. No additional facilities are needed. Cyclists would stay on Springville Road.

Discussion: There are no good trail connections from the park to 40 Mile Loop trails in this area. There would be little impacts to natural resources.

RT - 1S **40 Mile Loop Trail Connection/Overpass over Burnside Street**

Location: Wildwood Trail at Burnside Street
Priority: Medium
Cost Estimate: \$250,000.

Recommendation: Construct an overpass over Burnside Street to provide safe crossing for pedestrians and cyclists. Traffic on Burnside is already heavy. As traffic on Burnside increases, this project will become more urgent. (Note: this proposal has been made in many other plans.)

Discussion: Although Wildwood Trail is on private property in this area, realignment of the trail is not desirable. Since many attractions are on the south side of Burnside including the zoo, the Rose Garden and Hoyt Arboretum, a safe connection between these and attractions such as Pittock Mansion and the Audubon Society in the south part of Forest Park is desirable. There will be some impacts on the natural resources from construction of the bridge ends, especially on the north side. Restoration will be required. Much additional study is required.

BIKE TRAIL CONNECTIONS AND EXTENSIONS

RT - 3C

Bike Trail Connection from FL 5 to Leif Erikson

Location: Between end of FL 5 and Leif Erikson at Wildwood Trail
Priority: High
Cost Estimate: \$6,000.

Recommendation: Provide a bike trail connection between FL 5 and Leif Erikson where it crosses Wildwood. Trail length is approximately 1/5 kilometer (1/8 mi.)

Discussion: FL 5 is suitable for bike use but there is no place to go at end of road. Leif Erikson trail is nearby and the grade between the two trails is manageable. Bikes are allowed on Leif Erikson. There will be little impact to natural resources.

RT - 3S

Bike Trail Connection at US 30 and 30th

Location: US 30 at Roosevelt near White Shield Home to Leif Erikson trail.
Priority: High
Cost Estimate: \$75,000. (more if property needs to be acquired)

Recommendation: Investigate feasibility of constructing neighborhood bike trail connection to Leif Erikson above Thurman St. in area of White Shield Home. Investigate landslides/steepness; determine need for bridge.

Discussion: Because of heavy use and congestion at the Thurman St. entry, a new bike trail connection to Leif Erikson is needed. A new bike trail connection in this area could tie into the new trailhead proposed for development on US 30 at Roosevelt (see Project PI - 7S). Property and ownership issues will need to be explored. Further study is needed. Impacts to the natural resources will be determined later.

ACCESSIBLE TRAILS

RT - 2S **Balch Creek Interpretive Trail - ADA Accessible**

Location: Balch Creek at Lower Macleay Park
Priority: High
Cost Estimate: \$20,000.

Recommendation: Rework and pave existing trail to meet ADA standards and provide accessible interpretive trail along Balch Creek between Upper and Lower Macleay Parks. Provide creek overlook at terminus, about 0.8 kilometer (1/2 mi.) from Lower Macleay Park. Make trail as accessible as possible along Lower Macleay reach. Include trail signs and interpretive stops. Ensure that handicapped-accessible parking remains when Lower Macleay is redesigned as part of the BES water quality project. Add log bumpers along creek side to reduce impacts on creek. Coordinate with BES work at Lower Macleay.

Discussion: Existing trail along Balch Creek is flat but rough. There are few ADA accessible trails in the park. Parking exists at Lower Macleay. There will be few impacts to natural resources.

See PI - 5S, Thurman Street Trailhead-ADA Access to Park
for additional ADA accessible trails.

TRAIL REMOVALS

RT - 4N **Kwonesum Trail**

Location: Off Newton Street
Priority: High
Cost Estimate: \$250.

Recommendation: Remove evidence of unused trail; replant with native vegetation. Keep trail section from Wildwood Trail to Newton Street.

Discussion: Trail is unused and unneeded. Natural resources will be restored and improved by this project.

RT - 6S

Location:

Priority:

Cost Estimate:

Old Gas Line Trail

South of Alder Trail at Mile 1.2 on Leif Erikson

High

\$500.

Recommendation: Remove evidence of unused trail; plant cedar trees and place brush at trail entrance.

Discussion: Beginning of trail is used, but it has no terminus. Natural resources will be restored and improved.

TRAIL MAINTENANCE

RT - 5C

Location:

Priority:

Cost Estimate:

Leif Erikson Culvert Maintenance Study

Leif Erikson Drive - Entire length

High

\$20,000. (Study only)

Recommendation: Establish ownership and responsibility for culverts which are presently deteriorating. Hire engineer to study all culverts and prepare report on priorities, costs and time frame for replacement. Determine responsibility and funding source for repair and maintenance.

Discussion: Many culverts under Leif Erikson are blocked or not working. This is expected to have serious consequences for road stability and maintenance. Road ownership needs to be established to determine responsibility for future maintenance. There will be few impacts on the natural resources and an improvement in the life of the trail.

PI - PARK IMPROVEMENT PROJECTS

Goal:

Accommodate park use while causing little or no impacts on the park's natural resources.

Reduce conflicts between park users and local residents around park.

Objectives:

Provide public recreation facilities that will allow park users to access and use the park easily and enjoyably.

Provide facilities for park employees to perform their work efficiently and safely.

Provide facilities to educate park users about the history of the park and the natural resources in it.

Recommendations:

Improve existing parking areas by modifying their design and layout. Begin detailed study of two new entry points identified for acquisition and development as trailheads. Provide educational and interpretive information for the general public.

Discussion:

There is room within the park to accommodate additional future recreation use but existing parking areas and trailheads are inadequate to handle the increased use. These support facilities for major recreation trail uses are overused and need to be improved and expanded. Some are poorly designed and need to be modified.

The major trailhead area at Thurman Street for entry to Forest Park is seriously overused and other entry points with adequate parking and restrooms are needed. Preliminary site analysis has identified two possible entry sites to be studied further for suitability and impacts to natural resources.

Alternatives:

Without improvements to accommodate existing and future use, recreational and natural resources will deteriorate. Natural resources will be impacted by overuse, habitats will become less valuable and fewer species will populate the park. Conflicts will between park users and adjacent residents will increase reducing the enjoyment of the park recreational experience.

PARKING IMPROVEMENTS

PI - 1N

Improve Parking at US 30 and FL 12 at Harborton

Location: Bottom of FL 12 and Harborton at US 30/St. Helens Rd.

Priority: Low

Cost Estimate: \$3,000.

