

West Tiger Mountain Natural Resources Conservation Area

MANAGEMENT PLAN

July 1997



WASHINGTON STATE DEPARTMENT OF
Natural Resources
Jennifer M. Belcher - Commissioner of Public Lands

Acknowledgments

West Tiger Mountain NRCA Advisory Committee

Gordon Bradley, *University of Washington*

Jane Crowder, *Issaquah School District*

Larry Hanson, *Local Resident*

Alan Haywood, *City of Issaquah Department of Parks and Recreation*

Laurence Istvan, *Local Resident*

Ruth Kees, *Local Resident*

Harvey Manning, *Issaquah Alps Trails Club*

Walter Pacheco, *Tribal Representative, Muckleshoot Tribe*

Bud Parker, *King County Parks Division*

Washington State Department of Natural Resources

Jennifer Belcher, *Commissioner of Public Lands*

Kaleen Cottingham, *Supervisor*

Art Stearns, *Deputy Supervisor (retired)*

Stan Biles, *Deputy Supervisor*

Forest Resources Division

Michael Perez-Gibson, *Division Manager*

Janice Friebaum, *Assistant Division Manager*

Mark Sheehan, *Natural Heritage Manager*

Pene Speaks, *Natural Areas Program Manager*

Marsha Hixson, *Environmentalist*

Gina Wendler, *Publication Support*

Communications Product Development

Blanche Sobottke, *Editor*

South Puget Sound Region

Bonnie Bunning, *Region Manager*

Clay Sprague, *Assistant Region Manager*

Robert Larson, *Assistant Region Manager (retired)*

Dave Kiehle, *Public Use Coordinator*

Doug McClelland, *King District Manager*

Darcy McNamara, *NRCA Conservation Steward*

Margaret Macleod, *Interagency Coordinator*

Brian Vrablick, *Issaquah Unit Forester*

Rex Thompson, *Duvall Unit Forester*

Susan Combs-Bauer, *Recreation Planner*

Carol Thayer, *Geographic Information System Specialist*

University of Washington

Gordon Bradley, *Professor, College of Forestry*

Frank Westerlund, *Assoc. Professor, Urban Design & Planning*

Jennifer Powers, *Research Assistant*

David Wortman, *Research Assistant*

Past Contributors to the Management Plan

Jack Hulsey, *Resource Planning and Asset Management Division*

Bob Coon, *Forest Resources Division (retired)*

Richard Ramsey, *Resource Planning and Asset Management Division*



Jennifer M. Belcher
COMMISSIONER OF PUBLIC LANDS

July 1997

Dear Friend:

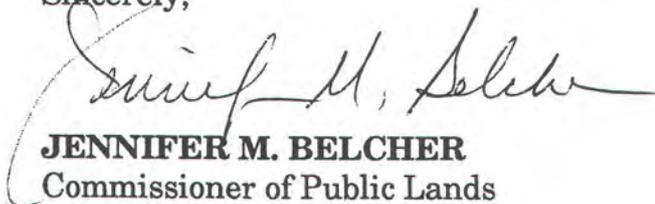
The West Tiger Mountain Natural Resources Conservation Area (NRCA) Management Plan was prepared to provide direction for the protection and management of the natural ecological systems of West Tiger Mountain.

The West Tiger Mountain NRCA was enlarged to encompass 4,430 acres of the western slopes of Tiger Mountain State Forest. Within the NRCA, the City of Issaquah owns 450 acres, called the Tradition Plateau. The city is managing its land in a manner consistent with the NRCA guidelines, which provides us with exciting partnership opportunities.

The West Tiger Mountain NRCA was expanded to preserve and protect sensitive areas such as stands of old-growth forest, wetlands and lakes, a madrone plant community, riparian areas, and the rock outcrops and summits of the three West Tiger Mountain peaks. Moreover, the NRCA is located within a highly scenic segment of the Mountains to Sound Greenway in the Interstate 90 corridor. And the NRCA is host to one of the most often used trailheads in the state for low-impact recreation opportunities.

Due to the designation of West Tiger Mountain as an NRCA, future generations will be able to enjoy our state's wonderful natural and cultural heritage. I encourage you to stay involved as the West Tiger Mountain NRCA management plan is implemented. Join us in creating a legacy of wise management and stewardship of our valuable natural resources.

Sincerely,



JENNIFER M. BELCHER
Commissioner of Public Lands

Contents

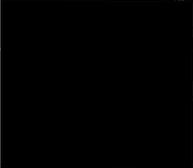
1	Preface
3	Introduction
5	The Department of Natural Resources (DNR)
5	West Tiger Mountain NRCA Description and Location
9	Executive Summary
9	The Planning Process
11	Program Purpose
11	Natural Resources Conservation Area Act
11	Natural Resources Conservation Area Statewide Management Plan
13	Resource Inventory
13	Geology
14	Soils
14	Wetlands and Aquatic Resources
16	Vegetation
17	Wildlife
17	Scenic Landscape
19	Cultural Resources
19	Sensitive Areas
21	Disturbed Areas
23	NRCA Boundary and Acquisition Recommendations
23	Recommended Acquisitions
25	Stewardship Recommendations
25	Management Philosophy
26	General Management Goals, Strategies, and Prescriptions
33	Management Prescriptions by Land Unit
37	Regulation, Enforcement, and Fire Management
38	Interagency Coordination
41	Monitoring Program
41	Purpose
41	Monitoring Objectives
41	Monitoring Tasks and Indicators
43	Glossary
47	References
	Figures
4	Figure 1. Vicinity Map
5	Figure 2. West Tiger Mountain NRCA
18	Figure 3. Sensitive Areas
20	Figure 4. Disturbed Areas
22	Figure 5. NRCA Boundary and Recommended Acquisitions
32	Figure 6. Land Units



Preface

In 1987 the Natural Resources Conservation Area Act was passed by the Washington State Legislature. West Tiger Mountain was established as an NRCA in 1989. The NRCA program is a product of the work of many individuals, including the Commissioner of Public Lands, state legislators, residents, conservationists and recreational users. The Department of Natural Resources (DNR) was selected as the agency to manage these lands for the multiple conservation purposes of protecting ecological systems and providing low-impact public use opportunities. The West Tiger Mountain NRCA Management Plan meets the requirements set forth in the Natural Resources Conservation Area Act (RCW 79.71) and adheres to the guidelines stipulated in the Natural Resources Conservation Area Statewide Management Plan (1992).

This document was developed with the assistance of the West Tiger Mountain Citizen's Advisory Committee, which identified key planning issues, provided valuable information and constructive comment on stewardship recommendations. Additional assistance came from federal, state, local, and tribal agencies, organizations, citizens, recreational users, and faculty, research assistants and students from the University of Washington.



Introduction

The Department of Natural Resources (DNR)

DNR manages approximately five (5) million acres of state-owned forest, aquatic, agricultural, range and urban lands. These lands are managed for long-term benefits to designated public beneficiaries and the general public. Approximately 66,000 additional acres are managed for resource protection as Natural Resources Conservation Areas and Natural Area Preserves. DNR's Forest Resources Division is responsible for management of NRCAs.

- **Trust Lands** were established when Washington became a state in 1889. The Congressional Enabling Act designated over 3 million acres to be managed for the benefit of schools, universities and other state institutions.
- **Forest Board Lands** were acquired by purchase or transfer from the counties beginning in the 1930's. Revenue from these lands goes to the county containing the Forest Board Lands.
- **Aquatic Resource Lands**, 2.1 million acres of state-owned tidelands, shorelands, and beds of navigable lakes, rivers and marine waters, are managed by the Department to provide a balance of public benefits for all the citizens of the state.
- **Natural Area Preserves (NAPs)**, established by an act of the Washington State Legislature in 1972, contain high-quality natural habitat acquired by gift or purchase by the Department. NAPs are managed for the perpetual protection of rare species and outstanding ecosystems native to Washington State.
- **Natural Resources Conservation Areas (NRCAs)** are the most recent land designation to DNR. Created by an act of the Washington State Legislature in 1987, the NRCA program's multiple purposes include protecting outstanding ecological, geologic, and cultural resources while providing opportunities for low-impact public use.

FIGURE 1: VICINITY MAP

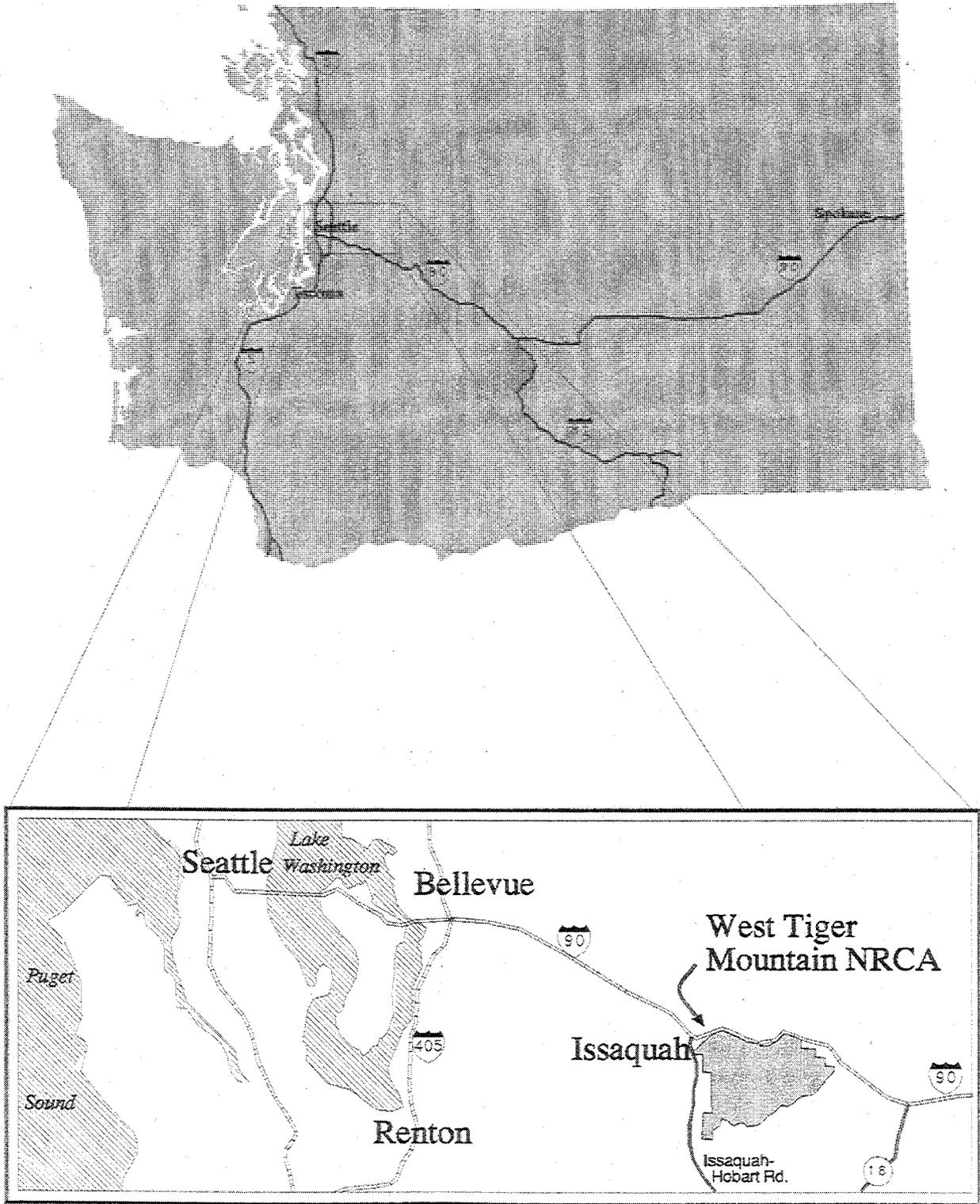


Figure 1

West Tiger Mountain NRCA Description and Location

West Tiger Mountain NRCA is located in western Washington Puget Sound Basin approximately 20 miles east of the city of Seattle (Figure 1). The area is part of a chain of Cascade Range foothills known locally as the "Issaquah Alps" which includes Tiger, Squak and Cougar Mountains. As part of the "Issaquah Alps," the NRCA provides an important scenic backdrop to the City of Issaquah. Moreover, the "Issaquah Alps" are located within the Mountains to Sound Greenway, a state and federally designated scenic and visual corridor.

