United States
Department of
Agriculture

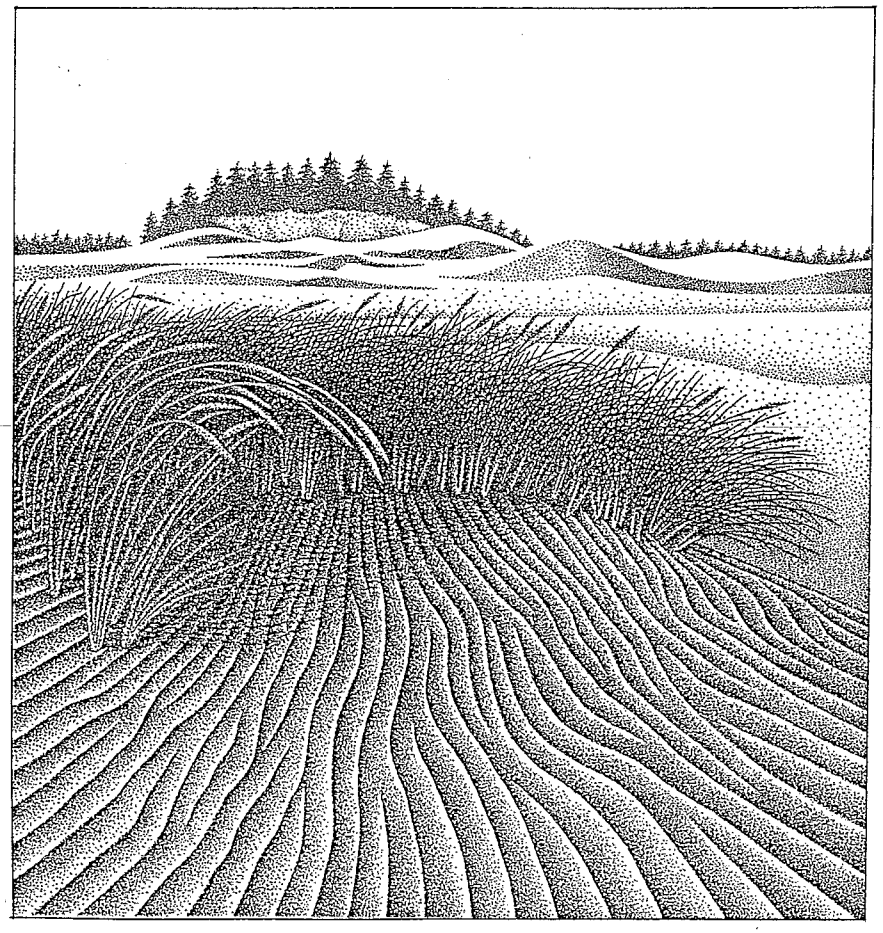
Forest Service

Pacific
Northwest
Region

Final Environmental Impact Statement

Dunes Management Plan

Oregon Dunes NRA
Siuslaw National Forest



Final Environmental Impact Statement for the Oregon Dunes National Recreation Area Management Plan

Siuslaw National Forest

Coos, Douglas and Lane counties
July 1994

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Abstract

This final environmental impact statement describes eight alternatives for managing the 31,500-acre Oregon Dunes National Recreation Area. Each alternative responds differently to the major issues and concerns identified earlier in the planning process. All the alternatives except C amend the Siuslaw National Forest Land and Resource Management Plan adopted March 1990.

Alternative A emphasizes off-road vehicle recreation and would provide access, facilities and services designed to serve large numbers of visitors. It focuses on providing both developed and dispersed recreation opportunities. **Alternative B** would enhance opportunities for both developed and dispersed non-motorized recreation activities. It focuses on separating motorized from non-motorized recreation uses. **Alternative C** is the "no action" alternative that retains the current management plan. It emphasizes a balanced mix of motorized and non-motorized opportunitites while keeping large portions of the area undeveloped. **Alternative D** emphasizes management of fish, wildlife, plants and unique geologic features. It would reduce human impacts while maintaining opportunities for low-density, low-intensity recreation.

Alternative E focuses on allowing natural succession to proceed unimpeded and reducing management presence on the Oregon Dunes NRA. It would allow low-density, low-impact recreation while concentrating facilities along Highway 101. **Alternative F(PA)** is the Preferred Alternative. It provides a broad range of ORV and non-motorized recreation opportunities while enhancing conditions for plants, fish, wildlife and unique geologic features. **Alternative G** emphasizes off-road-vehicle riding opportunities while increasing separation between motorized and non-motorized users. It would provide access, facilities and services designed to serve large numbers of visitors as well as developed and dispersed recreation opportunities. **Alternative H** emphasizes management for non-motorized recreation and increased access to scenic, wildlife and geological features of the Oregon Dunes NRA. Off-road vehicle use would not be allowed.

The Dunes Interdisciplinary Team analyzed information acquired during review of the draft environmental impact statement (DEIS) and included the updated information in the FEIS. Changes between draft and final are highlighted at the beginning of each chapter. A summary of substantive comments, along with responses to those comments, is included in Appendix I of the FEIS.

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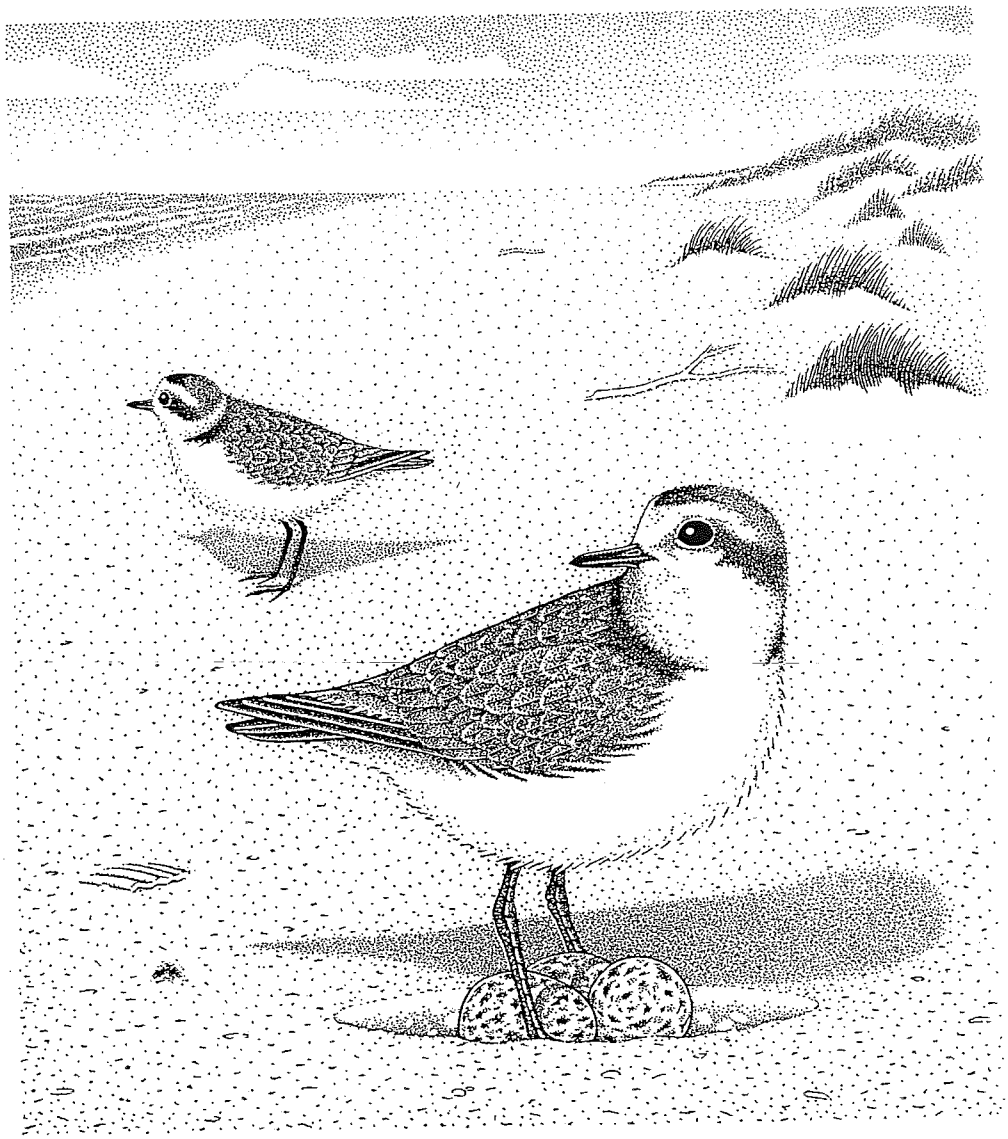
Artwork on cover drawn by John Hutmacher. Additional artwork inside drawn by John Hutmacher and Chris Cox. Desktop publishing by Gina Ramirez. Maps in draft environmental impact statement prepared by Joe Kemp. Alternative maps created by Carol Murdock.

Chapter I
Purpose and Need for the Proposed Action



CHAPTER I

PURPOSE AND NEED FOR THE PROPOSED ACTION

The dune system which comprises the Oregon Dunes National Recreation Area (hereafter referred to as the Oregon Dunes NRA or the NRA) has been a part of the Siuslaw National Forest since 1908, when the Forest was established by President Theodore Roosevelt. In March 1972 Congress passed legislation (PL 92-260) establishing the Oregon Dunes NRA. The legislation states that the area is to be administered by the U.S. Department of Agriculture (USDA), Forest Service for the purposes of "... public outdoor recreation use and enjoyment ... and the conservation of scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters, ... ". A copy of this legislation is included in Appendix A. Since its establishment the NRA has been administered from headquarters located in Reedsport, Oregon, as a sub-unit of the Siuslaw National Forest.

CHANGES BETWEEN DRAFT AND FINAL

The vegetation management issue (#5) was expanded to include special forest products and incorporate concerns about declining aquifer water quality and increasing fire hazard as a result of increasing vegetation at the NRA.

The affect on communities issue (#11) was expanded to note the economic benefit to local communities from special forest products and water from the dunes aquifer.

The water issue (#14) has been rewritten to respond to concerns that the social and economic value of water from the dunes aquifer had not been adequately noted in the DEIS.

The mineral issue (#15) has been rewritten to respond to concerns that original Congressional intent for the buffer lands was not clear in the DEIS and to provide agency rationale for considering making a request to withdraw these lands from mineral entry.

NATURE OF THE ACTION

The Forest Service proposes to amend that section of the Siuslaw National Forest Land and Resources Management Plan (hereafter referred to as the Forest Plan) that provides management direction for the Oregon Dunes NRA. The revised management direction is intended to guide resource programs at the NRA for several years. Future revisions of NRA management direction will be part of overall Forest Plan updates and will be in response to monitoring results or changed conditions. The Forest Supervisor is the deciding official for this action and will select the alternative that best meets the need for updated direction, while most effectively addressing a range of issues and opportunities raised by the public, other agencies, and Forest Service managers.

The National Forest Management Act (NFMA) and the National Environmental Policy Act (NEPA) require preparation of an Environmental Impact Statement (EIS) for this action. It is an amendment of the Siuslaw National Forest Plan which is a "major federal action significantly affecting the quality of the human environment."

An EIS is prepared to present the decision maker, other agencies, and the public with alternative ways to manage the land and resources of the Oregon Dunes NRA. It discloses the environmental consequences associated with each of those alternatives and it provides the decision maker with information necessary to select a course of action.

This EIS describes 8 alternatives, including a Preferred Alternative, for future management of the Oregon Dunes NRA. It is organized in the following manner:

- Chapter I provides background information and discusses the purpose and need for the proposed action.
- Chapter II describes the alternatives, the analysis process, and summarizes outputs and effects associated with each.
- Chapter III describes the affected environment.
- Chapter IV discusses the environmental consequences of each alternative.

PROJECT AREA LOCATION AND DESCRIPTION

The Oregon Dunes NRA occupies a strip of land approximately 40 miles long and averaging 1½ miles wide on the central Oregon coast between Coos Bay-North Bend in the south and Florence in the north (see Vicinity Map). It occupies the western part of Lane, Douglas, and Coos counties. Principal nearby communities include Florence, Reedsport, Coos Bay, and North Bend. Several smaller communities such as Dunes City, Lakeside, and Hauser are also nearby.

There are 31,500 acres within the NRA boundary. The Forest Service manages 27,450 acres of federally owned lands within the Oregon Dunes NRA and approximately 1,450 acres of national forest lands outside the NRA boundary. Principal features include unique coastal geology and scenery, varied recreational opportunities, numerous freshwater lakes and streams, and a wide variety of unusual and limited wildlife habitats. A mild climate and easy access along the length of the area, via U.S. Highway 101, promote year-round visitation for a wide variety of activities.

The economy of the surrounding area was historically based on wood products and commercial fishing. However, in recent years these industries have declined while tourism and service industries (generally associated with an increasing retiree population) are becoming increasingly important contributors to the coastal economy.

UNDERLYING NEED

In May 1979, John McGuire, then Chief of the Forest Service, approved the first Oregon Dunes NRA Management Plan and associated Environmental Impact Statement. This document provides the current direction for managing NRA resources. It was incorporated unchanged into the Forest Plan, approved in March 1990 by Regional Forester John Butruille.

Since the NRA Plan was enacted, and especially during the Siuslaw National Forest planning process, members of the general public, other federal and state agencies, and Forest Service managers have noted problems with, and opportunities to alter, current NRA management direction. These problems and opportunities stem from changes in use patterns, resource conditions, laws and regulations, residential patterns around the NRA boundary, and in public values that have occurred over the life of the current plan. They focus around a broad range of environmental conditions that are discussed in the Issues, Concerns, and Opportunities (ICOs) section of this chapter.

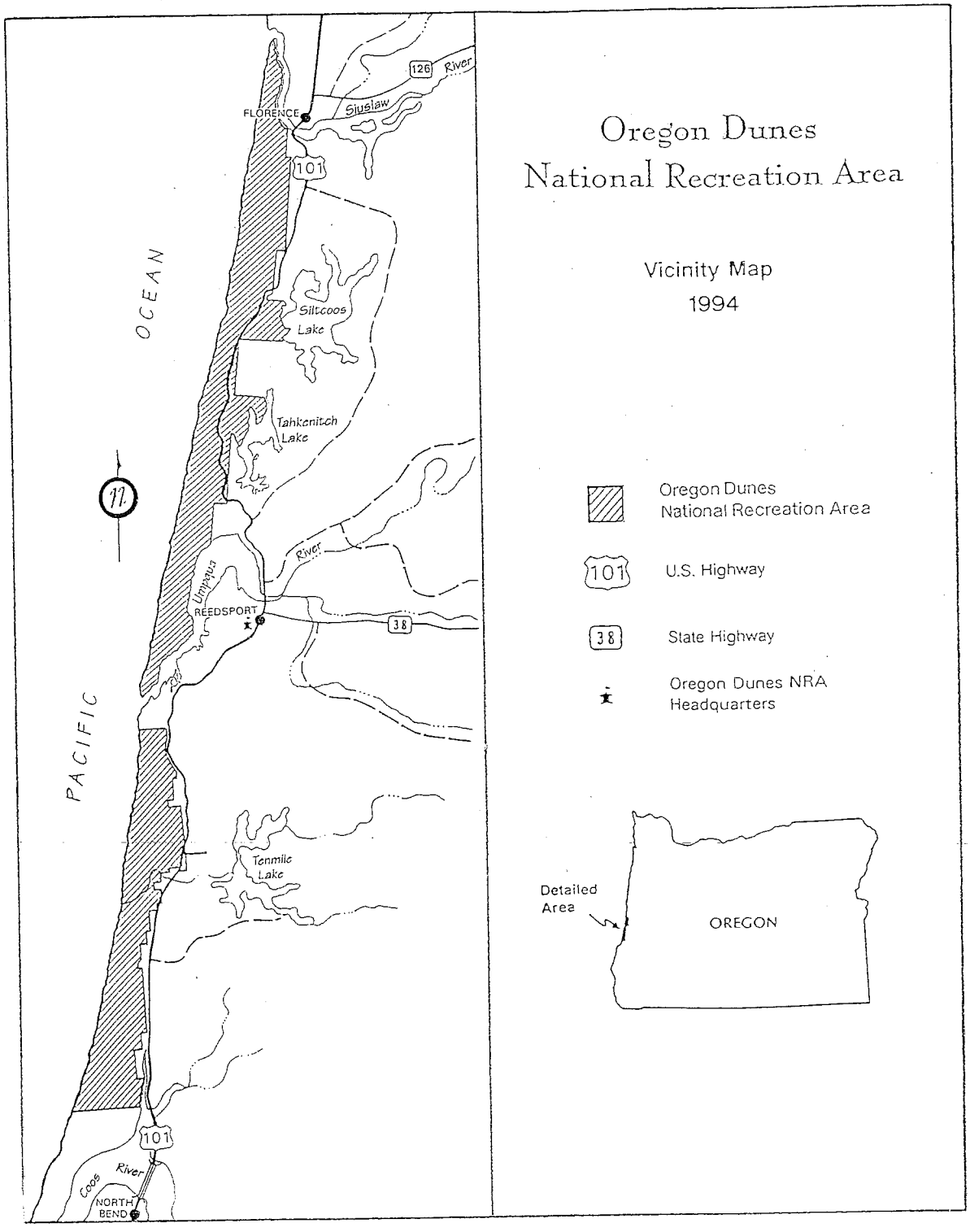


Figure I-1. Location of the Oregon Dunes NRA

Thus, the Forest Supervisor has determined a need to review and amend that portion of the Forest Plan that provides management direction for the Oregon Dunes NRA based on 2 considerations:

- the age of the current direction
- numerous and broad-based public, other agency, and Forest Service management concerns with current management direction

PUBLIC INVOLVEMENT

A preliminary step in reviewing and revising the Oregon Dunes NRA Management Plan was identification of relevant issues, concerns, and opportunities. The purpose of identifying ICOs is to understand what is expected from the NRA in terms of services, goods, uses, and environmental conditions. The ICOs help to determine the scope of the revision effort and provide questions to be answered in developing alternatives for future management of the area.

ICOs were initially generated through a series of 4 informal open houses in communities near the Oregon Dunes NRA, 32 speaking engagements to organized groups, 5 hikes and auto tours, and a newsletter including a response form sent to approximately 1,850 individuals and organizations on the Forest Plan mailing list. A more detailed discussion of public involvement is contained in Appendix B.

Using written and verbal comments the Forest Service Interdisciplinary Team (IDT) identified a series of public issues, management concerns, and resource opportunities. ICOs dealing specifically with the Oregon Dunes NRA that had been identified, but deferred during the Siuslaw National Forest planning process were added to these. The Forest Supervisor reviewed all ICOs and they were validated with interested individuals and organizations through an "Issues Newsletter" mailed to 2,100 individuals and groups on the NRA mailing list. The newsletter included a response form to add or refine issues.

Only ICOs meeting the following criteria were used in the planning process:

- required by law and within the jurisdiction of the Forest Service
- a land management or administrative concern
- currently valid
- related to the Oregon Dunes NRA

- resolvable during the planning process
- resolution would result in significant long-term effects

ISSUES, CONCERNS AND OPPORTUNITIES

In meeting the need to update management direction for the Oregon Dunes NRA, Forest Service managers also want to address a number of environmental ICOs. These ICOs represent problems or opportunities that were raised by the general public, by other agencies, and by the managers themselves during the Siuslaw Forest planning process and in the early phases of this project. In assessing a range of alternatives that meet the need for updated NRA management direction, the deciding official will also be looking for the alternative that best addresses the following ICOs. Responsiveness of alternatives to ICOs is presented in Figure II-17 in Chapter II of this document.

For ease in understanding, the ICOs are presented in 3 groups.

- The first group is ICOs that were used in designing alternatives to ensure a broad range of responses.
- The second group is ICOs that were not used in alternative design, but that are affected differently by the alternatives.
- The third group is ICOs that were not used in alternative design and that are affected the same in all alternatives.

ICOs that were used in developing the various alternatives are as follows:

1. What mix of recreation settings and opportunities will be provided at the NRA?

   The Oregon Dunes NRA can provide a wide variety of outdoor settings where visitors can engage in numerous recreational activities. Currently the majority of the area is in undeveloped settings where recreationists can engage in activities not dependent on facilities, have few other people around, and experience a moderate level of self reliance and risk. Natural resources in these areas have not been modified to accommodate human use. About 3% of the NRA is in more developed settings where many of the activities are based at or near facilities, there are moderate numbers of other people around, and self-reliance and risk levels are low. Natural resources in these areas have been significantly modified to accommodate human use.

In addition, about 51% of the area is currently available for off-road vehicle (ORV) recreation. A primary issue for both those favoring and opposing ORV use has been how much of the Oregon Dunes NRA should be accessible to ORVs and which specific areas should be open or closed. Federal regulations (U.S. Code of Federal Regulations, Title 36, Part 295) require the Forest Service to use the land management planning process to analyze and evaluate the current and potential impacts arising from ORV use. Based on this analysis and evaluation the agency can then allow, restrict or prohibit use of vehicles off roads. Public opinion varies as to what range of settings, which specific activities, and what levels of use should be accommodated at the Oregon Dunes NRA in the future.

Responsiveness to this issue can be evaluated by considering the acres available in the different Recreation Opportunity Spectrum (ROS) classes for each alternative.

2. How will ORV recreation be managed in relation to resources, nearby residents, and other recreationists?

Both advocates and opponents of ORV use are concerned about how to manage this activity to minimize impacts on other resources and to be compatible with other recreational uses and interests of nearby residents. The concerns focus around issues of safety resulting from crowding in some ORV areas; from mixing ORV and non-motorized recreationists in the same areas, and from mixing ORVs and highway vehicles on the same roadways. There are additional concerns from nearby residents about ORV noise emanating from the NRA, especially at night, and about ORV trespass onto private property where it borders NRA riding areas. There are also concerns by both ORV users and other recreationists about ORV noise in campgrounds at night. Finally, there is a broad-based concern about the potential adverse effects of ORVs on plants, wildlife, fish, geologic resources and other elements of the NRA environment.

Federal regulation (36 CFR, 295) directs the Forest Service to manage ORVs on National Forest lands in such a manner as to: minimize damage to soil, watershed, vegetation and other resources; minimize harassment of wildlife or significant disruption of wildlife habitats; and minimize conflicts between off-road use and other existing or potential recreational uses of the same or neighboring public lands, and to ensure compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

Responsiveness of the alternatives to this issue can be evaluated by comparing the acres open to ORV use; ORV-restricted buffers adjacent to private land; and standards and guidelines that impose ORV riding curfews, stricter ORV noise goals, designated routes in vegetated areas, motorized dispersed camping restrictions, and campground quiet hours.

3. How much access and facility development is appropriate at the Oregon Dunes NRA?

   Currently much of the NRA is undeveloped, natural appearing, and accessible only by cross-country travel via foot, horseback, or ORV. Four paved roads run through the area from Highway 101 to the beach. Most developed facilities such as campgrounds, trailheads, staging areas, boat launches, and picnic areas are concentrated along these corridors and Highway 101. There are also some secondary gravel or sand roads, about 25 miles of hiking trails, and some primitive facilities located away from paved roads. Public opinion varies as to how much development of this type should be present at the NRA.

   Responsiveness of alternatives to this issue can be evaluated by considering the following: miles of paved road, miles of gravel road, miles of surfaced or accessible trail, miles of other trail, number and capacity of overnight facilities, number and capacity of day use facilities, and number of concessions.

4. What level of education and resource interpretation should be provided at the Oregon Dunes NRA?

   Learning opportunities at the NRA can range from unstructured self-guided exploration to highly-structured Forest Service-led programs. Learning can be either based at a facility, such as at an interpretive center, or outdoors. Public opinion varies as to the level of program and types of learning opportunities that should be provided.

   Responsiveness of alternatives to this issue can be evaluated by considering the number of interpretive facilities proposed.

5. How will vegetation and special forest products be managed to maintain or enhance the unique scenic, ecological, and recreational qualities associated with dunes ecosystems at the Oregon Dunes NRA?

   The expanse of open, unvegetated sand is the singular feature that characterizes the Oregon Dunes NRA. For many people the sand provides unique scenery and varied recreational opportunities. Introduction and subsequent spread of a variety of non-native plant species, in particular European beachgrass, have changed the area ecologically. As a result, open sand is being covered with both native and non-native plants at an accelerated rate, especially in the deflation plain area. In addition, there is some concern that increasing vegetation is reducing both the quality and quantity of water in the dunes aquifer. Water from the aquifer is important for domestic and industrial purposes in the communities of Coos Bay and North Bend. Denser and more extensive vegetation is

increasing the hazard of fire as a public safety threat for NRA visitors. The public wants the Forest Service to take active steps to reverse this process, primarily to maintain the unique scenic, recreational, and ecological qualities associated with large areas of open, unvegetated sand dunes.

Special forest products include resources such as mushrooms, live plants for transplanting, boughs and greens, and mosses and lichens. They are collected by recreationists and in some cases by commercial pickers. These resources are also important components of healthy ecosystems. Criteria and priorities for use of these resources need to be established to ensure that they are sustained at levels consistent with the intent of the NRA Act.

Responsiveness of alternatives to this issue can be evaluated by comparing the amount of area where vegetation treatment is proposed and by standards and guidelines governing the management of special forest products.

6. How will wildlife, fish, and proposed, endangered, threatened, and sensitive (PETS) species habitat, including special habitats, be managed at the Oregon Dunes NRA?

The Oregon Dunes NRA has the potential to provide habitat for a variety of wildlife, fish, and PETS species. Also, it contains several habitats that are unusual, unique, or limited either within the area, the coastal region, or the nation. These special habitats include high beach, tree islands, wetlands, and Coast Range meadows. Many people feel habitats, including special habitats, are important values of the area. In addition, there are legal requirements that must be met in the case of PETS species. However, other resource program objectives and effects, such as those for Research Natural Areas and recreation, may not be compatible with habitat management and opinion varies about the balance among programs and where habitat should be managed. Potential to provide habitat for a variety of species also gives rise to varied opinions as to which habitats, to benefit which species should be managed.

Responsiveness of alternatives to this issue can be evaluated by comparing the following measures: acres of special habitats managed, acres of fish habitat managed, number and capacity of wildlife-based recreation facilities, number and capacity of fish-based recreation facilities, and acres of PETS habitat managed.

7. Which areas at Oregon Dunes NRA will be allocated for establishment as Research Natural Areas (RNAs)?

Two areas at the Oregon Dunes NRA are potential RNAs. Both Umpqua Spit (formerly Threemile) and Tenmile Creek are about 2,000 acres in

size. The Forest Plan deferred determination of whether the 2 areas would be recommended for establishment as RNAs to the NRA planning effort. Since completion of the Forest Plan 770 acres in the Umpqua Spit area has passed out of federal ownership under provisions of the 1872 Mining Law. Without these lands the remaining 1,330 acres of federal lands would not be viable as an RNA. RNA status would preclude some management activities (such as some types of habitat improvement) and some public uses (such as ORV activities). As a result, opinions differ as to whether either area should be allocated for establishment.

Responsiveness of the alternatives to this issue can be evaluated by comparing the number and size of areas allocated for establishment as RNAs.

8. Which streams at the Oregon Dunes NRA will be recommended to Congress for inclusion into the national Wild and Scenic River system, and how will they be managed?

Portions of 3 streams within the NRA boundary (Tenmile Creek, Tahkenitch Creek, and Siltcoos River) are being studied for eligibility and suitability for inclusion into the Wild and Scenic River system. Inclusion into the system could restrict management and use of the streams. As a result, opinion varies about whether the streams should be nominated to the system.

Responsiveness of the alternatives to this issue can be evaluated by considering the number and classification of streams that will be recommended to Congress for inclusion into the Wild and Scenic River system and the types of restrictions that would result should they be designated.

ICOs not used in alternative design, but that are affected differently by the alternatives are as follows:

9. How will enforcement, education, and other techniques be used to ensure compliance with regulations at the Oregon Dunes NRA?