Recommendation: Work with PDOT to provide graveled parking lot for 6 cars on US 30/St. Helens at Harborton; add small signs to identify area for parking. Consider needs of cyclists using bicycle route on US 30. Sign parking lot for bike trail access.

Discussion: Parking area at this entry to Forest Park causes conflict with neighborhood traffic. There is no room for parking on Creston; some car clouting occurs there. There are no impacts to resources.

PI - 2N

Improve Parking at FL 15 and Skyline

Location: Top of FL 15 at Skyline Rd.

Priority: Low

Cost Estimate: \$2,000.

Recommendation: Formalize existing gravel parking area to provide parking for 4 cars and create small trailhead. Execute easement. Add small trail sign.

Discussion: On street parking adequate; no resource impacts.

PI - 3N

Improve Parking at BPA Road and Skyline Drive

Location: BPA Road - Parking Lot

Priority: Medium

Cost Estimate: \$6,000.

Recommendation: Re-grade and enlarge existing gravel lot from 2 - 3 cars to 6 cars and 2 trailers.

Discussion: Existing lot needs improvement. Area is owned by Parks. Impacts to resources will be minor.

PI - 4N**Improve Parking on Newton Road to Accommodate Horse Trailers**

Location: Newton Rd. near Skyline
Priority: Low
Cost Estimate: \$3,000.

Recommendation: Reconfigure and reduce size of existing gravel parking lot to provide parking for 3 - 4 trailers; Vacate Newton street (Parks to do). Replant with native vegetation.

Discussion: Most horse trail use occurs in the north unit. Additional parking for horse trailers is needed. Usefulness of parking lot will be improved. Reconfiguring lot and replanting with native vegetation will enhance natural resources.

PI - 1C**Improve Parking Lot at Germantown Road and Leif Erikson**

Location: Leif Erikson at Germantown and FL 9, 10
Priority: High
Cost Estimate: \$15,000.

Recommendation: Reconfigure existing graveled parking lot, move parking closer to Germantown Rd. and reduce size of lot. Provide room to park 3 trailers along Germantown Rd. Add informational sign board; relocate gate. Revegetate with native plants and restore area to forest.

Discussion: Parking area is poorly designed and difficult to monitor for security of cars. Although some fill may be needed and natural resources may be affected in the short term, the long term effect will be to improve both the natural resources and the recreation facilities.

PI - 2C**Improve Parking at Saltzman and FL 5**

Location: Saltzman and FL 5, just east of Skyline Blvd.
Priority: High
Cost Estimate: \$10,000 (parking lot construction and design for expanded maintenance area)

Recommendation: Determine ownership/status of Saltzman Road. Improve existing parking within right-of-way to

provide parking for 8 cars and access for cyclists.
Add informational sign board.

Develop plan for upgraded park maintenance area which will include a small pole barn and a larger storage area.

Discussion: Saltzman Road is closed to traffic and is good area for bikes because of flatter grades and the well-graded road surface of packed gravel. Saltzman provides a good east-west connection through park. Parking lot improvements will cause few impacts to the natural resources. Additional study is needed to determine the impacts from upgrading the maintenance area.

PI - 2S **Improve Parking at Upper Macleay near Audubon Society**

Location: Upper Macleay near the Audubon Society facility on Cornell Road

Priority: Medium

Cost Estimate: \$50,000

Recommendation: Provide major parking lot improvements at existing parking lot east of Audubon facilities. Reconfigure parking to provide for 20 cars and pave; develop lighted trail from parking lot to Audubon. Work with Audubon to gate parking lot at night. Improve trail connections between Forest Park and Audubon.

Provide drinking fountain and seasonal restrooms. Convert existing drain field to handle gray water only. Remove existing restrooms and replace with seasonal, composting toilets.

Discussion: Existing parking situation is poor, area is congested. Audubon needs parking for evening events, park needs it during the day. Existing restrooms and drain field are in poor shape. There will be few impacts to natural resources.

TRAILHEADS - CONSTRUCTION AND IMPROVEMENTS

PI - 4S

Thurman St. Trailhead Improvements

Location: West end of Thurman Street at Leif Erikson Dr.

Priority: High

Cost Estimate: Not known until agreement is reached on improvements.

Recommendation: Work with neighborhood as requested to reconsider solutions from 1993 Citizen's Advisory Committee. Adopt the recommended solutions if desirable, in conjunction with other proposals for new entries, in order to reduce congestion and neighborhood problems at Thurman Street.

Discussion: Existing access to Leif Erikson at Thurman is very congested and controversial for neighborhood. A Citizens Advisory Committee was convened in 1993 to address this problem. Although a number of suggestions were made to alleviate the problems there, no final solutions were adopted.

PI - 5S

Thurman Street Trailhead - ADA Access to Park

Location: Leif Erikson Trail at Thurman Street

Priority: Medium

Cost Estimate: \$120,000

Recommendation: Develop entry area at Thurman to be handicapped-accessible. Re-grade Leif Erikson and pave to width of 2.4 m. (8 ft.) to viewpoint area at Mile 2 1/4. Provide information board with current rules and notices at Thurman. Develop area at Mile 2 1/4 as terminus; provide picnic table. Thin trees as needed to maintain the view at terminus. (See PI - 7S and PI - 8S for descriptions of new park entries.)

Discussion: Although existing access to Leif Erikson at Thurman is very congested, it is a good area in which to provide handicapped access. Leif Erikson Trail is reasonably flat in this area and a section of accessible trail could be provided. A good viewpoint exists at Mile 2 1/4; gradient on trail is within ADA standards. Even if other entries are developed, this use should remain at Thurman St.

Minor impacts to natural resources will occur due to tree thinning to maintain the view at Mile 2 1/4.

PI - 6S

Lower Macleay Park Trailhead - BES Water Quality Project

Location: Balch Creek at Lower Macleay Park
Priority: High
Cost Estimate: Additional study needed; work with BES.

Recommendation: Work with BES on redesign of whole area from Lower Macleay Park down to US 30/St. Helens Rd. (see Project PI-7S) to provide improved park access to Forest Park and improved facilities at Lower Macleay. If possible, include day-lighting a portion of Balch Creek between Lower Macleay and St. Helens Road to provide additional habitat and educational interest in that area. Remove existing playground and artwork. Maintain vehicular access to Lower Macleay Park in order to provide handicapped parking. Relocate maintenance facilities to US 30/St. Helens area.