The Mountains to Sound Greenway extends east-west along the I-90 corridor from Thorp Prairie on the east side of the Cascades to Puget Sound on the west. The Greenway vision incorporates several principal themes: protecting scenic and visual qualities/resources along I-90; providing economic incentives such as a landscape of working forests, farms and communities; providing recreational opportunities including a Mountains to Sound Greenway trail system; and providing environmental education/interpretation about the cultural, natural, and physical resources found through out the Greenway. The Tiger Mountain State Forest meets the components of the Greenway vision because it involves an integrated forest management program which includes a working state forest, protection of sensitive resource areas, preservation of the scenic and visual qualities as viewed from the city of Issaquah and I-90, and provision of recreational and educational opportunities.

The West Tiger Mountain NRCA comprises the northern and western slopes of the Tiger Mountain State Forest and the City of Issaquah's Tradition Plateau land (Figure 2). The NRCA encompasses 4,430 acres and ranges in elevation from 470 feet at the Tradition Plateau to 2,948 feet at the summit of West Tiger "1", the highest of three peaks located in the NRCA. Land ownership within the NRCA boundary consists mainly of DNR managed trust lands and the City of Issaquah designated Tradition Plateau NRCA. There are also several privately owned parcels or "inholdings" located within the NRCA boundary.

Distinctive physical features of the area include the talus rocks (caves), two lakes, three predominant stream systems, forested wetland areas on the Tradition Plateau, a dry-site vegetation mosaic dominated by Pacific madrone at Yah-er Wall, numerous scenic views, and several stands of Douglas-fir forest exhibiting old-growth characteristics.

West Tiger Mountain NRCA is part of Tiger Mountain State Forest, a 13,500-acre "working forest" managed by the DNR for multiple uses. Although guided by different objectives, integrated management between West Tiger Mountain NRCA and the working forest lands of Tiger Mountain State Forest is a key component for the successful integration of natural resource preservation and economic use while providing public recreational opportunities. Ecosystem management, protection of scenic views, education programs and other public uses are all part of the integrated management

FIGURE 2: WEST TIGER MOUNTAIN NRCA

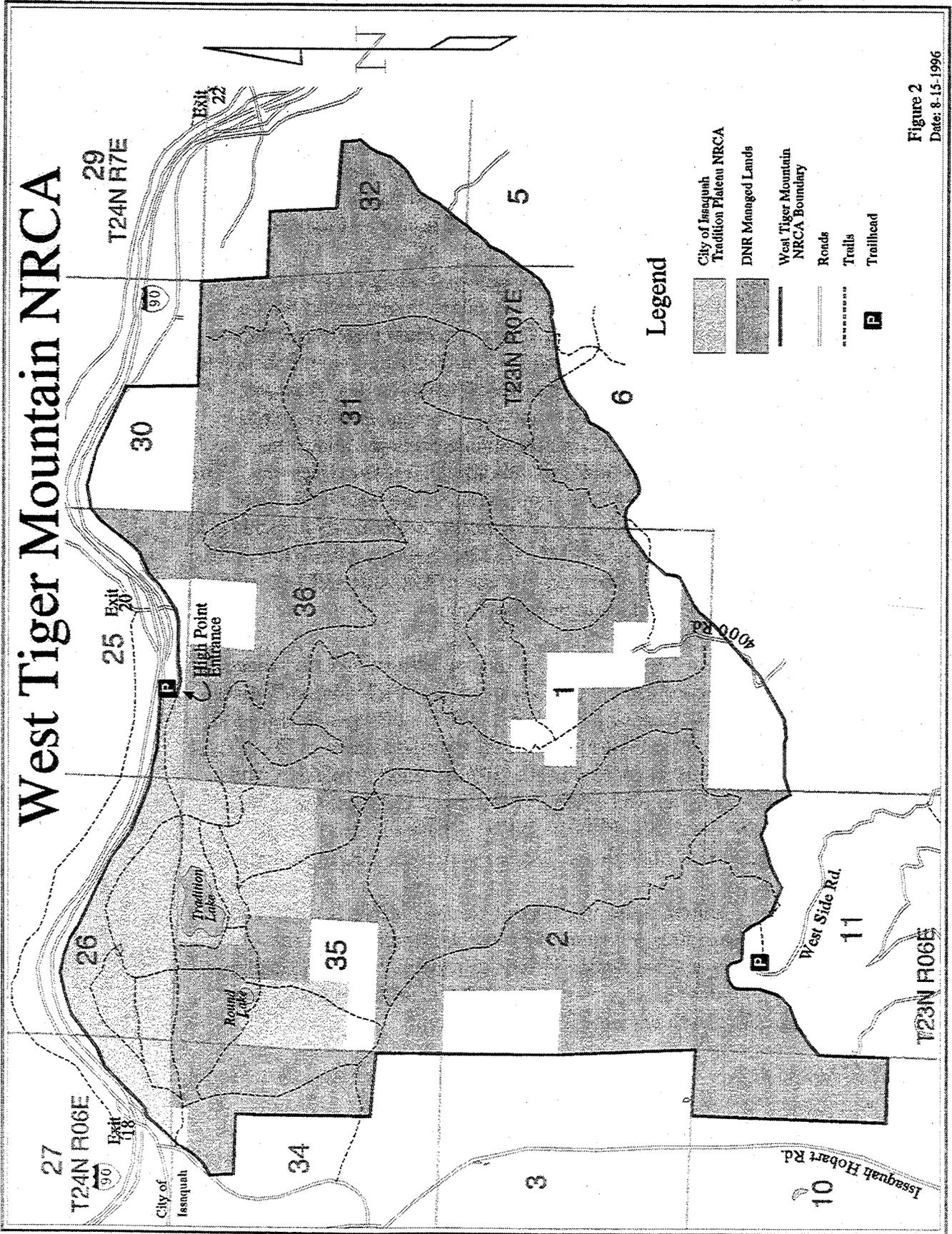


Figure 2
Date: 8-15-1996

approach and are necessary considerations in performing landscape-level management of the entire Tiger Mountain State Forest.

Due to the NRCA's close proximity to the Seattle metropolitan area, public use levels are high. An estimated 150,000+ visitors use the NRCA annually. This current level of use is resulting in severe degradation of several natural features that the NRCA was designated to protect. As demand for use of the area continues to increase, resource damage and conflicts between visitors will accelerate without additional management efforts by the DNR. With proper management, the NRCA presents a unique opportunity for protection of natural features and provision for low-impact public uses and education in close proximity to the Seattle metropolitan area.

SITE PLANNING PROCESS

The West Tiger Mountain NRCA Management Plan, developed by DNR's South Puget Sound Region, consists of an inventory of existing uses and natural features, and analysis of these conditions. Management recommendations were developed based on existing conditions, NRCA guiding program policy, and public comment. The NRCA was divided into six land units based upon ecological sensitivity, and management strategies were developed for each unit.

An ecological site inventory of the NRCA was conducted by the DNR's Natural Heritage Program staff. A cultural resource survey was conducted by a private consulting firm. Research assistants from the University of Washington also gathered information pertinent to the development of this document. This information included relevant state and local policies, previous studies completed for the site, discussions with local citizens, interest groups, and government agencies, and a survey of visitors.

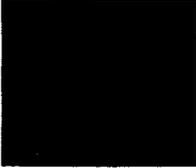
The analysis phase was conducted with the assistance of a class from the University of Washington. The class evaluated current resource and public use conditions in light of NRCA program goals and developed recommended management strategies. Final goals, strategies, and management prescriptions were developed based on these recommendations, along with extensive input from the West Tiger Mountain NRCA Citizen's Advisory Committee.

PUBLIC REVIEW

In compliance with the State Environmental Policy Act (SEPA; RCW 43.21) and the NRCA Statewide Management Plan, the draft management plan was subject to review and comment by the public and tribal, federal, state, and local agencies prior to final approval by the Commissioner of Public Lands. Two public meetings were held in the spring 1993, including agency review and comments, which resulted in the editing of the draft management plan. Subsequently, a public hearing on the recommended site boundary was held on May 9th, 1995 and comments and changes are included in this document to reflect all public and agency comments and input.

PLAN REVIEW PROCESS

Following adoption, the management plan will be reviewed by DNR, the NRCA Statewide Advisory Committee, and the public on a five-year cycle. The NRCA will be monitored, and interim management strategies will be developed if resource conditions warrant. These reviews will enable the document to be revised to address current management issues.



Executive Summary

The West Tiger Mountain Natural Resources Conservation Area (NRCA) will be managed to protect ecological systems and encourage natural successional processes while providing controlled opportunities for low-impact public use emphasizing environmental education.

The Planning Process

The Commissioner of Public Lands, with input from local Department of Natural Resources (DNR) staff, appointed the nine-member West Tiger Mountain NRCA Advisory Committee. Several committee members who dedicated their time to this management plan have been involved in issues concerning the management of the entire Tiger Mountain State Forest for many years. The committee worked with DNR staff for 12 months to assist DNR in identifying key issues, collecting information, and determining appropriate management prescriptions for the West Tiger Mountain NRCA. DNR staff and committee members evaluated issues raised by the public; completed ecological, cultural, and other field reconnaissance studies; and learned about the NRCA Act and the department's NRCA Statewide Management Plan (1992) to produce the following recommendations.

PROTECTED RESOURCES

In accordance with the Statewide Management Plan, the West Tiger Mountain NRCA will be managed to protect outstanding examples of native ecosystems, habitat for threatened, endangered, and sensitive (TES) species, and scenic landscapes. Sensitive areas identified during the planning process include highly erodible soils, stands of old-growth forest, wetlands and lakes, a madrone plant community, riparian areas, and rock outcrops/summit areas. All public uses and management activities will be evaluated to determine potential impact on these resources as well as scenic landscapes and any TES species identified in future site reconnaissance studies.

ECOSYSTEM MAINTENANCE, ENHANCEMENT, AND RESTORATION

Several strategies and management prescriptions were developed to help maintain, enhance, and restore the ecological systems of the West Tiger Mountain NRCA. DNR will coordinate management of the West Tiger Mountain NRCA with the management of the Tiger Mountain State Forest. DNR will also coordinate its planning activities and management of the West Tiger Mountain NRCA with the City of Issaquah. In December, 1993 the city designated its lands located within the West Tiger Mountains NRCA boundary as the Tradition Plateau Natural Resource Conservation Area (NRCA). The

city's action ensured that the entire West Tiger Mountain area is managed in a consistent manner.

DNR will also coordinate with other land management agencies in the region to enhance the NRCA's role as a connecting corridor in a regional system of natural areas and open space. Essential wildlife habitat will be identified and protected. Natural successional processes will be allowed to re-establish the natural character of the NRCA. Where necessary, disturbed ecosystems that are not recuperating through natural successional processes, as well as degrading ecosystems, will be restored. Habitat specifically required by TES species will be maintained, enhanced, and restored.

PUBLIC USE

Low-impact public educational and recreational activities will be allowed where such activities do not conflict with NRCA goals and do not diminish ecosystem quality and natural site characteristics. Activities generally not consistent with NRCA goals include camping/overnight use, hiking off-trail, mountain biking or horseback riding off-road or on non-designated trails, use of off-road motor vehicles, snowmobiling, target shooting/archery, bear-baiting, and collection of plants, mushrooms, or firewood for non-tribal purposes. Information will be provided at or near NRCA entry points and near areas of interest that explain NRCA purposes, define allowable uses, and provide area maps. Public use will be monitored and additional restrictions imposed, if necessary, to meet NRCA goals.

BOUNDARY RECOMMENDATIONS

With this management plan, the West Tiger Mountain NRCA is being expanded from its current size of approximately 854 acres to encompass 4,430 acres within the 13,500 acre Tiger Mountain State Forest. The boundary recommendations for the West Tiger Mountain NRCA were made based on ecological characteristics, threats of incompatible development occurring adjacent to the NRCA and opportunities to provide controlled access for education and low-impact public use. Highest priority acquisitions located within the NRCA include those parcels that if developed, will decrease habitat and resource values, the scenic and visual qualities, and provide a buffer between adjacent developed areas and the NRCA.