Many people want better compliance with regulations at the Oregon Dunes NRA. Compliance can be achieved through a variety of methods including enforcement, education, and facility design. Full compliance with regulations is the Forest Service objective under each alternative. However, the likelihood and risk of non-compliance varies between alternatives, and will in turn result in varying levels of activities designed to promote compliance.

Responsiveness of alternatives to this issue can be evaluated by comparing the level of compliance program provided in each alternative.

10. How will diversity of plant and animal communities (biodiversity) be maintained at the Oregon Dunes NRA?

    The Oregon Dunes NRA contains a great deal of biodiversity within its relatively small land base. This is one of the features that contributes to the uniqueness of the area, and many people want to maintain it. In addition, the dunal environment of the NRA also contributes to the broader biodiversity of the Oregon coastal region. Human uses (such as recreation) and natural processes (such as the spread of native and non-native vegetation) can reduce biodiversity. Other natural processes and human activities (such as habitat manipulation) can increase or maintain biodiversity. Future biodiversity at the NRA varies among alternatives depending on the balance among resources such as recreation, non-native vegetation, wildlife/fish/PETS habitats, Research Natural Areas, special habitats, and Wild and Scenic Rivers.

    Responsiveness of the alternatives to this issue can be evaluated by comparing the amount of fish, wildlife, PETS and special habitats managed in each of the alternatives and by comparing the vegetation treatment acres and objectives in each alternative.

11. How will Oregon Dunes NRA management affect local communities?

    The Oregon Dunes NRA, while it is a national recreation area belonging to all the people of the United States, is very important to local residents and communities. Some local people see the NRA primarily as a source of revenue and economic benefit because of the visitors it attracts and the resources, such as water and special forest products, it supplies to the area. Others see it primarily as a contributor to a desirable lifestyle that includes opportunities for high quality outdoor experiences. Still others value both of these attributes and feel that the exclusive pursuit of one would be detrimental to the other. The Oregon Dunes NRA contributes to the communities' economic vitality by enhancing quality of life and thus the ability to attract and retain businesses, residents, and visitors. In turn, a diverse and healthy local economy contributes to quality of life of local residents. Each alternative contains a different mix of programs and emphases at the Oregon Dunes NRA, which in turn will result in differing levels of economic and quality-of-life returns to local residents and communities.

    Responsiveness of alternatives to this issue can be evaluated by comparing payments to counties, local employment, and incomes.

12. What land ownership adjustments will be made at the Oregon Dunes NRA?

    Of the 31,500 acres within the NRA boundary, 4,050 are in either private, state, or county ownership. Public opinion varies regarding how much

and which of these lands should be acquired by the federal government for addition to Oregon Dunes NRA. The mix of resource programs and management emphases within each alternative provides varying objectives and priorities for future land ownership adjustments at the NRA.

Responsiveness of alternatives to this issue can be evaluated by comparing land acquisition priorities.

13. How much of the Oregon Dunes NRA will be managed as roadless areas?

Roadless areas are large parcels of land that do not contain roads. Currently there are 4 roadless areas totaling about 20,000 acres within the NRA. They provide a variety of resources such as semi-primitive recreation opportunities and wildlife and plant habitat away from human disturbance. Some people want more of the NRA to be accessible by road, while others want some existing roads to be removed. Public opinion varies as to how much and which areas at the NRA should remain in or be returned to a roadless condition.

Responsiveness of alternatives to this issue can be evaluated by the amount of acres maintained in roadless condition.

ICOs that are affected the same in all alternatives are as follows:

14. How will water be managed at the Oregon Dunes NRA?

Many people value surface water and associated resources such as scenery, wildlife and fish, and recreation. Legislation creating the Oregon Dunes NRA, however, recognized several prior rights to some of the surface and underground water resources. The ability to exercise these water rights has important economic and social ramifications for communities and residents around the NRA. The mix of resource programs and emphases in each alternative is dependent upon, and establishes a need for, a certain quantity and quality of surface water at the NRA. Congressional records indicate an expectation that surface water levels would be protected from excessive drawdown (Establishing the Oregon Dunes National Recreation Area in the State of Oregon, Report No. 92-894, February 20, 1972, Committee on Interior and Insular Affairs, p.26.). The NRA has issued a special use permit with terms that must be met in the withdrawal of water from the Dunes Aquifer. Under all alternatives the Forest Service will use the special use permitting process to interact with other parties having water rights and thus meet water objectives and priorities identified through this planning effort.

15. Should the mile wide buffer of national forest lands at the south end of the Oregon Dunes NRA be recommended for withdrawal from mineral entry?

The legislation creating the Oregon Dunes NRA removed all lands within the boundary from any further mineral entry. Congress specifically excluded from the NRA a mile wide buffer of national forest land immediately south of the NRA boundary. These national forest lands were intended to separate the NRA from industrial lands and developments on the north spit of the Coos River. This buffer area has been managed by the Oregon Dunes NRA, but is not excluded from mineral entry.

Since the NRA was established several major recreation facilities have been developed within this area. This development has occurred with the support of the county and the local communities and without opposition from adjacent industrial owners. The area is currently one of the most heavily used at the NRA, accounting for about 18% of total annual visitation. It contains wetland areas developed with assistance from adjacent industrial landowners as mitigation for wetlands impacted by development activities on their own lands. The buffer lands have also recently been found to include some globally significant plant communities.

Because of new information and changes that have occurred on these buffer lands, mineral entry and extraction could now diminish their proven suitability and value for the above-cited values. It could also jeopardize the public's significant investment in capital improvements on these lands. There are several mineral claims currently filed on these lands. While the Forest Service cannot withdraw areas under its jurisdiction from mineral entry, it can recommend such action to the Bureau of Land Management, the federal agency with authority in such matters. Some people feel this area, while technically not part of NRA, should be recommended for withdrawal from further mineral entry.

For these reasons the Forest Service will consider seeking a closure of these lands to further mineral entry. This process would be continued under all alternatives being considered in this plan.

16. How will cultural resources be managed at the NRA?

Federal laws and regulations require protection of significant cultural and historic resources on public lands (Antiquities Acts of 1906 and 1974; Historic Preservation Act of 1966 and 1980 amendment). Although alternatives have varying levels of potential disturbance to such resources, standards for protection would be the same. Cultural resource inventories will be conducted for proposed ground-disturbing activities. Sites will be evaluated for their potential to be nominated to the National Register of Historic Places and management plans prepared to insure their protection.

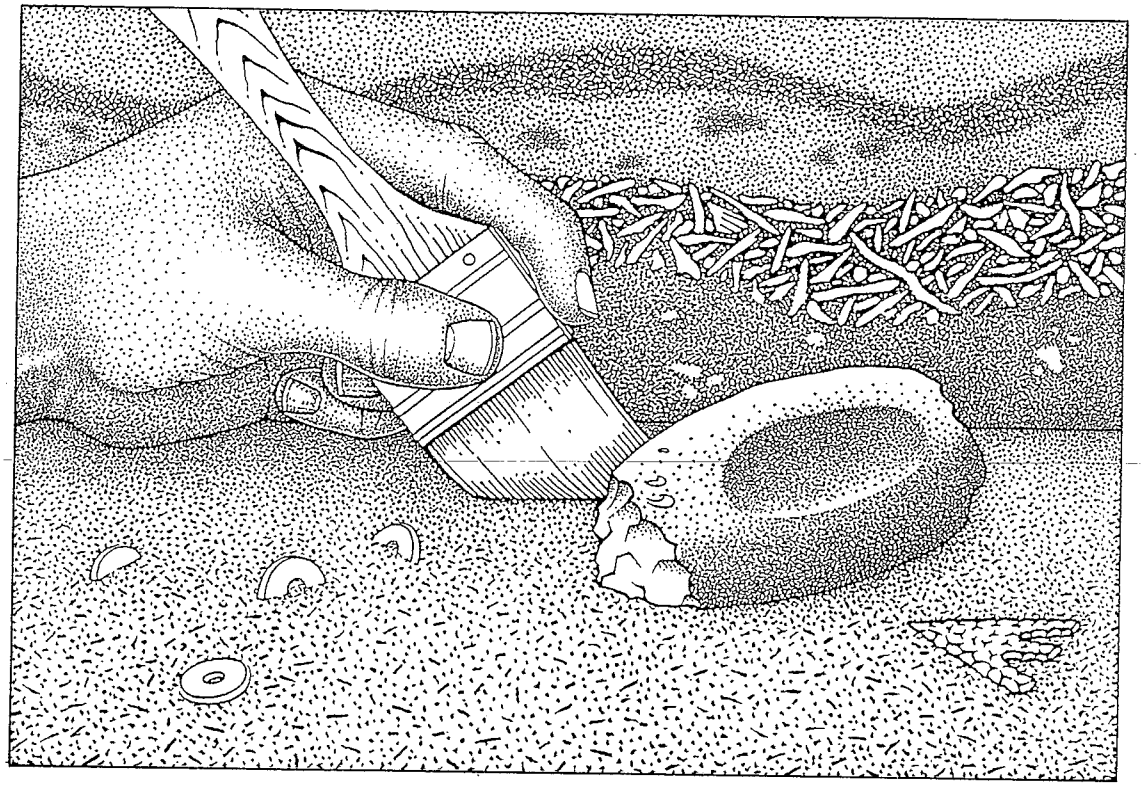
17. How will Native American religious freedom be assured at the Oregon Dunes NRA?

Forest Service policy requires that the setting and location of sites once important for religious purposes be protected from disturbance and available for use by Native Americans. Forest and NRA personnel will continue to cooperate with the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw in identifying and maintaining traditional uses of lands within the Oregon Dunes NRA.

PLANNING RECORDS

All documents and files chronicling the planning process for the Oregon Dunes NRA are available for review at the NRA Headquarters, 855 Highway Avenue, Reedsport, Oregon 97467. These documents and files contain the detailed information and decisions used in developing the FEIS. They are referenced at appropriate places in the text or appendices of this FEIS.

Chapter II
Alternatives Including the Proposed Action



CHAPTER II

ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter is the heart of the FEIS. It describes the management alternatives that were considered, how these alternatives were developed, and compares the resource programs, activities, and outputs of each.

This chapter consists of 3 parts:

- a summary of the analysis conducted while developing the alternatives;
- a description of the objectives, management emphases, and resource outputs of each alternative; and
- a comparison of the alternatives. This comparison, in both narrative and tables, shows the response to issues, emphasized land uses, resource outputs, selected environmental effects, tradeoffs between resources, and economic costs and benefits that would occur with each alternative.

CHANGES BETWEEN DRAFT AND FINAL

Management Areas Section

Acres in all tables have been revised to reflect General Land Office (GLO) acres (versus computer digitized acres) managed by the NRA.

Management Area 10(I) is dropped from Alternative F(PA) because in this alternative vegetation management is treated as an activity that may occur in any management area.

Management Area 10(L) (Noise-Control Buffer) is added to Alternative F(PA).

In Figure II-1, acres by management area are changed for Alternative F(PA).

Recreation Section

Acres of semi-primitive motorized (SPM) setting increased by about 2,700 acres and semi-primitive non-motorized (SPNM) decreased by a similar amount.

Acres of open sand available for ORV use increased by about 900 acres.

Acres of vegetated area available for ORV use on designated routes increased by about 1,800 acres.

More designated routes for ORVs will be permitted in the managed wetlands (MA 10G) between Tenmile Creek and Horsfall Road.

Driftwood II Campground will remain available for ORV use.

All four primary NRA access corridors will remain available for both ORV and non-ORV use.

The noise-reduction buffer in the Woahink-Cleawox lake area (MA 10L) is reduced in size (370 acres).

New ORV staging and/or overflow camping will be constructed in the following locations to help alleviate ORV impacts to wetlands and sensitive vegetated areas and to eliminate the need for ORVs to operate on NRA roadways designed for passenger vehicles:

- west end of Siltcoos Road near Driftwood II Campground
- Hauser
- Horsfall staging (enlarge current facility)
- Bull Run area in Horsfall corridor
- Goosepasture staging (enlarge current facility)

Motorized camping outside fee campgrounds will be limited to designated sites available by permit.

The camping prohibition along NRA roads will remain at 200 feet (instead of 500 feet).

The NRA will establish stricter ORV noise goals requiring machines to operate at 95 decibels by 1997 and 90 decibels by 1999.

Night-riding curfew areas are expanded to include all of South Jetty to Siltcoos riding area and Tenmile to Horsfall riding area.

In descriptions of recreation (ROS) settings, average visitor densities (average visitors per acre) are added.

In Figure II-2, acres by ROS class are changed in Alternative F(PA).

Plant Communities

Globally significant plant communities are added to Detailed Comparison of Alternatives and to Outputs and Effects (Figures II-17 and II-18).

Globally significant plant communities are added to Management Area 10(F).

Vegetation Management

The Alternative F(PA) vegetation management program discussion was expanded to include objectives, potential treatment areas, and primary and secondary potential treatment areas.

Wild and Scenic Rivers

In Alternative F(PA), the Siltcoos River is changed from suitable to not suitable, and is not recommended for designation.

Also in Alternative F(PA), Tahkenitch Creek is recommended for designation at the "wild river" classification level rather than the "scenic river" classification level.

ALTERNATIVE DEVELOPMENT PROCESS

Introduction to Alternatives

Alternatives display different ways of managing the lands and resources of the Oregon Dunes NRA. They are based on resource capabilities and are formulated to address:

- legislative intent for the NRA,
- projected demand for a broad range of goods and services,
- laws and regulations that guide Forest Service management, and
- the issues described in Chapter I which are based, in part, on comments received during public involvement.

They differ from each other in terms of level of emphasis given to the different resource activities, outputs produced, and environmental consequences.

The Interdisciplinary Team (IDT) initially formulated 5 alternatives in detail. Within the sideboards provided by the NRA enabling legislation and other applicable laws and regulations, they were designed to provide a broad range of future management options for the NRA and a broad range of responses to the various planning issues. In response to preliminary public review of these 5 alternatives, 3 alternatives were added. These 8 alternatives were then considered in detail and the Preferred Alternative was selected by the Forest Supervisor taking into consideration several factors including comments received, existing use, future trends, and environmental consequences of each alternative.

In creating alternatives, the IDT began by identifying a broad objective or focus for each alternative. These objectives were based on the issues, concerns, and opportunities (ICOs) gathered early in the public involvement phase of the project. Next the IDT developed Management Emphasis Areas (hereafter referred to as Management Areas or MAs) to represent the major NRA planning issues. Considering the focus of each alternative, they then determined the appropriate and compatible level of response to the NRA planning issues. This response was then incorporated into the alternative by varying amount and spatial arrangement of various Management Areas. For most of the planning issues this resulted in a continuum of response across alternatives.

Each alternative is designed to manage the NRA to achieve some goals and objectives. By managing NRA resources in different ways, various objectives can be achieved to respond to the many issues and concerns. Management can vary by what is done, where it is done, and when it is done. The result is a combination of management activities, management areas, and schedules which define a unique combination of resource outputs and environmental conditions for each alternative.

Net Public Benefit

Net Public Benefit (NPB) is the value to the nation of all benefits less all costs associated with an action, such as management of the Oregon Dunes NRA under a new NRA management plan. It includes both priced and nonpriced benefits. Priced benefits such as those received from developed recreation and domestic water from the dunes aquifer can be given dollar values. Nonpriced benefits such as scenic views, threatened and endangered species, natural and scientific areas, historical and archeological sites, and clean air and water are among those for which there are no available dollar values.

A primary purpose of alternative development is to provide an adequate basis for identifying the course of action with the highest NPB [CFR 219.11 (f)]. Alternatives are based upon demand for goods and services from the NRA as well as on resource capabilities of the NRA. The Preferred Alternative is believed to provide the highest NPB.

Analysis Process

In analyzing the effects of alternatives a variety of tools were used. Vegetation and landform data initially collected in 1972 was updated in 1987. Both sets of data were then entered into a computer-based Geographic Information System

(GIS) and aerial photographs were used in analyzing changes in vegetation and landforms over time and effects of past management. A survey of recreation use levels and activities was conducted in 1989-1990 (USFS 1991) and this information was paired with similar data collected in 1977 to assess changes in activity patterns and levels of use. As a part of the 1989-1990 visitor survey an analysis of the economic impact of the Oregon Dunes NRA on local communities was completed (USFS 1991) and used in assessing the effects of alternatives on communities. In addition, a variety of published information (references included in bibliography), as well as professional judgement and personal observation by Forest Service managers was used in assessing the effects of alternatives.

Management Requirements

Numerous laws and regulations guide Forest Service activities. The 1976 National Forest Management Act (NFMA) in particular has resulted in management requirements that the agency must meet. These NFMA requirements are fully discussed in Chapter II and Appendix H of the Forest Plan FEIS. The Forest Plan also prescribes a series of Forest-wide standards and guidelines designed to ensure that these management requirements are met.

The Oregon Dunes NRA, as a sub-unit of the Siuslaw National Forest, is subject to the same NFMA requirements. All alternatives being considered in this action, except possibly Alternative C, the "No Action" alternative, are designed to meet them. This was accomplished by tiering this action to the Forest Plan FEIS and thus making the NRA subject to the aforementioned Forest-wide standards and guidelines. These can be reviewed in Dunes Plan, Chapter III. In addition, standards and guidelines were developed specifically for the Oregon Dunes NRA to address its unique conditions and resources. They are also included in Appendix C and Dunes Plan, Chapter III.

Range of Alternatives

No Action (Current Direction) - The "No-Action" Alternative is required by NFMA [36 CFR 219.12 (f)(7)] and Council on Environmental Quality (CEQ) [40 CFR 1502.14 (d)] regulations. This alternative continues management of the Oregon Dunes NRA as defined by the approved management plan and existing policies, standards and guidelines. It provides the basis of comparison for the 7 other alternatives. This alternative does not always reflect existing conditions, however, because some portions of the current plan were never fully implemented and because the current plan may not meet all requirements of NFMA. Similarly, it does not always show the same outputs as the current plan because more recent inventories are sometimes used to predict results of implementation. Alternative C is the "No Action" Alternative in this DEIS. It neither meets the underlying need to update management direction for the NRA nor addresses many of the ICOs identified during scoping.

Other Alternatives - Additional alternatives [A, B, D, E, F(PA), G and H] were developed to respond to ICOs on the Oregon Dunes NRA, to assure compliance with NEPA and NFMA regulations [36 CFR 219.12(f)(1)] and to provide decisionmakers and the public with information needed to make a reasoned choice. The IDT developed a broad range of alternatives. Alternatives were designed so that they were "distributed between the minimum resource potential and the maximum resource potential" to display the "full range" that the NRA could produce.

Preferred Alternative - Alternative F(PA) is the Preferred Alternative. It was selected after careful comparison of all alternatives on the basis of their resource outputs, environmental effects, implementation costs, and resource and economic tradeoffs between them. Alternative F(PA) is the one which the Forest Supervisor feels provides the highest NPB. It meets the need for updated management direction and best addresses the planning ICOs.

One potential RNA is included in Alternative F(PA) with modified boundaries. This action allocates the modified Tenmile Creek area for establishment as an RNA. Final establishment would be approved by the Chief of the Forest Service. Similarly, this alternative would nominate portions of 2 streams for designation as Wild and Scenic Rivers. Actual designation is dependent on Congress accepting and approving the Forest Service recommendation. Until Congress makes a final decision, these lands would be managed to protect their eligibility.

Alternatives Not Considered in Detail

In addition to 8 alternatives analyzed in detail and described later in this chapter, the following alternatives were considered, but eliminated from detailed study for a variety of reasons.

Additional Wilderness Designation - In 1975, in accordance with provisions of the NRA Act and the 1964 Wilderness Act, a wilderness suitability assessment was undertaken for the undeveloped portions of the Oregon Dunes NRA. That assessment concluded that none of the lands within the NRA were suitable to be recommended for wilderness. As a result, no alternatives recommending additional wilderness were developed at this time. However, all the alternatives that were developed maintain the option for Congress to designate additional Wilderness in the future.

Emphasize Diversity Values - An alternative was considered that would provide over time a broad array of functioning plant communities comprised of native species. This was in response to specific comments during scoping and a general public concern about maintaining biodiversity on the National Forests. Plant communities that are currently limited on the Oregon Dunes NRA could have been expanded while others that are more abundant could have been altered to favor more limited types. This alternative was not developed further because biodiversity is a concept meant more to apply to broad geographic areas and the NRA is too small an area to manage meaningfully for biodiversity. Some aspects of this alternative are included in Alternative D and **F(PA)**.

Maintain Current Recreation Uses and Emphasize Visitor Management - An alternative was considered that would enhance present recreation experiences solely through increasing levels of visitor information and education, law enforcement, regulations, and more stringent use standards. This was in response to strong public comments that the current plan would be adequate if it were more stringently enforced. This alternative was not fully developed because preliminary analysis indicated that some of the major planning issues could not be adequately addressed and some minimum resource requirements could not be met solely by changing the emphasis on visitor management.

Enhance Recreation Opportunities Through Removal of Non-native Vegetation - An alternative was considered that would increase recreation opportunities through creation of more areas of open, unvegetated sand. Non-native vegetation, particularly European beachgrass, would be removed over a large area (such as 5,000 acres) except where needed to protect access and facilities from encroaching sand. This was in response to overwhelming public concern about spread of beachgrass. This alternative was not fully developed because of considerable uncertainty at this time about cost and effectiveness of beachgrass control methods on such a large area. Aspects of this alternative were included in many of the alternatives considered in detail, including Alternative F(PA).

Emphasize Natural Qualities - An alternative was considered that would provide the most natural setting possible, including returning the area's vegetation to a state prior to introduction of beachgrass. Control of non-native vegetation would be emphasized. This was mostly in response to public comments asking that the area be returned to the conditions described in the Act creating the Oregon Dunes NRA. This alternative was not considered further because such a degree of control does not appear feasible at this time. Some aspects of this alternative were included in Alternative F(PA).

Maximize Economic Returns - An alternative was considered that would emphasize those NRA programs and activities that provide greatest economic returns to local communities. This was in response to opinions expressed by local individuals and organizations that the NRA should be managed to provide economic support to local communities. It was not fully analyzed because the economic relationship between specific NRA programs and economic contributions to local communities is complex and not fully understood. Also, nothing in the act creating the NRA indicates that maximizing economic returns should be a primary management objective.

Conservation Groups' Alternative - After reviewing the 5 draft alternatives, a coalition of conservation groups presented 2 additional alternatives that they had developed. One of these became Alternative H. The other would provide a broad range of non-motorized recreation and wildlife/fish/plant/unique geologic features opportunities while restricting off-road vehicle (ORV) use to just the Horsfall area. This alternative was not fully analyzed because the IDT felt it was similar to other alternatives already being considered.

Off-Road Vehicle Group Alternative - Early in the public involvement process representatives from ORV user groups presented an alternative that would change some of the current ORV open and ORV closed designations. This was not a fully developed alternative because it did not address other issues, such as habitat, RNAs, Wild and Scenic Rivers, or vegetation management. As a result, it was not fully analyzed, but the proposed mix of open and closed ORV areas was incorporated into Alternative G that was analyzed in detail.

Alternatives With More Detailed Implementation - Additional details about implementing the alternatives, such as size of wildlife improvement projects and recreational developments at campgrounds, could have been included. However, any slight improvement in the ultimate decision would not have justified the additional time and costs. Additional environmental analysis will be conducted as decisions, such as construction of trails, are implemented. If a site-specific environmental analysis identifies significant adverse effects on the human environment, a site-specific EIS will be prepared. For these reasons, the IDT chose not to include highly detailed schedules of projects for most aspects of alternative decisions. Limited schedules are included in the DEIS to help decisionmakers and readers determine extent, timing, and environmental impacts of activities.

Alternatives Considered in Detail

Following are descriptions of the 8 alternatives which were considered in detail. Information is given in several different forms in order to provide the reader with a complete picture of what is planned in each alternative and how the alternatives compare with each other.

- Pages 10 through 25 focus on each alternative separately by providing a short descriptive summary, along with a table of selected important facts and a point/counterpoint comparison for each alternative;
- Pages 27 through 29 are a fold-out display which is arranged for easy comparison of the alternatives by issue;
- Page 33 provides a comparison of the number of acres in each management area for the alternatives;
- Pages 34 through 91 describe proposed management of the alternatives from the perspective of each resource area; and
- Pages 92 through 103 provide tabular summaries comparing quantitative and qualitative resource outputs and effects of the alternatives.

Alternative A

This alternative focuses on enhancing ORV recreation opportunities and on developing additional facilities for a broad range of recreation activities. The amount of paved roads and developed facilities would increase and there would be a moderate decrease in undeveloped settings at the NRA. The amount of area available for ORV use would increase. Other resource activities, such as fish and wildlife habitat management and vegetation removal would generally complement and be compatible with the primary focus. Some resource programs, such as RNAs, would not be compatible and would not be emphasized.

Alternative A at a Glance

Description	Value
Acres open to ORV use	7,675
Acres where ORVs restricted to designated routes	11,800
Miles of designated routes	35
Net increase of miles of graveled and paved roads	10
Net increase of miles of non-motorized trails	9
Net increase of facilities (campgrounds, boat ramps, etc.)	24
Number of new interpretive sites (visitor centers and contact stations)	8
Acres of vegetation removal	150
Acres of plant, fish and wildlife habitat management	240
Acres of wetlands improved or maintained	920
Research Natural Areas allocated	none
Recommendations for Wild and Scenic Rivers System	none

Point/Counterpoint Comparison - Alternative A

POINT	ISSUE	COUNTERPOINT
One third more area would be open to ORVs then now. Restricted ORV areas would increase by 44%.	Recreation Mix	The area available for recreation away from the sights and sounds of ORVs would be half of now.
60% more miles of roads and trails would be provided than now. More easy access and more access for people with disabilities.	Roads and Trails	Roadless acreage would decline by 14%.
About 70% more facilities would be provided than now. Facilities would be relatively large and highly developed.	Facilities	Opportunities for non-motorized recreation in remote, undeveloped areas would decline. Fewer facilities for non-motorized users.
More visitor centers, contact stations, and guided opportunities would be available for those seeking a more intensive learning experience at the Oregon Dunes NRA.	Interpretation	Fewer undisturbed settings for unguided exploration.
150 acres of land would be treated to control or eliminate European beachgrass.	Vegetation Removal	Chances of success of the control measures are far from certain. Most of the Oregon Dunes NRA would continue to change rapidly and be overrun with beachgrass.
More fish-related facilities would be provided. More fishing opportunities.	Fish	The expected increase in fishing effort could overharvest certain fish populations. Favorite fishing spots may be more crowded.
More wildlife-related facilities would be provided. All species should be provided minimum habitat needed to maintain viability. T&E species receive special protection.	Plants and Wildlife	Increased use may result in more harassment of certain species of wildlife. Species could be lost in local areas if adequacy of minimum habitat needs were overestimated; margin for error would be narrow when managing at minimum levels of habitat.
30% more acres of wetlands would be managed to reduce shrubs and trees and more waterfowl would be present on those acres. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On 920 acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
Areas allocated as RNAs in other alternatives would initially be available for research on natural systems.	Research Natural Areas	No areas would be allocated as RNAs, so there would be fewer opportunities for research on natural systems in the future.
Areas of the Siltcoos, Tahkenitch, and Tenmile systems recommended as W&S corridors in other alternatives would initially retain their outstandingly remarkable values.	Wild and Scenic Rivers	No streams would be recommended for W&S designation. Recreational, land, and water developments would alter these values in the future.
Job opportunities related to recreation would increase. Opportunities for some personal uses of the Oregon Dunes NRA (e.g., hunting, fishing, mushroom gathering, and roaded and ORV recreation) would increase. Receipts from the campground program and economic benefits to local communities would be high.	Communities	Local residents who want the Oregon Dunes NRA used for resources which are inconsistent with ORV riding and other intensive recreation would be less satisfied as levels of solitude, some wildlife species, roadless areas, and visual quality were reduced. Taxes could increase to pay for developments for additional visitors.

Alternative B

This alternative focuses on enhancing non-motorized recreation opportunities in both developed and undeveloped settings. The amount of paved roads and developed facilities would increase and there would be a small decrease in undeveloped settings. The amount of area available for non-motorized dispersed recreation (closed to ORVs) would increase. Other resource programs, such as fish and wildlife habitat management, RNAs, Wild and Scenic Rivers, and vegetation removal would be managed to complement and be compatible with the primary focus.