Discussion: BES presently maintains a trash rack at the east end of Balch Creek where it goes into a culvert for the remainder of its journey to the Willamette. The park in that area is fairly flat with parking for about 5 cars, a maintenance building and restrooms, an old weathered wood play structure, and some abstract art work.

BES is proposing major work at the lower end of the creek consisting of excavating a wetland detention area at Lower Macleay and redesigning the park's facilities.

This area provides an entry to the heavily used south unit. This project should be considered in conjunction with PI-7S. Natural resources will be impacted in the short term but improved in the long term. Additional study is needed to determine impacts and mitigation.

PI - 7S

Construct New Trailhead at US 30 and 30th

Location: US 30/St. Helens Rd. at 30th and Roosevelt
Priority: High
Cost Estimate: \$350,000

Recommendation: Study feasibility of acquiring property for major new entry with parking, restrooms and drinking fountain at US 30. Study feasibility of developing new maintenance facility at that location. This development would tie to the BES water quality Project PI - 6S. Study use of shuttle bus service from new parking area to other park access points. Service could be for small fee with busses capable of carrying bicycles.

Discussion: The heaviest recreational use occurs in the south unit of the park. Unfortunately, access to park in this area is very congested and difficult. This area is presently outside the park in a mixed residential/ industrial area. Proper facilities and proper trail location and construction will direct the recreational uses to appropriate locations. Street closures between NW Wilson and NW St. Helens Road at NW 29th and NW 30th will be maintained.

PI - 8S

Construct New Park Trailhead on US 30 at Yeon

Location: US 30/St. Helens Rd. at Yeon and Kittridge St.
Priority: High
Cost Estimate: \$250,000

Recommendation: Negotiate purchase or use of land on US 30/ St. Helens at intersection of Yeon and Kittridge. Develop regional trailhead with parking for 20 cars, drinking fountain, and seasonal restrooms. Build multi-use trail up to Leif Erikson and Fire Lane 1 - to handicap standards, if possible. Pedestrians will continue on Leif Erikson and cyclists will continue on Fire Lane 1.

Arrange for possible use of old fire station or construct new building for use by organized events—runs, walks, bike events, etc. Study use of shuttle bus service from new parking area to other park access points. Service could be for small fee with busses capable of carrying bicycles.

Discussion: See discussion on PI - 7S.

MISCELLANEOUS PROJECTS

PI - 1S

53rd Drive Closure - on Nightly Basis

Location: 53rd Drive between Thompson and Cornell
Priority: High
Cost Estimate: \$10,000 for gates and minor fill.

Recommendation: Work with the neighborhood on the closure of 53rd Drive. Coordinate this issue with the use of FL 1. Provide a comprehensive look at traffic problems in the area.

The minimum recommendation is to maintain access to homes while controlling through traffic by gating the north end of 53rd at Mile 9 1/4 of Wildwood Trail and gating the Birch Trail parking lot. 53rd Drive could then be closed to vehicular traffic at night between those areas.

If this closure becomes permanent in the future, provide a turn-around for large vehicles and access to the park for non-athletic visitors.

Discussion: 53rd Drive is sparsely populated with very few homes at each end and none in the center area of drive. The area is attractive to teens and others for late-night parties and other inappropriate uses that cause problems for residents. Nightly closure of 53rd will reduce and possibly eliminate these problems while maintaining access. Minor amounts of fill would be required. There are no impacts to the natural resources.

PI - 3S

Improve Access to Community Garden

Location: Community Garden Area on south side of Cornell
Priority: Low
Cost Estimate: \$5,000

Recommendation: Re-grade and re-pave driveway. Make garden areas handicapped-accessible. Add raised beds.

Discussion: Driveway is steep and poorly constructed; gardens are not ADA accessible. Project will provide access to more facilities for all park users. There are no impacts to resources.

PI - 9S

Modify Stone House

Location:

Stone House on Balch Creek - 1.3 kilometers (0.8 mi.) from Lower Macleay Park

Priority:

Medium

Cost Estimate:

\$10,000 (study and modifications)

Recommendation:

Work with neighborhood and Planning Bureau to modify Stone House; reduce adverse uses by opening up the site and removing hiding places; reuse any stone on nearby trail work and in other areas of park. If this fails to alleviate problems, pursue demolition option.

Discussion:

Undesirable activity occurs in this remote area which is difficult to monitor. Although the structure is listed on Inventory of Historic Places, it is not a Landmark. It can be modified or demolished after working with Planning Bureau. Impacts to resources will be minor.

PI - 1 All

Provide Seasonal Restrooms

Location:

Various locations - incl. Leif Erikson/Wild Cherry.

Priority:

High

Cost Estimate:

\$500/site

Recommendation:

Continue this on-going activity. Install portable restrooms at various locations as needed; remove during months of low use.

Discussion:

No restroom facilities exist in the interior of the park and use of the park is frequently heavy. Existing roads and fire lanes will be used to install and remove the portable restrooms. Natural resources will not be affected by this project.

PI - 2 All

Animal Waste Disposal

Location:

Various locations along trails.

Priority:

High

Cost Estimate:

\$30/station

Recommendation:

Investigate methods of assisting park users in proper disposal of dog and horse waste, including installation of composting bins for waste materials and education about effects of proper disposal.

Discussion: Dog waste is an increasing problem along the trails in the South Management Unit and horse waste is a concern in the North Unit. Park users need to be encouraged to properly dispose of these materials. Positive benefits will accrue to the environment and to the park users.

S - SIGNING PROJECTS

Goal:
Improve park users recreational and educational experiences.

Objectives:
Provide clear directional signs for entry into the park and for finding facilities within the park.

Provide interpretive and educational signing to explain the natural resources of the park, including the need for protection, and the need for certain management activities.

Provide trail signs that indicate type of trail, length and degree of difficulty.

Recommendations:
Hire a graphic designer or sign expert to develop a signing system to identify the kinds of recreation trails, lengths and degree of difficulty of each type of trail. Post signs at all trail intersections as well as at trailheads and other entry points. Provide interpretive information where appropriate as well as general park information at trailheads and major entry points. Natural resources will not be affected by signing projects and may be improved by educating the public about their values.

Discussion:
Because of the extensive trail system in Forest Park, signing of the trails is particularly important. At present, signing exists on many trails, but there is no comprehensive signing plan. Information on the type of trail, the name of the trail and its length is needed. Interpretive information along certain foot trails would make the experience of being in the park more meaningful. Additional sign boards should also be provided at trailheads to inform visitors of rules and regulations in the park, as well as points of particular interest.