MONITORING AND EVALUATION PROGRAM

The success of the recommendations made in this document depends upon effective monitoring and evaluation. A detailed monitoring plan will be developed to provide further guidance in ensuring that management recommendations are being carried out and NRCA goals met. Monitoring should be done on an annual basis to provide valuable input for future revisions to this management plan. The document as a whole will be reviewed on a five-year cycle.



Program Purpose

The West Tiger Mountain Natural Resources Conservation Area (NRCA) Management Plan was prepared in conformance with the Natural Resources Conservation Area Act (RCW 79.71) and Department of Natural Resources Statewide Management Plan guidelines. The purpose of this plan is to provide site guidelines for the management of the West Tiger Mountain NRCA.

Natural Resources Conservation Area Act

The Washington Natural Resources Conservation Areas (NRCA) Act was created by the Legislature and signed into law on May 18, 1987 as RCW 79.71. The Act defines the characteristics of a NRCA as:

- Lands with a high priority for conservation, natural systems, wildlife and low impact public use;
- An area of land and/or water with flora, fauna, geological, archaeological, scenic or similar critically important features that retains to some degree or has reestablished its natural character;
- Examples of native ecological communities; and
- Environmentally significant sites threatened by incompatible or ecologically irreversible developments.

The Act further defines the purposes of a conservation area as:

- Maintaining, enhancing or restoring ecological systems, including but not limited to aquatic, coastal, montane, and geological systems, whether such systems are unique or typical to the state of Washington;
- Maintaining exceptional scenic landscapes;
- Maintaining habitat for threatened, endangered, and sensitive species;
- Enhancing sites for primitive recreational purposes; and
- Providing opportunities for outdoor environmental education.

Natural Resources Conservation Area Statewide Management Plan

In 1992 the NRCA Statewide Management Plan was developed with the assistance of a nine-member citizen's advisory committee. The statewide plan was prepared to provide the basic framework and issues to be addressed for each of the individually prepared NRCA management plans. This would ensure

that each plan would be consistent with one another. The statewide plan prioritizes the purposes and permitted uses of the NRCA as follows:

- The primary purpose of the NRCA program is to protect outstanding examples of native ecosystems, habitat for threatened, endangered, and sensitive (TES) plants and animals and scenic landscapes.
- Opportunities for environmental education and low-impact public uses will be provided where such uses do not adversely affect the resource values the area is intended to protect.



Resource Inventory

The physical attributes described in this section include: geology, soils, wetlands and aquatic resources, vegetation, wildlife, scenic landscapes, cultural resources, sensitive areas, and disturbed areas. The following is a description of the findings for each resource.

Geology

Within the West Tiger Mountain NRCA visitors can see numerous outcrops and features that record and display the area's stratigraphic, tectonic, and glacial history.

The Tiger Mountain State Forest, in which the NRCA is located, covers a west-trending spur of the Cascade Range. The area is underlain by volcanic and sedimentary rocks that range in age from middle to late Eocene (about 50 to 38 million years). The age range is confirmed by fission-track dating of zircons in the sedimentary rocks and potassium-argon dating of local igneous rocks. The sedimentary units found in the NRCA are, from oldest to youngest, the Raging River, Tiger Mountain, and Tukwila Formations. Of these, the Tukwila Formation is most widely exposed.

Coal from the Tiger Mountain Formation was mined in the Fifteenmile Creek drainage south of the NRCA. About 9 million tons of subbituminous coal may lie within the Tiger Mountain area, but the quality of the coal and the difficulties of extracting from it the faulted coalbeds make it an unattractive resource. More extensive mining took place in the Renton, Cougar Mountain, Maple Valley, and Squak Mountain areas.

The topography of the region today is largely a result of glaciation, which began nearly 2 million years ago. During the last pulse of glaciation, termed the Fraser Glaciation, a lobe of the continental ice sheet moved south across the Puget Lowland; it was thick enough to cover the peaks of the "Issaquah Alps" (for example, Tiger and Squak Mountains). The ice reached the area south of Olympia by 18,000 years ago, then rapidly retreated to the latitude of Seattle by about 14,000 years ago. Throughout the area, both the ice and its deposits forced drainage routes to shift.

As the climate warmed and glaciers retreated, meltwater torrents carved steep slopes in the Tiger Mountain area. The slopes are the sources of the large boulders that form the Talus Rocks. Large stranded blocks of stagnant ice melted in place to form kettle lakes, such as Tradition Lake. The sediments

deposited directly by the ice and by rivers draining the ice are the parent materials of many of the soils in the West Tiger Mountain NRCA.

The Seattle fault, which trends nearly east-west, has been traced east as far as Tiger Mountain and, across Seattle, west nearly to Bremerton. It was active about 1,100 years ago, possibly causing large landslides into the south side of Lake Sammamish.

Soils

There are ten major soil types represented within the West Tiger Mountain NRCA. These soils are formed from various combinations of glacial till, glacial outwash, glacial drift, volcanic ash and igneous rock, and are gravelly sandy loams. The different parent materials have interacted with climate, topography, living organisms, and time to form the various soils on the site.

Soil capability refers to the extent to which different soil types can withstand damage resulting from public use. Several factors are taken into consideration for each soil including runoff potential, compaction potential, erosion potential, slope and soil stability. Overall soil capability is determined by the number and severity of limitations for each soil type. Soil capability ratings are:

- **High Capability:** Soil can support most uses and has a low erosion potential, low to moderate runoff and compaction potential. Slopes are generally stable.
- **Moderate Capability:** Soil can support limited uses as long as precautions are taken. Erosion potential, runoff and compaction potential are low to moderate and there may be some problems with slope instability.
- **Low Capability:** These soils are highly erodible, may have steep or unstable slopes, or high runoff or compaction potential. Potential hazards should be taken into account for various uses to minimize impacts and hazards. These soils are unsuitable for most public uses as well as high levels of use.

Wetlands and Aquatic Resources

West Tiger Mountain NRCA is located within two major drainage basins: the East Fork of Issaquah Creek and the main stem of Issaquah Creek drainage basins. Several sub-drainages have been identified within these two major basins.

Three major stream systems are found within and adjacent to the NRCA: East Fork of Issaquah Creek, High Point Creek and the streams of Many Creek

Valley. The NRCA also contains several seasonal and perennial stream systems. These streams are classified into different water types by the Washington Forest Practices Board, for forest management purposes. Water types generally depend on channel width and range from Type 1 (navigable, fish-bearing waters) to Type 3 (may contain significant numbers of resident game or anadromous fish) to Type 5 (ephemeral flow, non-fish bearing waters). Most streams in the NRCA are rated as Type 4 or 5 with fish populations utilizing the lower reaches of the creeks.

Within and adjacent to the West Tiger Mountain NRCA, fish populations and spawning habitat are supported in the lower reaches of High Point Creek, the Many Creek Valley drainage, the East Fork of Issaquah Creek and Issaquah Creek. The Many Creek Valley drainage supports coho populations and may provide spawning habitat for Lake Sammamish kokanee, a species believed to be diminishing in population. Much of this spawning habitat is currently located downstream from the NRCA (Furstenburg, personal communication).

All streams in the NRCA are found within older second-growth forests. Most streams are characterized by cobble or boulder beds, steep banks, constrained riparian areas and numerous cascades due to steep topography. Riparian zones throughout the NRCA are generally dominated by salmonberry and devils club, although several other plant species are found in these areas. Most stream banks in the NRCA are stable except when crossed by trails where erosion occurs (Crawford et.al. 1992).

There are two lakes located within the NRCA: Tradition Lake (16 acres) and Round Lake (1.6 acres). Tradition Lake is fed by two unnamed streams that collect runoff from a 533-acre drainage basin. The drainage in the upper central plateau runs north by northwest from West Tiger Mountain to Tradition Lake and then flows underground to Round Lake (Crawford et. al. 1992). Both lakes host water lilies and other floating/emergent species. Sedge meadows surround Tradition Lake and Round Lake. The spirea zone forms the transition between sedge meadows and the surrounding upland. This zone is dominated by Douglas spirea, but other shrub species such as willow and red-osier dogwood also occur here. Reed canarygrass, an aggressive exotic species, is well established around Tradition Lake and to a lesser extent around Round Lake. It is most abundant in and around the spirea zone and emergent marsh zones.

There are approximately 6.5 acres of forested wetland located north of Round Lake. This wetland type is characterized by saturated soils supporting a variety of trees such as Oregon Ash and Black Cottonwood as well as understory species that include slough sedge, trailing blackberry, false lily-of-the-valley and snowberry. A large area of scrub/shrub wetland also occurs on the Tradition Plateau. Cattails predominate where shrubs have been mown to accommodate the utility corridors on site. A hemlock wetland is located in the middle of a western redcedar grove on Tradition Plateau.

Both Tradition and Round Lakes are undergoing eutrophication and show signs of disturbance. A 1978 study of the Tradition Plateau by Puget Sound Power & Light Company showed relatively high levels of phosphorous, nitrates, and nitrites. Heavy recreational use on trails around both Tradition Lake and Round Lake have resulted in damage to wetland vegetation and peat soils. Many areas, including the south shore of Round Lake and around the inflow streams of Tradition Lake, are denuded of vegetation.

Vegetation

The West Tiger Mountain NRCA consists of a mosaic of lowland, high elevation, dry-site and wetland vegetation types. Four forest types dominate the landscape: Mixed deciduous (red alder and bigleaf maple), mature and old Douglas fir, young Douglas fir, and western hemlock. Red alder and bigleaf maple, and much of the younger Douglas fir and western hemlock, occur in relatively large single-aged stands. The three stands containing older Douglas fir, western hemlock, and western redcedar include several age classes (Crawford, et. al. 1992 and University of Washington, 1992).

Stands of mature and old-growth conifer forest dominated by Douglas fir, western hemlock, and western redcedar occur in the western and northeastern portions of the NRCA. These stands exhibit old-growth structure consisting of large trees, abundant snags, and a moderate to well developed understory.

Second-growth Douglas fir stands cover extensive areas of the Tradition Plateau, part of the Many Creek basin and central portions of the NRCA. Two second growth stands, located on the Tradition Plateau and on the summit ridge, have been thinned and consist of widely spaced trees with a heavy undergrowth of salal. A small area in the southwest corner of the NRCA is composed of regenerating Douglas fir harvested approximately 20 years ago.

Mature western hemlock is limited to northeastern portions of the NRCA. Other hemlock stands are located in the summit ridge area and on the north slopes of West Tiger Mountain. Young western hemlock is developing on part of the south slope of West Tiger Mountain.

Several areas of forest dominated by western red-cedar occur on the flats and wet areas in the northern part of the NRCA and on the Tradition Plateau. Although these stands are only about 100 years old, they exhibit many old-growth characteristics such as relatively large trees, abundant downed woody material, and well developed understory vegetation. Some of the stands have a forested wetland character.

There are several 40 to 50 year old stands throughout the NRCA composed almost entirely of red alder with a sword fern understory. Much of the NRCA, particularly in western portions, is dominated by mixed alder, bigleaf maple, and, in later successional stages, western hemlock. The understory, consisting of vine maple, oregon grape, salal, salmonberry, red huckleberry, and sword fern, dominates the ground layer.

Other tree species include silver fir, located along the summit ridge, and mountain hemlock, found especially at higher elevations on West Tiger #1. Sitka spruce, found scattered in wetter forested areas on the Tradition Plateau, are distinctive, as the NRCA is located near the limits of this species' range. The west facing cliffs of Yah-er Wall support a distinctive madrone and associated dry cliff vegetation community, including Oregon white oak and bristly manzanita.

Utility rights-of-way represent the largest areas of grassy meadow within the NRCA. These areas are intensively managed and contain invasive non-native species, including scot's broom. A combination of small conifers, young red alder, and other early successional species occur on recently harvested units and in utility corridors. Brush also covers much of the slope between Tradition Plateau and Interstate 90 (I-90).