Alternative B at a Glance

Description	Value
Acres open to ORV use	2,165
Acres where ORVs restricted to designated routes	885
Miles of designated routes	5
Net increase of miles of graveled and paved roads	3
Net increase of miles of non-motorized trails	20
Net increase of facilities (campgrounds, boat ramps, etc.)	27
Number of new interpretive sites (visitor centers and contact stations)	12
Acres of vegetation removal	100
Acres of plant, fish and wildlife habitat management	240
Acres of wetlands improved or maintained	660
Research Natural Areas allocated	Umpqua Spit
Recommendations for Wild and Scenic Rivers System	Siltcoos, Tahkenitch, Tenmile--all recreational

Point/Counterpoint Comparison - Alternative B

POINT	ISSUE	COUNTERPOINT
The area available for recreation away from the sights and sounds of ORVs would be almost 90% greater than now.	Recreation Mix	Only 36% as much area would be open to ORVs as now. Restricted ORV areas would decrease by 90%.
46% more miles of roads and trails would be provided than now. More easy access and more access for people with disabilities.	Roads and Trails	More traffic congestion. Roadless acreage would decline by 2%.
About 75% more facilities would be provided than now. Facilities would be relatively large and highly developed.	Facilities	Fewer facilities would be oriented to ORV users.
More visitor centers, contact stations, and guided opportunities would be available for those seeking a more intensive learning experience at the Oregon Dunes NRA.	Interpretation	Fewer opportunities for unguided exploration along major roads and trails.
Land would be treated to control or eliminate European beachgrass.	Vegetation Removal	Chances of success of the control measures are far from certain. Most of the Oregon Dunes NRA would continue to change rapidly and be overrun with beachgrass.
Twice as many facilities and 4 miles of trail would be provided specifically to enhance opportunities to catch and view fish.	Fish	The expected increase in fishing effort could overharvest certain fish populations. Favorite fishing spots may be more crowded.
Six more wildlife-related facilities would be provided. All wildlife species should be provided minimum habitat needed to maintain viability. T&E species receive special protection.	Plants and Wildlife	Increased use may result in more harassment of certain species of wildlife. Species could be lost in local areas if adequacy of minimum habitat needs were overestimated; margin for error would be narrow when managing at minimum levels of habitat.
9% more acres of wetlands would be managed to reduce brush and trees and more waterfowl would be present on those acres. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On 660 acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
The Umpqua Spit area would be allocated as an RNA and would be available for research on natural systems.	Research Natural Areas	The Tenmile Creek area would not be allocated as an RNA, so there would be fewer opportunities for research on natural systems in the future.
The Siltcoos River and Tahkenitch and Tenmile creeks would be recommended for W&S designation at the Recreational classification.	Wild and Scenic Rivers	Recreational classification would not provide as much protection as Scenic and Wild. The stream corridors would be more available for recreational, land, and water developments than in some alternatives.
Job opportunities related to recreation would increase. Opportunities for some personal uses of the Oregon Dunes NRA (e.g., hunting, fishing, mushroom gathering, hiking, and roaded recreation) would increase. Receipts from the campground program and economic benefits to local communities would be high.	Communities	Local residents who want the Oregon Dunes NRA used for resources which are inconsistent with intensive non-motorized recreation would be less satisfied as levels of solitude, some wildlife species, and roadless areas were reduced. Taxes could increase to pay for developments for additional visitors.

Alternative C

This is the "No Action" alternative. It would continue the operation of the NRA under the current management plan. It would continue to focus management primarily on NRA recreation resources with very little direction for programs such as fish and wildlife habitat and vegetation removal. It would continue to defer decisions on programs such as RNAs and Wild and Scenic Rivers.

Alternative C at a Glance

Description	Value
Acres open to ORV use	6,090
Acres where ORVs restricted to designated routes	8,220
Miles of designated routes	26
Net increase of miles of graveled and paved roads	1
Net increase of miles of non-motorized trails	6
Net increase of facilities (campgrounds, boat ramps, etc.)	3
Number of new interpretive sites (visitor centers and contact stations)	2
Acres of vegetation removal	0
Acres of plant, fish and wildlife habitat management	70
Acres of wetlands improved or maintained	605
Research Natural Areas allocated	2[1]
Recommendations for Wild and Scenic Rivers System	none[2]

[1]Possibility for allocating both potential Research Natural Areas would be maintained
[2]Eligibility of all 3 streams would be maintained

Point/Counterpoint Comparison - Alternative C

POINT	ISSUE	COUNTERPOINT
6,090 acres would be open to ORVs, with another 8,220 acres for restricted ORV riding.	Recreation Mix	14,590 acres would be available for recreation away from the sights and sounds of ORVs.
12% more miles of roads and trails would be provided than now.	Roads and Trails	Limited amount of backcountry trails.
42 facilities and concessions would be provided. Facilities could serve 5,000 people at one time.	Facilities	Some facilities would be crowded on summer holidays and weekends.
The Oregon Dunes Overlook and the NRA office in Reedsport would be major interpretive centers.	Interpretation	Limited amount of dispersed interpretive sites.
Experiments would be carried out to determine the best methods to control or eliminate European beachgrass.	Vegetation Removal	Chances of success of any control measures are far from certain. The Oregon Dunes NRA would continue to change rapidly and be overrun with beachgrass.
Facilities like docks and boat ramps would assist anglers at several lakes.	Fish	Many lakes would be inaccessible and fished mostly by local anglers.
All wildlife species should be provided minimum habitat needed to maintain viability. T&E species would receive special protection.	Plants and Wildlife	Species could be lost in local areas if adequacy of minimum habitat needs were overestimated; margin for error would be narrow when managing at minimum levels of habitat.
605 acres of wetlands would be managed to remove shrubs and trees to benefit waterfowl. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On those acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
No decision on whether the Umpqua Spit and Tenmile Creek areas would be allocated as RNAs would be made for 10-15 years. In the meantime, their qualities would be protected and they would be available for research on natural systems.	Research Natural Areas	Scientists may be reluctant to start long-term research projects without a final decision on allocation. Roadless condition and homogeneity of much of the dunes limits other opportunities for research on natural systems.
No decision on whether any streams would be recommended as W&S would be made for 10-15 years. In the meantime, development would be restricted in order to maintain eligibility of the Siltcoos River and Tahkenitch and Tenmile creeks for W&S designation.	Wild and Scenic Rivers	No streams would be recommended for W&S designation. Suitability would not be determined at this time.
The Oregon Dunes NRA would make a substantial contribution to the economies of Coos Bay/North Bend, Reedsport, and Florence. Opportunities for personal uses of the area include fishing, hiking, and ORV riding.	Communities	Local residents who want more or less of the area used for ORVs or for more economic return would be disappointed.

Alternative D

This alternative focuses on enhancing conditions for fish, wildlife, plants and unique geologic features at the NRA. The amount of habitat management and protection for unique habitats and geologic features would increase. The amount of undeveloped area would increase as a result of reducing road miles and developed facilities. Opportunities for recreation in developed settings and for ORV recreation would decrease. Other resource programs, such as RNAs, Wild and Scenic Rivers, and vegetation removal would be managed to complement and be compatible with the primary focus.

Alternative D at a Glance

Description	Value
Acres open to ORV use	2,870
Acres where ORVs restricted to designated routes	2,810
Miles of designated routes	9
Net increase of miles of graveled and paved roads	-3[1]
Net increase of miles of non-motorized trails	9
Net increase of facilities (campgrounds, boat ramps, etc.)	4
Number of new interpretive sites (visitor centers and contact stations)	8
Acres of vegetation removal	100
Acres of plant, fish and wildlife habitat management	3,675
Acres of wetlands improved or maintained	3,395
Research Natural Areas allocated	Tenmile Creek
Recommendations for Wild and Scenic Rivers System	Siltcoos, Tahkenitch and Tenmile--Scenic

[1]Siltcoos and South Jetty roads are shortened

Point/Counterpoint Comparison - Alternative D

POINT	ISSUE	COUNTERPOINT
The area available for recreation away from the sights and sounds of ORVs would be 60% greater than now.	Recreation Mix	Only 47% as much area would be open to ORVs as now. Restricted ORV areas would decrease by 66%.
32% more miles of trails would be provided than now. More easy access and more access for people with disabilities.	Roads and Trails	More trails are provided in some other alternatives. Roadless acreage would increase
A few more day-use facilities would be provided than now.	Facilities	The number of overnight facilities would remain the same, but with less capacity.
More visitor centers, contact stations, and guided opportunities would be available for those seeking a more intensive learning experience at the Oregon Dunes NRA. Emphasis would be on natural environments.	Interpretation	Interpretive opportunities for those not interested in natural environments would be limited.
100 acres of land would be treated to control or eliminate European beachgrass.	Vegetation Removal	Chances of success of the control measures are far from certain. Most of the Oregon Dunes NRA would continue to change rapidly and be overrun with beachgrass.
Many more fish-related facilities and 3 miles of trail for angler access would be provided. More fishing opportunities. Intensive fish habitat enhancement program.	Fish	The expected increase in fishing effort could overharvest certain fish populations. Favorite fishing spots may be more crowded. Fish habitat will be enhanced in less than 1/3 of the lakes.
More wildlife-related facilities would be provided. Many wildlife species should have far more habitat than needed to maintain viability. T&E species receive maximum protection. 3,675 acres managed intensively as wildlife habitat.	Plants and Wildlife	Habitat needs of many species still not emphasized.
Over 5 times as many acres of wetlands would be managed to reduce shrubs and trees as now, and more waterfowl would be present on those acres. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On 3,395 acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
The Tenmile Creek area would be allocated as an RNA and would be available for research on natural systems.	Research Natural Areas	The Umpqua Spit area would not be allocated as an RNA, so there would be fewer opportunities for research on natural systems in the future.
The Siltcoos River and Tahkenitch and Tenmile creeks would be recommended for W&S designation. Scenic classification would provide a high level of protection.	Wild and Scenic Rivers	Scenic classifcation would provide less protection than the Wild category. The stream corridors would be more available for recreational, land, and water developments than in some alternatives.
Opportunities for some personal uses of the Oregon Dunes NRA (e.g, hunting, fishing, birdwatching) would increase. Job opportunities related to fish and wildlife would increase.	Communities	Local residents who want the Oregon Dunes NRA used for resources which are incompatible with wildlife and low-impact recreation would be less satisfied as areas used for ORV riding and other intensive recreation were reduced.

Alternative E

This alternative focuses on reducing human impacts, including management impacts, at the NRA. It would allow natural processes to proceed unimpeded. The amount of undeveloped area would increase as a result of removing most roads and facilities from the interior of the NRA. Opportunities for most recreation activities would decline and the entire area would be closed to ORV use. Other resource programs, such as RNAs and Wild and Scenic Rivers would be managed to complement and be compatible with the primary focus. Vegetation removal would not be consistent with the focus.

Alternative E at a Glance

Description	Value
Acres open to ORV use	0
Acres where ORVs restricted to designated routes	0
Miles of designated routes	0
Net increase of miles of graveled and paved roads	-8[1]
Net increase of miles of non-motorized trails	-21[2]
Net increase of facilities (campgrounds, boat ramps, etc.)	-15[3]
Number of new interpretive sites (visitor centers and contact stations)	0
Acres of vegetation removal	0
Acres of plant, fish and wildlife habitat management	590
Acres of wetlands improved or maintained	0
Research Natural Areas allocated	Umpqua Spit and Tenmile Creek
Recommendations for Wild and Scenic Rivers System	Tahkenitch and Tenmile--Wild

[1]Shorten Horsfall, Siltcoos, South Jetty and Threemile roads
[2]Most trails would not be maintained
[3]Some of the existing facilities would be closed

Point/Counterpoint Comparison - Alternative E

POINT	ISSUE	COUNTERPOINT
The entire Oregon Dunes NRA would be available for recreation away from the sights and sounds of ORVs. Access to the area for recreation would be challenging.	Recreation Mix	No area would be open to ORVs. Access for recreation in general would be more limited and difficult.
Roadless acreage would increase. More primitive trails for those seeking hiking challenges. Reduced traffic congestion.	Roads and Trails	About 60% of the miles of roads and trails would be removed or abandoned. Trails would eventually revert to natural conditions and some would not be useable.
Facilities would be relatively small and primitive. Opportunities for recreation in remote, undeveloped areas would increase.	Facilities	About 40% less facilities would be provided than now.
Interpretive opportunities would be primarily unguided exploration.	Interpretation	Few visitor centers, contact stations, and guided opportunities would be available for those seeking a more intensive learning experience at the Oregon Dunes NRA.
Natural succession and processes would continue unimpeded.	Vegetation Removal	No land would be treated to control or eliminate European beachgrass. The Oregon Dunes NRA would continue to change rapidly and be overrun with beachgrass.
Uncrowded angling for easily caught fish would be available to those willing to work to find it.	Fish	No more fish-related facilities or access would be provided.
All wildlife species should be provided habitat needed to maintain viability. T&E species receive special protection.	Plants and Wildlife	No more wildlife-related facilities would be provided. Species could be lost in local areas if adequacy of minimum habitat needs were overestimated; margin for error would be narrow when managing at minimum levels of habitat.
More open-water wetlands would temporarily increase as the deflation plain expands.	Wetlands	No more acres would be managed as wetlands. There would be a temporary loss of shrubby wetland habitat.
The Umpqua Spit and Tenmile Creek areas would be allocated as RNAs and would be available for research on natural systems.	Research Natural Areas	Roadless condition and homogeneity of much of the dunes limits other opportunities for research on natural systems.
Tahkenitch and Tenmile creeks would be recommended for W&S designation. Wild classification would provide maximum protection.	Wild and Scenic Rivers	The Siltcoos River would not be recommended for W&S designation, and would be available for more recreational, land, and water development.
Local residents who want the Oregon Dunes NRA used for resources which are inconsistent with ORV riding and other intensive recreation would be more satisfied as solitude and natural conditions become more prevalent.	Communities	Job opportunities related to recreation would decrease. Opportunities for some personal uses of the Oregon Dunes NRA (e.g, hunting, fishing, and roaded and ORV recreation) would decrease.

Alternative F(PA)

This is the "preferred" alternative. It focuses on maintaining a broad range of non-motorized and ORV recreation opportunities while enhancing conditions for fish, wildlife, plants, and unique geologic features. The amount of undeveloped area would increase slightly as a result of reducing road miles. The amount of area available for ORVs would decrease. Other resource programs, such as RNAs, Wild and Scenic Rivers, and vegetation removal would be managed to complement and be compatible with the combination habitat/geology/recreation focus.

Alternative F(PA) at a Glance

Preferred Alternative Description	Value
Acres open to ORV use	5,930
Acres where ORVs restricted to designated routes	4,455
Miles of designated routes	20
Net increase of miles of graveled and paved roads	2
Net increase of miles of non-motorized trails	12
Net increase of facilities (campgrounds, boat ramps, etc.)	17
Number of new interpretive sites (visitor centers and contact stations)	8
Acres of vegetation management	up to 5,000
Acres of plant, fish and wildlife habitat management	3,120
Acres of wetlands improved or maintained	2,540
Research Natural Areas allocated	Tenmile Creek (modified)
Recommendations for Wild and Scenic Rivers System	Tahkenitch--Wild Tenmile--Scenic

Point/Counterpoint Comparison - Alternative F(PA)

POINT	ISSUE	COUNTERPOINT
The area available for recreation away from the sights and sounds of ORVs would be 27% greater than now.	Recreation Mix	97% as much area would be open to ORVs as now. ORV restricted areas would decrease by 45%.
About 50% more miles of trails would be provided than now. More fully accessible areas.	Roads and Trails	About the same mileage of roads would be provided.
34% more facilities would be provided than now.	Facilities	Capacity of overnight facilities would remain the same. Additional facilities would be concentrated within existing corridors.
More visitor centers, contact stations, and guided opportunities would be available for those seeking a more intensive learning experience at the Oregon Dunes NRA. Emphasis would be on natural environments.	Interpretation	Interpretive opportunities for those not interested in the natural environment would be limited.
5,000 acres are identified as primary areas for treatment addressing a variety of resource objectives. Actual treatment areas would be determined through site-specific project proposals and environmental analysis.	Vegetation Removal	Effects of successful control measures would be limited to relatively small localized areas. Much of the Oregon Dunes NRA would continue to change rapidly as a result of spreading vegetation.
Many more fish-related facilities and 2 miles of trail for angler access would be provided. More fishing opportunities. Intensive fish habitat enhancement program.	Fish	The expected increase in fishing effort could overharvest certain fish populations. Favorite fishing spots may be more crowded. Fish habitat will be enhanced in less than 1/3 of the lakes.
Several more wildlife-related facilities would be provided. Many wildlife species should have far more habitat than needed to maintain viability. T&E species receive maximum protection. 3,120 acres managed intensively as wildlife habitat.	Plants and Wildlife	Habitat needs of many species still not emphasized.
Four times as many acres of wetlands would be managed to reduce shrubs and trees as now, and more waterfowl would be present on these acres. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On 2,540 acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
Part of the Tenmile Creek area would be allocated as an RNA and would be available for research on natural systems.	Research Natural Areas	The Umpqua Spit area and part of the Tenmile Creek area would not be allocated as an RNA, so there would be fewer opportunities for research on natural systems in the future.
Tahkenitch and Tenmile creeks would be recommended for W&S designation. Wild classification for Tahkenitch Creek would provide maximum protection.	Wild and Scenic Rivers	Scenic classification for Tenmile Creek would provide less protection than the Wild category. Not designating Siltcoos River would make it more available for recreational, land, and water developments than in some alternatives.
Opportunities for some personal uses of the Oregon Dunes NRA (e.g., hunting, fishing, birdwatching) would increase. Job opportunities related to fish and wildlife would increase.	Communities	Local residents who want the Oregon Dunes NRA used for resources which are incompatible with wildlife and low-impact recreation would be less satisfied as areas used for ORV riding and other intensive recreation were reduced.

Alternative G

This alternative focuses on enhancing ORV recreation opportunities while providing non-motorized recreation and fish, plant and wildlife habitat in areas closed to ORVs. The amount of undeveloped area would decrease slightly while the amount of area available for ORV recreation would increase, primarily in the area of the Umpqua Scenic Dunes. Other resource programs, such as Wild and Scenic Rivers and vegetation removal would be managed to complement and be compatible with the predominant ORV recreation focus. RNAs would not be compatible with the focus.

Alternative G at a Glance

Description	Value
Acres open to ORV use	7,295
Acres where ORVs restricted to designated routes	7,830
Miles of designated routes	26
Net increase of miles of graveled and paved roads	3
Net increase of miles of non-motorized trails	9
Net increase of facilities (campgrounds, boat ramps, etc.)	21
Number of new interpretive sites (visitor centers and contact stations)	7
Acres of vegetation removal	150
Acres of plant, fish and wildlife habitat management	440
Acres of wetlands improved or maintained	910
Research Natural Areas allocated	none
Recommendations for Wild and Scenic Rivers System	Siltcoos--recreational; Tahkenitch--scenic

Point/Counterpoint Comparison - Alternative G

POINT	ISSUE	COUNTERPOINT
6% more area would be open to ORVs as now, with about the same amount of ORV restricted area.	Recreation Mix	The area available for recreation away from the sights and sounds of ORVs would decrease by 10%.
24% more miles of roads and trails would be provided than now. More fully accessible areas.	Roads and Trails	More traffic congestion on some roads. Roadless acreage would decline by 1%.
60% more facilities would be provided than now. Facilities would be relatively large and highly developed.	Facilities	Non-motorized opportunities for recreation in remote, undeveloped areas would decline.
More visitor centers, contact stations, and guided opportunities would be available for those seeking a more intensive learning experience at the Oregon Dunes NRA.	Interpretation	Fewer undisturbed settings for unguided exploration.
150 acres of land would be treated to control or eliminate European beachgrass.	Vegetation Removal	Chances of success of the control measures are far from certain. Most of the Oregon Dunes NRA would continue to change rapidly and be overrun with beachgrass.
Several more fish-related facilities would be provided. More fishing opportunities.	Fish	The expected increase in fishing effort could overharvest certain fish populations. Favorite fishing spots may be more crowded.
Several more wildlife-related facilities would be provided. All wildlife species should be provided habitat needed to maintain viability. T&E species receive special protection.	Plants and Wildlife	Increased use may result in more harassment of certain species of wildlife. Species could be lost in local areas if adequacy of minimum habitat needs were overestimated; margin for error would be narrow when managing at minimum levels of habitat.
50% more acres of wetlands would be managed to remove shrubs and trees and more waterfowl would be present on these acres. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On 910 acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
Areas allocated as RNAs in other alternatives would initially be available for research on natural systems.	Research Natural Areas	No areas would be proposed as potential RNAs, so there would be fewer opportunities for research on natural systems in the future.
The Siltcoos corridor would be recommended for W&S designation at the Recreational classification and Tahkenitch Creek at Scenic.	Wild and Scenic Rivers	Recreational and Scenic classifications would not provide as much protection as other categories. Tenmile Creek would not be recommended for W&S designation and would be available for recreational, land, and water developments.
Job opportunities related to recreation would increase. Opportunities for some personal uses of the Oregon Dunes NRA (e.g., hunting, fishing, mushroom gathering, and roaded and ORV recreation) would increase. Receipts from the campground program and benefits to local economies would be high.	Communities	Local residents who want the Oregon Dunes NRA used for resources which are inconsistent with ORV riding and other intensive recreation would be less satisfied as levels of solitude, some wildlife species, roadless areas, and visual quality were reduced. Taxes could increase to pay for developments for additional visitors.

Alternative H

This alternative focuses on maintaining a broad range of non-motorized recreation opportunities while enhancing conditions for fish, wildlife, plants, and unique geologic features. The amount of undeveloped area would decrease slightly because of increases in paved roads and facilities. The amount of habitat management and protection for unique habitats and geologic features would increase. The entire area would be closed to ORVs. Other resource programs, such as RNAs, Wild and Scenic Rivers, and vegetation removal, would be managed to complement and be compatible with the primary focus.

Alternative H at a Glance

Description	Value
Acres open to ORV use	0
Acres where ORVs restricted to designated routes	0
Miles of designated routes	0
Net increase of miles of graveled and paved roads	-1[1]
Net increase of miles of non-motorized trails	18
Net increase of facilities (campgrounds, boat ramps, etc.)	11
Number of new interpretive sites (visitor centers and contact stations)	6
Acres of vegetation removal	150
Acres of plant, fish and wildlife habitat management	660
Acres of wetlands improved or maintained	2,315
Research Natural Areas allocated	Umpqua Spit and Tenmile Creek
Recommendations for Wild and Scenic Rivers System	Siltcoos--recreational; Tahkenitch and Tenmile--wild

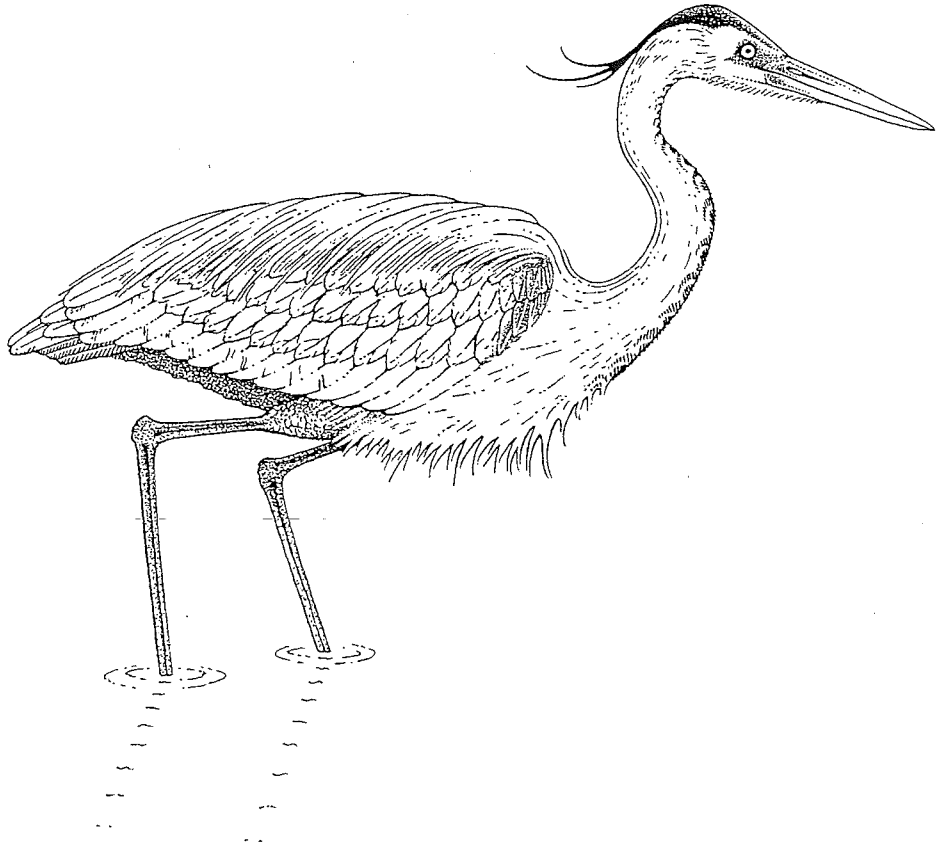
[1]Threemile Road is closed to motor vehicles

Point/Counterpoint Comparison - Alternative H

POINT	ISSUE	COUNTERPOINT
The entire Oregon Dunes NRA would be available for recreation away from the sights and sounds of ORVs.	Recreation Mix	No area would be open to ORVs.
72% more miles of trails would be provided than now. More fully accessible areas and strenuous hiking trails.	Roads and Trails	About the same miles of roads would be provided.
53% more day-use facilities would be provided than now.	Facilities	The number and capacity of overnight facilities would remain the same.
More guided opportunities would be available for those seeking a learning experience at the Oregon Dunes NRA. Focus on education about geology, natural history, ecology, and cultural resources.	Interpretation	Opportunities for more intensive learning experiences in large group situations would be rare at the Oregon Dunes NRA.
150 acres of land would be treated to control or eliminate European beachgrass.	Vegetation Removal	Chances of success of the control measures are far from certain. Most of the ODNRA would continue to change rapidly and be overrun with beachgrass.
Many more fish-related facilities and 3 miles of trail for angler access would be provided. More fishing opportunities. Intensive fish habitat enhancement program.	Fish	The expected increase in fishing effort could overharvest certain fish populations. Favorite fishing spots may be more crowded. Fish habitat will be enhanced in less than 1/4th of the lakes.
Several more wildlife-related facilities would be provided. Many wildlife species should have far more habitat than needed to maintain viability. T&E species receive maximum protection. 660 acres managed intensively as wildlife habitat.	Plants and Wildlife	Habitat needs of many species still not emphasized.
About 4 times as many acres of wetlands would be managed to reduce shrubs and brush as now, and more waterfowl would be present on these acres. Habitat diversity on the Oregon Dunes NRA would be enhanced.	Wetlands	On 2,315 acres, there would be a loss of shrubby wetland habitat and an increase in already locally abundant species like waterfowl.
The Umpqua Spit and Tenmile Creek areas would be allocated as RNAs and would be available for research on natural systems.	Research Natural Areas	Roadless condition and homogeneity of much of the dunes limits other opportunities for research on natural systems.
The Siltcoos River and Tahkenitch and Tenmile creeks would be recommended for W&S designation. Wild classification for Tahkenitch and Tenmile creeks would provide a high level of protection.	Wild and Scenic Rivers	Recreational classification for the Siltcoos River would provide less protection than other categories, so it would be more available for recreational, land, and water developments than the others.
Opportunities for some personal uses of the Oregon Dunes NRA (e.g., fishing, birdwatching) would increase.	Communities	People who want the Oregon Dunes NRA used for resources which are incompatible with wildlife and low-impact recreation would be less satisfied as areas used for ORV riding and other intensive recreation were reduced.

DETAILED COMPARISON OF ALTERNATIVES

The display on the following fold-out pages provides a detailed comparison of the major management direction of the 8 alternatives which were analyzed in detail. This management direction is arranged by planning issue and is formatted for easy side-by-side comparison of each issue among the alternatives.