Alternatives:

Not installing directional, interpretive and educational signing will reduce the pleasure and enjoyment of a visit to the park. It will eventually contribute to misuse of the park through lack of knowledge of rules and regulations. A reduced understanding of the natural resources will contribute to their degradation.

TRAIL IDENTIFICATION

S - 1 All**Trail Identification System**

Location:

All trails

Priority:

High

Cost Estimate:

\$30,000 (includes analysis and design)

Recommendation:

Color code all trails for three degrees of difficulty (easy, moderate and difficult). Sign all trails for length and destination.

Discussion:

Trail users do not know length and degree of difficulty for the trails as they start out. This would make using the trails easier and more pleasant and allow users to have the kind of recreational experience most enjoyable for them.

S - 1C**Bike Trail/Fire Lane Signing**

Location:

Intersections of fire lanes/bike trails with foot trails.

Priority:

High

Cost Estimate:

\$500.

Recommendation:

Install directional signs at all areas where bike trails cross foot trails. If necessary, add gates or barricades to keep cyclists off foot trails.

Discussion:

Bikes are only allowed on certain fire lanes. Occasionally, cyclists get onto foot trails where the trails cross the fire lanes. This can be dangerous for walkers, as well as for cyclists.

INTERPRETIVE SIGNS

S - 2 All**Interpretive Signs**

Locations:

All areas of park.

Priority:

Medium

Cost Estimate:

\$5,000.

Recommendation: Examine the park for appropriate areas for interpretation. Identify sign types, locations and appropriate information. Contract with graphic designer for sign design.

Discussion: Forest Park is an ideal area for providing interpretive signs to explain natural features and processes, as well as management activities in the park. Few signs now exist.

S - 2S **Interpretive Signs along Balch Cr. Trail**
Location: From Lower Macleay to Audubon Society.
Priority: Medium
Cost Estimate: \$1,000.

Recommendation: Install signs along creek trail from Lower Macleay to Audubon House in Upper Macleay Park. Signs need to be accessible to all, especially along the ADA accessible portion of trail.

Discussion: Area is heavily used and offers excellent opportunities for interpretation of creek and surrounding park area.

SAFETY SIGNS

S - 1N **Traffic Signs on Germantown Road**
Location: Intersection of Wildwood trail and Germantown Road
Priority: High
Cost Estimate: \$200.

Recommendation: Install 'pedestrian crossing' sign on Germantown.

Discussion: Road crossing is dangerous for trail users because road curves and traffic moves fast here. Extra caution is needed by drivers and pedestrians.

INFORMATION SIGNS

S - 1S **Information Sign at Pittock Mansion**
Location: Wildwood crossing at Pittock Mansion parking
Priority: Medium
Cost Estimate: \$2,000.

Recommendation: Provide large sign board for trail information/ map distribution at trailhead/ parking lot at Pittock Mansion. Incorporate information on other area tourist attractions on to board.

Discussion: Trail parking is provided at Pittock Mansion but there are no signs about trails or other facilities and how to reach them.

SV - STREET VACATION PROJECTS

Goal:

Assure that Parks has control over non-public streets and roads within the park.

Objective:

Clarify any property ownership questions by ascertaining that Parks has clear title to non-public streets within the park.

Recommendations:

Provide clear title to all unused streets in Forest Park. Divide the street vacation projects into two general groups - those where no conflict is foreseen and those that may need additional research and preliminary preparation. Hire an intern on these projects.

Discussion:

Before Forest Park existed, many streets and residential developments were platted in that area. Most were never built but the plats still exist. In some cases they may provide access to inholdings which may need to be maintained.

Natural resources will be improved by reducing inappropriate access or remain unchanged by these projects.

Alternatives:

No action in this area would continue the present lack of certainty on property ownership and the ability to properly manage park recreational and natural resources.

UNCONTESTED PROJECTS

SV - 1 All

Platted Roads in Interior of Park

Location: Numerous locations in park.
Priority: High
Cost Estimate: \$5,000. (staff work and filing fees)

Recommendation: Vacate all the roads that do not provide access to inholdings in the park.

Discussion: There are dozens of roads that are platted on property maps for developments that were never built. Most do not serve any inholdings and their vacation would not be contested.

PROJECTS REQUIRING RESEARCH

SV - 2 All **Platted Roads in Interior of Park**

Location: Numerous locations in park.
Priority: High
Cost Estimate: \$8,000. (staff work and filing fees)

Recommendation: Pursue acquisition of the inholdings within the park and vacate streets that serve them.

Discussion: There are dozens of roads that are platted but were never built. Some are used as access to properties within the park. Acquiring these unused rights-of-way will clarify Parks ownership of many areas of the park.

SV - 1S **Alexandria Street**

Location: Near the White Shield Home
Priority: High
Cost Estimate: \$2,000. (staff work and filing fees)

Recommendation: Vacate Alexandria Street near the White Shield Home. Install gate near driveway/entry which will still allow access to Home. Share gate with Water Bureau for park access.

Discussion: Area is difficult to monitor for unwanted uses. Reducing the area accessible to vehicles will improve security and reduce problems.

SV - 2S/C **Leif Erikson**

Location: From Thurman St. to terminus at Germantown
Priority: High
Cost Estimate: \$4,000. (staff work and filing fees)

Recommendation: Determine ownership of Leif Erikson. Turn over to Parks for management and control since it is all within the park boundaries.

Discussion: Road has been closed to public vehicular traffic for many years and effectively under Parks control.

SV - 1C **NW Springville Road through park**
Location: NW Springville Road in interior of park
Priority: High
Cost Estimate: \$3,000. (staff work and filing fees)

Recommendation: Acquire title to Springville to maintain closure and ensure that traffic is not allowed in park.

Discussion: Springville Road is gated to vehicular traffic at present, except for park and emergency vehicles.

SV - 2C **NW Saltzman Road through park**
Location: NW Saltzman Road in interior of park
Priority: High
Cost Estimate: \$3,000. (staff work and filing fees)

Recommendation: Acquire title to Saltzman Rd. to maintain closure and keep traffic out of the park in future.

Discussion: Saltzman Road is gated to vehicular traffic at present, except for park and emergency vehicles.

SV - 1N **Newton Road**
Location: East-west connection in north unit of park
Priority: High
Cost Estimate: \$3,000. (staff work and filing fees)

Recommendation: Acquire title to Newton Rd. from point of last existing driveway to ensure that traffic is not allowed in park in future.