Wildlife

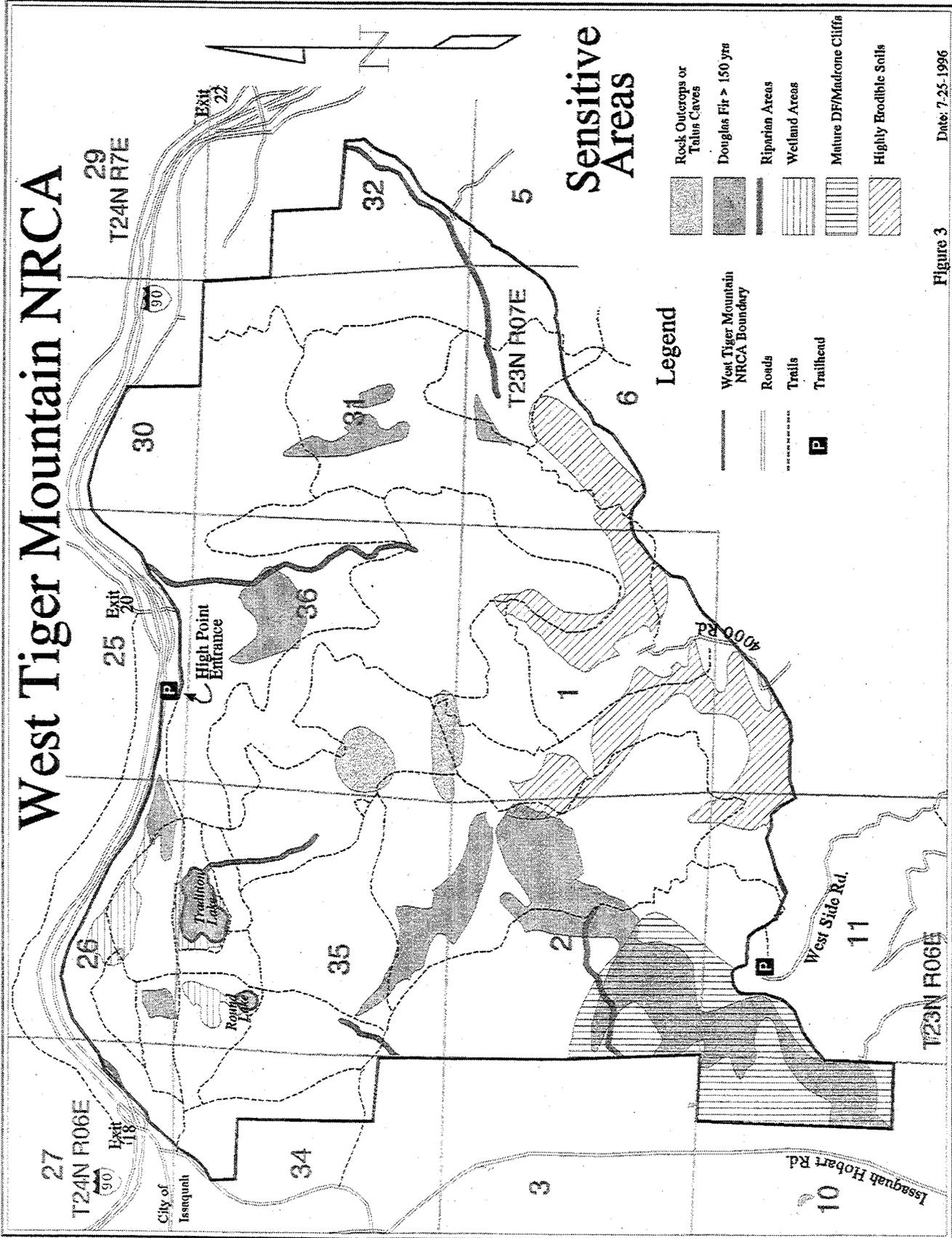
The wildlife inhabiting the West Tiger Mountain NRCA is typical of west side second-growth forest habitats and includes a variety of birds, mammals, amphibians, and fish. Large mammals known (from direct observation and sign) to use the NRCA include blacktail deer, cougar, bobcats, black bear, coyote, and occasionally elk. Red-tailed hawks, osprey, barred owls, pygmy owls, and pileated woodpeckers have been observed. Great horned owls and screech owls are likely inhabitants of the older sections of forest, since their main habitat requirement is a suitable nest cavity. Field surveys for northern spotted owls, conducted in 1993 and 1994 and covering the entire Tiger Mountain State Forest, resulted in no sightings of the owls. Waterfowl, including mallard, gadwall, ruddy, and wood ducks, use Tradition Lake for feeding, and in some cases, nesting. Tradition and Round Lakes are used by migratory birds as stopovers. Fish (salmonids and cottids) inhabit the two main stream systems that drain West Tiger Mountain (High Point Creek and Many Creek Valley).

Scenic Landscapes

Scenic and visual quality of the NRCA is important from both within and outside the NRCA boundary. The NRCA, as part of the "Issaquah Alps" (Tiger, Squak and Cougar Mountains), provides the scenic backdrop to the city of Issaquah and is located within the Mountains to Sound Greenway. The three summits of West Tiger Mountain and the Poo-Poo Point area offer outstanding views of the surrounding Cascade Range as well as views westward toward Seattle, Puget Sound and the Olympic Range.

Views along some of the area's hiking trails are nearly as spectacular, including a west-facing view along the east-west powerline corridor running through the NRCA. West and east-bound traffic along Interstate 90 in the

FIGURE 3: SENSITIVE AREAS



Date: 7-25-1996

Figure 3

vicinity of the city of Issaquah directly view the NRCA. The summits of the NRCA are also visually important along Highway 18 south and east of Tiger Mountain and along the Issaquah-Hobart Road west of Tiger Mountain State Forest.

Cultural Resources

Research on cultural resources revealed a rich history of timber harvesting and mining activities in a large area around the city of Issaquah, located west of the NRCA. Timber harvesting began during the 1870's and early 1880's and peaked between 1910 and 1930. Old railroad grades are still in evidence on the mountain. Flumes were also used on the creeks, specifically at High Point Creek (Washington State Department of Natural Resources, 1986). Mills at High Point, Kerriston, Preston and Hobart processed logs brought down the mountain by railroads and tramways. Artifacts of these logging operations can still be found scattered through out the NRCA and the rest of Tiger Mountain State Forest.

Information of tribal uses of the NRCA is limited. Archaeological and historical surveys revealed one site of potential significance for its historical use by tribes in the area. It is likely that other areas within the NRCA were also used for tribal purposes, but due to weathering and human degradation, no direct evidence was found (Robinson and Rice, 1992).

There is evidence that there were at least two homesteads located on the Tradition Plateau in the 1800's. Fruit trees that were planted at that time still remain. Other historical artifacts associated with the city of Issaquah's original water system on the Tradition Plateau are also located in the NRCA.

Sensitive Areas

Sensitive areas are important to protect because of rare or sensitive physical or biological structure, wildlife habitat value, or a combination of both (Figure 3). The following sensitive areas were identified:

Erodible soils: These areas that contain soils subject to erosion are sensitive due to a low tolerance for disturbance due to public use. Erosion of these soils can cause loss of vegetation, sedimentation of streams and lakes, and deterioration of visual quality.

Old-growth forests (200 plus years old): Patches of forest exhibiting old-growth characteristics may provide habitat suitable for a variety of sensitive species such as spotted owl, marbled murrelets, Vaux's swift and pileated woodpeckers. Such areas may also contain high numbers of invertebrates.

FIGURE 4: DISTURBED AREAS

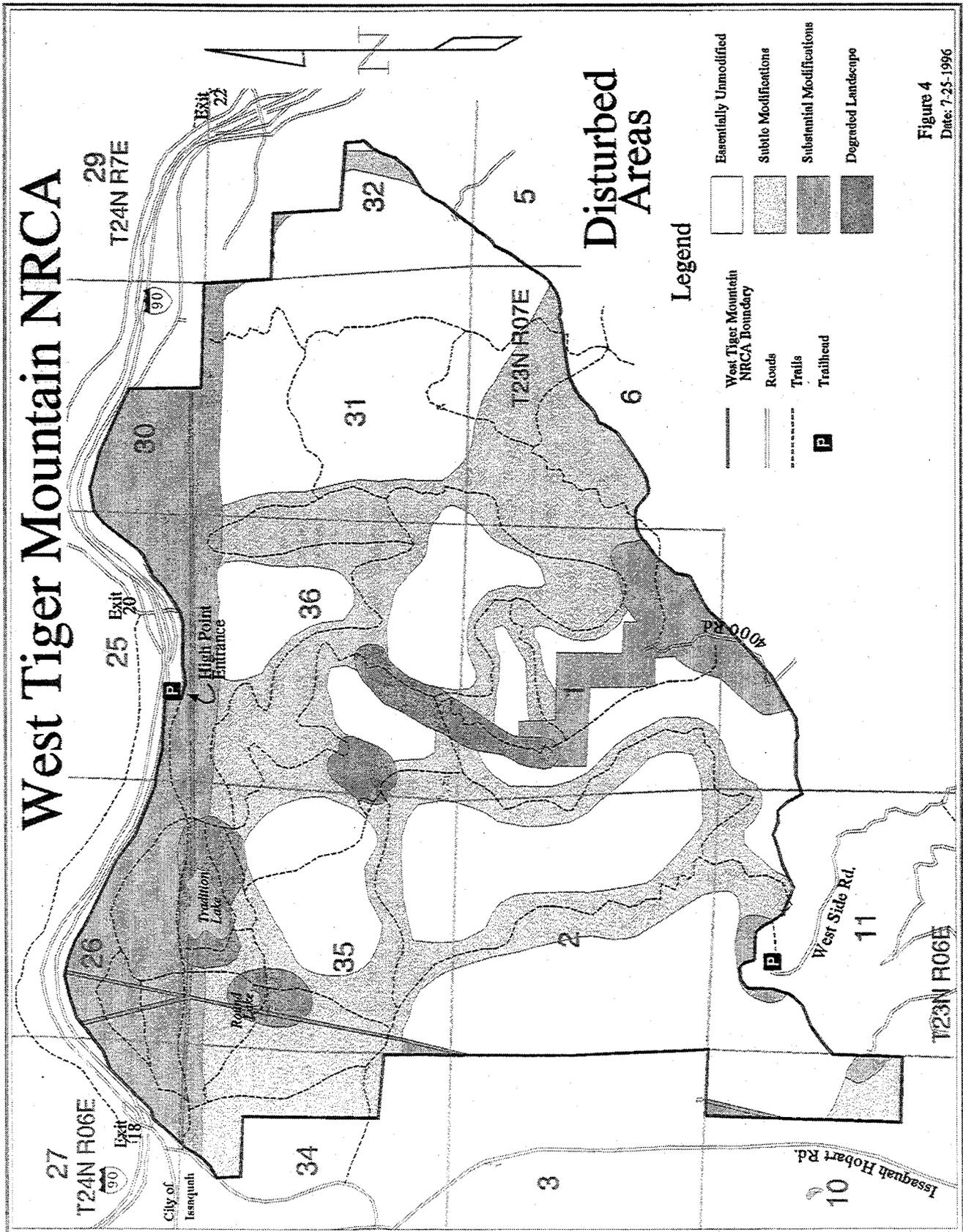


Figure 4
Date: 7-25-1996

Wetlands and lakes: Wetlands and lakes located within the NRCA provide habitat for many diverse species of aquatic plants, associated riparian vegetation and wildlife. Wetlands also provide a buffer against erosion and runoff, and may be a source of groundwater recharge.

Madrone plant community: A rocky, south-facing slope at Yah-er Wall on the southwest portion of the NRCA supports a distinctive dry-site plant community dominated by Pacific madrone. Although not unique statewide, this plant community is unique for the region.

Talus rocks: The talus rocks have caves that are some of the largest in the state and represent a unique habitat type as well as a geologic resource.

Stream systems and riparian areas: The NRCA contains significant streams and riparian corridors along the East Fork of Issaquah and High Point Creeks. These areas support highly diverse plant, wildlife and aquatic communities and are sensitive to erosion and runoff.

Rock outcrops/summit areas: Ridges in the higher elevations of the NRCA contain areas of summit/meadow plant communities and rock outcrops. These areas have thin, easily erodible soils and may contain plants sensitive to disturbance.