DETAILED COMPARISON OF ALTERNATIVES (continued)

ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F(PA)	ALTERNATIVE G	ALTERNATIVE H
NON-MOTORIZED RECREATION	**Increase opportunities primarily along paved roads.**	**Increases, with an emphasis on structured activities near paved access, such as:** • More sites for viewing fish, wildlife and scenery; (Siltcoos fish viewing area, Horsfall wildlife viewing area, Umpqua Beach ocean-view platforms), • More fishing opportunities (Lagoon and Siltcoos River fishing docks, trails to various lakes); • More high-use recreation opportunities (Horsfall urban trail system, Umpqua Beach concessions)	**Emphasis on dispersed activities, such as:** • Many opportunities to explore on your own; • Focus on activities such as hiking, dispersed camping and horseback riding	**Stays about the same with more fishing and wildlife-related activities. For example:** • More area for viewing wildlife (South Jetty wetlands, Umpqua Beach whale watching platform); • More fishing opportunities (Beale Lake angler camp); • More opportunities to explore on your own	**Fewer opportunities; mostly primitive in nature. For example:** • Focus on activities not needing facilities (cross-country hiking, viewing, nature study, canoeing), • Facility-dependent activities (like camping) focused along Highway 101.	**Stays about the same with more fishing and wildlife-related activities. For example:** • More area for viewing wildlife (South Jetty wetlands, South Jetty whale watching platform); • More fishing opportunities (Elbow Lake angler camp).	**Increased opportunities primarily along paved roads. For example:** • Waxmyrtle, Lagoon, and Bluebill campgrounds closed to ORVs; • Beale Lake campground - angler focus; • Easy access urban-type trails near paved roads	**Increases, with conversion of ORV areas to non-motorized use. Emphasize both structured activities near paved access, and dispersed, non-structured recreation away from developed areas. For example:** • More opportunities to explore on your own, • More opportunities for hiking from Highway 101 to ocean, • More sites for viewing fish, wildlife, and scenery, including wooden foot trails and platforms.
ORV RECREATION	**More area and a wider range of experiences are available for ORV riders. For example:** • More trail riding areas (North Spit of the Umpqua; • Siltcoos Lake Area, south of Horsfall Road), • More sand play areas (Umpqua Scenic Dunes).	**Less area available and more riding restrictions than now, such as:** • Two sand play areas (Woahink, Horsfall to Tenmile), • More designated routes (Goosepasture, Woahink deflation plain, Horsfall-Tenmile deflation plain); • Close some facilities (Siltcoos Corridor campgrounds, South Jetty Stagung Area, Bluebill and Spinreel campgrounds).	**51% of lands available, in which:** • Relatively unrestricted riding permitted in 6,090 acres of open sand, • Riding restricted to designated travel routes in vegetated areas (not fully implemented or enforced), • Closures around campgrounds, day-use areas and water bodies (not fully implemented or enforced).	**Less area available and more riding restrictions than now, such as:** • Two sand play areas (Woahink area, Umpqua Dunes), • More designated routes (Horsfall Area, deflation plains); • Close staging areas and campgrounds (Driftwood II Campground, Siltcoos and Horsfall Beach parking lots).	**Entire area closed to ORVs. For example:** • Convert or remove all ORV-related facilities.	**Less area available and more riding restrictions than now, such as:** • Three sand play areas (Woahink area, Umpqua Dunes, Spinreel-Horsfall); • Develop additional staging and overflow capacity to facilitate limited dispersed camping and closing some campgrounds to ORV use; • Institute buffers and curfews in some areas to reduce noise and trespass (buffer Cleawox Lake, curfews S.Jetty-Siltcoos and Tenmile-Horsfall)	**More area and a wider range of experiences are available for ORV riders. For example:** • More sand play areas (Umpqua Scenic Dunes); • More ORV accessible interpretive opportunities (Beale Lake cultural site); More ORV trail riding opportunities (Butterfield Lake complex)	**Entire area closed to off-road use of vehicles.** • Support closure of beaches adjacent to the NRA.
VEGETATION MGMT.	**Strong emphasis on finding ways to control non-native and other encroaching vegetation in order to provide and maintain more open sand, especially in locations that would encourage additional motorized recreation use.**	**Moderate effort aimed at maintaining open sand and scenery by removing encroaching vegetation in a small number of plots in non-motorized areas.**	**Emphasis is on studying the spread of vegetation and potential control methods for non-native vegetation.**	**Few attempts to maintain open sand and scenery by controlling non-native vegetation.**	**No attempts to maintain open sand and scenery by controlling non-native vegetation.**	**Identification of 5,000 acres of primary treatment area addressing a variety of resource objectives including habitat creation and maintenance, visual resource management, fire hazard reduction, and recreation enhancement.**	**Strong emphasis on finding ways to control non-native vegetation in order to provide and maintain more open sand, especially in locations that would encourage additional motorized recreation use.**	**Emphasize finding ways to control non-native vegetation in order to provide and maintain a native landscape, with preservation of open sand areas.**
FISH AND WILDLIFE	**More emphasis than now, with focus on providing additional motorized recreation opportunities, such as:** • Provide more ORV-accessible fishing opportunities (Beale Lake, Siltcoos Lake), • Some areas may be restricted from time to time in order to meet legal requirements for proposed, endangered, threatened and sensitive species.	**More emphasis than now, with focus on providing easily-accessible, non-motorized recreation opportunities, such as:** • Provide more and wider variety of fishing opportunities (Elbow Lake, Lagoon, South Jetty boat ramp); • Create viewing areas (South Jetty, Siltcoos, Horsfall); • Manage habitats and access to improve hunting opportunities; • Protect tree island habitats (large ORV closure at Cleawox Lake); • Meet legal requirements of proposed, endangered, threatened and sensitive species.	**Low level program to promote public appreciation and conservation of resources. For example:** • No development in critical habitats, • Improve some habitats (South Jetty wild grain plots, osprey nest platforms), • Meet legal requirements for proposed, endangered, threatened and sensitive species	**Manage extensive areas to increase fish, wildlife and plant populations (including proposed, endangered, threatened and sensitive species), maintain habitat diversity, and provide related recreation. For example:** • Create additional snowy plover habitat; • May restrict human use of some habitats (Siltcoos estuary, North Spit of Umpqua waterfowl habitat), • Improve fish habitat in lakes and streams (control aquatic weeds in Siltcoos Lagoon, build fish hiding structures in Tahkenitch), • Improve wildlife habitat (maintain Butterfield meadows); • Meet legal requirements of proposed, endangered, threatened and sensitive species.	**Management limited to proposed, endangered, threatened and sensitive (PETS) species, such as:** • Prohibit human use of some habitats (Siltcoos, Tahkenitch and Tenmile, estuaries, North Spit of Umpqua); • Create additional snowy plover habitat; • Meet legal requirements of proposed, endangered, threatened and sensitive species.	**Manage extensive areas to increase fish, wildlife and plant populations (including proposed, endangered, threatened, and sensitive species), maintain habitat diversity, and provide related recreation. For example:** • Create additional snowy plover habitat; • May restrict human use of some habitats (Siltcoos estuary, North Spit of Umpqua waterfowl habitat); • Improve fish habitat in lakes and streams (control aquatic weeds in Siltcoos Lagoon, build fish hiding structures in Tahkenitch), • Improve wildlife habitat (maintain Butterfield meadows).	**More emphasis than now, with focus on providing additional motorized recreation opportunities, such as:** • Provide more ORV-accessible fishing opportunities (Beale Lake, Siltcoos Lake); • Some areas may be restricted from time to time in order to meet legal requirements for proposed, endangered, threatened, and sensitive species.	**More emphasis than now. For example:** • Provide more and a wider variety of fishing opportunities, • Create viewing areas (South Jetty, siltcoos, Horsfall); • Protect current and create additional snowy plover habitat; • Protect estuaries and other sensitive wildlife habitats from excessive impacts, • Improve fish habitats (control aquatic weeds in Siltcoos Lagoon, build fish hiding structures in Tahkenitch), • Improve wildlife habitat (maintain Butterfield meadows), • Meet legal requirements of proposed, endangered, threatened, and sensitive species

DETAILED COMPARISON OF ALTERNATIVES

ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F(PA)	ALTERNATIVE G	ALTERNATIVE H
GENERAL EMPHASES	Emphasize off-road vehicle (ORV) recreation and provide access, facilities, and services designed to serve large numbers of visitors. Focus on providing both developed and dispersed recreation opportunities.	Enhance opportunities for both developed and dispersed non-motorized recreation activities. Focus on separating motorized from non-motorized recreation uses.	This is the "No Action" Alternative (current management plan). It emphasizes a balanced mix of motorized and non-motorized opportunities while keeping large portions of the area undeveloped	Emphasize management of fish, wildlife, plants and unique geologic features. Reduce human impacts while maintaining opportunities for low density, low intensity recreation.	Emphasize allowing natural succession to proceed unimpeded and reduce management presence on the Oregon Dunes NRA. Allow low-density, low-impact types of recreation throughout the area while concentrating facilities along Highway 101.	Emphasize diverse recreational opportunities and management of fish, wildlife, plants and unique geologic features.	Emphasize motorized recreation opportunities while increasing the separation between motorized and non-motorized users. Provide access, facilities, and services designed to serve large numbers of visitors and focus on providing both developed and dispersed recreation opportunities	Emphasize management for non-motorized recreation and increased access to the natural, scenic, wildlife, and geological features of the NRA. Eliminate off-road use of vehicles.
RECREATION ROADS AND TRAILS	**More miles of trails and paved roads. For example:** • Add roads (North Spit, Butterfield); • Modify roads (pave Threemile, gravel Waxmyrtle), • More easy trails (wheelchair-accessible boardwalk at Umpqua Beach, fitness trail at Horsfall, paved loop trails near roads); • Add ORV trails (tree island-to-tree island interpretive trail, tour routes through wooded areas).	**Both miles of trails and paved roads would increase. For example:** • Pave secondary roads (Threemile Road); • Add high access trails (urban trails at Siuslaw Vista and Horsfall, interpretive trails at High Dunes Overlook and Butterfield), • Add hiking trails (Waxmyrtle, Spinreel, High Dunes Overlook)	**Approximately 23 miles of paved roads and 25 miles of maintained trails, including:** • Four paved access roads; • Most trails are unsurfaced, short, and close to paved roads and facilities (Waxmyrtle Trail, Umpqua Scenic Dunes Trail); • Some planned roads not yet constructed (Threemile Road paving, Hauser and Butterfield Lake accesses)	**Trail mileage remains about the same; fewer miles of paved roads. For example:** • Short roads (Siltcoos and South Jetty), • Reroute trails (Tahkenitch and Waxmyrtle); • Add trails for fishing and viewing wildlife, • Maintain most existing trails; • More roadless acres.	**Trail miles reduced; substantially fewer miles of paved roads. For example:** • Short roads (Horsfall, Siltcoos, South Jetty, Threemile); • Most trails not maintained (Threemile and Tahkenitch trails); • More roadless acres.	**Trail mileage remains about the same; slightly fewer miles of paved roads. For example:** • Reroute trails (Waxmyrtle), • Add trails for fishing, viewing wildlife, hiking; • Maintain most existing trails, • Construct or upgrade some existing trails to make disabled accessible	**More miles of trails and paved roads. For example:** • Add roads (Hauser, Butterfield), • Modify roads (gravel Waxmyrtle), • More easy-access trails (wheelchair-accessible boardwalk at Umpqua Beach, fitness trail at Horsfall, paved loop trails near roads); • Add ORV trails (tree island-to-tree island interpretive trail).	**Paved road mileage and parking access remain about the same. Increased trail mileage, with new trails for easy-access, strenuous hiking, and access for people with disabilities. Emphasize respect for private property rights. For example:** • Easily accessible trails near parking and picnic facilities, • Short trails for fishing and viewing wildlife near former ORV areas; • Easy-access wooden foot trails near developed areas through forest, shrub, and dune areas; • Clear signing to indicate distance and terrain of easy access trails, • Bicycle trail near former Threemile Road; • Hiking trails from Highway 101 to ocean away from paved roads, • Clear signing to protect sensitive habitats and private property rights
FACILITIES	**More facilities with more amenities. For example:** • Add campgrounds along all paved roads; • Add interpretive and viewing sites (Fort Umpqua, High Dunes recreation complex, Umpqua Beach ocean view parking); • Add access facilities (Horsfall ORV staging area, increased fishing access); • Add concessions (South Jetty marina complex, Butterfield aquatic recreation center, dog-sled rides); • Upgrade facilities (showers, electric and sewer hookups, information and interpretive areas, disabled-person access)	**More facilities with some changes. For example:** • Modify facilities (convert South Jetty Hill staging area to a day-use and picnic area, convert Lodgepole Campground to group campground and day-use area); • Change use (facilities in Siltcoos Corridor closed to ORVs, Bluebill Campground closed to ORVs), • Add facilities (Hauser ORV Campground, South Jetty ocean-view shelter, Fort Umpqua interpretive site).	**14 campgrounds and 21 day-use facilities. For example:** • Facilities concentrated on Highway 101 and paved roads, • Most facilities without conveniences such as hookups, flush toilets and showers), • Facilities designed to provide access to undeveloped areas (ORV staging areas, hiker and horse trailheads), • Some planned facilities not yet constructed (Hall Lake visitor center, Butterfield area campground); • Some existing facilities not used as planned (Lodgepole Campground, Tahkenitch Boat Launch), • Some facilities not converted as planned (Tyee Campground converted to bicycle camping)	**Fewer facilities and some changes, such as:** • Close facilities (Siltcoos Beach parking lot, Driftwood II Campground, five parking lots on South Jetty Road), • Change use (Waxmyrtle and Lagoon campgrounds closed to ORVs), • Modify facilities (convert Lodgepole Campground to day-use group facility, close riverside sites); • Add facilities to concentrate recreation in specific areas	**Very few facilities, generally more primitive. For example:** • Close facilities (five parking lots on South Jetty Road, Driftwood II, all ORV staging sites, Spinreel Campground), • Change use (Waxmyrtle and Bluebill become hike-in campgrounds), • Modify facilities (close Waxmyrtle riverside sites, convert Horsfall to RV campground)	**More facilities and some changes, such as:** • Change use (Waxmyrtle and Lagoon campgrounds closed to ORVs), • Modify facilities (convert Lodgepole Campground to day-use group facility, rehab riverside sites); • Add facilities to concentrate recreation in specific areas and to facilitate management changes, such as ORVs off of paved roadways and designated dispersed motorized camping	**More facilities with more amenities. For example:** • Add ORV-focus campgrounds in S Jetty, Siltcoos, Umpqua Beach, and Horsfall corridors, • Add interpretive and viewing sites (Waxmyrtle and S Jetty viewing areas, Umpqua Beach ocean-view parking), • Add access facilities (Horsfall ORV staging area, increased fishing access), • Add concessions (South Jetty marina complex, Butterfield aquatic recreation center), • Upgrade facilities (showers, electric and sewer hookups, disabled access)	**Maintain or modify existing, and add new facilities which emphasize access to non-motorized recreation, including access for people with disabilities. For example:** • Convert or remove all ORV-related facilities (such as staging areas to day-use and camping facilities); • Bicycle and walk-in camping facilities added to campgrounds; • New cultural interpretive features such as historical markers.
INTERPRETATION	**More emphasis than now. Programs and facilities designed to educate and serve large numbers of visitors. For example:** • Many guided and structured opportunities (Fort Umpqua interpretive center, visitor center and ORV interpretive trails at Butterfield Lake), • Many signed trails accessible from paved roads.	**More emphasis than now with focus on education about geology, natural history and cultural resources. For example:** • More structured and guided activities at facilities (Butterfield Lake environmental and cultural resource center, South Jetty wetlands interpretive center, Fort Umpqua interpretive site, Hauser cultural interpretive site); • More self-guided interpretive opportunities (Butterfield interpretive trails, South Jetty and Horsfall wildlife viewing areas).	**Emphasis on education at on-site locations and off-site facilities. For example:** • Unstaffed contact stations at north and south district boundaries, • Staffed interpretive center at Oregon Dunes NRA headquarters, • Various guided activities (campfire programs, guided walks), • Planned interpretive center not yet constructed (Hall Lake)	**More emphasis than now, with a focus on natural resource education at specific sites, such as:** • More presentations, exhibits and one-on-one contact at facilities (wetlands interpretive center, headquarters)	**Less emphasis than now with a focus on natural resource education, such as:** • Presentations at Oregon Dunes NRA headquarters or off-site locations, • On-the-ground interpretive activities designed to serve small groups and have low impact on the environment	**More emphasis than now, with a focus on natural resource education at specific sites, such as:** • More presentations, exhibits and one-on-one contact at facilities (wetlands interpretive center, headquarters)	**More emphasis than now. Programs and facilities designed to educate large numbers of visitors, including:** • Many guided and structured opportunities (Lodge/Visitor Center and ORV interpretive trails at Butterfield Lake), • Many signed trails along paved roads.	**More emphasis than now with focus on education about geology, natural history, ecology, and cultural resources. For example:** • More structured and guided activities at facilities; • More self-guided interpretive opportunities; • Various guided activities (campfire programs, guided walks)

DETAILED COMPARISON OF ALTERNATIVES (continued)

ISSUE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E	ALTERNATIVE F(PA)	ALTERNATIVE G	ALTERNATIVE H
SPECIAL AREAS WETLANDS	**Slightly more emphasis than now, with a focus on providing recreation opportunities. For example:** • Manage some wetlands close to roads, trails and campgrounds for wildlife viewing (South Jetty, Waxmyrtle Marsh, Hauser, Horsfall), • Manage some wetlands for waterfowl hunting (North Spit).	**More emphasis than now, with focus on providing easily-accessible, non-motorized recreation opportunities. For example:** • Manage most wetlands close to roads and trails for recreation and education (Waxmyrtle marsh, Horsfall wetlands).	**No direction provided, however:** • wetlands managed under "Taking Wing" initiative (South Jetty, Waxmyrtle Marsh), • some wetlands enhanced as mitigation areas (Spinreel and Henderson marshes)	**Extensive areas managed to maintain habitat diversity and provide related recreation, such as:** • Maintain remote deflation plain wetlands for wildlife (Siltcoos-Threemile area, Horsfall-Tenmile area); • Restrict some human uses (close Siltcoos Overflow Campground); • Manage some wetlands close to roads and trails for recreation and education (South Jetty)	**No wetlands managed.**	**Extensive areas managed to maintain habitat diversity and provide related recreation, such as:** • Maintain remote deflation plain wetlands for wildlife (Siltcoos-Threemile area, Tenmile area); • Restrict some human uses (close Siltcoos Overflow Campground), • Manage some wetlands close to roads and trails for recreation and education (South Jetty)	**Slightly more emphasis than now, with a focus on providing recreation opportunities. For example:** • Manage some wetlands close to roads, trails, and campgrounds for wildlife viewing (South Jetty, Waxmyrtle Marsh, Hauser, Horsfall), • Manage some wetlands for waterfowl hunting (North Spit)	**Maintain ecosystems to protect and enhance populations of currently endangered species, and avoid future endangerment of species;** • Evaluate special events for impact on special habitats • More emphasis than now on wetlands, with extensive areas managed both to maintain habitat diversity and provide accessible recreation, • Manage most wetlands close to roads and trails for recreation and education (Waxmyrtle marsh, South Jetty); • Maintain remote deflation plain wetlands for wildlife (Siltcoos-Threemile area, Horsfall-Tenmile area)
GLOBALLY SIGNIFICANT PLANT COMMUNITIES	**No communities would be allocated for protection. Most communities occur within ORV-use areas and could be threatened by ORVs not remaining on designated routes.**	**All communities would be outside ORV-use areas, but could be impacted by hikers leaving trails. No specific management to protect and maintain these communities.**	**Many communities would be outside ORV-use areas, yet some upland forest communities could be threatened by ORVs not remaining on designated routes or hikers leaving trails.**	**Most communities would be outside ORV-use areas, but subject to impacts from hikers leaving trails. No specific management to protect and maintain these communities.**	**Same as Alternative B.**	**All known communities in good to excellent condition would be allocated for protection and maintenance.**	**No communities would be allocated for protection. Many could be threatened by ORVs not remaining on designated routes.**	**Same as alternatives B and E.**
RESEARCH NATURAL AREAS (RNAs)	**No areas would be allocated for establishment.**	**The Threemile area would be allocated for establishment.**	**The research values of both areas would be preserved for a future decision about RNA status.**	**The Tenmile Creek area would be allocated for establishment.**	**Both the Threemile and Tenmile Creek areas would be allocated for establishment.**	**The Tenmile Creek area with modified boundaries and reduced acres would be allocated for establishment.**	**No areas would be allocated for establishment.**	**The Tenmile and Threemile areas would be allocated for establishment.**
WILD AND SCENIC RIVERS	**None of the 3 study rivers (Siltcoos, Tahkenitch and Tenmile) would be recommended for designation into the Wild and Scenic River System.**	**All 3 study rivers would be recommended for designation into the Wild and Scenic River System - classification: recreational.**	**None of the 3 study rivers would be recommended for designation into the Wild and Scenic River System; however, eligibility would be maintained at the level inventoried.**	**All 3 study rivers would be recommended for designation into the Wild and Scenic River System - classification: scenic.**	**Tahkenitch and Tenmile creeks would be recommended for designation into the Wild and Scenic River System - classification: wild.**	**Two of the 3 study rivers would be recommended for designation into the Wild and Scenic River System - classification: wild for Tahkenitch, scenic for Tenmile.**	**Two of the 3 study rivers would be recommended for designation into the Wild and Scenic River System - classification: recreational for Siltcoos, scenic for Tahkenitch.**	**All 3 study rivers would be recommended for designation into the Wild and Scenic River System - classification: recreational for Siltcoos, wild for Tahkenitch and Tenmile. The NRA would assert reserved water rights.**
FUTURE CONDITIONS	Under Alternative A, a visitor in the year 2000 would see concentrated public use along Highway 101 and the east-west corridors to the beach. One would also see many ORVs in open sand areas. Campgrounds and other facilities such as a marina would be highly developed and more "urban" in setting. Developments including commercial enterprises aimed at visitor services and entertainment would be prevalent Opportunities to experience solitude, quiet, and remote settings would be rare and confined to areas well away from the corridors. Larger areas of open sand might be evident if efforts to reduce spread of European beachgrass were effective. A visit to a newly developed visitor center would be focused on state-of-the-art interpretive exhibits Signs along Highway 101 would encourage travelers to stop at staffed contact stations at the north and south ends of the Oregon Dunes NRA.	Under Alternative B, a visitor to the Oregon Dunes NRA would encounter many other non-motorized recreationists, particularly along the six major corridors. The visitor would also readily find paved hiking trails, boardwalks, viewing platforms, fishing piers, boat ramps, and interpretive signs along these corridors. Associated facilities such as parking lots and restrooms would be highly developed and plentiful. Wetlands and other fish and wildlife habitat near major corridors would appear somewhat manipulated and would have trails, viewing platforms, and signs associated with them. Visitors hiking away from major corridors would find some opportunity for unguided exploration of dune environments. Motorized recreationists would have limited opportunity for unguided play in open dune areas They would travel on designated routes to highly developed specified destinations (e.g., wildlife viewing areas and fishing lakes) and would see many other people at these sites.	Under Alternative C, a visitor in the year 2000 along the four major east-west corridors and Hwy 101 itself would encounter scenery that appears natural. Visitors would also find a variety of facilities, such as campgrounds, picnic areas, parking areas, and trailheads allowing them to leave their vehicle With-in 1/2 mile on either side of corridors, visitors would see other people and structures/facilities, hear vehicles, and find numerous "easy" opportunities to explore and learn about the area. Moving away from the corridors (either on foot, horseback, or ORV) visitors would find fewer and fewer other people, more natural scenery, less noise and evidence of humans and more strenuous, less structured opportunities to experience and explore the environment Views of open sand dunes would be less common than now, and more area would be covered by vegetation.	Under Alternative D, a visitor in the year 2000 would notice that the Oregon Dunes NRA is relatively undeveloped except along Highway 101 and the major east-west access routes Managed wetlands would be common in the deflation plain and the South Jetty area, and one would see a variety of wildlife habitats and management activities near many of the lakes. Opportunities for viewing wildlife, hunting, and fishing in an undeveloped setting would abound Visitors would also find opportunities for other activities such as hiking that are compatible with fish, wildlife, and other natural resources. One would notice fewer Forest Service personnel and other visitors than now. Visitors would find information about the Oregon Dunes NRA's natural resources at a visitor center and at other locations like the Oregon Dunes Overlook	Under Alternative E, large portions of the Oregon Dunes NRA would appear to be natural to a visitor in the year 2000, although much of the ongoing vegetational succession would involve spread of non-native species like European beachgrass, Scot's broom, and gorse. There would be considerably less open sand, and sand dunes and deflation plains with varying amounts of vegetation would dominate the scene. Travel through most of the Oregon Dunes NRA would be somewhat difficult, and visitors would see few signs of other recreationists and Forest Service personnel Any other people encountered would most likely be close to Highway 101 and the shortened east-west corridors. Solitude, quiet, and opportunities for unguided exploration of dune environments would be pervasive Facilities might stand out because of their scarcity	Under Alternative F(PA), a visitor in the year 2000 would notice that the Oregon Dunes NRA is relatively undeveloped except along Highway 101 and the major east-west access routes. Managed wetlands would be common in the deflation plain and one would see a variety of wildlife habitats and management activities near many of the lakes. Opportunities for viewing wildlife, hunting, fishing and other non-motorized recreational activities in an undeveloped setting would abound. Visitors would see ORV recreationists in the 4 major corridors, on designated travel routes, and in some open sand play areas Visitors would find information about the Oregon Dunes NRA's natural resources at a visitor center and at other locations such as the Oregon Dunes Overlook and the High Dunes Overlook.	Under Alternative G, a visitor in the year 2000 would see concentrated public use along Highway 101 and the east-west corridors to the beach. One would also see many ORVs in open sand areas Campgrounds and other facilities such as a marina would be highly developed and more "urban" in setting Developments including commercial enterprises aimed at visitor services and entertainment would be prevalent Opportunities to experience solitude, quiet, and remote settings would be rare and confined to areas well away from the corridors Larger areas of open sand might be evident if efforts to reduce spread of European beachgrass were effective. A visit to a newly developed visitor center would be focused on state-of-the-art interpretive exhibits. Signs along Highway 101 would encourage travelers to stop at staffed contact stations at the north and south ends of the Oregon Dunes NRA	Under Alternative H, a visitor in the year 2000 along the four major east-west corridors and Hwy 101 would find abundant opportunities for non-motorized recreation in a quiet setting, amid scenery that appears natural Visitors would find a variety of facilities such as campgrounds, picnic areas, parking areas, and trailheads Visitors would find numerous "easy" opportunities near roads to explore and learn about the area. Wetlands and other fish and wildlife habitat near corridors would have enhanced trails, viewing platforms, and signs consistent with non-intrusive access to these areas Moving away from the corridors, visitors would find plentiful opportunities for unstructure recreation and viewing wildlife, hunting, and fishing in an undeveloped setting

MANAGEMENT AREAS

Introduction

The Oregon Dunes NRA is a single management area (MA 10) in the Forest Plan. A management area is a land area for which overall management direction (goals, desired condition, and standards and guidelines) is the same. It varies in important respects from management direction for all other management areas. The total land area within a management area (Figure II-1) can be either contiguous or an aggregation of a number of separate, smaller land areas.

The NRA is an area for which Congress identified diverse purposes. To achieve these varied purposes different management activities and public uses may require being separated physically or being located in portions of the NRA with specific resource potentials. For this reason, MA 10, the Oregon Dunes NRA, has been subdivided and each of the subdivisions is treated as a new management area. They are numbered 10(A), 10(B), etc. to indicate they are subdivisions of Forest MA 10 and are delineated on the map accompanying this document.

Descriptions

Following is the number, name and a brief description of each management area.

MA 10(A) - Non-Motorized Undeveloped Area

This management area provides non-motorized recreation opportunities in undeveloped settings.