Discussion: Most of Newton Road is within the park boundaries and has been closed to public vehicular traffic for many years. There are no known impacts.

COP - CITY OF PORTLAND - OTHER BUREAUS

Goal:

Accommodate City of Portland (COP) Bureau projects if they do not impact Park natural resources.

Objectives:

Protect park natural resources.

Provide timely review of all COP Bureau projects for impacts on recreation and natural resources.

Recommendations:

Allow bureaus and agencies to use the park for facilities that benefit the general populace, if park natural resources are protected; in general, allow reconstruction of existing facilities; encourage use of other, more appropriate areas where resources will be adversely impacted.

Insist on detailed information on any proposed changes to facilities in the park. Allow these kinds of uses in the park after impact and alternative analyses are performed, only if no other suitable alternatives exist. Insist on stringent mitigation and revegetation in disturbed sites.

Discussion:

The Water Bureau, Fire Bureau and the Bureau of Environmental Services often have an interest in siting and expanding their facilities in and around Forest Park. Some of these projects will have little impact on the park, while others will have a major impact on the park and its resources. All need to be examined carefully.

Alternatives:

Not allowing various bureaus to construct facilities within the park may increase construction costs for those facilities, but it will also degrade park natural resources.

WATER BUREAU PROJECTS

WB - 1

Saltzman Tank Replacement

Location: At southeast end of Saltzman Road, above Hwy. 30

Schedule: To be completed in 1994-95

Proposal: Demolish existing tank and replace with new tank.

Concerns: Access to tank; impacts to vegetation and natural resources. Parks needs detailed information before further comments are made.

WB - 2 **Springville Main Replacement**

Location: Along Springville Road through center of park.

Schedule: To be completed in 1998-99

Proposal: Replace the 0.3 meter (12 in.) main line from the Springville Pump Station at the east end of Springville Road to its terminus at Skyline Blvd.

Concerns: Springville is a major access road into and through the park. Construction activities will affect resources and recreation activities in the park. Parks needs detailed information before further comments are made.

WB - 3 **Springville Tank Replacement**

Location: At east end of Springville Road

Schedule: Not scheduled at this time.

Proposal: Construct a new tank at the east end of Springville Road above the residential area.

Concerns: Construction activities will impact natural resources and recreation activities in the park. Parks needs detailed information before further comments are made.

WB - 4 **Mayfair Pump Main/Access Road**

Location: Near intersection of Leif Erikson and Thurman Street

Schedule: Not scheduled at this time.

Proposal: Construction of access road and installation of main line.

Concerns: Main line alignment appears to be in a ravine. This could cause unnecessary erosion and difficulty in revegetating the construction area. Construction activities will impact natural resources and recreation activities in the park. Parks needs detailed information before further comments are made.

WB - 5 **Mayfair Pump Station**

Location: Not precisely located at this time, may be within park.

Schedule: Not scheduled at this time.

Proposal: Construct new pump station.

Concerns: Construction activities will affect natural resources and recreation activities in the park. Parks needs detailed information before further comments are made.

BES PROJECTS

BES - 1 **Balch Creek Water Quality Improvements**

Location: All along Balch Creek

Schedule: Various portions are under construction or in preliminary design.

Proposal: The Bureau of Environmental Services and Parks and Recreation are cooperatively undertaking a flood control, water quality and habitat improvement project in Lower Macleay Park. In addition to flood control and water quality benefits, the project will improve Park access, enhance wildlife and fish habitats through wetland creation, and provide educational opportunities. The project will involve regrading and landscaping (with native plants) about one to two acres of Lower Macleay Park to create ponded wetland habitat, fish pools, conjunctive use detention space, and handicap accessible observation areas.

Project design will include wetland creation, stream and riparian restoration, hydraulic control structures, improved access through better trails and parking, and the use of existing high-value park amenities. The project objectives also include enhancing the visual appeal of the park by mitigating the visual effects of the existing in-stream debris rack and culvert trash rack. Some of the Parks Bureau alternatives to be explored include the extension to the north of the open channel portion of Balch Creek, providing detention north of the park closer to Highway 30, establishing parking and access from the Columbia River Hwy, and combining Macleay Park with Leif Erickson trail access. The project design will consist of both short and long term phases to allow for funding availability.

Concerns: Parks will monitor proposals for the various portions of work to ensure that natural resources are not adversely affected and that recreation opportunities are improved. (See Project PI - 6S.)

Management Projects - All Management Units

Goal:

Protect park recreational and natural resources through programs and policies.

Objectives:

Provide improved park management and protection.

Provide direction on appropriate use of the park.

Develop a strong enforcement program, if needed, to protect park users and park resources.

Recommendations:

Encourage volunteer foot patrols on pedestrian trails and bike patrols on bike trails to provide more security for park users. Rewrite portions of the City Code to allow easier enforcement of park rules. Expand park information and natural resource interpretation to be more accessible to all park visitors.

Discussion:

Recreational use of the park is affected by things other than physical facilities and the natural environmental of the park. Rules, regulations and their enforcement also have an impact on the visitors enjoyment of the park. Interpretation and education programs also improve the visitor's interest in the park and its resources. These programs will need additional staff to manage the park and its future use.

Alternatives:

Failure to address issues of security for park users and enforcement of park rules and regulations will reduce the ability of park personnel to manage park users and educate them on appropriate use of the park.

PARK MANAGEMENT

M - 1

Create and Staff Park Ranger Position

Location:

All units

Priority:

High

Cost Estimate:

\$50,000/year

Recommendation:

Create and staff a Park Ranger position to deal exclusively with Forest Park issues and management, in cooperation with other park staff.

The Ranger would coordinate interpretive programs, work with volunteers, discuss and resolve issues with neighborhood groups and provide other services as necessary. The ranger would be trained in recreation management with some natural resource background.

Discussion: This position would allow for more and better contacts with the public who use the park and the public who live around the park. Communication and problem resolution abilities would be enhanced. Park management would be improved.

M - 2 **Perform Periodic Recreational Surveys**

Location: All units
Priority: High
Cost Estimate: \$20,000/survey

Recommendation: Work with statisticians and others knowledgeable in user surveys to obtain baseline use statistics for the park showing numbers of users, time of use and kind of use. Develop acceptable levels of use for each management unit. Conduct periodic surveys to monitor use and adjust management units accordingly.

Discussion: In order to properly manage park resources and recreational use, it is necessary to know who the park users are and when they are using the park. Park managers have a good general idea of that information but specific information will enable them to make better decisions.