Disturbed Areas

There are significant areas of disturbed landscape within and around the NRCA, stemming from past forest and mining activities and continuing recreational use.

Different activities that occurred at different times are grouped into four areas of modification (Figure 4). The unmodified areas are those areas that are essentially unchanged and include areas with no roads or trails and where no forest management activities have occurred within the last sixty years. The subtly modified areas are those areas which include trails and trail corridors that have not resulted in significant disturbance to the area (such as erosion or trampling of vegetation). Those areas that have been substantially modified are the areas where forest management activities have occurred within the last 15 years; where roads are currently open; where bootleg trails have caused erosion and trampling of vegetation, and where other disturbances, such as Interstate 90, may be disrupting natural ecological processes. The most degraded locations are those areas where any modifying activity has caused extensive erosion, loss of vegetation, spread of invasive exotic plants or extensive disturbance to a sensitive area such as old-growth forests, wetlands, streams/riparian areas, rock outcrops, or highly erodible soils.

FIGURE 5: NRCA BOUNDARY AND RECOMMENDED ACQUISITIONS

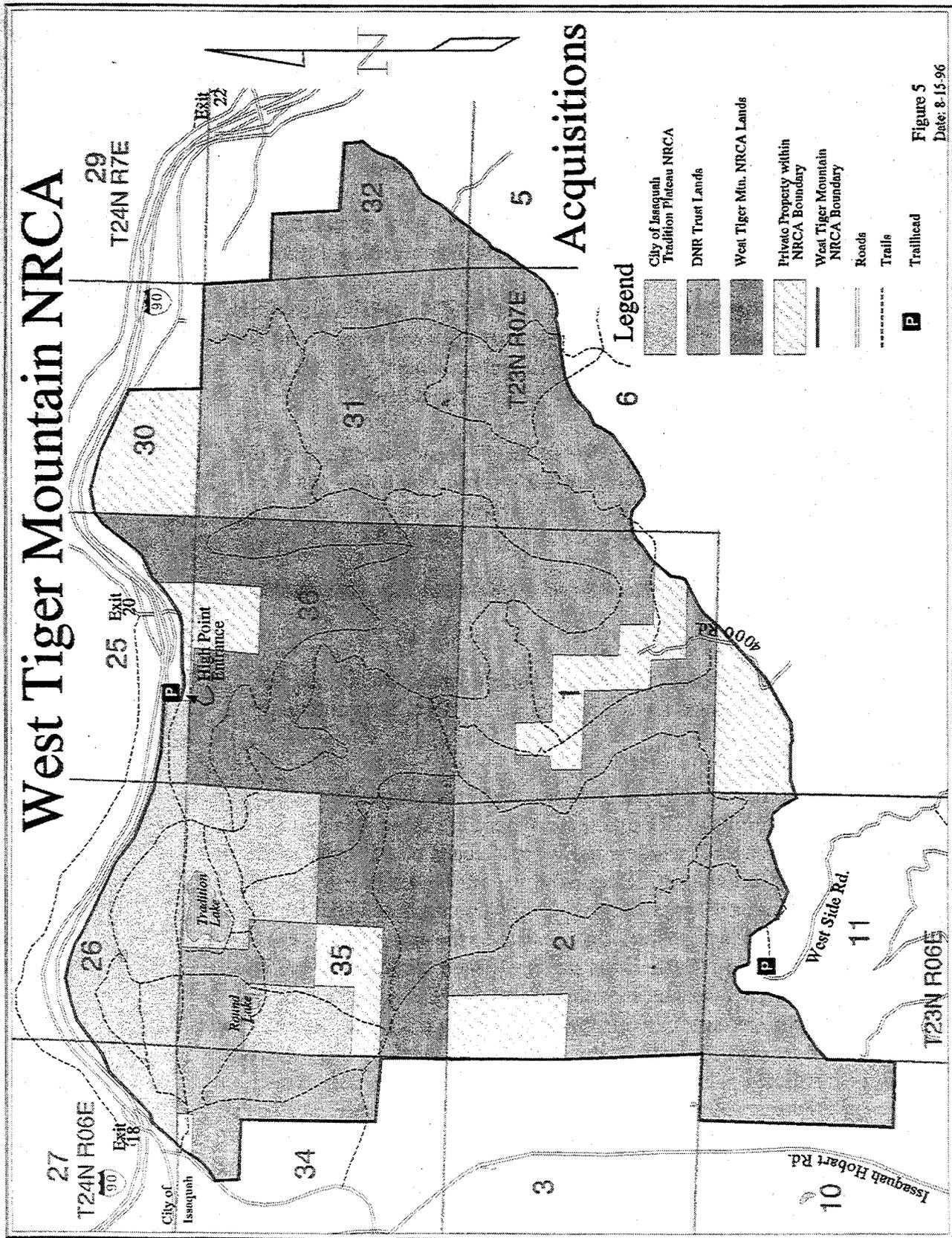


Figure 5
Date: 8-15-96



NRCA Boundary and Acquisition Recommendations

The West Tiger Mountain NRCA encompasses 4,430 acres of which the state manages 3,348 acres. The boundary was made based on ecological characteristics, threats of incompatible development adjacent to the NRCA, and opportunities to provide controlled access for education and low-impact public use (Figure 5). The boundary includes significant areas of mature Douglas fir forests, riparian areas, talus slopes and rock outcrops, wetlands and scenic viewpoints from the NRCA. The area also provides additional buffering to protect sensitive areas in the NRCA from incompatible development.

The northern boundary was chosen to buffer areas of the NRCA from disturbance from Interstate 90 and to minimize threats of urban development to these areas. The eastern boundary is marked by the East Fork of Issaquah Creek and was designated to include several areas of mature conifer forest and to protect riparian areas associated with the East Fork of Issaquah Creek. The southwestern and southern boundary consists of a ridge line and was selected as a watershed boundary to integrate the NRCA with the entire Tiger Mountain State Forest. The recommended western boundary is a north-south line, except where parcels have already experienced residential development; to protect areas of old-growth forest and sensitive stream systems, and to provide an additional buffer between the NRCA and development in the city of Issaquah.

Recommended Acquisitions

Acquisition of private properties located within the NRCA boundary shall be by willing seller only. Inclusion of properties not currently owned by the state but within the NRCA boundary indicates the state's willingness to purchase those properties if funding is available. The West Tiger Mountain NRCA boundary encompasses public (city and state) and privately owned lands. The privately owned lands are generally "inholdings" surrounded by the public lands. In addition to "inholdings" there are a number of properties along the edge of the High Point frontage road (SE 79th St) included in the boundary. To maximize the efficient management of the public lands, reduce fragmentation of resource values and habitat areas, and protect scenic values it would be appropriate to acquire these "inholdings" and edge properties when feasible.

There are 2,494 acres of state-managed trust lands within the NRCA boundary. Acquisition via a trust land transfer is recommended in order to accomplish the conservation goals in this plan.

Integrated Forest Management in Tiger Mountain State Forest

There are several additional areas of the state forest that are important for ecological, scenic and recreational/educational purposes. These areas should be managed consistent with the NRCA guidelines through integrated forest management. These areas include sensitive wetland areas in and around Otter Lake, Double-Beaver Wetland, Beaver Valley and Silent Swamp, geologic features along Fifteenmile Creek, stands of 100 plus year-old forest and scenic views from the Tiger Mountain summits. Management of the Tiger Mountain State Forest should include protecting these areas through a “conservation overlay” to enhance native ecosystems in the area while providing an opportunity to develop a coordinated forest management and environmental education program.



Stewardship Recommendations

The Statewide NRCA Management Plan provides policy guidance for the selection and evaluation of appropriate management priorities and strategies for individual NRCA's. The Statewide Plan also recognizes that the opportunities, constraints, and needs of each NRCA site vary, and that management philosophy should reflect the uniqueness of each area. The West Tiger Mountain NRCA provides a unique combination of natural resource, recreational and educational opportunities.

A series of stewardship activities have been formulated to guide the management of the West Tiger Mountain NRCA. These enhancement activities and recommendations were formulated to provide an integrated forest management approach between the West Tiger Mountain NRCA and the Tiger Mountain State Forest. Many guidelines for managing natural resources and recreational uses on Tiger Mountain State Forest will continue to provide management direction for the West Tiger Mountain NRCA. However, where such guidelines were found in conflict with NRCA objectives, new guidelines were formulated.

The management philosophy for the West Tiger Mountain NRCA is provided below. The management philosophy is supported by general goals that apply, where appropriate, to the entire NRCA. Following these goals are management prescriptions to implement each goal. In addition, the management plan contains management prescriptions that are specific to each land unit in the NRCA.

Management Philosophy

The West Tiger Mountain NRCA will be managed to protect ecological systems and encourage natural successional processes while providing controlled opportunities for low-impact public use emphasizing environmental education.

This overriding management philosophy is supported by several major policy goals, as defined below. Specific strategies for accomplishing these goals are also defined.

GENERAL MANAGEMENT GOALS FOR WEST TIGER MOUNTAIN NRCA

- Maintain, Enhance and Restore Ecological Systems
- Maintain or Provide Habitat for Threatened, Endangered, and Sensitive Species

-
- Maintain Scenic Landscapes
 - Protect Cultural Resources
 - Enhance Opportunities for Environmental Education
 - Provide Opportunities for Low Impact Public Use

Following are the management strategies and prescriptions for the General Management Goals.

General Management Goals, Strategies, and Prescriptions

Note: Please refer to Land Unit section for more specific management strategies on each Land Unit.

Goal: Maintain, Enhance and Restore Ecological Systems

MANAGEMENT STRATEGIES

- Closely integrate management activities in Tiger Mountain State Forest between the NRCA and the working forest to provide for the maintenance, enhancement, and restoration of ecosystems.
- Connect the West Tiger Mountain NRCA with other natural areas, primarily to the east toward the Cascades, and secondarily to natural areas in the Puget Sound basin. Enhance the role of the NRCA as a critical connector in the regional system of natural areas.
- Identify and protect essential and valuable wildlife habitat and facilitate biological diversity to reduce fragmentation of area genetic resources and geographic isolation of ecosystems.
- Wherever possible, allow natural successional processes to proceed in order to reestablish the natural character of the land and water.
- Manage and enhance resources where disturbed areas are not recuperating through natural successional processes and where ecosystem quality is degrading through erosion, non-native (exotic) plant invasion, or other means.

MANAGEMENT PRESCRIPTIONS

- Establish formal and informal management agreements with other landowners and appropriate agencies to protect and enhance existing wildlife corridors between natural areas such as Squak Mountain, Cougar Mountain, Rattlesnake Mountain, Grand Ridge, and the Cedar River Watershed. Most critical is the wildlife crossing on Highway 18.
- Acquire properties (“inholdings”) within the NRCA boundary, where feasible.
- Regularly evaluate recreation use levels and increase recreation control, maintenance, and enforcement activities when use levels interfere with ecological maintenance, enhancement and restoration efforts.
- Allow natural processes (excluding fires) to reestablish the natural character of the land.

-
- Where enhancement/restoration projects are necessary due to site disturbance, use local stock of native/endemic plants when possible in restoration and enhancement efforts in the NRCA that require planting vegetation.
 - When possible, allow natural events to occur, except in cases where there is imminent threat to public safety, adjoining landowner property, long-term ecological health of the NRCA or facilities located on site.
 - Define minimum habitat requirements and limits of acceptable change, assess habitat value, and perform population surveys for key indicator species. Actively pursue baseline studies for those plant and/or animal species of significance which have not already been studied. Encourage ongoing monitoring of these species. Protect occupied and potential habitat, and encourage establishment of native species currently absent on the NRCA.
 - Remove exotic (non-native) plant and animal species where they threaten ecosystem integrity or habitat of sensitive species. Monitor regenerating areas, recently closed roads, and other disturbed areas for the invasion of exotic plant species.
 - Monitor use and maintenance of utility corridors to ensure that the conservation goals of the NRCA are not compromised. Pursue formal agreements with corridor owners to facilitate restoration and ongoing management. Work with utility corridor owners to monitor and control scot's broom invasion along powerline corridors.
 - Reconstruct and revegetate areas of disturbed stream channels and banks where roads and trails have been abandoned.
 - Monitor development proposals for adjacent private lands that have the potential to impact the ecological health of the NRCA.
 - Support efforts of the Mountains to Sound Greenway Trust to designate a system of natural areas forming a connected corridor from Puget Sound to the eastern foothills of the Cascade Mountains in the Interstate 90 corridor.