MA 10(B) - ORV Open

This management area provides ORV riding opportunities in undeveloped, unvegetated settings.

MA 10(C) - ORVs Restricted to Designated Routes

This management area protects vegetated habitats while providing controlled opportunities for ORV touring and travel on designated routes.

MA 10(D) - Developed Corridors

This management area provides highway vehicle access to developed facilities designed for a variety of recreation opportunities.

MA 10(E) - Snowy Plover Habitat

This management area provides suitable nesting habitat to help in the recovery of the species.

MA 10(F) - Plant, Fish, and Wildlife Habitats

This management area provides opportunities to maintain, create, enhance, or restore a variety of plant, fish, and wildlife habitats.

MA 10(G) - Wetland Management Area

This management area provides opportunities to maintain, enhance, create, or restore wetlands.

MA 10(H) - Wildlife and Fish Viewing

This management area provides a variety of opportunities for a broad range of recreationists to view and learn about wildlife and plant communities.

MA 10(I) - Vegetation Removal Area

This management area provides opportunities to reduce or eradicate "problem" non-native vegetation and other encroaching vegetation in order to maintain or restore natural dunal processes, native plant communities, and unique scenery.

MA 10(J) - Proposed Wild and Scenic River

This management area maintains the river's free-flowing character and protects or enhances the outstandingly remarkable values of the river and its immediate environment.

MA 10(K) - Research Natural Area

This management area provides focused opportunities for research and is similar to MA 13 in the Forest Plan in terms of management direction.

MA 10(L) - Noise-Control Buffer

This management area provides a noise "buffer" of restricted ORV access between NRA lands open for ORV use and private residential areas adjacent to the NRA boundary

Figure II-1. Management area acreage [1]

	ALTERNATIVE							
MANAGEMENT AREA	A	B	C	D	E	F(PA)	G	H
10(A) Non-motorized Undeveloped[2]	6,590	20,610	12,810	11,325	23,850	7,830	9,666	19,615
10(B) ORV Open	7,676	2,167	6,090	2,872	0	5,930	7,297	0
10(C) ORV Restricted to Designated Routes	11,800	885	8,220	2,809	0	4,455	7,832	0
10(D) Developed Corridors	1,210	921	876	740	660	1,050	921	888
10(E) Snowy Plover Habitat	0	0	20	82	155	1,010	108	82
10(F) Plant, Fish, and Wildlife Habitats	240	240	25	3,676	0	3,120	440	659
10(G) Wetland Emphasis	920	660	605	3,395	0	2,540	912	2,315
10(H) Wildlife and Fish Viewing	314	314	244	314	0	314	314	314
10(I) Vegetation Removal	150	50	10	10	0	0[3]	150	150
10(J) Recommended Wild and Scenic River	0	1,852 [4]	0	1,852	1,210	1,090	1,260	1,852
10(K) Allocated Research Natural Area	0	1,201	0	1,825	3,025	1,190	0	3,025
10(L) Noise-Control Buffer	0	0	0	0	0	370	0	0
TOTAL	28,900	28,900	28,900	28,900	28,900	28,900	28,900	28,900

[1] Does not include private land.
[2] 2,060 acres of recently acquired lands near Tahkenitch Lake included in MA 10A in all alternatives.
[3] Vegetation management not treated as a separate MA with allocated acres in this alternative.
[4] This alternative includes an additional 590 acres of private land outside the NRA Boundary.

MANAGEMENT OF RESOURCE PROGRAMS

The following section provides another way to compare the alternatives - by resource program. In this section, major management goals and objectives for each resource area are described and differences between the alternatives for that resource are emphasized. This is intended to allow the reader who is only interested in a particular resource area to easily review how management of that resource varies among the alternatives.

MANAGEMENT OF RECREATION

The Oregon Dunes NRA is managed to provide recreation settings that will:

- encourage and facilitate public enjoyment and understanding of the coastal sand dune environment, and
- provide a variety of recreational opportunities that can enhance the quality of life for visitors and area residents.

In addition, sound management of recreation resources is viewed as a primary means by which the Forest Service can assist surrounding communities in building a diversified, strong and stable economy.

Recreation Program Management

The recreation program at the Oregon Dunes NRA is comprised of 4 areas of management emphasis: recreation visitors, developed settings, motorized undeveloped settings, and non-motorized undeveloped settings. The level of management for all 4 areas varies by alternative.

Management of Recreation Visitors

Visitor management at the Oregon Dunes NRA under all alternatives, except C, would consist of 3 primary elements:

- Establishing and using (when needed) capacity levels based on the recreation settings provided.
- Increasing emphasis on education, facility design, monitoring, and more stringent enforcement to gain fuller compliance with regulations.
- Initiating and enforcing administrative tools to reduce unacceptable impacts of visitors on non-recreation resources, other visitors, and nearby residents.

Recreation Management Philosophy

Since its creation, management of the Oregon Dunes has focused on making a broad range of outdoor recreation activities available to as many visitors as wanted to come. Managers have emphasized accommodating visitors and meeting their recreation needs to the greatest extent possible, with a minimum of interference in the form of regulations, enforcement, and other types of control. At times this philosophy has negatively impacted non-recreation resource values, interests of nearby residents, and interests of some recreationists.

While this philosophy has generally served the NRA and many visitors well for the past 20 years, changes during those 20 years have brought about a need for some modification. Some of these changes are part of broader nationwide trends, such as federal legislation and public values favoring increased protection of publicly-owned natural resources in places such as national parks, national forests, and NRAs.

Other changes specific to the Oregon Dunes NRA are:

- Concentrated use during some holiday and special-event weekends has exceeded the capacity of developed facilities and management's ability to provide adequate public safety and resource protection.

- Unauthorized routes and impacts on resources in undeveloped portions of the NRA have proliferated with more ORVs (the result of individual all-terrain vehicles displacing multiple-passenger dune buggy/sand rails as vehicles of choice).

- Continued loss of open sand due to encroaching vegetation has limited some types of recreation.

- Technological changes in recreation equipment have changed use patterns and resource impacts. For example, larger and more powerful ORV engines have made remote areas more accessible and subject to more use and resource impacts.

- Increasing residential development around the NRA boundary has heightened sensitivity to noise originating on the NRA.

In response to these changes and to ensure sound stewardship in the future, NRA recreation management philosophy seeks to balance visitor use with the following objectives:

- better protect physical and biological resources of the NRA.

- prevent deterioration of recreational settings and experiences to an inappropriate level.

- be a "good neighbor" to people and communities adjacent to the area.

All alternatives except C would implement a management philosophy that strengthens emphasis on visitor management. Strengthened visitor management would be evident in 2 primary areas: increased emphasis on compliance with regulations and management of visitor numbers to be consistent with land capabilities and recreation experience objectives. Initially this latter element will involve limitation of visitor and vehicle numbers in corridors to the designed capacity of the developed facilities within those corridors. Eventually (within several years of the revised NRA management plan) it would also involve determination of capacity limits for undeveloped portions of the NRA. These limits would be enforced whenever use reaches capacity. That could be immediately or at some point in the future.

Capacity Levels

To maintain acceptable levels of impacts on physical and biological resources, provide desired levels of recreation experience, and reduce impacts on nearby residents and communities, visitor capacity levels would be set at the NRA. This would be done under all alternatives except C by limiting use in corridors and individual facilities to their designed capacity. Use of "over-flow" areas not specifically located and designed for such use would cease.

The capacity of undeveloped areas at the NRA would be determined within several years of plan approval. Appropriateness of new facilities would then be determined on a project-by-project basis by considering their contribution to agreed-upon acceptable levels of change to physical and biological resources, quality of recreation experiences, and nearby residents and communities. Once acceptable levels of change have been reached, no additional use or facilities that would cause additional change would be permitted. Forest Service managers currently have a variety of methods to keep visitation levels within capacity limits and to mitigate effects of such limits on visitors.

Compliance

The need for increased compliance with regulations was noted by many participants in this process. Fuller compliance with regulations would be achieved under all alternatives except C through a combination of increased visitor information and education, improved facility design, and strengthened enforcement. Under all alternatives the Forest Service would expend all available resources in terms of time, funding, equipment and staffing to ensure compliance. However, agency resources are finite and beyond agency efforts NRA visitors and user groups will have to accept greater responsibility for educating and policing themselves to ensure adequate compliance with regulations. This will help avoid additional legally-mandated (36 CFR) recreation use restrictions. Situations of 50 percent non-compliance in spite of Forest Service compliance efforts, as was recently found for State noise standards, will not be tolerated in future and self-policing will be important in ensuring fuller compliance with regulations.

In addition, all alternatives require a monitoring plan with clearly identified thresholds requiring action to bring impacts resulting from excess use or non-compliance back within acceptable limits. All alternatives contain measures to mitigate (reduce or alleviate) adverse environmental impacts. For example, requiring ORVs to remain on designated routes through wetlands and vegetated areas is a mitigation measure intended to minimize vehicle impacts in accordance with 36 CFR, Part 295. Mitigation establishes a reasonable balance between use and resource impact and is a commitment by the agency that use can be managed to keep impacts at an acceptable level. If monitoring shows that non-compliance is compromising the effectiveness of mitigation measures (and as a result impacts are not being kept to acceptable levels) the agency must take additional (often more restrictive) actions to remain in compliance with its legal and regulatory mandates.

Based on the considerations listed below, different levels of compliance were designed into different alternatives.

Level of visitation - Alternatives with higher anticipated numbers of visitors would require a more extensive compliance program.

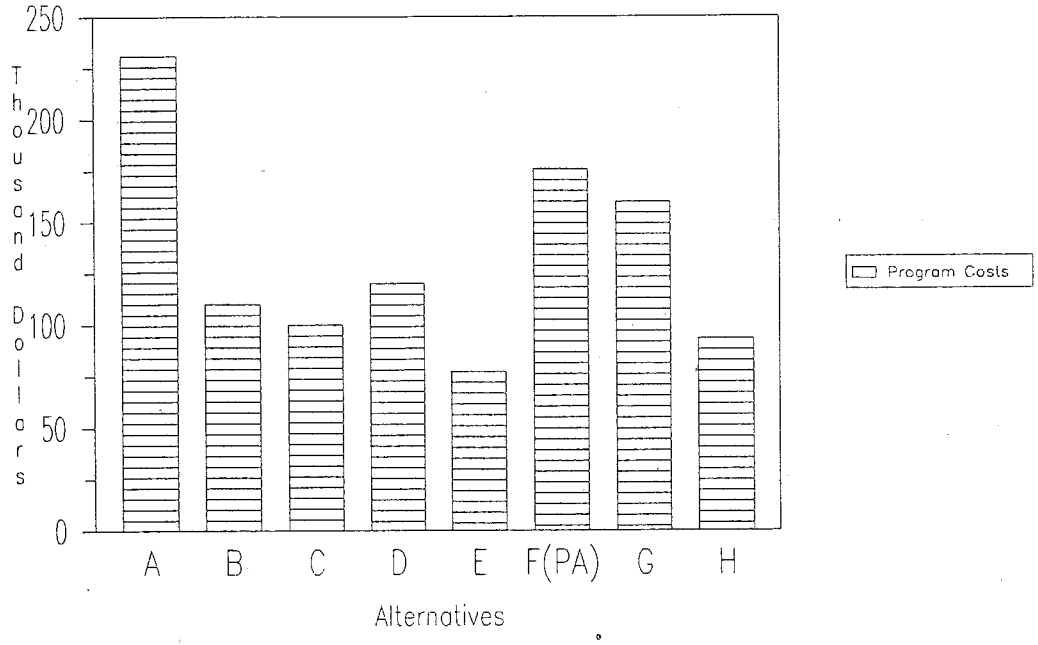
Type of recreation use - Different types of recreation use require different compliance programs. For example, past experience at the Oregon Dunes NRA has shown that ORVs require a more intensive and extensive compliance program than non-motorized uses because ORVs can cover greater area, can travel at higher speeds, and generally have more environmental impacts.

Management philosophy - A philosophy emphasizing visitor management would require a greater compliance program than a philosophy emphasizing visitor accommodation.

Likelihood of violations - Depending on the spatial arrangement of management areas and activities in the alternatives, varying likelihoods of violations exist. Those alternatives with a higher likelihood of violations are designed to have greater compliance programs.

Impact of non-compliance - The likely severity of impacts resulting from non-compliance varies by alternative. In some alternatives, non-compliance might be a temporary nuisance or disturbance to other recreationists or nearby residents. The impact of such non-compliance would be short-term and not very severe. In other alternatives, non-compliance might result in damage to a sensitive environment, such as a wetland. The impact of this non-compliance could be long-term and quite severe. Thus, differing compliance programs are designed into alternatives depending on severity of impacts that could result from non-compliance in each (Figure II-2).

Figure II-2. Compliance program as reflected by projected cost



Additional Tools

Several administrative tools for managing use at the NRA would be used to varying degrees under all alternatives. Specific tools that could be used more widely include:

- buffers closed to ORVs along sections of the eastern boundary of the NRA (to reduce ORV noise impacts and trespass on private lands)
- wider buffers closed to camping along developed access corridors (to reduce visual, sanitation and other impacts from concentrated camping along roads outside of campgrounds)
- quiet hours in developed campgrounds between 10 p.m. and 6 a.m. (to reduce ORV and generator noise)
- curfews on ORV use in undeveloped portions of the NRA (to reduce late night noise impacts on nearby residents and other visitors)
- restrictions on camping outside fee (developed) campgrounds

Buffers along the eastern boundary are built directly into the alternatives and can be reviewed on alternative maps by noting lands open and closed to ORVs. Of the 6 alternatives that continue ORV use, alternatives B, D and F(PA) include such buffers and alternatives A, C and G do not.

Camping closures along roads, campground quiet hours, and curfews are applied as standards and guidelines under the alternatives. Currently, roads at the NRA are closed to camping for 200 feet on either side. Alternatives A, C, F(PA) and G would continue this 200-foot closure. Alternatives B and H would increase the closure to 500 feet and alternatives D and E would increase it to 1,000 feet.

Campground quiet hours and ORV riding curfews (10 p.m. to 6 a.m.) are not currently used at the NRA. They would be initiated as follows under the alternatives:

Alternative	Quiet Hours Locations	Curfew Locations
A	Waxmyrtle, Butterfield, Bluebill, Carter Lake, Wildmare, all other non-ORV focus campgrounds	None
B	All campgrounds except Horsfall and Hauser	Competition Hill and within ¼ mile of NRA boundary in Cleawox and Woahink Lake area
C	No change from current	None
D	All campgrounds	Competition Hill and within ¼ mile of NRA boundary in Cleawox and Woahink Lake area,
E	All campgrounds	Not applicable; area closed to ORVs
F(PA)	All campgrounds (midnight to 6 a.m. Horsfall and Spinreel)	South Jetty to Siltcoos (10 p.m to 6 a.m.) Tenmile to Horsfall (midnight to 6 a.m.)
G	Same as A	None
H	All campgrounds except Horsfall	Not applicable; area closed to ORVs

Restrictions on camping outside of fee campgrounds would be employed under all of the alternatives except s. Alternative F(PA) would restrict motorized camping outside of fee campgrounds in all areas open to ORV use. It would restrict non-motorized camping outside fee campgrounds when monitoring indicates unacceptable resource impacts are occurring.

Recreation Settings

The Recreation Opportunity Spectrum (ROS) is a system used by many federal and state land management agencies to categorize different outdoor recreation settings. There are 6 recreation settings within the ROS system and each setting provides a different set of recreation opportunities and experiences. ROS settings run from highly modified environments with numerous contacts with other people to undisturbed, natural environments with little or no contact with others. Four of the 6 ROS settings occur on the Oregon Dunes NRA: Rural (R), Roaded Natural (RN), Semi-Primitive Motorized (SPM), and Semi-Primitive Non-Motorized (SPNM).

Rural - is characterized by a substantially modified natural environment. Resources are modified to enhance specific recreation activities. Sights and sounds of humans are readily evident and interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Facilities for intensified motorized use and parking are available. Visitor capacity of rural settings is high and is generally the sum of the capacities of all facilities. Average visitor densities in NRA rural settings would be between 15 and 30 people per acre.

Roaded Natural - is characterized by predominantly natural-appearing environments. Facilities are designed and constructed to accommodate conventional motorized use. Moderate sights and sounds of humans exist and interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification is evident, but in harmony with the natural environment. Visitor capacity of roaded natural setting is intermediate between rural and semi-primitive settings. At the NRA, average visitors per acre in roaded natural settings is between 2.5 and 5.

Semiprimitive Motorized - is characterized by a predominantly natural or natural-appearing environment of moderate to large size (generally greater than 2,500 acres). Concentration of users is low, but there is often evidence of other users. The area is managed with minimal and subtle on-site controls and restrictions. Motorized use is permitted. Visitor capacity of semi-primitive motorized settings is low to moderate. Initial estimates of appropriate average visitor density in this setting at the NRA is between 1 and 2 people per acre.

Semiprimitive Nonmotorized - is characterized by a predominantly natural or natural-appearing environment of moderate to large size (generally larger than 2,500 acres). Interaction between users is low, but there is often evidence of other users. The area is managed with minimal and subtle on-site controls and restrictions. Motorized use is not permitted. Visitor capacity of this setting is low. At the NRA, average visitor densities in this setting would be between .25 and 1 person per acre.

The alternatives contain varying mixes of these 4 ROS classes. Figure II-3 presents the amount (number of acres) of each setting included in each of the 8 alternatives.

Figure II-3. Acres within each ROS class by alternative.

	ALTERNATIVE							
ROS Class	A	B	C	D	E	F(PA)	G	H
Rural (R)	350	360	250	240	160	**300**	340	240
Roaded Natural (RN)	4,180	3,570	3,630	3,490	3,480	**3,660**	3,590	3,660
Semiprimitive Motorized (SPM)	19,260	3,290	13,990	6,070	0	**12,440**	16,540	0
Semiprimitive Nonmotorized (SPNM)	5,110	21,680	11,030	19,100	25,260	**12,500**	8,430	25,000
TOTAL NRA (National Forest acres)	28,900	28,900	28,900	28,900	28,900	28,900	28,900	28,900

Alternative A - would increase amounts of R, RN, and SPM settings over current, while reducing the amount of SPNM setting. It would provide the most facility and access development and the most area for ORV riding. SPNM would be reduced primarily on the North Spit of the Umpqua River and in the Umpqua Scenic Dunes between Tenmile Creek and the Coos County line.

Alternative B - would increase amounts of R and RN settings slightly over current by improving access and developing facilities in the Hauser and Butterfield Lake areas. It would increase SPNM by reducing the amount of SPM (primarily in the Umpqua Beach to Coos County line area and south of Horsfall Road).

Alternative D - would increase the amount of SPNM over current by reducing the amount of R and RN settings in the South Jetty and Siltcoos corridors. It would also increase SPNM by reducing SPM settings south of Tenmile Creek and south of Horsfall Road.

Alternative E - would not provide SPM settings because it closes the NRA to ORVs. It would provide the most SPNM by reducing R and RN settings through elimination of many interior roads and facilities as well as all SPM settings.

Alternative F(PA) - would provide R and RN settings similar to current levels. The amount of SPM would be reduced because the area south of Horsfall Road would be closed to ORV use.

Alternative G - would increase amounts of R and RN settings over current by improving access and developing facilities in the Hauser and Butterfield Lake areas and by developing additional camping facilities in the South Jetty, Siltcoos, and Horsfall corridors. It would increase the amount of SPM by opening the Umpqua Scenic Dunes to ORV use and would reduce the amount of SPNM.

Alternative H - would reduce the amount of RN setting slightly by closing Threemile Road to motor vehicles. It would maintain R settings at the current level and increase SPNM settings significantly by closing the NRA to ORVs, thus eliminating any SPM setting.

Management of Developed Settings

Developed recreation settings are those areas where the Forest Service has provided improvements such as roads designed for highway vehicles, campgrounds, picnic areas, trailheads, parking lots, staging areas, and viewing sites. They are generally intended to provide recreation opportunities that are easily accessible, do not provide much solitude, and require low levels of self-reliance. Developed settings serve visitors interested in both non-motorized and motorized recreation pursuits. Some developed facilities, such as trailheads or staging areas, are intended not so much as recreation sites in themselves, but as access points for dispersed recreation activities in less developed portions of the area. Developed recreation settings are classified into either the R or RN ROS class.

Every developed facility has a specific designed capacity. This capacity is expressed in a factor called "persons at one time" or "PAOT". As the term implies, this is the number of people a facility is designed to accommodate at one point in time. For example, individual camp units within a campground are intended to serve 5 individuals. Therefore, a 20-unit campground has a PAOT capacity of 100 people. Developed facilities are designed to serve a specific capacity for several reasons:

- to provide high-quality overnight experiences
- to provide high-quality day-use experiences
- to keep impacts on other resources within acceptable limits
- to provide a safe recreation setting
- to keep visitor numbers within manageable limits

The alternatives provide different levels of developed recreation settings and improvements. The levels are based on resource capabilities, concerns and opportunities raised by the public, and varying degrees of response to seasonal shortages of such facilities in the area around the NRA. Amounts, types, and locations of facilities, trails and roads vary by alternative. Appendix G shows additions to and reductions from current NRA facilities, trails and roads. A brief discussion of the rationale for the changes that would occur under each alternative follows.

Alternative A - Increased visitation to the NRA and especially increased ORV-based recreation are primary objectives. As a result, many easily accessed facilities located close to existing paved roads and designed to serve large numbers of visitors (especially ORV recreationists) are added. Miles of easy, disabled accessible trails designed to attract and accommodate high volumes of visitors and miles of ORV trails are increased. Miles of paved and gravel roads designed to accommodate

highway vehicles are increased to encourage and facilitate increased visitation. Roads are built into several new areas of the NRA to increase ease of access and encourage increased visitation.

Alternative B - Increased visitation to the NRA and especially increased non-ORV-based recreation are primary objectives. As a result, many different types of easily accessed facilities designed primarily to serve large numbers of people are added near exisiting paved roads. Miles of easy disabled accessible trails (short, level, hard-surfaced) designed to serve high volumes of visitors are increased near paved roads. Miles of longer, more difficult angler, horseback, mountain bike and hiker trails into less developed areas are also increased. One additional area (Butterfield Lake) is made accessible to highway vehicles through construction of a paved road.

Alternative C - This is the "no action" alternative. A balanced mix of ORV and non-ORV recreation while keeping much of the area undeveloped is the objective. Three additional facilities contributing to this objective are added and one additional area (Butterfield Lake) is roaded to allow passenger vehicle access as called for in the existing management plan. Additional ORV and hiker/horse trails are added to facilitate use of undeveloped portions of the NRA.

Alternative D - Providing low-density, low-impact types of recreation at visitation levels similar to current while increasing management emphasis on fish, wildlife, plants and unique geologic features are primary objectives. As a result, several existing facilities and portions of two existing paved roads are removed in order to make access more difficult and thereby reduce human impacts to habitats and unique features. Use at some facilities is converted to types of recreation activities having less impact than current types. Some small facilities promoting fish, wildlife and plant oriented recreation are added in both developed and undeveloped parts of the NRA. Trail miles focusing on fish, wildlife, and plant oriented recreation experiences away from roads are increased, but easy, high-visitor-volume trails are not a high priority.

Alternative E - Concentrating recreation opportunities and access along Highway 101 while reducing use and management to allow natural processes to go on unimpeded in the interior portions of the NRA are the objectives. As a result, most existing facilities, roads and trails in interior portions of the NRA are removed or abandoned.

Alternative F(PA) - Providing a broad range of recreation opportunities at visitation levels similar to current while increasing the management emphasis on fish, wildlife, plants and unique geologic resources are the primary objectives. As a result, some larger facilities (such as additional ORV overflow camping and staging near Driftwood II, new ORV staging at Hauser and Bull Run, expanded ORV staging at Goosepasture and Horsfall day-use) are added to replace facilities where the focus is changed (e.g. Waxmyrtle and Lagoon Campgrounds) or where use is restricted (e.g. motorized dispersed camping) to reduce resource impacts. Some small facilities promoting fish, wildlife and plant oriented recreation are added in both developed

and undeveloped parts of the NRA and two additional areas are roaded (Butterfield and Beale lakes) to promote fish and wildlife-based recreation opportunities. New non-ORV day-use facilities are added at Butterfield Lake and at Hall and Schutpeltz lakes. Bicycle lanes along NRA access roads and a mix of easy, disabled accessible trails near paved roads and more difficult hiker, horse and bicycle trails away from roads are added to provide a diversity of recreation opportunities.

Alternative G - Providing enhanced ORV-based recreation opportunities while enhancing non-ORV recreation and other resources in other portions of the NRA are primary objectives. As a result, many facilities intended to provide ORV-based recreation opportunities are added. Facilities designed to encourage fish and wildlife-based recreation and other non-ORV recreation opportunities are also added in areas away from ORV-use areas. The use focus of some facilities is changed to enhance recreation experiences for both ORV and non-ORV recreationists. A mix of easy trails near roads, non-ORV trails and ORV trails away from roads are added to enhance a broad range of recreation opoprtunities. Two additional areas are roaded and Waxmyrtle Road is upgraded for highway vehicle access to provide enhanced ORV and fish-based recreation.

Alternative H - Providing a broad range of non-ORV based recreation opportunities while increasing access to to the natural, scenic, wildlife and geologic features of the NRA are primary objectives. As a result, the use focus of many facilities changes from ORV to non-ORV and several facilities are added to enhance fish and wildlife-based recreation opportunities. Miles of easy, disabled accessible trails near existing paved roads are increased as are miles of hiker, horse, bicycle trails in less developed portions of the NRA. Road access is provided to the Butterfield Lake area and Threemile Road is converted to a bicycle trail to enhance the range of non-ORV recreation opportunities.

Levels of developed recreation management are shown in Figure II-4 by the amount of acreage within Rural and Roaded Natural ROS classes and by the cumulative PAOT capacity for each alternative.

Figure II-4. Levels of developed recreation capacity by alternative

	ALTERNATIVE							
Opportunity	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Rural/Roaded Natural (acres)	4,530	3,930	3,880	3,730	3,640	**3,960**	3,930	3,900
Developed Site Capacity (PAOT)	7,910	7,045	5,815	4,840	2,535	6,370	7,560	5,705

Management of Motorized Undeveloped Settings

Undeveloped recreation settings, whether motorized or non-motorized, are areas with very few or no facilities. Undeveloped settings tend to be large areas of at least 2,000 acres. They are intended to be moderate in terms of difficulty in reaching them, provide moderate opportunities for solitude, and require moderate levels of self reliance. Oregon's *State Comprehensive Outdoor Recreation Plan* (SCORP 1989) found semi-primitive settings such as the undeveloped portions of the NRA to be in the shortest supply when existing resources are compared to projected future demand.