This information will be used in conjunction with wildlife monitoring information to determine if certain areas need to be closed to park use at certain times of the year.

M - 3 **Coordinate w/Other Resource Agencies**

Location: All units
Priority: High
Cost Estimate: Staff time

Recommendation: Work with all other state and local resource regulatory agencies whose decisions affect Forest Park. Establish contacts with county and

municipal staff members who deal with issues outside of the park boundaries that will affect recreational use of the park and natural resources in the park.

Discussion: Developments in and around the park affect the park through increased runoff, traffic, noise and disturbance to the area. These impacts can be mitigated if addressed early on.

PARK SAFETY

M - 4 Work with Police Bureau

Location: All units
Priority: High
Cost Estimate: Staff time

Recommendation: Work with local Police officers and neighborhoods to deal with homeless/transient camping, drug use and other matters of concern.

Discussion: Parks and local neighborhoods have a good working relationship with local police officers. This should be continued in order to deal with those problems that are beyond the responsibility of park personnel.

M - 5 Work with Fire Bureau

Location: South and Central Units
Priority: High
Cost Estimate: Staff time

Recommendation: Continue to work with the Fire Bureau on their training exercises in Forest Park.

Discussion: The Fire Bureau conducts annual training exercises in Forest Park to maintain expertise in fighting fires in natural areas. Impacts are minimal and coordinated with park staff.

M - 6 Encourage and Facilitate Volunteer Foot and Bike Patrols

Location: All units
Priority: High
Cost Estimate: Part of Volunteer Coordinator duties

Recommendation: Work with local interested citizens and park users to patrol park trails on a regular basis and to report any problems to the proper authorities; act as guides and educators in the park.

Discussion: Because of budget constraints and lack of staff time, use interested, knowledgeable persons to work with public to assist in recreational surveys, interpret park resources, to be available to act as 'eyes and ears' to staff and perform other tasks. A Volunteer Coordinator is needed to make this kind of program successful.

Many areas of Forest Park are somewhat isolated and not seen on a regular basis by park personnel. Use of volunteers would help identify problems and also give park users an added sense of security while using the park.

M - 7

Rewrite Portions of City Code

Location: All units
Priority: High
Cost Estimate: Staff time

Recommendation: Rewrite applicable portions of the City Code to allow for better enforcement of Forest Park use and management regulations. Develop progressive citation system to include confiscation of property for some offenses.

Discussion: At present certain portions of the code are difficult to enforce.

M - 8

Domestic Animals: Enforce Existing Ordinances Dealing with Domestic Animals in the Park. Consider Additional Regulations and Programs

Location: All management units
Priority: High
Cost Estimate: Staff time

Recommendation: Enforce the dog leash law in all areas of the park.

Staff an ad hoc advisory committee to examine whether additional regulations or programs are

needed for domestic animals and develop a source of funding for enforcement.

Discussion:

Many park users believe that walking in the park with their dogs provides them with personal security, provides dogs with needed exercise, and does not significantly affect wildlife. Parks staff believe that many park users who walk in the park with their dogs do not obey the existing leash law which requires dogs in parks to be on leash no longer than 8 feet at all times. No surveys have been conducted, but parks staff estimate that the percentage of dogs kept on leash is less than 50%. Parks staff and park visitors have witnessed multiple incidents where unleashed dogs disturb wildlife. Parks and Animal Control staff have received multiple complaints about unleashed dogs in the park bothering or biting people and other (leashed) dogs.

At the present time, the leash law is enforced primarily under a Multnomah County code that was first adopted by the City of Portland in 1978. The current County Code authorizes the County's Animal Control Officers to issue a "notice of infraction" ticket to typical leash law offenders using the following schedule: \$25 for first offense, \$50 for second offense, \$150 for third offense within a one-year period. The notice of infraction may be appealed within 20 days through an administrative hearings officer. The City of Portland Code (20.12.140) also regulates animals in parks, but is generally not utilized. The City Code is important for Forest Park because it does not allow any (domestic) animal to enter any lake, pond, fountain, or stream and provides for the impoundment of offending animals. Presumably this City code is applicable whether or not the animal is on leash, but is unenforceable through a notice of infraction.

Parks staff believe that user conflicts are greatest in the South Unit where levels of use are high. Staff believe that conflicts with wildlife are greatest along Balch Creek in the South Unit and in the

North Unit where levels of use are relatively low and interior forest habitat quality is highest.

Substantial evidence has not been collected to support a contention that leashed dogs walked on trails disturb wildlife. Domestic animal regulations applied by other natural resource agencies (i.e., Metro, US Forest Service, US National Parks) appear to be inconsistent. Parks staff believe that the issue should be studied further and ongoing input from the public be considered regarding additional domestic animal regulations or programs.

Summary - Most Important Projects

These projects are vital to the continued success of Forest Park's management. Additional funding will be needed to address them. The following projects are important in all areas of the park. Projects specific to certain management units are also listed.

All Management Units

- Perform a Recreational Use Survey.
- Establish a program to periodically monitor natural resources and recreation use impacts.
- Acquire land for and develop a major new park trailhead/entry.
- Establish a program to fund the acquisition of important in-holdings and other properties.
- Create and staff a Park Ranger position.
- Establish an educational and interpretive program that addresses how park users can protect park resources while continuing to use and enjoy the park.
- Increase rate of ivy removal in all management units, with special attention to the North Unit.

South Management Unit

- Work with BES on protection and enhancement of Balch Creek.

Central Management Unit

- Begin the natural resource enhancement programs.
- Build the bike trail connections that will broaden the recreation opportunities in that unit.

North Management Unit

- Build the Wildwood Trail extension.
- Protect the watershed, headwater and wildlife areas.

Recommendations for Future Work

Although this NRMP is a thorough and comprehensive planning document, there were many tasks that could not be completed because of lack of funds and time. These projects are necessary to the continued success of park management and additional funding is needed to address them.

The most important of these are as follows:

- Perform a Recreational Use Survey
- Establish a program to monitor natural resources
- Establish a site for and develop a major new park trailhead/entry.
- Establish a program to acquire important in-holdings and other properties.
- Establish an educational and interpretive program that addresses how to protect park resources and how to use and enjoy the park.