Goal: Maintain or Provide Habitat for Threatened, Endangered and Sensitive Species

MANAGEMENT STRATEGY

- Maintain, enhance and restore habitats specifically required by threatened endangered, or sensitive (TES) plant and animal species.

MANAGEMENT PRESCRIPTIONS

- Identify suitable habitat for TES species.
- Evaluate reintroduction of extirpated TES species in areas of suitable habitat.
- Give highest priority to the protection of designated TES species and occupied and potential habitat in all management decisions.
- Work cooperatively with other agencies and organizations with expertise in species management in the evaluation of regional TES species.
- Coordinate TES species studies in the Tiger Mountain State Forest as well as with other landowners in the region.

Goal: Maintain Scenic Landscapes

MANAGEMENT STRATEGY

- Preserve visual and aesthetic resources provided by West Tiger Mountain NRCA's unique location at the edge of urban development in the Puget Sound metropolitan region.

MANAGEMENT PRESCRIPTIONS

- Integrate management activities in Tiger Mountain State Forest between the West Tiger Mountain NRCA and working forest to minimize impacts to scenic views from areas within the NRCA that are extensively visited by recreational users (such as West Tiger #3).
- Maintain existing scenic views in those areas that have been designated to receive the highest level of public use.
- Protect on-site aesthetic qualities by using rustic materials and earth-tone colors in the design of public facilities, including interpretive signs or kiosks, public rest rooms, picnic tables, benches, viewing platforms, interpretive structures, or other facilities.
- Where possible, encourage management activities and site development to be placed in areas which are out of sight from major viewpoints from within the NRCA. Appropriate natural screening may be used where activities or site development occur.
- Coordinate with owners of utility corridors on the NRCA to mitigate visual impacts from additional development and to reduce existing impacts where feasible.
- Coordinate with Washington State Parks and Recreation Commission, King County and the City of Issaquah to review and comment on development plans for areas adjacent to the NRCA that may impact scenic views to and from the NRCA.
- Coordinate with the Washington State Department of Transportation (WSDOT) to manage vegetation along the Interstate 90 right-of-way to maintain and enhance scenic views of the NRCA.

Goal: Protect Cultural Resources

MANAGEMENT STRATEGY

- Protect existing cultural and historic resources in the NRCA, with specific emphasis on tribal heritage resources.

MANAGEMENT PRESCRIPTIONS

- Continue to work with the Native American (Puget Sound) Tribes to identify and protect sites of tribal significance.
- Identify and incorporate into educational programs significant non-Native American historic and cultural sites within the NRCA where incorporation does not interfere with ecosystem processes.

Goal: Enhance Opportunities for Outdoor Environmental Education

MANAGEMENT STRATEGIES

- Create a greater understanding of West Tiger Mountain NRCA and Tiger Mountain State Forest as a whole and instill a sense of stewardship in the protection of the area's significant natural resources.
- Maintain and enhance environmental, cultural and historic educational opportunities for all citizens of Washington State, with special emphasis on the K-12 program.
- Incorporate site restoration efforts into educational programs.

MANAGEMENT PRESCRIPTIONS

- Actively pursue funding through grants and program sources for a full-time education and volunteer coordinator for the West Tiger NRCA, the Tiger Mountain State Forest and additional NRCA and trust lands located in King County.
- Provide informational signs, kiosks, maps, or brochures at or near the entry to the NRCA which explain the purposes of NRCAs, acceptable uses on the site, and rules of public use. Maps and brochures may be distributed at strategic sites in Issaquah.
- Provide interpretive signs at or near areas of biologic, geologic, historic, or prehistoric interest which will educate and instill in the public a sense of stewardship. Use appropriate materials to blend the signs with surroundings and avoid overuse of signs.
- Provide informational signs at areas where there are use restrictions, such as restricted or limited access or where access is prohibited explaining the purpose of restricting or prohibiting public use in the area.
- Work with the interagency trail coordinator for DNR, King County, City of Issaquah and Washington State Department of Parks and Recreation to develop and coordinate regional education programs consistent with NRCA program goals.
- Coordinate with local educators, programs, organizations, and the Superintendent of Public Instruction to develop educational materials and programs.
- Concentrate education facilities where public use occurs, particularly where the public enters the NRCA.
- Develop a Docent Program:
 - Recruit volunteers to help inform all types of users about NRCA goals, fragile areas, use regulations, and conflicts while providing information on natural and cultural history, and recreational opportunities.
 - Develop and conduct interpretive tours for user groups to convey the purposes of the West Tiger Mountain NRCA and the resources it was designated to protect. Use volunteers to conduct tours if staffing is limited.
- Coordinate with the Mountains to Sound Greenway Trust to develop a regional signage program.

Goal: Provide Opportunities for Low-Impact Public Use

MANAGEMENT STRATEGY

- Accommodate public recreational and educational activities only where use levels and activities do not conflict with NRCA goals and do not diminish ecosystem quality and natural site characteristics.

MANAGEMENT PRESCRIPTIONS

- The NRCA shall be open during daylight hours, dawn to one hour after dusk. The parking area shall be gated and closed during the off hours to ensure that the NRCA remains a day-use area.
- Temporarily restrict public access during stewardship activities and extreme fire weather, if necessary. Other seasonal closures of sites or trails may be needed to protect sensitive plants, wildlife, highly erodible soils, and restoration efforts.
- Hunting as an allowed public use within the NRCA requires additional review due to increased public recreational use of the NRCA and Tiger Mountain State Forest, public safety considerations, and because of public comments received during the public hearing and review process of the management plan. Presently hunting (bows and shotguns only) and fishing are allowed only during scheduled seasons, except on City of Issaquah lands where hunting is prohibited. Hunting as a continued activity in the NRCA raises several issues: what level of hunting can or cannot be accommodated in the NRCA; does hunting and fishing have an ecological impact, adverse or otherwise, on wildlife and fish populations and other natural resources, and does hunting create recreational user conflicts or a public safety issue during the hunting season due to the increased (year-round) recreational use of the area. DNR, in conjunction with the Washington State Dept. of Fisheries and Wildlife, which regulates hunting and fishing, should conduct an analysis to determine whether hunting and fishing activities are having an effect on the resources and uses of the NRCA. The analysis should develop and include a recommendation on hunting and fishing activities within the NRCA based upon the results of the findings.
- Allow only those public use activities that are consistent with NRCA goals and policies that protect landscape elements from degradation. Specific exceptions are noted for individual land units. Activities not consistent with the West Tiger Mountain NRCA goals are: camping/overnight use, hiking off-trail, mountain biking and horseback riding off road or on non-designated trails, use of motor vehicles off road or on non-designated roads, snowmobiling, target shooting/archery, bear-baiting, and collection of plants, mushrooms, or firewood for non-tribal purposes. Commodity-based activities (i.e., mining, timber harvesting) should also be precluded, except for selective forest management activities associated with adopted land restoration, rehabilitation plans, or limited sub-surface mining which does not harm ecological systems. These uses shall only be permitted on a case-by-case basis.

-
- Motorized vehicle use shall be limited to emergency response, stewardship activities, permitted educational opportunities and use in designated areas by those who are differently able. Rules for motorized use on roads open to public use are contained in the Tiger Mountain State Forest Recreation Plan.
 - Allow incidental collection, through issuance of a permit, of rocks and minerals only where there is no noticeable disturbance to the landscape and with the use of hand tools only. Monitor impacts, and impose additional restrictions if impacts occur.
 - Monitor public use levels. Where impacts exceed acceptable thresholds (where ecological processes are being damaged) use will be controlled, and site enhancement or restoration will be employed.
 - Rehabilitate and improve trails where necessary to encourage trail use and discourage off-trail activities. Maintain official trails and informational signs.
 - Avoid leading NRCA visitors on trails or roads to locations that would encourage trespass on private land.
 - Re-evaluate plans as identified in the Tiger Mountain State Forest Recreation Plan for trails and trailhead facilities located outside of the NRCA for potential impacts to the natural features of the NRCA.
 - Require that permits be obtained from the Department for scientific research, large group activities or other special events. Large group activities and special events include any event involving more than 12 participants which is advertised in advance, sponsored by any individual or organization, and conducted at a predetermined time and place within the NRCA.
 - Use effective signs to educate users. Post the general rules and regulations of the NRCA, as well as a map of the area at developed trailheads. Work with user groups to reduce impacts and conflicts arising from group use.
 - Provide information at developed trailheads regarding other recreational opportunities located within Tiger Mountain State Forest and adjacent public lands.
 - Work with the interagency trail coordinator for the Department, King County, City of Issaquah and Washington State Department of Parks and Recreation to develop and coordinate regional trails and low-impact public uses consistent with NRCA program goals.
 - Keep pets leashed at all times within the NRCA to minimize conflicts with other users and wildlife. Monitor and assess damage done by pets to vegetation and wildlife habitat areas. Consider restricting pets from the NRCA if necessary to accomplish preservation and conservation goals.

FIGURE 6: LAND UNITS

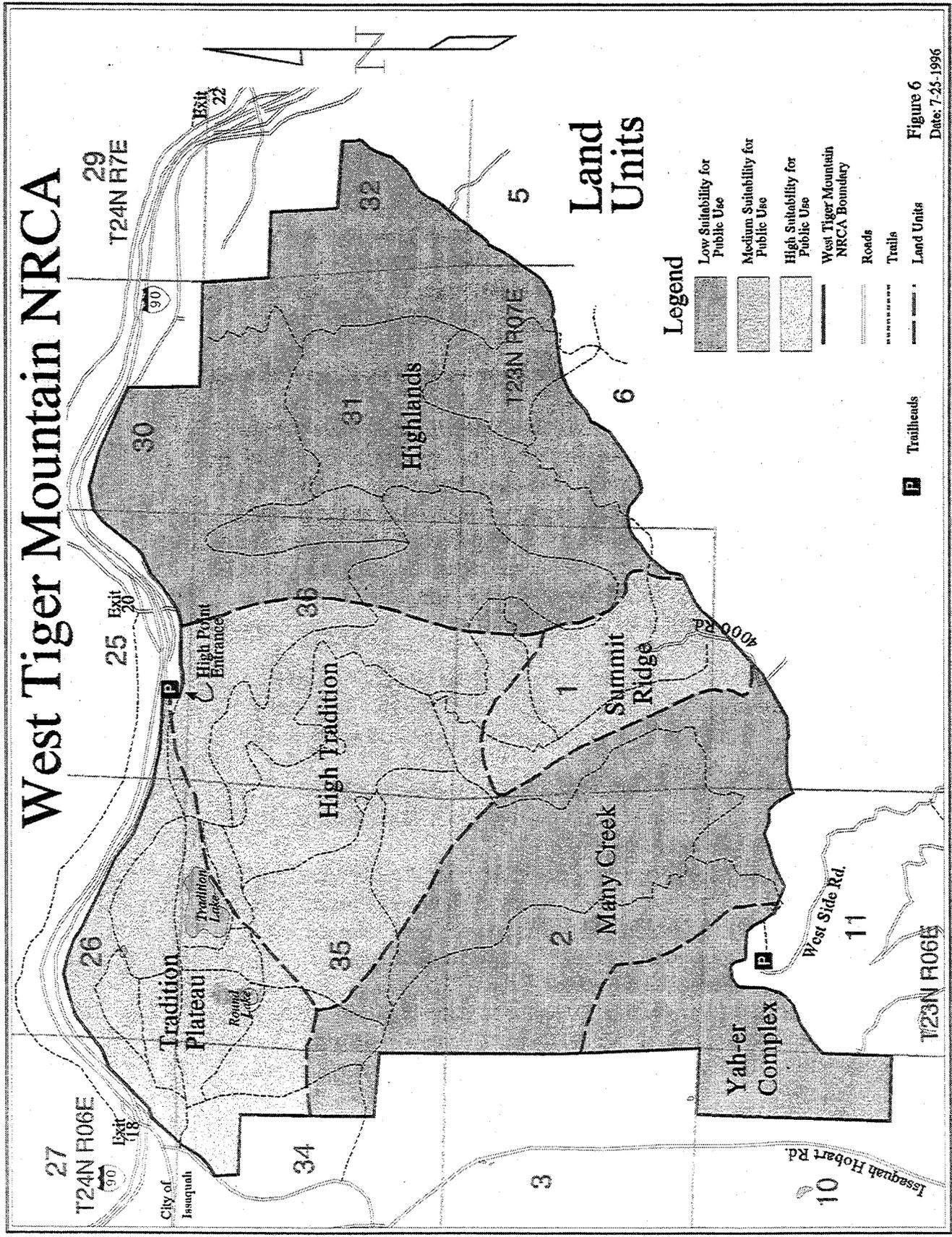


Figure 6
Date: 7-25-1996

Management Prescriptions by Land Unit

The NRCA is divided into six unique land units based on watershed boundaries, ecological quality, sensitive areas, amount of disturbance, habitat potential, and current use. Each land unit provides unique management opportunities and restraints (Figure 6).