Motorized undeveloped settings are managed primarily for visitors who wish to use ORVs for access and exploration. These settings are also available for non-motorized use; however, because of inherent conflicts or discouragement by management, little mixing actually occurs. Management of these settings involves:

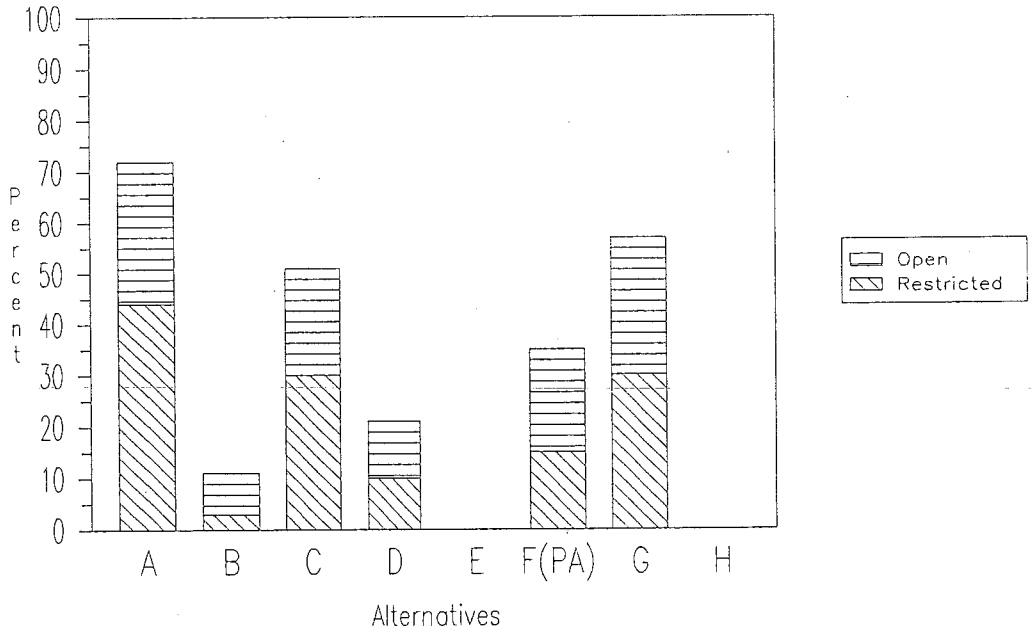
- providing developed access points, such as campgrounds or staging areas, around the periphery.
- providing hand-outs and on-site information about locations and regulations for use.
- providing signs, barriers, enforcement, and other controls to ensure that use complies with regulations (especially Title 36, Code of Federal Regulations, Part 295 - Use of Motor Vehicles Off Forest Development Roads).
- providing minimum improvements, such as designated routes, to keep impacts on resources such as wetlands or wildlife habitats within acceptable limits.
- refining capacity limits within several years of this action and using them when needed.
- monitoring ORV use as prescribed in the above CFRs.

Under all alternatives a distinction is made between ORV use in unvegetated versus vegetated areas. Unvegetated sand in some parts of the NRA is open to ORV use and visitors may operate vehicles wherever they wish in accordance with regulations. However, all vegetated areas are closed to public ORV use except on designated routes. Designated routes through vegetation provide: access from one open sand area to another; access from sand areas to beach areas open to ORVs; and ORV trail riding and exploration opportunities. In managed wetlands (MA 10G), designated routes will only be provided for access between riding areas. This constitutes a change from current management because managed wetland acres with limited motorized access will no longer be counted as open to motorized use. Operating a vehicle off of designated routes in vegetated areas will violate the closure.

Within the ROS, undeveloped motorized settings may be classified as either RN or SPM. As with other ROS classifications, each of these settings has specific attributes which define them. ORV accessible areas of the NRA (both RN and SPM) are and will be managed at the higher user densities, frequency of encounters, and managerial presence consistent with the RN setting. The primary attribute that would differentiate between RN open for ORVs and SPM settings is the presence of roads and other developments.

Alternatives E and H would close the entire NRA to off-road motorized use and thus lack motorized undeveloped settings. All of the other alternatives provide varying amounts of undeveloped motorized area in the SPM settings. Each of the 6 alternatives that permit ORV use also provide differing amounts of designated routes through closed (vegetated) areas (Figure II-5). Alternatives A, B, D, F(PA), and G would permit motorized dispersed camping only in designated locations. Alternatives D and F(PA) would limit motorized dispersed camping more than alternatives A,B and G.

Figure II-5. Percent of NRA Available for ORV Use



Management of Non-motorized Undeveloped Settings

These are undeveloped settings managed primarily to be reached and explored either by foot, horseback or other non-motorized means. Otherwise, they have the same attributes as undeveloped motorized areas in terms of general size, expected degree of solitude, and required level of self reliance.

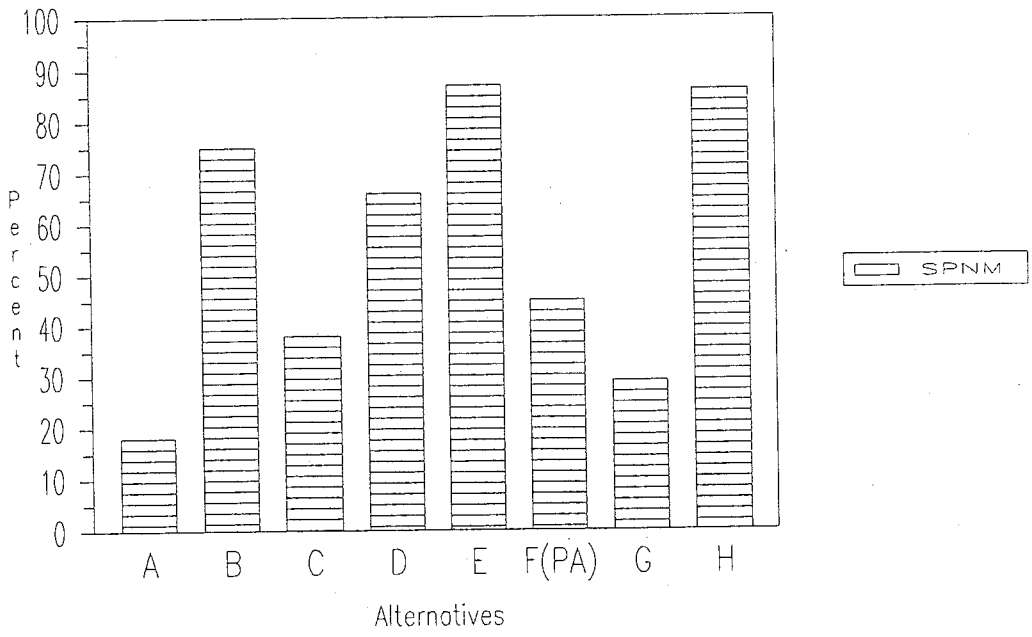
Management of these settings involves:

- providing developed access points, such as campgrounds or trailheads, around the periphery.
- providing a range of opportunity for non-motorized experiences by keeping some large areas without trails and less accessible.
- providing hand-outs and on-site information about location and regulations for use.
- providing signs, barriers, enforcement, and other controls to ensure that use complies with regulations.
- providing minimum improvements, such as trails and viewing sites, to keep impacts on resources such as wildlife habitats within acceptable limits.
- determining capacity limits within several years of this plan approval and using them when needed.

Several other undeveloped settings at the Oregon Dunes NRA (such as wetlands or habitat areas) would also be available for non-motorized visitors in some alternatives. Recreation is not the primary focus of these areas and, as a result, access may be more difficult, management controls more prevalent, numbers of visitors more limited, and acceptable levels of impact lower. How recreation would be managed in these areas can be found in the appropriate program description(s) and in the management area prescriptions found in Dunes Plan, Chapter III.

Within the ROS, undeveloped non-motorized areas, including those emphasizing other resource uses would be classified as SPNM. Each alternative is designed to provide different amounts of SPNM setting (Figure II-6). The levels are based on various concerns and opportunities expressed by segments of the public and on various levels of management response to anticipated future demand for such settings. If, in the future, non-motorized dispersed camping is adversely impacting resources it would be limited to designated locations available by permit.

Figure II-6. Percent of NRA in SemiPrimitive Nonmotorized ROS class



MANAGEMENT OF INTERPRETATION

The interpretive program includes personnel, facilities and activities such as talks, signs, brochures and exhibits. It helps visitors to understand and appreciate the NRA by sharing information about geology, natural history and cultural resources. It also encourages thoughtful use of the area and minimizes human impacts on resources. Interpretation promotes understanding of the goals and objectives for which the Oregon Dunes NRA was established.

The interpretation and natural resource education program at the Oregon Dunes NRA consists of 3 major components:

- overall focus of the program
- interpretive methods (called "media")
- interpretive facilities

The interpretive program for the alternatives includes varying degrees of the 3 components.

Overall Focus

The interpretive program is tailored to each alternative. In Alternative A, the program would emphasize highly-structured learning experiences such as staffed visitor centers capable of serving large numbers of visitors. For Alternative E, the program would provide unstructured, self-guided learning experiences such as unstaffed, covered exhibits that are suitable for low-density, low-impact types of recreation. Figure II-7 describes the focus of the interpretive program for each alternative.

Interpretive Media

Interpretive media is the techniques used to provide experiences and is easily separated into guided and unattended services. In guided activities, visitors come in direct contact with interpretive specialists and a 2-way conversation occurs. Examples include guided walks, talks to groups and staffed viewing areas and visitor centers.

In unattended experiences, communication flows one way. This type of interpretive media includes audio devices, written materials, self-guided activities and unstaffed exhibits and visitor centers. Self-discovery occurs when visitors explore on their own, without any interpretive media. Figure II-7 lists some of the interpretive media appropriate for the guided and unattended services included in each alternative.

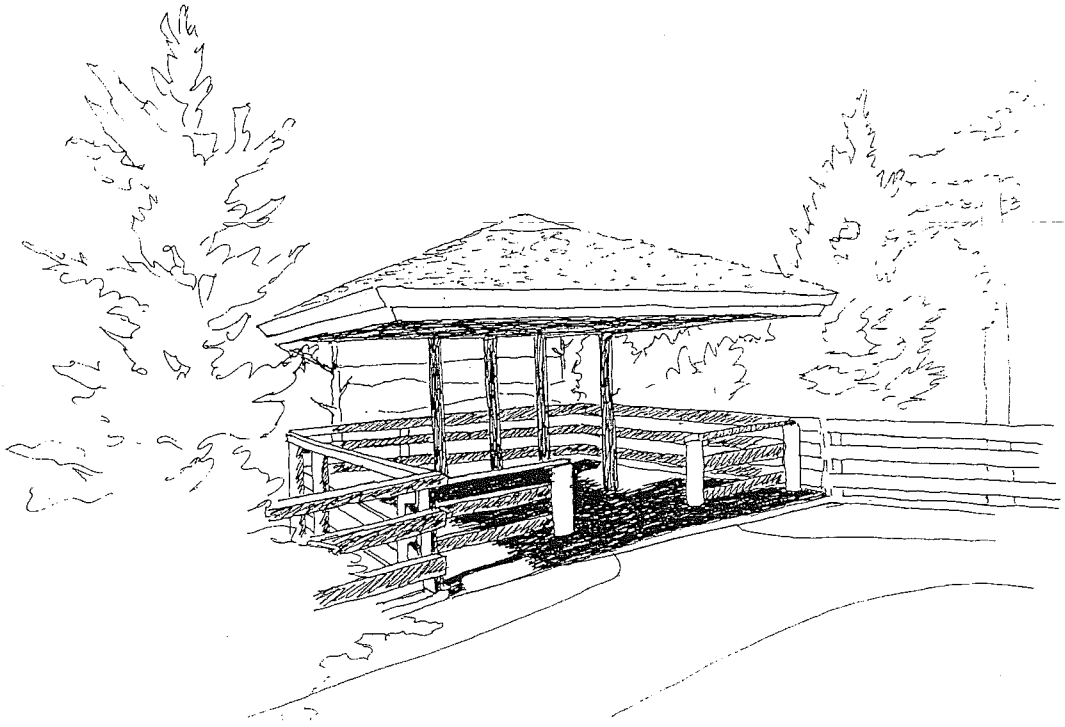


Figure II-7. Focus and interpretive media for each alternative.

Focus of Alternative	Interpretive Media
Alternative A - program educates and serves large numbers of people with guided, highly-structured learning opportunities for both motorized and non-motorized users. Facilities are generally located close to roads.	**Guided** - story telling, Elderhostel programs, campfire programs, walks, interpretive visitor centers, ORV, auto and bus tours **Unattended** - activity guide, ORV and auto tours, brochures, recreation guide, trail guides, interpretive signs, newspaper guide, radio transmission, sensory device
Alternative B - program is designed primarily for non-motorized recreation with an emphasis on geology, natural history and cultural resources.	**Guided** - walks, classes, Elderhostel program, interpretive visitor centers, public excavation, roving interpreter, campfire programs, staffed viewpoints **Unattended** - activity guide, brochures, discovery guide, exhibits, newspaper guide, sensory device, interactive videos, trail guides, interpretive signs
Alternative C - program focused at visitor centers and designed to provide information about facilities and recreation opportunities	**Guided** - staffed visitor centers, campfire programs, walks **Unattended** - brochures, interpretive signs
Alternative D - program emphasizes unattended interpretation focused on minimizing impacts to important plant, fish and wildlife habitats. Program is aimed at non-motorized recreationists.	**Guided** - school presentations, Elderhostel program, campfire programs, staffed viewing sites, walks, staffed headquarters, field seminars **Unattended** - displays, exhibits, kiosk, interpretive signs, brochures
Alternative E - program's focus is on self-discovery with little interpretation	**Guided** - staffed headquarters, school presentations **Unattended** - none
Alternative F(PA) - program emphasis is on interpreting the natural environment at designated sites to minimize impacts on fish, plant and wildlife habitats.	**Guided** - Elderhostel program, school presentations, campfire programs, interpretive visitor and viewing centers, walks, roving interpreters, public excavations, seminars, staffed headquarters **Unattended** - exhibits, displays, kiosks, interpretive signs, brochures
Alternative G - program includes many guided opportunities designed to educate and serve large numbers of motorized and non-motorized recreationists.	**Guided** - story telling, Elderhostel programs, campfire programs, walks, interpretive visitor centers, ORV, auto and bus tours **Unattended** - activity guide, ORV and auto tours, brochures, recreation guide, trail guides, interpretive signs, newspaper guide, radio transmission, sensory device

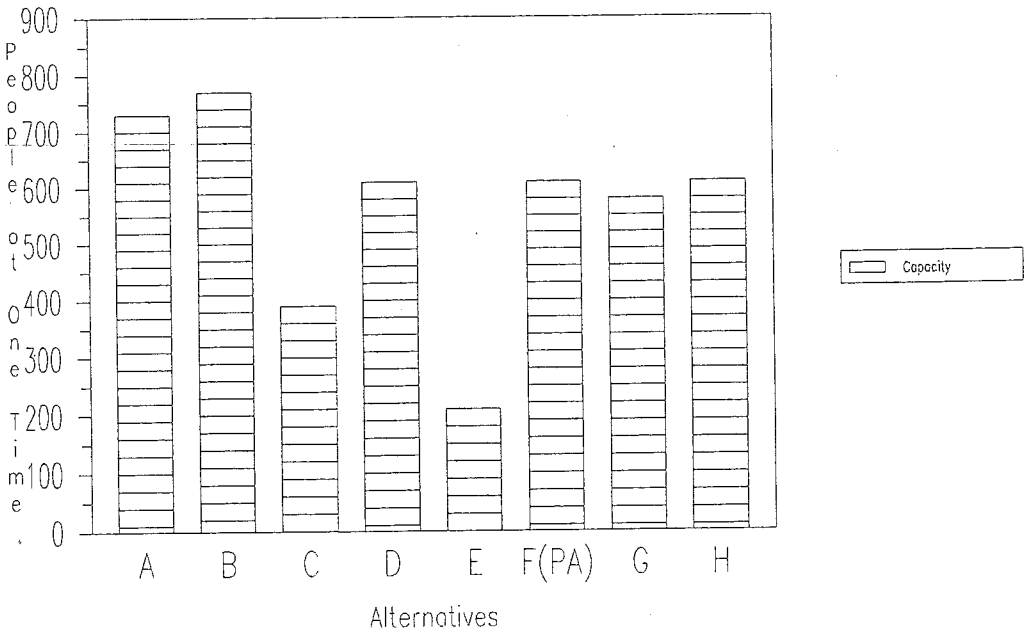
Figure II-7. Focus and interpretive media for each alternative (continued).

Focus of Alternative	Interpretive Media
Alternative H - program emphasizes unattended interpretation focused at minimizing impacts on important fish, plant and wildlife habitats.	**Guided** - walks, classes, Elderhostel program, interpretive visitor centers, public excavation, roving interpreter, campfire programs, staffed viewpoints **Unattended** - activity guide, brochures, discovery guide, exhibits, newspaper guide, sensory device, interactive videos, trail guides, interpretive signs

Interpretive Facilities

A wide range of interpretive facilities is included in the alternatives. Alternatives A and G include visitor and interpretive centers that are close to roads and capable of serving large numbers of people at one time. Interpretive facilities in alternatives D and H are small, blending in with the surroundings. Alternative E has only one interpretive facility, the NRA headquarters. An environmental learning facility is included at Butterfield Lake in Alternative F(PA) and is considered an interpretive facility, even though it would be open to the public only as members of sponsored groups or educational institutions. Alternative C includes facilities that provide information about recreation opportunities. Facilities interpreting the environment are included in Alternative B. Refer to Appendix G for a complete listing of interpretive facilities for each alternative. Figure II-8 compares the total capacity of interpretive facilities for each alternative in people at one time (PAOT).

Figure II-8. Capacity of interpretive facilities in PAOT, by alternative.



MANAGEMENT OF SCENERY

Scenery, or the visual resource, is managed by establishing standards for all NRA land. Projects and management activities are then planned to meet these standards, called Visual Quality Objectives (VQOs). VQOs describe the desired condition of the landscape and how much deviation from it is acceptable upon completion. A description of each VQO follows.

Visual Quality Objectives

Preservation - The landscape appears natural from any place within the area. Ecological changes are the only changes permitted. There are few management activities except for low-volume recreation facilities like trails. Facilities such as signs, buildings and viewing platforms are absent.

Retention - To the average forest visitor, activities are not evident from the viewing location; however, a variety of roads, viewing platforms, and parking areas may be present. Upon completion of the activity, the viewed area will only appear slightly altered. Vegetation and landforms are used to screen facilities and unwanted views. A variety of vegetation manipulation techniques are used to maintain and increase visual variety.

Partial-Retention - From the viewing location, management activities are more apparent to the average forest visitor. These activities are visually subordinate to the natural landscape, except in the first year or so. Lines, colors, forms and textures of the activity are borrowed from the surrounding landscape.

Modification - Management activities are not only seen but dominate the viewed landscape. Activities include providing facilities such as buildings, signs, roads, and parking lots.

Since all lands are seen, lands that are not in a viewshed will be managed with the VQO that corresponds with the assigned ROS classification. Lands that have been assigned as roaded natural, semi-primitive motorized or semi-primitive non-motorized that are not in a viewshed, will be managed as retention.

Management

Scenery is managed by controlling how it is altered from the natural appearance, and by introducing or maintaining variety into the seen area.

Proposed Deviations - Proposed deviations are evaluated against the VQO and a judgment is made as to whether or not they meet the established objective. The decision is based on how well the activity harmonizes with the natural character of the landscape. Manipulation in landform, vegetative screening, redesign and relocation are some alternatives that will allow a proposed activity to harmonize with the landscape.

Maintaining Variety - There are areas where vegetation is reducing variety. Examples are where beachgrass is moving in or where vegetation is allowed to grow and block views. Variety is maintained when vegetation is altered to reverse these natural processes.

Viewsheds

Viewsheds are not management areas as they are in the Forest Plan. They are the areas that can be seen from a viewing location, or locations, within the viewshed. They are typically along heavily traveled roads and trails and at viewing platforms, parking lots, and developed recreation facilities. A single viewshed may overlap several management areas or several management areas may be located in one viewshed.

Management of viewsheds varies substantially by alternative. Figure II-9 shows which VQOs are assigned to each viewshed in each alternative.

Figure II-9. Protection levels of viewsheds

		Alternatives							
Viewshed	**Miles**	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Highway 101	26.0	PR	R	R	R	R	R	R	R
Overlook	0.4	PR	PR	R	R	R	R	R	R
High Dunes Overlook [1]		PR	PR	PR	R	-	PR	PR	R
Major Road Corridors									
Siltcoos	2.0	M	PR	PR	R	R	R	PR	PR
South Jetty	5.2	M	PR	PR	R	R	PR	PR	PR
Umpqua Beach	2.2	M	PR	R	R	R	R	PR	R
Horsfall	2.4	M	PR	PR	R	R	PR	PR	PR
Minor Road Corridors									
Threemile Road	1.0	M	PR	R	R	R	R	R	R
Trails									
High Use [2]	9.2	PR	R	R	R	P	R	R	R
Moderate and Low Use [3]	14.7	PR	R	R	P	P	R	R	P

P = Preservation, **R** = Retention, **PR** = Partial Retention, **M** = Modification

[1]Proposed development for some alternatives.
[2]High Use Trails - Carter Dunes, Eel Dunes, Lagoon, Overlook Loop, Waxmyrtle, Taylor Dunes and Umpqua Dunes.
[3]Moderate and Low Use Trails - Bluebill, Chief Tsiltcoos, Siltcoos Lake, Tahkenitch, Tahkenitch Creek, and Threemile Lake.

MANAGEMENT OF PLANT COMMUNITIES AND WILDLIFE HABITAT

Management of plant communities and wildlife habitats consists of 4 major components: 1) protective measures in or near special communities, populations or habitats; 2) population and/or habitat improvement and restoration projects; 3) coordination efforts with appropriate agencies; and 4) planning and developing opportunities for wildlife-related recreation. Management levels of all 4 vary by alternative.

In addition, special measures may be implemented for PETS species (species which have been included on the federal threatened or endangered species list, are proposed for federal listing, or have been listed as sensitive by the Regional Forester), and their habitats. All alternatives would at least meet minimum requirements of PETS species. Meeting these requirements would primarily involve protective measures and coordination with appropriate agencies. However, in alternatives which emphasize plant communities and wildlife habitats (Alternatives D, F(PA), H), habitat improvement or population restoration projects would be planned. These latter alternatives would also include more stringent protective measures.

Protective Measures

Protective actions designed in alternatives would be aimed at maintaining plant communities and wildlife habitats themselves, components of healthy habitats, and habitat diversity. In addition, protective measures designed for PETS species would be designed to protect individual plants or animals.

All alternatives include standards and guidelines which provide minimal protection to plant communities and wildlife habitats (Appendix C and Dunes Plan, Chapter III). In some cases, land allocations designed for particular alternatives protect plant communities and wildlife habitats (e.g., allocating land to MA 10A rather than MA 10C. Alternative F(PA) is the only alternative which designates globally significant plant communities as part of MA 10F. Additional protective measures may include educating visitors about ways to minimize impacts on plants and wildlife; implementing more stringent standards and guidelines; removing or altering existing trails or facilities; barricading or enclosing special habitats or populations; and altering recreation or administrative use patterns. These additional protective measures would vary by alternative in number, kind and degree of stringency. Alternatives which emphasize plant community and wildlife habitat values would include more protective measures, and those measures would be more stringent, than alternatives which emphasize recreation.

Examples of measures which would be used to protect plant communities and wildlife habitats include:

- Channel and concentrate recreational use away from special plant communities and wildlife habitats;

- Restrict administrative and/or recreation use in sensitive habitats or during critical seasons (e.g., breeding season); for example:

  - Prevent concentrated use, particularly dispersed camping, in sensitive habitats year-round or during critical seasons;
  - Close some sensitive habitats to recreation use;
  - Prohibit removal of important habitat components (mushrooms, dead and down wood, driftwood) in some areas.

- Educate visitors about plants, wildlife, communities and habitats and protective measures taken to maintain them.

Specific examples of protective measures designed in each alternative are:

Alternative	Protective Measures
A	- Includes no protective measures in addition to minimums.
B	- Protects tree islands by buffering Cleawox Lake area through land allocation.
C	- Precludes developments in critical habitats.
D	- Allocates little area to ORV riding. - Closes roads or portions of roads to protect wetlands, snowy plover habitat and beach strand habitat (South Jetty, Waxmyrtle and Siltcoos roads). - Closes many campgrounds to protect a variety of habitats (Siltcoos Overflow, Lodgepole, Driftwood II campgrounds). - Removes portions of campgrounds to protect riparian and aquatic habitats (Lagoon and Waxmyrtle campgrounds). - Reroutes trails to reduce human disturbance of snowy plover habitat (Waxmyrtle and Tahkenitch trails). - Restricts public use of estuaries and sand spits to protect snowy plover habitat and estuaries.

Alternative	Protective Measures
E	- Prohibits ORV riding to protect all ecosystems. - Closes roads or portions of roads to protect wetlands, snowy plover habitat and beach strand habitat (South Jetty, Waxmyrtle, Siltcoos, Threemile, and Horsfall roads). - Closes many campgrounds to protect a variety of habitat types (Lagoon, Driftwood II and Spinreel campgrounds). - Removes portions of Waxmyrtle Campground to protect riparian and aquatic habitats. - Allows most trails to revegetate to protect ecosystems. - Restricts public use of estuaries and sand spits to protect snowy plover habitat and estuaries.
F(PA)	- Closes portions of campgrounds or rehabilitates specific campsites to protect riparian and aquatic habitats (Waxmyrtle and Lagoon campgrounds). - Reroutes Waxmyrtle Trail to protect snowy plover and beach strand habitat. - Limits recreation in globally significant plant communities to non-motorized use on trails. - Limits ORVs to designated routes in vegetated areas. - Restricts motorized dispersed camping to designated sites available by permit.
G	- Closes special habitats within ORV riding areas.
H	- Prohibits ORV riding to protect all ecosystems. - Converts Threemile Road to bike trail to protect beach strand habitat. - Close Siltcoos Overflow Campground to protect wetland habitat. - Removes portions of Waxmyrtle Campground to protect riparian and aquatic habitats. - Reroutes Waxmyrtle Trail to protect snowy plover habitat. - Restricts public use of estuaries and sand spits to protect these habitats.

Improvement Projects

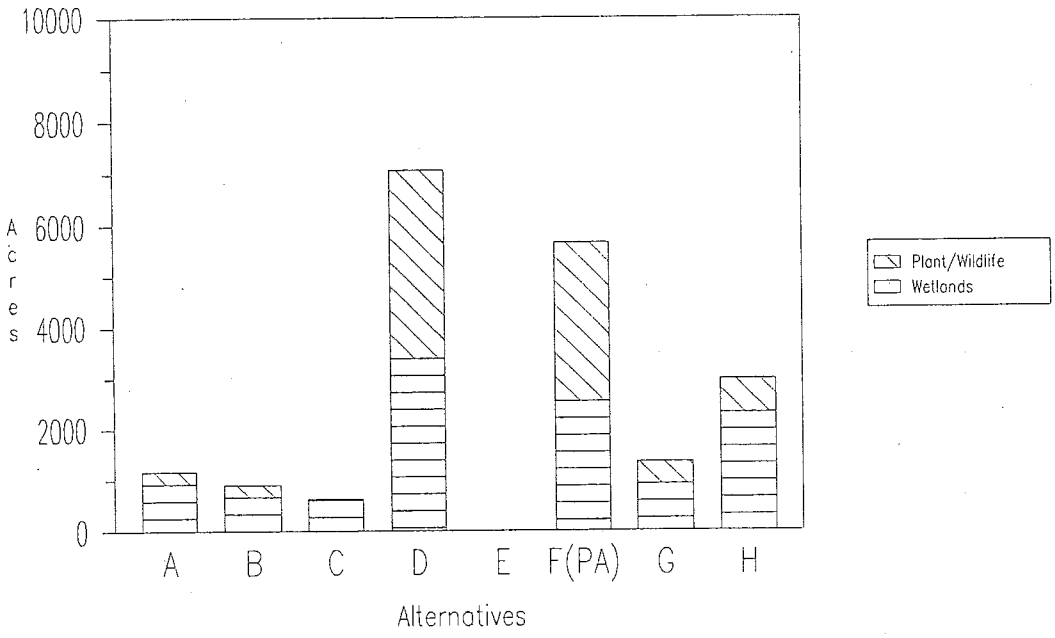
A variety of improvement actions are available for enhancing plant communities and wildlife habitats. Generally, these actions would be designed to maintain and/or enhance important habitat components, maintain individuals of limited populations, and maintain or create a range of seral stages.

Management options for specific plant communities and wildlife habitats include:

Community	Management Options
Meadow	- Maintain early seral stages by burning, mowing or grazing - Introduce native meadow plants. - Leave or create windrows in open meadow habitat to create hiding cover. - Maintain or create snags and/or perch trees on meadow edges.
Forest	- Thin or create small clearings in plantations and second growth stands to increase horizontal and vertical diversity. - Maintain or create snags and dead and down wood.
Riparian	- Plant native species to increase riparian cover.
Beach	- Remove and/or control European beachgrass. - Introduce native beach plants in appropriate areas. - Place dredge material on upland sites to increase open beach habitat for snowy plovers. - Remove trash and artificial debris, particularly plastics and toxins on a regular basis.
Aquatic	- Place logs, woody debris, etc. to enhance fish and invertebrate cover. - Enhance native plant growth to provide cover for fish and invertebrates. - Enhance fish populations to increase forage for fish-eating species (see Management of Fish, Chapter II).
Wetlands	- Maintain a range of seral stages by burning, mowing, grazing or mechanically treating. - Maintain open water longer into the growing season to: a) reduce shrub encroachment into early seral stage wetlands, and b) create suitable breeding habitat for species which require open water in mid to late summer. - Maintain mudflat habitat for foraging shorebirds.
Globally Significant	- Remove or otherwise control non-native competing vegetation.
General Habitat	- Place nest structures, nest boxes when nest sites are limited.