CHAPTER 8. IMPLEMENTATION PROCEDURES

Introduction

Procedures

Project Review Table

CHAPTER 8. IMPLEMENTATION PROCEDURES

Introduction

This chapter presents procedural requirements for projects identified in Chapter 7 and for other future park improvements or resource management actions. These procedures apply to all publicly-owned park land located within the Forest Park NRMP boundary as shown on the Official Zoning Maps. It is intended that these procedures shall also apply to parcels of land that are acquired by the City and added to Forest Park.

Numerous NRMP projects, identified under Uses Allowed in the following section, receive approval through adoption of this NRMP and require no further review. Other projects, found under Uses Needing Further Evaluation, require a Type II Environmental Review procedure. Exceptions to the plan require a Type III Environmental Review procedure. New criteria apply to both the Type II and Type III procedures. Modifications to Plan Vision, Goals or Strategies require a legislative procedure as provided in 33.740.

Procedures

A. Actions in Conformance with the Plan

1. Uses Allowed.

No land use review is required for projects that support Plan goals and strategies and are specifically identified and evaluated in the Management Plan. The following projects listed in the plan are allowed uses:

- All RP projects (resource protection)
- All RE projects (resource enhancement)
- RT-1N, RT-2N, RT-4C, RT-4S, RT-5S (trail connections)
- RT-3C (bike trail)
- RT-2S (Balch ADA/Interpretive trail)
- RT-4N, RT-6S (trail removals)
- RT-5C (trail maintenance)
- PI-1N, PI-2N, PI-4N, PI-2S, PI-5S (parking, trailheads)
- PI-1S, PI-3S, PI-9S, PI-1All, PI-2All (miscellaneous projects)
- S-1All, S-1C, S-1N, S-1S, S-2S (specific sign projects)
- S-2All (interpretive signs)
- All SV projects (street vacation)

Resource monitoring projects and modification of trailhead locations, trail alignments, and interpretive signage for any projects identified above are allowed if the following standards are met:

1. No woody vegetation is removed or disturbed during construction.
2. Signs are within 10 feet of edge of the trail.
3. Wet weather erosion control standards of the Bureau of Environmental Services are met.

2. Uses Needing Further Evaluation.

Certain projects identified in the Plan, and certain unanticipated uses, require additional review before a determination can be made as to conformance with Plan goals and strategies. These projects and uses are processed as minor amendments to the plan and are reviewed through a Type II environmental review procedure.

The following unanticipated projects and modifications to identified Plan projects are minor amendments:

1. Resource enhancement projects not identified as allowed uses.
2. Expansions of less than 50 percent of site area for projects identified as allowed uses.
3. Modifications to design or location of Plan projects identified as allowed uses.
4. New facilities requiring above or below ground structures, which cumulatively disturb less than 10,000 sq. ft. of soil or vegetation.
5. Creation of new trails or closure of existing trails.

The following projects need more detailed evaluation before they can be approved. They are also considered minor amendments.

RT-3N (Wildwood Trail extension)
RT-3S (bike trails)
RT-5N, RT-1C, RT-2C, RT-1S (40 Mile Loop connections, improvements)
PI-1C, PI-2C, PI-3N, PI-4S, PI-7S, PI-8S (parking, trailhead improvements)
PI-6S (Lower Macleay trailhead and park facilities)
BES-1 (Balch Creek water quality project)

Environmental reviews for minor amendments are evaluated using the following approval criteria:

Approval Criteria for Minor Amendments: The amendment will be approved if:

- A. There is a demonstrated need for the proposal.
- B. The proposed action is consistent with Forest Park Natural Resources Management Plan Goals and Strategies.
- C. Alternative locations and design modifications were evaluated to show that the proposal has the least significant detrimental environmental impact of the practicable alternatives.
- D. A construction management plan and a mitigation plan will minimize impacts on resource and restore adjacent disturbed areas.

B. Exceptions to the Plan

All other projects are processed as exceptions to the Plan.

Exceptions

- 1. Expansions of 50 percent or more of site area for projects identified as allowed uses.
- 2. New public or park facilities requiring above or below ground structures, which cumulatively disturb 10,000 sq. ft. or more of soil or vegetation.
- 3. Changes to Management Unit boundaries.
- 4. All other projects or Plan modifications except changes to Plan Vision, Goals or Strategies.

Procedure: Exceptions to the Plan are reviewed through a Type III environmental review procedure.

Environmental reviews for exceptions will be approved if the following approval criteria are met.

Approval Criteria for Exceptions:

- A. The proposal meets all the criteria for minor amendments.
- B. The proposal is a park-related development, or no alternative locations exist outside of Forest Park for the proposal.
- C. There are no practicable alternative locations within Forest Park suitable for the use in which the development will have less adverse impact on resource values.
- D. Any long-term adverse impacts of the proposed action on resource values are fully mitigated within the Management Unit.
- E. The proposal is consistent with the purpose of the Environmental Zones.

C. Plan Policy Modifications

Modifications to Plan Vision, Goals or Strategies are processed using a legislative procedure, as provided in Chapter 33.740, Legislative Procedure, of the Zoning Code.

FOREST PARK NRMP PROJECTS REVIEW STATUS

Project Type and Description	Review Status
<i>Natural Resource Protection Projects</i>	
RP - 1All page 128 Acquisition of In-Holdings	Allowed as written
RP - 2S page 130 Protection of Balch Creek Watershed	Allowed as written
RP - 3All page 133 Acquisition and Protection of Willamette River Linkages	Allowed as written
RP - 4All page 135 Acquisition and Protection of Headwater Areas	Allowed as written
RP - 5All page 136 Acquisition and Protection of Wildlife Corridor	Allowed as written
RP - 6All page 138 Acquisition for Development of Park Access	Allowed as written

<i>Natural Resource Enhancement Projects</i>	
RE - 1C/N page 140 Maple Thinning/Conifer Release	Allowed as written
RE - 2S/C page 143 Maple Thinning/Conifer Planting	Allowed as written
RE - 3S/C page 146 Conifer Thinning/Snag Creation	Allowed as written
RE - 4All page 148 English Ivy Removal	Allowed as written
RE - 5All page 150 Exotic Plant Removal	Allowed as written
RE - 6C page 154 Maple Thinning/Conifer Seeding	Allowed as written
RE - 7All page 156 Natural Resource Monitoring	Allowed as written
RE - 8C/N page 159 Utility Corridor Management	Allowed as written
RE - 9S page 164 Streambank Restoration Balch Creek	Allowed as written
RE - 10S page 167 In-Stream Restoration Balch Creek	Allowed as written
RE - 11N page 171 Newton Wetlands	Allowed as written