In addition to the general management goals as outlined above the entire NRCA, DNR will carry out the following recommendations for each land unit in the NRCA.

Tradition Plateau Unit

The Tradition Plateau Unit contains over 500 acres and is the most heavily used unit recreationally in the NRCA. The unit is popular because it is relatively level and easily accessible from Interstate 90. The area contains easy family walks around Tradition Lake and offers a boardwalk through a forested wetland. This unit shall be managed to protect sensitive wetland areas and mature forest, restore and enhance the degraded areas, and maintain wildlife habitat while providing controlled opportunities for environmental education and low impact recreation.

MANAGEMENT PRESCRIPTIONS FOR THE TRADITION PLATEAU UNIT:

- No additional trails should be constructed. Concentrate use on existing hardened and established trails.
- Reed canarygrass should be eliminated from Tradition and Round Lakes.
- Permanent protection of the Tradition Lake sedge meadow from visitors should be implemented. Protective measures such as the existing split-rail fence should be supplemented with native plantings around that portion of the sedge meadow that is closest to the utility spur road and that seems to offer the most direct route to the marsh.
- Access to Round Lake and surrounding sensitive wetland areas should be restricted or closed entirely, and the south shore should be revegetated. Split-rail fence (or similar material) as well as signage should be installed. Native trees (red alder and Douglas fir) could be planted behind this fence to provide a permanent physical and visual barrier to discourage access to the lake.
- The unnamed "social" trails leading to, from and around Round Lake to the utility road should be closed by filling with brush at the utility road. The Wetlands Trail should be rerouted from where it is located within the lake's buffer area. In the redesign of the Wetlands Trail include one access/viewpoint of the lake. This will provide a controlled opportunity for recreational users to view the lake and wildlife. Split-rail (or similar material) fencing, plus use of hardy vegetation, should be incorporated into the planning of the access route. This will ensure that people stay within the defined access corridor and not venture into surrounding sensitive areas.

-
- Thin and open small gaps in second-growth, even-aged, densely forested stands of Douglas fir to improve structural diversity on Tradition Plateau. Replant with a mixture of shade tolerant species which will also increase habitat values and diversity.
 - Additional interpretive signs should be used around Tradition Lake to describe the wildlife, wetland ecosystems, and current restoration efforts .
 - Use of the proposed group shelter should be on a reservation basis, if necessary, to limit overuse of this area.
 - Access to Tradition Lake should be limited to one site where there would be the least amount of site and resource disturbance. Split-rail (or similar material) fencing, plus use of hardy vegetation, should be incorporated into the planning of the access route to ensure that people stay within the defined access corridor and not venture into surrounding sensitive areas.
 - The impact of fishing on the ecological health of Tradition Lake should be studied. If impacts are found to be occurring, fishing activities should be managed to minimize disturbance.
 - DNR should work with owners of the power substation to pursue the screening of this facility with native vegetation.
 - DNR should work with owners of the east-west utility corridor through the unit to maintain the scenic views from the western portion of the Tradition Plateau.
 - Eroding stream banks should be stabilized and planted with native vegetation. Trails should be re-directed to minimize damage to stream channels and creekside areas.

High Tradition Unit

The High Tradition Unit encompasses 877 acres and is located on the mountain slopes above the Tradition Plateau Unit. It supports well-established vegetation in a mixture of conifer and deciduous species of varying ages. The management focus for this unit is to restore and enhance the disturbed Talus Rocks area and only allow controlled low-impact public use on the designated trails.

MANAGEMENT PRESCRIPTIONS FOR THE HIGH TRADITION LAND UNIT:

- Public access to areas where trampling has led to compaction of the soil and inhibition of the understory should be managed and/or eliminated to allow for the recovery of the vegetation.
- Interpretive signs should be posted around the talus rock area informing visitors of restoration efforts and the need to protect the soil and vegetation.
- The Department should work with writers of local trail guides to discourage mention of the "Talus Caves". If any mention of the area is included in a guide book, the reference should be to the "Talus Rocks" in order to reduce the level of attention to the area.

-
- The Department should work with local school children to reduce incidence of informal gatherings at the Talus Rocks .
 - Restoration efforts at the Talus Rocks should be closely monitored, and additional access restrictions employed if disturbance continues.
 - Prior to upgrading of the Section Line Trail and the West Tiger Railroad Grade to accommodate equestrian use as planned for in the Tiger Mountain State Forest Recreation Plan, the use should be re-evaluated based on results from additional ecological inventory and future use levels in the area.
 - The slope comprising the High Tradition management unit is part of the view from Interstate 90 and should be maintained in its present natural state.

Highlands Unit

The Highlands Unit (1,580 acres) is the least disturbed area of the NRCA and is forested with a mixture of mature conifer and deciduous species where patches of old-growth western hemlock and western red cedar are also found. Other sensitive areas found in the unit include High Point Creek and associated riparian areas. There are several management issues for this land unit. They include maintaining the scenic views from Interstate 90, allowing ecological processes such as forest succession to proceed undisturbed, and protecting the quality of High Point Creek as a sensitive area and fish-bearing stream.

MANAGEMENT PRESCRIPTIONS FOR THE HIGHLANDS UNIT:

- The Tiger Mountain Trail (TMT) should be maintained. The Preston Trail, Dwights Way, and Dick Heintz Trails were not addressed in the Tiger Mountain State Forest Recreation Plan and should be evaluated based on NRCA goals for this unit. If found to be incompatible with NRCA goals, these trails should be relocated or closed.
- No new trails should be constructed in this unit, and existing trails should be bridged and cross perpendicular to the creeks to protect sensitive riparian areas.
- If stream bank erosion occurs, trails should be located along short sections of puncheon in order to prevent trampling of wet creekside soils.
- Trail and stream crossings should be clearly marked, and all undesignated stream crossings should be closed to protect sensitive riparian areas.

Many Creek Unit

Due to the fairly low levels of public use in this unit, this 910-acre area remains relatively undisturbed. The unit is fairly diverse, containing a mixture of red alder and bigleaf maple on the lower elevations and a mixture of red alder and old-growth Douglas fir on the upper elevations. In addition, the area supports a sensitive stream system, hence its name. The management goal for this land unit is to maintain and protect the sensitive riparian habitats while providing limited trail access from the Tradition Plateau to Poo-Poo Point.

MANAGEMENT PRESCRIPTIONS FOR THE MANY CREEK UNIT:

- Trails and stream crossings should be clearly marked, and all undesignated stream crossings should be obliterated.
- Undesignated trails in this unit should be closed to concentrate use on existing trail corridors and hardened areas.
- Public use levels should be monitored, and additional trail closures and use restrictions applied if soil erosion or disturbance increases.

Yah-er Complex Unit

The Yah-er Complex Unit is 293 acres and contains a high-quality example of the Douglas fir-Pacific madrone/salal plant community type. This vegetation is unique for the west slope of the Cascades. It most closely resembles a plant community found in the San Juan Islands and the Olympic rain shadow of the Puget Trough. This plant community is a high priority for protection because there are few high quality examples known to exist. The very thin soils and their associated herbaceous and non-vascular vegetation are quite susceptible to trampling damage. This land unit will be managed to protect the sensitive plant community.

MANAGEMENT PRESCRIPTIONS FOR THE YAH-ER COMPLEX UNIT:

- Efforts in this area should focus on preservation of the vegetation and cliffs.
- The Yah-er Wall cliff trail should be monitored for erosion and instability, and use of this area should be discouraged. If trail erosion and trampling of vegetation increases, trail closure or relocation should occur.
- The regenerating forest east of Yah-er Wall should be managed to produce an uneven aged stand where diameter growth, species diversity, and understory development are encouraged.
- The views from this area offer an opportunity to inform the public about the Mountains-to-Sound Greenway and the "Issaquah Alps." Interpretive signs conveying these themes should be installed at adjacent Poo Poo Point.
- The Department should continue to work with user groups to minimize user conflicts and prohibit further facility development not approved by the Department.
- Work with the paragliding community to relocate a trail from the landing area to Poo-Poo Point to protect the Yah-er Wall sensitive area.

Summit Ridge Unit

The Summit Ridge Unit is the smallest (268 acres), and is the least forested of the units and is fairly open. Douglas fir is the predominant species in the unit, although Pacific silver fir is found in the higher elevations. The soils in the area are sensitive and are subject to medium to high levels of compaction and high erosion potential. The management goal of the unit is to protect the erodible, low capability soils and sensitive plant communities along the ridge and preserve the scenic views from the ridge top of Mount Rainier, Seattle, and Squak Mountain.

MANAGEMENT PRESCRIPTIONS FOR THE SUMMIT RIDGE UNIT:

- A formal agreement with Weyerhaeuser Company (which owns the three West Tiger Summits) should be developed to integrate conservation values and scenic views with regional needs for communication sites.
- This area provides views of the surrounding mountains and Seattle, particularly from West Tiger #3, and to a lesser extent West Tiger #2 and West Tiger #1. Over time, tree growth may block these views. If this occurs, limited pruning or thinning of vegetation should be considered where such activity would not significantly disrupt ecosystem processes.
- Revegetation of the 4000 Road along the Summit Ridge should be pursued. The road cuts are eroded and create adverse resource and aesthetic impacts.
- An agreement should be sought with private landowners regarding construction and operation practices on their land. To minimize conflict between NRCA management techniques and the activities on private land DNR should cooperate with private landowners to prevent NRCA from trespassing visitors on the communication facilities at the summit sites.
- Excessive trampling of vegetation has occurred on the summit of West Tiger #3 due to high use levels. Restoration of the disturbed native plant community at this site should occur. Public use should be directed to hardened areas, and signs should be posted to educate visitors about the need to protect sensitive plants in the area.

Regulation, Enforcement, and Fire Management

Regulation, enforcement, and fire management are important aspects for the effective implementation of the management prescriptions contained in this plan. Adequate access and guidance for fire management, emergency response and law enforcement are necessary.

Because of threat of wildfire escape to surrounding private forest lands and surrounding residential development, wildfires within the NRCA will be extinguished. DNR should consider the primary goals and most sensitive resources of the NRCA in choosing fires suppression techniques, including location of control lines, role of equipment, use of chemical retardants, location and extent of mop-up, and type of mop-up activity. Natural resources should be protected wherever possible. Sites should be left in a "natural setting" including effects from natural events. Mop-up activities should be limited to use of water and hand tools. Any activity that could produce slumping or increased sedimentation into wetland or shore areas should be avoided. Any activity that would alter flow of water into or out of the wetlands, lakes, or streams should be avoided. Use of fire suppressants should be limited to plain water, "wet water" (or water containing similar wetting agents), or "foam". Retardants may also be appropriate in order to protect sensitive areas and

private lands. Helicopters should be used whenever possible. Mechanized equipment should be limited to roads. DNR is responsible for enforcement of fire regulations on the NRCA. DNR should cooperate with King County Emergency Services to provide adequate emergency response under the same guidelines as fire response.