The program varies between alternatives primarily in the amount of area allocated for protection, maintenance, or improvement. Alternatives which emphasize plant communities and wildlife habitats allocate many acres as wildlife habitat management areas; alternatives which emphasis recreation allocate fewer acres (Figure II-10). Alternative E does not allocate any area to improvement projects.

Figure II-10. Acres of wildlife habitat management by alternative



Coordination

Maintaining and improving plant communities and wildlife habitats requires close coordination with several state and federal agencies including Oregon Department of Fish and Wildlife (ODFW; all wildlife populations, state listed species, hunting and trappingregulations), U.S. Fish and Wildlife Service (USFWS; T&E species, species proposed for listing, migratory birds), U.S Army Corp of Engineers (wetlands management), Division of State Lands (wetlands management, estuary management), National Marine Fisheries Service (marine mammals), Oregon Natural Heritage Program (plants, wildlife and habitats), Oregon Department of Agriculture (T&E plants, noxious weed control) and the Oregon Department of Parks and Recreation (beach management). Coordination includes providing input to agencies on proposed or existing regulations, partnership funding of proposed projects, formal and informal conferencing with USFWS when proposed actions may affect federally listed species, and applications for wetlands enhancement permits. Coordination efforts vary by alternative in terms of both amount of coordination necessary and the agencies with which coordination would be most important.

Plant and Wildlife Recreation and Education

Plant and wildlife-related recreation includes activities such as wildlife viewing, plant gathering, nature photography, hunting and trapping. These activities are a vital component of the plant community and wildlife habitat program for several reasons. First, they are valid and popular recreation activities participated in by many NRA visitors. Second, human interaction with plants and wildlife in their natural habitats benefits natural resources by sensitizing visitors to the values and importance of plant communities and wildlife habitats. Interpretive materials can be designed to further educate and sensitize visitors about natural resources. Last, viewing structures and interpretive trails can focus recreation use in less sensitive habitat areas, reducing overall impacts on specific plant communities and wildlife habitats.

Although ODFW determines hunting and trapping regulations, the alternatives vary in the degree to which hunting and trapping opportunities would be encouraged. Alternatives which emphasize wildlife-related recreation (Alternatives D, F(PA), H) would manage suitable hunting areas and would provide information to hunters about opportunities on the NRA. Hunting would not be encouraged in alternatives with high levels of recreation use (Alternatives A, B, G) because safety would be a concern. Hunting would also not be encouraged in Alternative E because the emphasis of this alternative is to maintain ecosystems with little interference from humans. Hunting and trapping opportunities themselves would vary by alternative based on the amount of habitat enhancement designed in a particular alternative.

All alternatives include some wetlands/wildlife viewing structures and all some degree of interpretation of natural resources (see Management of Interpretation, Chapter II). However, the focus of wildlife-related recreation activities would vary between alternatives as would the number and development level of wildlife-related facilities. Alternatives which emphasize plant and wildlife habitats (Alternatives D, F(PA), H) would have many viewing structures designed to minimize impacts on special habitats. Alternatives which emphasize recreation (Alternatives A, B, G) would provide fewer facilities designed to be easily accessible to many recreationists. Alternative C would provide few facilities because the current plan does not provide direction for extensive wildlife viewing opportunities and Alternative E would provide no viewing opportunities to minimize impacts to ecosystems.

Alternative	Wildlife Emphasis/Developments
A	Emphasis is on providing wildlife-related facilities easily accessible to motorized recreationists including: - Wetlands viewing areas at South Jetty and Waxmyrtle Marsh - Umpqua North Spit waterfowl hunting area

B Emphasis is on providing easily-accessible wildlife-related facilities for non-motorized recreationists including:
- Environmental interpretive centers at South Jetty and Butterfield Lake
- Wetlands viewing areas at South Jetty, Siltcoos, Waxmyrtle, Horsfall
- Fish viewing area at Siltcoos

C No specific emphasis. Wildlife viewing designed as part of wetlands enhancement projects including viewing area at South Jetty.

D Emphasis is on minimizing impacts on important wildlife habitats while providing a range of wildlife-related facilities. Areas close to roads would be topics for interpretation while use would be minimized in habitats farther from access points.
- Interpretive centers at South Jetty
- Wetlands viewing areas at South Jetty, Waxmyrtle Marsh, Waxmyrtle Trail, Siltcoos, Horsfall
- Whale watching platforms at South Jetty and Umpqua Beach
- Trail system at Horsfall wetlands

E None

F(PA) Emphasis is on providing a range of wildlife-related facilities while minimizing impacts on important wildlife habitats. Features in areas close to roads would be topics for interpretation while use would be minimized in habitats farther from access points.
- Interpretive centers at South Jetty and Umpqua Beach
- Wetlands viewing areas at South Jetty, Waxmyrtle Trail, Waxmyrtle Marsh, Siltcoos, Horsfall
- Whale watching platforms at South Jetty and Umpqua Beach

G Emphasis is on providing wildlife-related facilities easily accessible by motorized recreationists including:
- Wetland viewing areas at South Jetty and Waxmyrtle Marsh

H Emphasis is on minimizing impacts on important wildlife habitats while providing a range of wildlife-related facilities. Areas close to roads would be topics for interpretation while use would be minimized in habitats farther from access points.
- Wetland viewing areas at South Jetty, Siltcoos, Waxmyrtle Trail, Waxmyrtle Marsh, Horsfall

MANAGEMENT OF VEGETATION

Background

In the early 1900s, several non-native plants were introduced to the Oregon coast, primarily to stabilize sand movement which threatened shipping channels, roads and buildings. Principal species of non-native species planted along the coast included European beachgrass and Scot's broom. In addition, shore pine, a native coastal variety of lodgepole pine, was also planted to reduce sand movement. Of these species, European beachgrass has had the most dramatic effect on the Oregon Dunes NRA, changing many of the values for which the area was established.

Beachgrass swept on to sandy beaches by the ocean tide formed the foredune, a grass-covered dune, which extends the length of the NRA. This foredune, which is more than 25 feet high in places, precludes further inland sand movement from the beach, and has in turn resulted in the establishment of a heavily-vegetated deflation plain immediately east of the foredune. Beachgrass continues to spread throughout much of the NRA, vegetating previously open sand dunes. The result of this single species' introduction is far-reaching; unique geological processes have been changed, limited beach and sand dune plant communities have declined, natural ecosystem processes have been altered, wildfire risk and associated public safety concerns have increased, and the quality of recreation experience has been reduced for many visitors.

Scope of Program

In response to public and management concerns, various methods of removing European beachgrass have been explored both on the Oregon Dunes NRA as well as in other areas along the coast. Because so little is known about effective ways of restoring dune geomorphological processes, any program would necessarily consist of 3 primary components: 1) development of effective vegetation management methods, 2) preparing a comprehensive strategy, and 3) effectively managing vegetation to accomplish resource objectives.

The program will include removing both native (shore pine, huckleberry, salal, waxmyrtle, willow) and non-native vegetation (Scot's broom, gorse, European beachgrass and various aquatic plants) where it adversely effects scenery, recreation quality or natural systems. Removing shore pine plantations would most likely consist of cutting trees and scalping off shrub and herbaceous components. More information on management and control of Scot's broom, gorse and native shrubs is available; mechanical treatment, burning, manual removal, biological controls and herbicide are all potential methods.

Vegetation removal would also be considered as part of the RNA program (see RNAs, Chapter II). Thus, alternatives which include RNAs would include some direction for removing non-native vegetation within RNAs to enhance native plant communities and natural processes.

Developing Vegetation Management Methods

Presently, there are no certain means of removing European beachgrass on a large scale. Manual removal appears to be the most effective, although it is far from efficient (estimates reach $40,000 per acre). Other methods which have been tried with varying success include mechanical removal, burning and herbicide treatment. Recent work using these methods found treatment cost to be far less than manual removal with cost ranging from $2,000 to $6,000 per acre. Because removing beachgrass may not assure inland sand movement (see Watershed, Chapter IV), studies are needed to determine if foredune breaching or other methods are more effective. Studies are also needed to determine whether less expensive methods of removing beachgrass are available.

Current knowledge of methods to use in coastal dune vegetation types, particularly in the case of European beachgrass, is limited. Different methods and combinations of methods will be tested to determine the most practical way to accomplish resource objectives under various site conditions. Evaluation and monitoring of treatment methods will include but are not limited to: efficacy of treatment methods in meeting resource objectives, environmental effects, public and employee safety, cost, and efficacy of mitigation measures.

Treatment Methods

Treatment methods which will be considered include:

Manual treatment - use of hands, hand tools or hand operated power tools to pull, cut, clear, thin, prune or remove competing or unwanted vegetation or noxious weeds. Tools employed with this method may include axes, brush hooks, brush pullers, shovels, sifting screens, chainsaws and brush cutters. Manual placement of plastic or weed barrier cloth to prevent seed germination or re-growth from roots or rhizomes is also included in this category.

Mechanical removal/treatment - use of heavy equipment or farm type equipment to cut, clear, remove or control competing or unwanted vegetation or noxious weeds. Equipment utilized with this method may include crawler or all-wheel-drive tractors equipped with a blade and/or brushrake, mower, rippers, disks, plows, backhoes or other implements. An alternative suggestion which may be tested in an appropriate area is use of ORV traffic to control European beachgrass.

Prescribed fire - use of fire under specific conditions to control competing or unwanted vegetation or noxious weeds, improve wildlife forage or habitat, and reduce fuel accumulation and fire hazard. Techniques may include broadcast burning, pile burning and underburning.

Chemical - application of commercially available herbicides to control competing or unwanted vegetation or noxious weeds. Only herbicides approved for use in vegetation management projects in the National Forests of the Pacific Northwest Region and registered with the Environmental Protection Agency will be considered for use. Application may be mechanical (vehicle mounted or towed wand or boom sprayers), with backpack equipment (usually a pressurized container with agitation device and wand applicator) or by hand (injection, cut and swab or granular soil application). Treatment of European beachgrass with rock salt or sea water has been suggested due to its intolerance of salt concentrations in soil exceeding 1%. Salting trials thus far have not proven effective in controlling beachgrass; however, if effective methods are developed, salting may be considered on the NRA.

Biological - use of natural pathogens to control non-native vegetation and noxious weeds. Previously introduced biological control agents for Scot's broom and gorse (seed weevels) are currently present on the NRA and showing limited success in preventing spread of these species. Natural pathogens must be screened and tested prior to release to ensure that other plant species are not susceptible. Only biological control agents which have been approved for importation and release by the USDA Animal and Plant Health Inspection Service Technical Advisory Group will be considered for release. While use of biological control agents appears quite promising for both gorse and Scot's broom, isolation of species-specific pathogens for European beachgrass does not appear likely in the near future.

Dredge material deposition - deposition of dredge material to control European beachgrass and create snowy plover nesting habitat. Depth and/or salinity of the deposited material appear to be most critical for beachgrass control. Consideration of this method is limited to relatively small sites adjacent to navigation channels or harbors.

Development of effective vegetation management methods on the NRA will also involve working cooperatively with researchers and interest groups to study ways of effectively treating beachgrass and potential to restore inland sand movement, making NRA lands available for research projects on vegetation removal, holding symposia or conferences to collect information, conducting controlled studies of vegetation removal, and collecting existing information on beachgrass control methods. Because all alternatives except Alternatives C and E include some degree of beachgrass removal, the degree of research would not vary between alternatives. The vegetation removal program in Alternative C would consist only of studying ways to remove beachgrass, while no research would be conducted in Alternative E.

Preparing a Strategy

With the exception of Alternatives C and E tentative locations where attempts might be made to restore inland sand movement are identified in each alternative based on the alternative's emphases (Figure II-11). These locations, however, are quite general and would be refined after more in-depth analysis. Following approval of the Final EIS and management plan for the Oregon Dunes NRA, a strategy would be prepared for the vegetation management program which would more clearly define program objectives, select appropriate treatment locations, and evaluate various treatment methods. All site specific analysis will comply with the Region 6 Vegetation Management EIS and Mediated Agreement and would be conducted in accordance with NEPA regulations.

Figure II-11. Emphasis of vegetation management, potential areas and RNAs.

ALTERNATIVES	EMPHASIS	TENTATIVE TREATMENT AREAS	OTHER NON-NATIVE PLANTS/ PLANTATIONS	RNAs
A	Maintain more open sand to enhance motorized recreation.	South Jetty-Siltcoos, Umpqua Scenic Dunes, South of Tenmile Creek	Remove all shore pine and Scot's broom plantations (except those needed to protect roads and facilities)	None allocated
B	Maintain open sand and improve scenery to enhance non-motorized recreation	Oregon Dunes Overlook, Umpqua Scenic Dunes	Remove plantations visible from overlooks, trails	Umpqua Spit
C	Study potential control methods	NA	Remove all gorse	None allocated
D	Enhance native plant communities and wildlife habitats	Siltcoos, Tahkenitch, Tenmile estuaries and near Siuslaw and Umpqua river mouths	Shore pine plantations managed as wildlife habitat; control nuisance aquatic plants	Tenmile
E	No attempts made		N/A	N/A Tenmile, Umpqua Spit
F(PA)	Enhance recreation, scenery, native plant communities, and wildlife habitat	Siltcoos, Tahkenitch, Tenmile estuaries; South Jetty and Waxmyrtle wetlands and viewing areas; deflation plain south of South Jetty Road and south of Tenmile Creek; globally significant plant communities. See map of potential vegetation management areas accompanying this FEIS.	Some shore pine plantations managed as wildlife habitat; control nuisance aquatic plants	Tenmile (modified)
G	Maintain more open sand to enhance motorized recreation.	South Jetty-Siltcoos, Umpqua Scenic Dunes, South of Tenmile Creek	Remove all shore pine and Scot's broom plantations (except those needed to protect roads and facilities)	None allocated
H	Enhance native plant communities and wildlife habitat and recreation	Siltcoos, Tahkenitch, Tenmile estuaries; Siuslaw and Umpqua river mouths; South Jetty and Waxmyrtle wetlands viewing areas; south of South Jetty Road	Some shore pine plantations managed as wildlife habitat	Tenmile, Umpqua Spit

Vegetation Management Strategy for Alternative F(PA)

In Alternative F(PA) a vegetation management strategy is outlined in which 11,317 acres have been identified for potential vegetation management by resource objectives. These areas have been further refined into primary (5,109 ac.) and secondary (6,208 ac.) treatment areas based upon importance of the resource and reasonable expectations of funding and accomplishment during the life of this plan (Figure II-12). Primary and secondary treatment areas are delineated on the map accompanying this FEIS. The large areas identified in this plan as potential treatment areas will be further refined through site-specific planning and analysis, which will follow the Region 6 Vegetation Management EIS and Mediated Agreement to evaluate options and determine strategies and monitoring needs.

The vegetation management program will have a broad overriding objective of restoring dunes geomorphological processes in localized areas. Within this broad objective a series of narrower objectives have been identified. These include:

- restoration and maintenance of snowy plover habitat
- restoration and maintenance of globally significant plant communities.
- reduction of threat of wildfire to public safety and property.
- maintenance and enhancement of scenic qualities.
- promotion and restoration of native species and habitat diversity.
- maintenance and enhancement of ORV recreation opportunities.
- maintenance and enhancement of aquifer water quality/quantity.

Intensity of treatment is expected to vary greatly depending on areas and resource objectives. Treatment will be less intense for projects such as small pockets of invading non-native vegetation in globally significant plant communities, pruning ladder fuels around campgrounds to reduce fire hazard, or removing small patches of European beachgrass to maintain snowy plover habitat. Treatments will be more intense for projects such as plover habitat restoration in European beachgrass dominated foredune areas, thinning or removal of Scot's broom/shore pine plantations for fire hazard reduction, visual resources or ORV recreational opportunities, and prescribed burning to improve wetlands habitat or reduce fire hazard.

In Alternative F(PA), many potential treatment areas contain overlapping vegetation management objectives depending on the resource considered. It is not intended that site-specific project planning and implementation stringently follow each resource objective by priority but rather to utilize resource objectives and priorities to guide site selection and project design. Site specific project analysis should incorporate all primary and secondary objectives identified for the analysis area. Areas of multiple vegetation management objectives should provide greater opportunity to combine funding, build partnerships and increase accomplishment. It is also not expected that all areas identified as primary potential treatment areas will be treated during the life of this plan. Site-specific analysis will provide further refinement of the large areas identified for potential treatment and will take into account other resource values such as wetlands, T&E species, recreational uses and cultural resources. Acres actually treated are expected to differ substantially from potential treatment acres.

Areas not presently identified with vegetation management objectives could be included in a vegetation management project if resource management objectives are identified for a specific area during site-specific project planning (may include projects other than than vegetation management). Land acquisition, discovery of noxious weed infestations (such as European gorse), identification of tree island or tree peninsula restoration needs, and identification of opportunities in selected plantations to increase diversity and structure complexity are expected to make up the majority of vegetation management activities within areas not currently identified.

Resource Objectives and Primary Treatment Areas

Snowy Plover

Focus will be primarily on European beachgrass control and establishment and maintenance of nesting habitat within snowy plover management areas. Most work will take place between the mean high tide mark and the eastern edge of the foredune. However, some additional vegetation may need to be removed to prevent encroachment into treatment areas or, project design may incorporate additional objectives such as visual quality or native species diversity. Estuaries near the mouths of the Siltcoos River, Tenmile Creek and Tahkenitch Creek currently provide suitable nesting habitat and will be highest priority for maintenance of habitat. Projects focused on restoration and creation of snowy plover habitat will build upon existing nesting habitat in these same areas. Primary areas in which treatment could be reasonably expected during the life of this plan, in order of priority, are: 1) from the Siltcoos estuary, south two miles; 2) from the Tenmile estuary, south one mile and north three miles; and 3) from the Tahkenitch estuary, one mile south and one tile north. Total area of all primary treatment areas is 714 acres.

The small snowy plover management area located on the eastern side of the North Spit of the Umpqua does not currently provide nesting habitat for snowy plovers. If dredge material planned to be deposited there are utilized for nesting, vegetation treatment would be needed to maintain and further restore this site as well. Inclusion of this area as a primary treatment area would increase the total acreage by 112.

Globally Significant Plant Communities

Vegetation management will focus primarily on control of aggressive non-native plant species colonizing within or encroaching upon globally significant plant communities. Globally significant plant communities identified as primary areas in which treatment could be reasonably expected during the life of this plan and the species targeted for control, in order of priority, are: 1) American dunegrass community restoration, targeted control species is European beachgrass; 2) seashore bluegrass community restoration, targeted control species is European beachgrass; 3) red fescue communities in good to excellent condition which contain a seashore bluegrass component, targeted control species are European beachgrass and Scot's broom; 4) red fescue communities in good to excellent condition which do not contain seashore bluegrass, target control species is European beachgrass; and 5) shore pine/hairy manzanita-bearberry communities in good to excellent condition, target control species is Scot's broom. Total area within primary treatment areas is 465 acres.

Both the American dunegrass and seashore bluegrass communities are native to foredune areas of the NRA. Quality of the these communities is currently low in all foredune areas, and restoration could logically be incorporated into snowy plover projects.

Reduction of Fire Threat

Focus will be on reducing fuel loading and fuel continuity in and around high use recreation areas to reduce fire threat to public safety and property. Work may consist of widening access routes and reducing fuels along them to allow safe egress of the public and safe access for emergency firefighting resources in the event of a wildfire. Shore pine/Scot's broom plantations may be removed in strategic locations to break up fuel continuity in areas of high risk for starts. Primary treatment areas in which treatment could be reasonably expected during the life of this plan, in order of priority, are: 1) the Siltcoos corridor; 2) the area around Horsfall Campground and extending north along the east side of Horsfall and Spirit Lakes; and 3) the area around Horsfall Beach parking area extending east to Wild Mare Campground. Total area within primary treatment areas is 857 acres.

Scenic Qualities

Focus will be on restoring and maintaining natural dune processes in localized areas to maintain or enhance scenic qualities.

Treatment will focus on control of aggressive non-native sand stabilizing species and early seral colonizing species (European beachgrass and Scot's broom). Projects in some areas may include removal of portions of shore pine/Scot's broom plantations. Maintenance of a natural appearing landscape and increasing scenic variety will be emphasized by promoting active dune processes. Primary treatment areas in which treatment could be reasonably expected during the life of this plan, in order of priority, are: 1) the viewshed west of the Oregon Dunes Overlook; 2) the area east and south of the third Umpqua Beach parking lot; and 3) the foregound area viewed from the Taylor Dunes Trail. Total area within primary treatment areas is 875 acres.

Native Species and Habitat Diversity

Focus will be on promoting and restoring native species and habitat diversity by maintaining and enhancing both wetlands and native species habitats associated with open/active dune ecosystems.

Wetland maintenance projects will focus on maintaining a range of seral wetland conditions with emphasis on early-seral waterfowl habitat in localized areas. Prescribed fire and mechanical treatment are expected to be the primary tools used to attain these objectives. Wetland enhancement projects may focus on expansion of existing wetlands though diking, pothole development or strategic removal of vegetation on stabilized sand to allow natural processes to scour out sand down to the water table.

Maintenance and enhancement of native species and habitats associated with more open sand will focus on treatment of European beachgrass in localized areas to promote active dune processes. . Re-establishment of some native plant species in these areas may require outplanting or seeding of locally collected stock. Many objectives identified for this treatment could be accomplished within priority treatment areas identified for other resource objectives such as visual quality, globally significant plant communities and snowy plover habitat. Primary areas in which treatment could reasonably be expected within the life of this plan, in order of priority, are: 1) the southern portion the South Jetty (Siuslaw River) wetlands emphasis area; 2) the area from Siltcoos Estuary south two miles from the mean high tide line to the western edge of the transition forest, emphasis will include both wetlands (Waxmyrtle Marsh) and active dune habitats and species; 3) the deflation plain wetlands south of the Tenmile Estuary; and 4) the area from Tahkenitch Estuary north one mile (active dune habitats and species emphasis). Total area of all primary treatment areas is 1,690 acres.

ORV Opportunities

Vegetation management for maintaining and enhancing ORV recreational opportunities will focus on open-sand riding areas. Primary emphasis will be in areas stabilized by European beachgrass. Some Scot's broom and pine plantations may also be removed. Opportunity to test various methods of European beachgrass control and techniques to enhance inland sand migration from the beaches will likely take place in these areas due to easy access for equipment and monitoring. Primary areas in which treatment could reasonably be expected during the life of this plan, in order of priority, are: 1) from Siltcoos Road north two miles from the high tide line to the eastern portion of the deflation plain; 2) European beachgrass dominated areas on the east side of the Umpqua Beach Road and south of the third beach parking lot to the Douglas/Coos county line; and 3) localized areas south of Tenmile Creek and west of Spinreel Campground. Total area of all the treatment areas is 1,541 acres.

Water Quality and Quantity

Maintaining and enhancing aquifer water quality and quantity would involve treatment of early and mid-seral vegetation in stabilized areas which support vegetation types with high rates of evapotranspiration (loss of water quantity) or vegetation types which produce acidic soil conditions and increased dissolved iron in ground water (loss of water quality). No primary treatment areas are presently identified for this objective. Studies are currently under way which will help to determine if vegetation management is feasible in meeting these objectives and provide direction in locating priority treatment areas.

Sand Stability

A number of areas have been identified with maintenance of sand stability as top priority. These areas are all adjacent to roads, private lands or other improvements which could be threatened by destabilization and reactivation of sand movement. Some of these areas fall within primary treatment areas; hence, vegetation treatment may be treated in these areas, but care will be taken in selecting treatment methods and target species to prevent reactivation of sand movement. Additional areas where stability is a concern may be identified during site specific planning.

Figure II-12. Acreage table for vegetation management as described in Alternative F(PA)

Resource Objective	Plover	Global	Fire Haz-ard	Visual	Natu-ral	Recre-ation	Water	Acres
Total Primary Area	714	465	857	875	1,690	1,541	0	5,109[1]
Total Seconday Area	196	0	111	975	4,015	687	1,754	6,208[1]
Total Primary and Secondary Areas = 11,317 acres[1]								

[1]Total acres do not equal the sum of acres by resource objectives because acres are double counted when they address multiple resource objectives.

Treating Vegetation

Attempts would be made in all alternatives except Alternatives C and E to treat European beachgrass and other encroaching vegetation to restore inland sand movement. Long-term studies of a foredune breach north of Siltcoos River indicate that removing the foredune may not be sufficient to restore inland sand movement. Therefore, any vegetation removal attempts might include removing both foredune sections as well as vegetation from the deflation plain behind it.

The total acres and areas selected for vegetation removal vary by alternative depending on the focus of the alternative. Alternatives A, B, D, G, and H feature designated and mapped vegetation treatment areas (MA 10I). In Alternative F(PA) vegetation removal is treated as an activity that would occur in many of the Oregon Dunes NRA management areas. As a result potential vegetation management areas for Alternative F (PA) are displayed on a map accompanying this FEIS and no specific acreage targets are currently assigned.

MANAGEMENT OF FISH

Management of fishery resources consists of protective measures near lakes and streams; habitat improvement and restoration projects; appropriate angling regulations; and various types of facilities, access, and interpretative services aimed at the angling public. Levels of management of all vary by alternative.

Protective Measures

Measures used to protect fish habitat by maintaining water quality, lake levels, streamflows, and vegetation on land managed for recreation include:

- Leaving strips of intact vegetation along lakes and streams to buffer impacts of recreational development;
- Minimizing the extent and degree of construction in riparian areas; and
- Channeling, regulating, and concentrating recreational use in ways to minimize impacts on riparian areas and fish habitat in lakes and streams.

Such protective actions should be coordinated closely with appropriate state and federal agencies, and aimed at maintaining present diversity of fish habitats. These measures will be used in all alternatives; however, Alternatives D and F(PA), which emphasize fish habitat, would include more stringent measures.

Habitat Improvement Projects

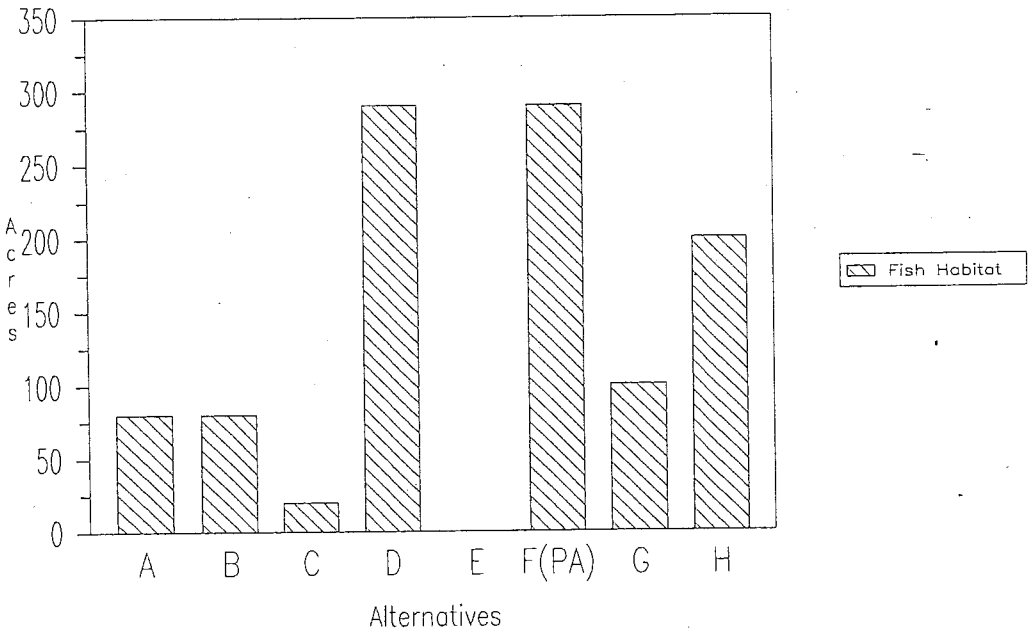
Many approaches can be used to improve or restore fish habitat on the Oregon Dunes NRA. Habitat improvement for streams consists of building structures to create gravel beds for spawning and pools for rearing, clearing blockages to fish passage, and planting beneficial vegetation along the banks. Habitat improvement in lakes includes control of aquatic macrophytes (submerged or floating higher aquatic plants), placing structures for cover, and planting shoreline vegetation such as native grasses and shrubs. Figure II-13 gives examples of the location and types of major projects included in each alternative.