Recreation Trail Projects		
RT - 1S <i>page 183</i>	40 Mile Loop Trail Connection Overpass over Burnside Street	Type II Review
RT - 2S <i>page 185</i>	Balch Creek/ADA Accessible Interpretive Trail	Allowed as written
RT - 3S <i>page 184</i>	Bike Trail Connection US 30 and 30th St.	Type II Review
RT - 4S <i>page 180</i>	Trail Connection Between Cornell Rd. and Birch Trail	Allowed as written
RT - 5S <i>page 180</i>	Trail Connection Below Pittock Mansion	Allowed as written
RT - 6S <i>page 186</i>	Trail Removal Old gas line trail off Leif Erikson	Allowed as written
RT - 1C <i>page 182</i>	40 Mile Loop Trail Connection to Greenway Trail At Doane Lake	Type II Review
RT - 2C <i>page 183</i>	40 Mile Loop Trail Connection At St. Johns Bridge	Type II Review
RT - 3C <i>page 184</i>	Bike Trail Connection FL 5 to Leif Erikson	Type II Review
RT - 4C <i>page 180</i>	Trail Connection Between Leif Erikson and Wildwood Trails	Type II Review
RT - 5C <i>page 186</i>	Leif Erikson Culverts Maintenance Study	Allowed as written
RT - 1N <i>page 179</i>	Neighborhood Connector Trail Improve in Linnton Area	Allowed as written
RT - 2N <i>page 179</i>	Neighborhood Connector Trail In Linnton Area	Allowed as written
RT - 3N <i>page 181</i>	Wildwood Trail Extension	Type II Review
RT - 4N <i>page 185</i>	Kwonesum Trail Removal	Allowed as written
RT - 5N <i>page 181</i>	40 Mile Loop Trail Connection to Greenway Trail At Fred's Marina	Type II Review

Park Improvement Projects		
PI - 1A <i>page 195</i>	Provide Seasonal Restrooms At Various Locations	Allowed as written
PI - 2A <i>page 195</i>	Animal Waste Disposal At Various Locations	Allowed as written
PI - 1S <i>page 194</i>	53rd Drive - Nightly Closure	Allowed as written
PI - 2S <i>page 190</i>	Improve Parking Lot Upper Macleay - near Audubon Society	Allowed as written
PI - 3S <i>page 194</i>	Improve Access to Community Garden	Allowed as written
PI - 4S <i>page 191</i>	Thurman Street Trailhead Improvements/Reductions in congestion/noise	Allowed as written
PI - 5S <i>page 191</i>	Thurman Street Trailhead ADA Access to Park	Allowed as written
PI - 6S <i>page 192</i>	Lower Macleay Park Trailhead BES Water Quality Project	Type II Review
PI - 7S <i>page 192</i>	New Park Trailhead At US 30 and 30th	Type II Review
PI - 8S <i>page 193</i>	Construct New Park Trailhead On US 30 at Yeon St.	Type II Review
PI - 9S <i>page 195</i>	Modify Stone Castle Study and Modify	Allowed as written
PI - 1C <i>page 189</i>	Improve Parking Lot At Germantown Road and Leif Erikson	Allowed as written
PI - 2C <i>page 189</i>	Improve Parking Lot At Saltzman Road and FL 15	Type II Review
PI - 1N <i>page 188</i>	Improve Parking Lot At US 30 and FL 12 at Harborton	Allowed as written
PI - 2N <i>page 188</i>	Improve Parking Lot At FL 15 and Skyline	Allowed as written
PI - 3N <i>page 188</i>	Improve Parking Lot At BPA Road and Skyline Drive	Allowed as written
PI - 4N <i>page 189</i>	Improve Parking Lot Newton Road to Accommodate Horse Trailers	Allowed as written

Signing Projects		
S - 1All page 197	Trail Identification System	Allowed as written
S - 2All page 197	Interpretive Signs	Type II Review
S - 1S page 198	Information Sign Pittock Mansion	Allowed as written
S - 2S page 198	Interpretive Signs Along Balch Creek Trail	Type II Review
S - 1C page 197	Bike Trail/Fire Lane Signing	Allowed as written
S - 1N page 198	Traffic Signs Germantown Rd and Wildwood Trail	Allowed as written

Street Vacations		
SV - 1All page 199 SV - 2All page 200	Platted Roads in Interior of Park Both uncontested and those needing research	Allowed as written
SV - 1S page 200	Street Vacation - Alexandria Street Near the White Shield Home	Allowed as written
SV - 2S/C page 200	Leif Erikson Drive From Thurman Street to terminus at Germantown	Allowed as written
SV - 1C page 201	NW Springville Road Through park	Allowed as written
SV - 2C page 201	NW Saltzman Road Through park	Allowed as written
SV - 1N page 201	Newton Road	Allowed as written

Management Projects			
M - 1	<i>All page 205</i>	Create and Staff Park Ranger Position	Allowed as written
M - 2	<i>All page 206</i>	Perform Initial Baseline and Periodic Recreational Surveys and Monitoring	Allowed as written
M - 3	<i>All page 206</i>	Coordinate with Other Resource Regulatory Agencies	Allowed as written
M - 4	<i>All page 207</i>	Work with Police Bureau	Allowed as written
M - 5	<i>All page 207</i>	Work with Fire Bureau	Allowed as written
M - 6	<i>All page 207</i>	Encourage and Facilitate Volunteer Foot and Bike Patrols, Other Volunteer Projects	Allowed as written
M - 7	<i>All page 208</i>	Rewrite Portions of City Code	Allowed as written
M - 8	<i>All page 208</i>	Adopt Ordinances to Deal with Domestic Animals in the Park	Allowed as written

MISCELLANEOUS PROJECTS - not prioritized

CITY OF PORTLAND PROJECTS

WATER BUREAU PROJECTS - pages 202-3

Require Type III Review

- WB - 1 Saltzman Tank Replacement**
Location: At southeast end of Saltzman Road, above Hwy. 30
- WB - 2 Springville Main Replacement**
Location: Along Springville Road through center of park.
- WB - 3 Springville Tank Replacement**
Location: At east end of Springville Road
- WB - 4 Mayfair Pump Main/Access Road**
Location: Near intersection of Leif Erikson and Thurman Street
- WB - 5 Mayfair Pump Station**
Location: Not precisely located at this time, may be within park.

BES PROJECTS - page 204

Require Type II Review

- BES - 1 Balch Creek Water Quality Improvements**
Location: All along Balch Creek