DNR will be responsible for enforcement actions within the NRCA. Enforcement will emphasize non-confrontational techniques and voluntary compliance. Education programs may also help reduce conflict among user groups. Where certain uses are not permitted, it is hoped that informing the user where these activities are permitted will reduce the number of violations. Because enforcement of regulations is integral to the effective implementation of recommendations made in this plan, funding for continued enforcement should be pursued to meet program goals. Issuing of tickets to non-conforming users of an area should be continued.

Existing enforcement activities on the NRCA are inadequate to control all existing non-conforming uses. Effective implementation of this plan will require additional staffing and funding to ensure that stewardship activities are not disrupted and additional public-use guidelines are followed. Opportunities to provide additional enforcement for the NRCA should be pursued to ensure that stewardship opportunities as specified in this plan are successfully implemented. The Department should continue to work cooperatively with King County and the City of Issaquah to provide adequate emergency response under the same guidelines as fire response.

Interagency Coordination

Many of the management recommendations outlined in this document involve coordinated efforts between land managers, scientists, recreationists, community organizations, neighbors, and local, state, and federal agencies. Coordination between agencies may prove valuable in making land acquisitions, in sharing mapping capabilities and data, in performing baseline studies of vegetation and wildlife, in recreation planning, and in regional landscape planning. Among the agencies with which DNR should coordinate are the USDA Forest Service, US Fish and Wildlife Service, Washington State Department of Fish and Wildlife, Washington State Department of Ecology, Washington State Department of Transportation, Washington State Parks and Recreation Commission, King County, City of Seattle (Watershed) and the City of Issaquah.

DNR should continue to support trail coordination efforts with King County, the City of Issaquah and the Washington State Department of Parks and Recreation Commission. In addition, DNR should continue funding their part of the Interagency Coordinator.

Long-term agreements should also be pursued with the private landowners to assure the permanent protection of their respective lands within and around the NRCA. Stewardship agreements with residents adjacent to the NRCA should be pursued to minimize incompatible development or other activities adjacent to the NRCA.



Monitoring Program

Purpose

The purpose of the monitoring and evaluation program is to track changes in the NRCA, to ensure that recommended management prescriptions are being followed, and to ensure that stewardship activities are being implemented successfully. Monitoring plans will be developed before stewardship activities and site development proceed.

Monitoring Objectives

Future monitoring of the NRCA will be guided by the following objectives:

- Maintain the natural diversity of plant and forest communities, with emphasis on the development and continuation of highly structured coniferous and multi-species deciduous woodlands, and a variety of wetlands.
- Maintain the natural level of diversity both in aquatic and terrestrial species.
- Educate users about restoration and monitoring efforts.
- Ensure that user safety and preferences of various user groups are accommodated to the extent practicable.

Monitoring Tasks and Indicators

Monitoring activities should be carried out based on overall NRCA program goals as well as specific conditions on the NRCA. Monitoring tasks should be prioritized as follows to help decide which monitoring activities should be implemented based on funding and staffing limitations.

- Activities should include addressing key gaps in ecological information, including TES and key indicator plant and wildlife species, priority habitats/vegetation communities, forest structure and understory vegetation, aquatic systems, and other characteristics.
- Monitoring should be given to ecologically sensitive areas identified in resource inventories, particularly those that are degrading.
- Monitor non-sensitive areas and facilities, such as trails, roads, trailheads, cultural and interpretive sites. DNR should consult with the Natural Heritage Program to design monitoring activities based on future ecological studies.

Indicators should be selected to address monitoring objectives, to provide an early warning of change, and to be cost-effective and relatively easy to implement. Following are examples of monitoring activities that could be used to track ecological conditions and visitor use on the NRCA. Final selection of indicators will be made based on additional ecological information.

- Use vegetation transects to measure species occurrence and cover as well as successional change in plant community conditions.
- Use photographic recording from fixed points to measure change of the amount of aerial extent of plant community and wildlife habitat types.
- Maintain records of reported wildlife sightings.
- Map nest locations.
- Document types and location of exotic plant species present and rates of invasion.
- Record the abundance of insects, annelids and other benthic organisms in aquatic communities, and the effects of stocking the lakes.
- Measure water quality parameters such as pH, turbidity, dissolved oxygen, nutrient levels, bacteria, temperature and heavy metals.
- Assess changes in the trail width, number of bootleg trails and rates of erosion through field checks and photographic recording and measurements.
- Use photographic recording to document visual changes from designated scenic viewpoints in the NRCA.
- Meet with agencies and interest groups to monitor activities on adjacent lands potentially affecting the NRCA.
- Document frequency of user conflicts and enforcement actions.
- Document frequency, type of damage and vandalism to structures, facilities, and vegetation (e.g., carving initials in trees and rocks, etc.).
- Maintain regular contact with local educators and user groups. Record frequency and location of use of the NRCA for organized education programs.
- Perform user surveys on a periodic basis at specific locations that assess activity types, levels of use, and preferences.



Glossary

act (the): The legislation which created RCW 79.71.

alteration: Any human-induced action which changes the existing condition of a sensitive area.

buffer: An area that surrounds and protects an environmentally sensitive area from adverse impacts to the functions and values of that area.

capability: The tolerance of a resource to modification, human-induced or otherwise.

cottids: A family of fishes composed of species of sculpins.

critical habitat: Those areas which are necessary for the survival of endangered, threatened, sensitive, or monitor species.

cultural resources: Archaeological and historic sites and artifacts.

DNR: Department of Natural Resources

ecosystem: All living components of a biological system.

enhance: To recreate one or more characteristics that existed on the site before alteration.

exotic: Any species of plants or animals that are foreign to the NRCA.

eutrophication: The process by which a body of water becomes naturally or by pollution rich in dissolved nutrients and often shallow with a seasonal deficiency in dissolved oxygen.

federal endangered species: A species in danger of extinction throughout all or a significant portion of its range.

federal threatened species: A species which is likely to become endangered within the foreseeable future.

federal proposed species (candidate): A species that is the subject of a proposed or final rule indicating the appropriateness of listing as threatened or endangered.

harden: To develop in such a way as to minimize public-use impacts to the surrounding natural ecosystem.

low-impact public use: Public recreation uses and improvements that do not adversely affect the resource values, are appropriate to the maintenance of the site in relatively unmodified natural setting, and do not detract from long-term ecological processes.

maintain: To keep in an existing state; preserve from failure or decline.

mitigation: Minimizing or compensating for adverse environmentally sensitive area impacts.

monitoring: The collection and analysis of data by various methods for the purposes of understanding and documenting changes in natural ecosystems and features.

native vegetation: Vegetation existing on a site or plant species which are indigenous to the area in question.

NRCA: Natural Resources Conservation Area

RCW: Revised Code of Washington

restore: To ameliorate human disturbance to the landscape.

state endangered species: Species native to Washington that are seriously threatened with extinction throughout all or a significant proportion of their ranges within the state.

state threatened species: Species native to Washington that are likely to become endangered within the foreseeable future throughout significant portions of their ranges within the state without cooperative management or the removal of threats.

state sensitive species: Species native to Washington that are vulnerable or declining and are likely to become threatened or endangered in a significant portion of their ranges within the state without cooperative management or the removal of threats.

stewardship: Management activities that are intended to maintain, restore, or enhance ecosystems.

streams: Those areas where surface waters flow sufficiently to produce a defined channel or bed.

TES: Threatened, endangered, and sensitive species.

WAC: Washington Administrative Code

wetlands: Lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.

wildlife: All species of the animal kingdom whose species are native to Washington and exist in an undomesticated state.



References

- Boyle, Brian. 1991. *Totem*. Washington State Department of Natural Resources.
- Cahill, Jim, et.al. 1992. *West Tiger Mountain NRCA Draft Management Plan*. Prepared for class in conservation planning, College of Forest Resources, University of Washington.
- Combs-Bauer, Susan. 1991. *Tiger Mountain State Forest Recreation Plan*. DNR South Puget Sound Region.
- Crawford, R., S. Andelman, L. Kunze, and M. Sheehan. 1992. *West Tiger Natural Resources Conservation Area Natural Resources Inventory and Management Recommendations*. Washington Natural Heritage Program, Department of Natural Resources, Division of Land and Water Conservation. Olympia, WA.
- Department of Development Review. 1990. *City of Issaquah Zoning Display Map*. Issaquah, WA.
- Department of Natural Resources. 1986. *Tiger Mountain State Forest Management Plan, Final*.
- Franklin, J. and C. Dyrness. 1973. *Natural Vegetation of Oregon and Washington*. Forest Service General Technical Report PNW-8, US Department of Agriculture (Reprinted with bibliography supplement, Oregon State University, Corvallis, 1988).
- Fish, Edwards R. 1981. *The Past at Present in Issaquah, Washington*. Port Angeles, WA; Pen Print, Inc.
- Hendee, John. 1978. *Wildlife Management*. USDA Forest Service, Seattle, WA.
- Huff, M., D. Manuwal, and J. Putera. 1991. *Winter bird communities in the southern Washington Cascade range*. pp. 207-220 in L.F. Ruggiero, K.B. Aubry, A. B. Carey, and others, eds. *Wildlife and Vegetation of Unmanaged Douglas-fir Forests*. US Department of Agriculture General Technical Report PNW-285.
- Interagency Committee for Outdoor Recreation. 1987. *Washington Outdoors: Assessment and Policy Plan: 1990-1995*. Seattle, WA.

-
- Issaquah Department of Parks and Recreation. 1992 (draft) *City of Issaquah, Issaquah Area Wildlife and Recreational Trails Plan.*
- Jones Associates. 1978. *Issaquah Plateau Groundwater Study.* Prepared for Puget Power and Light Co.
- King County Division of Surface Water Management. 1991. *Current/Future Conditions and Source Identification Report: Issaquah Creek Basin.*
- King County Planning Division. 1984. *Tahoma/Raven Heights Communities Plan, Areas Zoning.*
- King County Planning Division. 1991. *Snoqualmie Valley Community Plan.*
- King County Planning Division. (revised) 1988. *King County Zoning Code Synopsis.*
- Kruckeberg, A. 1991. *The Natural History of Puget Sound Country.* Seattle: Univ. Wash. Press.
- Leopold, E. and A. Gray. 1988. file copy. *Map of burns evident in 1906-1908, Tiger Mountain Area, King Co. WA.* Univ. Wash. Dept. Bot. and College of For. Res.
- Leopold, E. and J. Meinershagen. 1988. file copy. *The Raging River Burn of ca. 1896.* Report for Tiger Mountain Project, DNR. Univ. Wash. Dept. Bot. and College of For. Res.
- Longwell, William K. 1990. *Guide to The Trails of Tiger Mountain.* Issaquah Alps TrailsClub. Issaquah, WA.
- Robinson, Joan and Rice, Harvey S. 1992. *An Archeological Survey of DNR's Tiger Mountain Property, King County, Washington.*
- Rowe, Melissa A. 1992. *A Strategy for Natural Resources Conservation Area Planning; Defining Terms, Setting Priorities and Measuring Success.*
- Snyder, Dale E., Philip S. Gale and Russell F. Pringle. 1973. *Soil Survey of King County Area, Washington.*
- State of Washington, 52nd Legislature, 1991 Regular Session *Substitute Senate Bill 5612.* 1991 April 28.
- University of Washington, College of Forest Resources. 1983. *NRCA Plan.*
- USDA Forest Service. 1990. *Land and Resource Management Plan, Mount-Baker-Snoqualmie National Forest.*

USDA Forest Service. 1974. *National Forest Landscape Management*. USDA Handbook No. 462. Washington DC.

USDA Forest Service. 1992. *Prescribed Natural Fire Action Plan, Alpine Lakes Wilderness*. Washington State Department of Natural Resources. 1992. *Natural Resources Conservation Areas Statewide Management Plan*.

USDA Forest Service. 1983. *State Soil Survey - Report for the South Puget Sound Area*.

Wortman, David E. 1992. *Developing Monitoring Guidelines for Washington State's Natural Resources Conservation Area Program* (unpublished paper). University of Washington, Seattle, WA.

INDIVIDUALS CONTACTED AND REFERENCED:

Jim Agee, College of Forest Resources, University of Washington
Bob Furstenburg, King County Division of Surface Water Management
Harvey Manning, Issaquah Alps Trails Club
Steven Porter, University of Washington