Figure II-13. Location and type of fish-related projects.

Alternative	Habitat Projects		Development Projects
	Location	Improvements	
A	Butterfield, Beale, Snag Lakes	structures, weed control, phytoplankton work	fish viewing facility, signs, boat ramp, campgrounds
B	Elbow/Butterfly, Beale, Snag Lakes	structures, weed control, phytoplankton work, plant grass and shrubs	angler camp, signs, trails, boat ramp, fishing dock
C	Tahkenitch, Carter Lakes	weed control, phytoplankton work	boat dock, ramp
D	Siltcoos Lagoon, Beale, Carter, Elbow, Snag, Threemile, Osprey, Erhart/Loon Lakes,	structures, weed control, phytoplankton work, plant grass, riparian stabilization	angler camp, signs, fish cleaning facility, boat ramp, fishing dock, trail
E	none	none	none
F(PA)	same as D	same as D	same as D
G	Butterfield, Beale, Snag, Carter, Siltcoos Lakes	structures, weed control, phytoplankton work	angler camp, signs, boat ramp, trails
H	Siltcoos Lagoon, Beale, Carter, Snag, Osprey, Tahkenitch Lakes	hiding structures, control weeds, phytoplankton work	trails, signs

The costs and actual amount of projects is directly related to the degree of emphasis on fish in the alternative, considering other resource objectives. Thus, the acres of habitat work would vary from 290 in Alternatives D and F(PA), to 20 and 0 in Alternatives C and E respectively (Figure II-14). All alternatives that include a fish habitat management program would also require a commensurate lake and stream survey program to identify projects that help alleviate conditions which limit fish populations, and a program to monitor effectiveness of those projects.

Figure II-14. Acres of fish habitat improved in each alternative.



Angling Regulations

The strategy is to cooperate with and encourage ODFW to use specialized angler regulations and species introductions to enhance fish populations and fishing opportunities on the Oregon Dunes NRA (see Fish, Chapter III). Need for such management would be greater in alternatives like A, B, D, and F(PA) that emphasize increasing fishing activity.

Developments

Figure II-13, above, gives examples of the type of developments that would be provided in the alternatives to increase fishery resources and their use. The number of new fish-related facilities is greater (9 to 12) in Alternatives A, B, D, F(PA), G and H and lower (5 to 6) in Alternatives E and C (Figure II-17). Capacity of these facilities in Alternatives A and G would be greater than in other alternatives. Two to 4 miles of trail would be built in Alternatives B, D, F(PA), and H to increase fishing opportunities. Such developments would be concentrated near lakes, because of uncertainty about whether to encourage more fishing on anadromous fish runs in NRA streams.

Viewing and Education

It is important to extend information on access, fishing conditions, and what is likely to be caught to visitors requesting information. Interest in fishing various lakes will be promoted through popular-style articles and brochures and interpretative signing on lakes to promote available fishing opportunities. In particular, fishing experiences on the Oregon Dunes NRA will be marketed by emphasizing the uniqueness, aesthetic appeal, and/or remote (roadless) location of certain lakes.

We will develop a mailing list of various state, regional, and government agencies that help encourage tourists to visit and stay in the area, and provide them with fishing information as it becomes available.

MANAGEMENT OF RESEARCH NATURAL AREAS

General Background

Two areas (Umpqua Spit and Tenmile Creek) are allocated as Research Natural Areas (RNAs) in several alternatives. In Alternative F(PA), only the northern portion of the Tenmile Creek proposed RNA (1,360 acres) is allocated because of the high recreational values and potentials for conflicting use in the southern portion. RNA status for these areas would protect and preserve dune ecosystems for research, monitoring and education, and would add to the established areas currently within the national RNA network. Studies and education would focus on their unique dunes, deflation plain and wetland ecosystems (called cells in the RNA system; see Research Natural Areas, Chapter III). Figure II-15 shows which of these potential RNAs are allocated in each alternative, and how many acres are involved.

Figure II-15. RNAs allocated in alternatives

	Alternatives							
Research Natural Area	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Tenmile Creek				2,020	2,020	1,190[1]		2,020
Umpqua Spit [2]		1,330			1,330			1,330
Total	0	1,330	0 [3]	2,020	3,350	1,190	0	3,350

[1] Alternative F(PA) includes Tenmile Creek with modified boundaries.
[2] Acres for Umpqua Spit does not include 770 acres of private land
[3] Although neither proposed RNA is allocated for establishment in Alternative C, the research values in each area would be preserved so that the decision whether or not to allocate the areas could be made in the future.

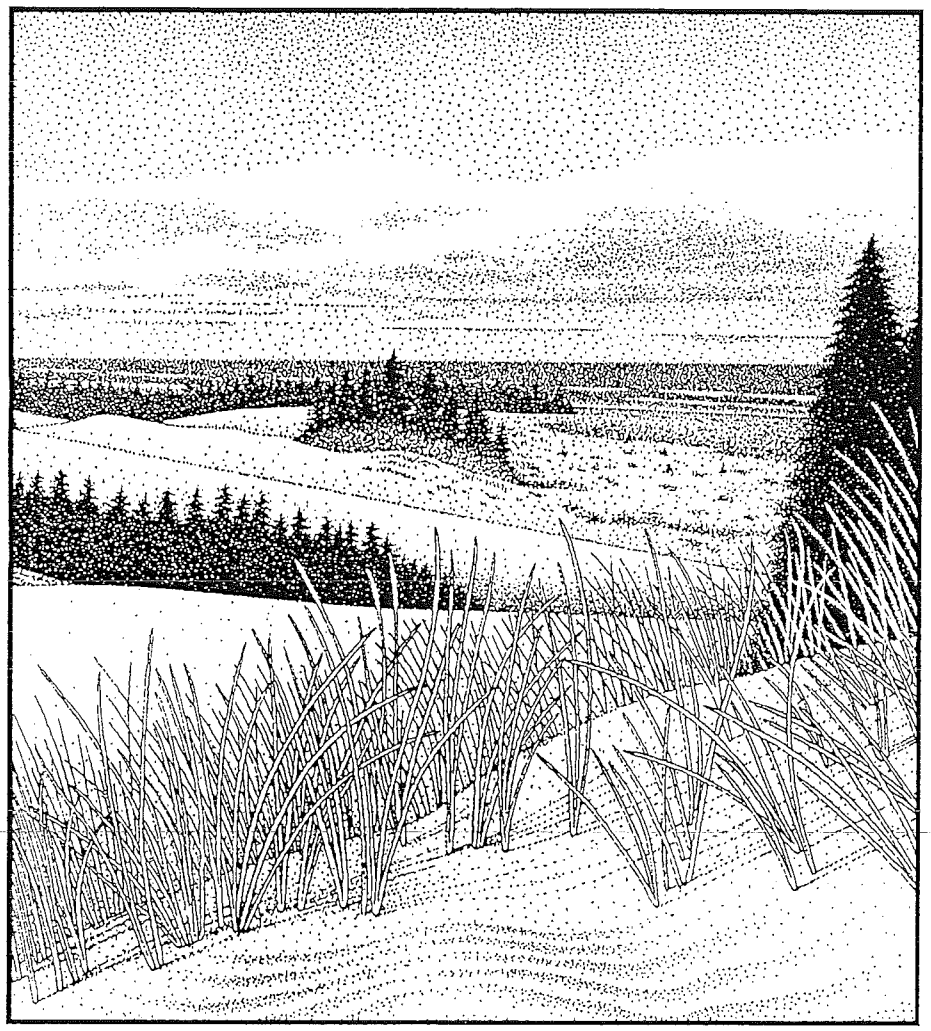
Management

RNAs are managed to allow natural patterns and processes to occur unimpeded. Road and trail construction, concentrated camping, and ORV use would not be permitted. Some recreation use would be allowed, including use of existing trails and roads for hiking as long as research and educational objectives for which the RNA was established are not compromised. European beachgrasss removal would be considered in areas where beachgrass is altering native plant communities.

Research would focus on coastal ecosystem development and dune movement, tree island stability, and rates of change of deflation plains. The areas could also serve as controls to help monitor effects of dune stabilization on adjacent lands, as well as effects of beachgrass control, recreation, and special forest products gathering on dunes ecosystems. RNAs would be managed in the same manner in all alternatives (see Standards and Guidelines, which will be in Chapter III, Dunes Plan). Emphasis of management would tend to be more on preservation rather than on active manipulation.

Management Plans

Management plans would be developed and implemented for each RNA after RNA establishment records are written and the RNA is approved. An RNA is approved by the Regional Forester after review of the establishment record.



MANAGEMENT OF WILD AND SCENIC RIVERS

Background

Three streams—Siltcoos River, Tahkenitch Creek and Tenmile Creek—have been studied to determine their suitability for inclusion in the National Wild and Scenic Rivers System. All or part of each stream meets the criteria for eligibility in the system. In order to determine the suitability of these streams for designation, each has been evaluated in a series of alternatives to determine the effects on existing river values and the reasonably foreseeable potential uses of the land and water which would be restricted or foreclosed. Two streams, Tahkenitch Creek and Tenmile Creek have been judged to be suitable for inclusion in the national system and will be recommended for designation. See Appendix E for details of the eligibility findings and suitability analysis.

Basic Management

Basic management of a wild and scenic river is aimed at keeping the stream in a free-flowing condition. This means that no new dams, diversions or levees could be built and no changes could be made to the stream that would significantly alter the existing channel or the river's natural flow processes. In addition, to the extent of Forest Service authority, water quality of all designated streams must be at least maintained, or if necessary improved. Finally, the Act says that "Each component of the National Wild and Scenic Rivers System shall be administered in such a manner as to protect and enhance the values which caused it to be included in the system, ..." This must be done, to the extent consistent with the above, "without ... limiting other uses that do not substantially interfere with public use and enjoyment of these values."

Beyond maintaining free-flow, the specific management strategies with which water quality and the outstandingly remarkable and other important river values are protected or enhanced would depend on the stream's classification and the specific contents of a management plan which must be prepared for it after designation. Table II-16 shows which streams and classifications are recommended in each of the alternatives.

Figure II-16. Wild and scenic rivers recommended in alternatives

	Alternatives							
Stream	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Siltcoos River								
Classification	*	Rec.	†	Scenic	*	*	Rec.	Rec.
Miles		1¾		1¾			1¾	1¾
Tahkenitch Creek								
Classification	*	Rec.	†	Scenic	Wild	Wild	Scenic	Wild
Miles		3		3	3	3	3	3
Tenmile Creek								
Classification	*	Rec.	†	Scenic	Wild/ Scenic	Scenic	*	Wild/ Scenic
Miles		5		3	2½/½	3		2½/½
Miles by Classification								
Recreational	0	9¾	0	0	0	0	1¾	1¾
Scenic	0	0	0	7¾	½	3	3	½
Wild	0	0	0	0	5½	3	0	5½
Total Miles	**0**	**9¾**	**0**	**7¾**	**6**	**6**	**4¾**	**7¾**

* not recommended for designation - river area allocated to other management area(s)
† not recommended for designation, but eligibility would be maintained.

Designation Process

It is important to remember that, even though two streams are included in this Plan as recommended wild and scenic rivers, these are only "preliminary administrative recommendations for wild and scenic river designation." These recommendations will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System through passage of legislation which must be signed by the President. If Congress chooses to designate these two streams, a wild and scenic river management plan will be developed for each with full participation of interested individuals, groups, Indian Tribes, and agencies.

The recommended river areas will be protected and managed on an interim basis under the assumption that they will be designated by Congress. Such interim management and protection will continue until adoption of a management plan for a river which has been designated by Congress, or until Congress decides not to include a suitable river in the Wild and Scenic Rivers System.

If a recommended stream is not designated by Congress, the area must be reallocated and this would be done through an adjustment to the forest plan. The area would

then be managed according to the direction for the management area(s) in which it is then located.

Since this Plan recommends that the Siltcoos River not be designated, the report will only be reviewed by the Washington Office of the Forest Service. Unless the Washington Office would request changes in that recommendation, the river area would then be allocated to one or more existing management areas under which it would then be managed. This would end consideration of the Siltcoos River for wild and river designation.

River Segments

For Siltcoos River and Tahkenitch Creek, the total length of stream found to be eligible is included in those alternatives in which the stream is recommended for designation. For Tenmile Creek, the full length of stream found to be eligible is included only in Alternative B. In all the other alternatives where Tenmile Creek is recommended for designation, only the lower segment is recommended. This is because the river-associated values tend to be concentrated in the lower segment, none of the land in the upper segment is federally owned, and there is considerable residential development in portions of the upper segment.

Management by Classification

It is not possible to know the specific management direction for a recommended wild and scenic river until it has been designated and a management plan adopted. However, general management principles are provided by the Final Revised Guidelines for Eligibility, Classification and Management of River Areas published by the Secretaries of Interior and Agriculture, and by Forest Service policy. These give a good indication of the type of activities which could and could not take place under the various classifications, and, when applied to the streams under study, can provide a picture of how they might be managed. Potential management is described below for each of the classification levels.

Wild River Areas

Tahkenitch Creek and portions of Tenmile Creek are recommended for wild classification in Alternatives E and H. Tahkenitch Creek is also recommended for wild classification in Alternatives F(PA), the Preferred Alternative. Wild river areas need to be kept generally inaccessible, except by trail, and their shorelines must remain essentially primitive. This means no roads, developed recreation sites, administrative facilities or other major structures would be built within the river corridors. Utilities such as transmission lines, gas lines, water lines, etc. would be located outside the corridors unless there would be no reasonable alternative.

Minor structures, such as simple toilets or structures required for wildlife habitat or fisheries enhancement programs could be built, so long as the structures harmonize with the surrounding environment and the area remains essentially primitive.

Motorized travel on land or water could be permitted, but is generally not compatible with wild river classification. This is not an isssue for these areas because all of

the NRA is closed to ORV use in Alternatives E and H. In the case of Alternative F(PA) a wild designation would preclude future roading, ORV use, or other motorized use within the river corridor (up to 1/4 mile on either side). This fits the management direction for the lands surrounding the Tahkenitch Creek corridor in Alt. F(PA).

Scenic River Areas

Scenic classification is recommended for all three streams in Alternative D, for Tenmile Creek in Alternative F(PA), and for Tahkenitch Creek alone in Alternative G. In addition, scenic is recommended for a ½-mile segment of Tenmile Creek in the two alternatives where the rest of it is recommended for wild (E and H).

Scenic river areas have their shorelines still largely primitive and undeveloped, but may be accessible in places by roads. This means that roads could be constructed to, or even across, the streams, and new developments and structures could be located within the river area so long as they are predominantly screened from the river and do not have a substantially adverse effect on the natural appearance of the area. However, no new road construction or recreation site development in the vicinity of these streams is planned in any of these alternatives during this planning period. In fact, in Alternative D, part of the Siltcoos Road and some of the developed recreation facilities would be removed in order to make the stream qualify for a scenic classification. Utilities would be treated the same as in a wild river area.

Motorized travel may be permitted or prohibited depending on river values and adjacent ORV restrictions. Restricted ORV riding would be allowed within the river area on the south side of Tenmile Creek in Alternative F(PA), but not along the shoreline. In all other alternatives, ORV riding would be prohibited in areas where scenic classification is recommended.

Recreational River Areas

Recreational classification is recommended for all three streams in Alternative B, and for Siltcoos River in Alternatives G and H. Recreational rivers may be readily accessible by road or railroad and may have some development along their shorelines.

In recreational river areas, parallel roads could be constructed on one or both banks and so could several bridge crossings and numerous river access points. However, none of the alternatives propose major new road developments within any of the river corridors which are recommended for recreational classification. In Alternative G, Waxmyrtle Road would be gravelled and this would be partially within the Siltcoos river area.

Recreation and administrative sites, and other structures and developments could be located within the river area, even in close proximity to the stream, provided that they did not adversely affect the outstandingly remarkable values and it would not be feasible to locate them outside the river area. Only in Alternative G is a major development proposed within one of the river areas recommended for

recreational classification. This would be a new ORV campground, but not in close proximity to the stream. Utilities would be treated the same as in wild river areas.

Motorized travel may be permitted or prohibited depending on river values and adjacent ORV restrictions. In Alternative B, ORV use would be allowed in the southeast portion of the Tenmile Creek river area, primarily in the vicinity of Spinreel Campground. In Alternative G, restricted riding would be allowed in part of the Siltcoos river area north of the Siltcoos Road. In all other alternatives where recreational classification is recommended, ORV riding would be prohibited.

Constraints on Management

The Wild and Scenic Rivers Act provides several important constraints on the ability of the Forest Service to control or acquire land that is not federally owned within a designated wild and scenic river area.

- First, it is important to remember that the Forest Service has no control over private land, unless it has purchased "rights" from the landowner (less than full title can be acquired from a private landowner through purchase of a "scenic easement"). Extent of control is limited to the exact rights the Forest Service has purchased.

- If 50% or more of the land within a designated river area is owned by federal, state or local governments, the Wild and Scenic Rivers Act prohibits use of condemnation for acquiring fee title to any private land. Since more than 50% of the land within the river area of the three streams under study is owned by the federal government, use of condemnation for acquisition of fee title to private land would be prohibited.

- Although condemnation could still be used to acquire scenic easements, it could only be used within the authorized boundaries of the river area, and it could not affect any regular use exercised prior to acquisition of the easement without the owner's consent. This means that the normal operation of International Paper Company's (IP) dams on the Siltcoos River and Tahkenitch Creek could not be affected. If IP would propose changes in operations that would create adverse effects on the streams' values the changed operations might be prevented.

- Lands owned by a county may not be acquired by the Forest Service without the consent of the county as long as it is following a plan for management of its lands which protects them and assures their use for purposes consistent with the Wild and Scenic Rivers Act.

In summary, the Forest Service, in its management of a designated wild and scenic river, cannot control pre-existing uses on land which is not national forest land without the consent of the owner. In addition, since over 50% of each of the river areas is government-owned, fee title to private land could only be acquired from willing sellers.

MANAGEMENT OF LANDS AND SPECIAL USES

The lands program at the Oregon Dunes NRA is comprised of 2 primary elements:

- Land acquisitions and exchanges
- Management of special uses

Land Acquisitions and Exchanges

Acquisition of private lands within the boundaries of Congressionally-designated areas, such as wildernesses and national recreation areas, is a high priority. At the Oregon Dunes NRA, land acquisitions and exchanges would continue on an "as opportunities present themselves" basis under all the alternatives being considered. In addition to lands within the NRA boundary, there are occasionally opportunities to acquire high resource-value lands outside, but adjacent to the NRA boundary. These lands would necessarily contribute to or enhance the purposes for which the NRA was established and would require an NRA or National Forest boundary adjustment. For example, currently there are lands around Tahkenitch Lake that are outside the NRA boundary, but would fit well with and compliment the management of adjacent public lands managed by the NRA on the lake.

The Forest Service acquires private lands or exchanges lands with other owners to meet a variety of management objectives. As a result, the emphasis for land acquisition or exchange, and thus the desirability of specific parcels, would vary slightly by alternative, depending on their primary management objectives.

Alternatives A, B and G would attempt to increase recreation use of the NRA and thus would place highest priority on acquiring lands with high recreation potential. Alternative D would attempt to increase habitat and biodiversity at the NRA and would place highest priority on acquisition of lands with high fishery, wildlife and plant habitat value. Alternatives F(PA) and H would equally emphasize acquiring recreational and habitat lands. There would be no special emphasis for land acquisition under Alternative E and this would not be a priority program under this alternative.

Special/ Commercial Uses Management

On National Forest lands, including those within the Oregon Dunes NRA, special uses are generally commercial uses of public lands that are permitted by the Forest Service, often for a fee or a portion of the receipts. Special uses would continue to be granted in all of the alternatives. However, priorities for granting and types of uses permitted would vary depending on the focus and management philosophy inherent in each alternative.

Alternatives A, B and G would promote a management philosophy that would encourage issuance of special use permits to increase and diversify recreation opportunities available at the Oregon Dunes NRA and to increase economic returns to local communities. Major concession facilities, such as additional campgrounds, marinas, or lodges would be most likely to be permitted under these alternatives. Opportunities for large-scale business ventures and opportunities for moderate to large companies would be highest under these alternatives. Permits for commercial activities, such as commercial mushroom gathering, would be maximized the extent possible within legal mandates.

Alternatives C, F(PA) and H would continue to allow permitted uses at a moderate level to provide services to NRA visitors and small-scale business opportunities to individuals. Permits for major privately-owned concession facilities would be unlikely under these alternatives. Permits to businesses located off of the NRA, but contributing to the broad public enjoyment of NRA lands would be common. Commercial uses, such as the gathering of special forest products, would be permitted to the extent that they do not detract from NRA outdoor recreation and resource conservation missions. For example, commercial mushroom gathering may be limited to specific areas in order to avoid conflicts with recreational/personal use mushroom gathering by the general public and/or to reduce impacts to plant and wildlife habitats.

Alternatives D and E would implement a management philosophy and direction that would greatly limit special uses on NRA lands except to the extent that they help meet specific management objectives.

Special forest products and commercial use of such resources is an emerging and rapidly evolving issue on national forest lands, including the Oregon Dunes NRA. Because of its unique management mission, NRA management direction for these uses may differ from the direction on other national forest lands, even those within the Siuslaw National Forest.

MANAGEMENT OF WATERSHEDS (INCLUDING WATER, SOIL, AND GEOLOGY)

Management of geological resources on the Oregon Dunes NRA largely involves restoring sand movement by controlling European beachgrass (see Vegetation Management, Chapter II). Management of water consists of maintenance of water quality in lakes and streams; improvement and restoration projects; management of withdrawal of water by Coos Bay/North Bend and other municipal and domestic users; support of, and coordination with other resource programs; and interpretation. Levels of management of all except water withdrawal vary by alternative.

Protective Measures

Measures used to protect water quality on land managed for recreation include:

- Leaving strips of intact vegetation along lakes and streams to buffer impacts of recreation development;
- Minimizing the extent and degree of construction in riparian areas, and designing and locating sanitary facilities to reduce risk of water pollution;
- Channeling, regulating, and concentrating recreational use in riparian areas in ways to minimize impacts on water; and
- Taking measures to prevent accidental spills of hazardous materials.

These measures to maintain water quality will be used fully in all alternatives. Those alternatives that include more recreational development and use (A, B, F(PA), and G) would require more extensive use of the measures.

Improvement Projects

Projects would focus on stabilizing sensitive areas, particularly along banks of lakes and streams. Activities could consist of seeding, planting trees and shrubs, stabilizing slopes with rock, and placing erosion-resistant mats. There would be efforts to restore natural surface water runoff patterns where they have been modified by ORV use. Partnerships with the fisheries and wildlife programs to build structures and do other work in stream channels and lakes on the Oregon Dunes NRA would also be emphasized.

Costs and number of projects are directly related to degree of emphasis on water in the alternative, considering other resource objectives. All alternatives that include a watershed management program would also require a commensurate survey program to identify projects that help improve watershed conditions, and a program to monitor effectiveness of those projects.

Municipal Watersheds

Continuing to work with the Coos Bay/North Bend Water Board and the U.S. Geological Survey to determine effects of water withdrawal on lake levels and saltwater intrusion into aquifers would be the highest priority of the watershed program on the Oregon Dunes NRA. This is a critical issue that has implications on many resources at the south end of the NRA, as well as on the economy and development opportunities of the Coos Bay/North Bend community.

Efforts to identify water rights and map other municipal and domestic water users will also continue.

Coordination

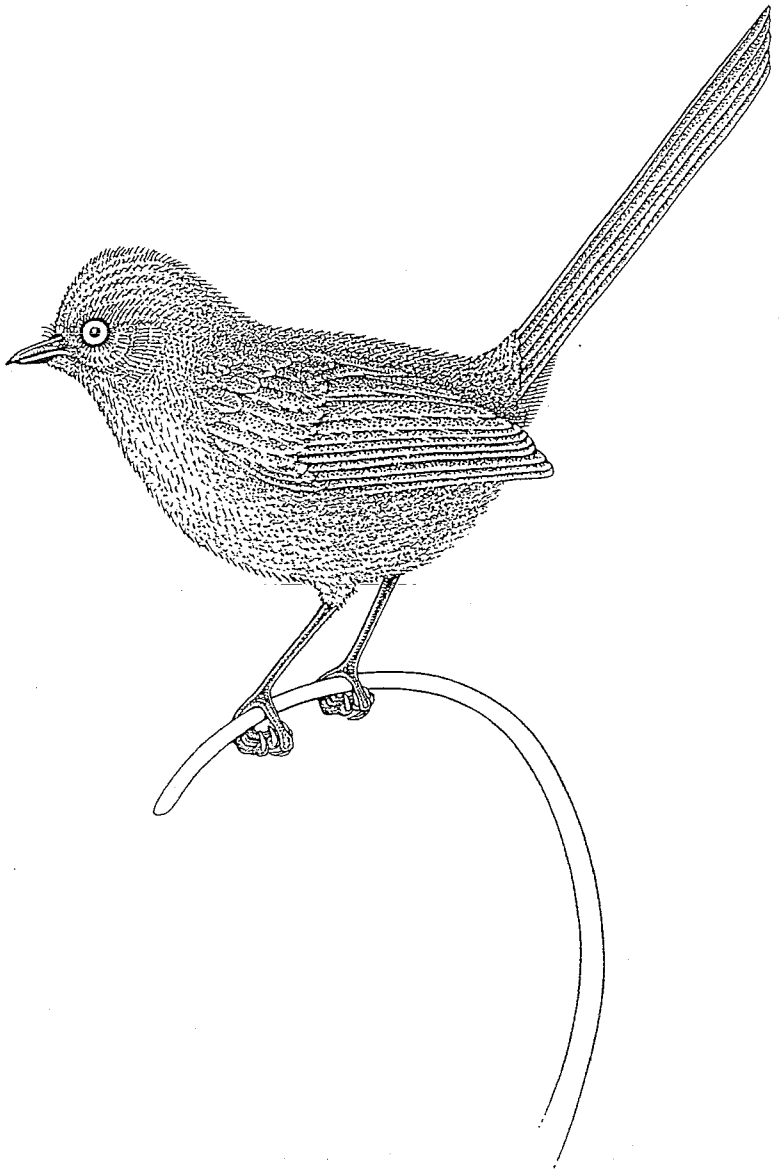
Some examples of support activities are hydrologic modeling for determining instream flows needed for fish, wildlife and other resources; providing advice on construction of levees and dams intended to create waterfowl habitat by increasing surface water levels; and helping to acquire water rights where appropriate. Need for coordination would be greatest in alternatives like D and F(PA) that emphasize wetlands and fish and wildlife habitat and least in Alternatives C and E.

Viewing and Education

Efforts would concern the unique geology of the Oregon Dunes NRA, particularly in relation to efforts to control European beachgrass by breaching the foredune and other methods. The unique interfaces between sand dunes and water that result in such actively migrating stream channels in some areas could also be a subject for viewing and education. Interpretative activities would be greatest in Alternatives A, B, D and F(PA) and least in Alternatives C and E.

MANAGEMENT OF MINERALS

Under all alternatives the Forest Service would continue consideration of closure for the 1-mile-wide buffer at the south end of the Oregon Dunes NRA to mineral entry. The remainder of the land administered by the NRA was withdrawn from mineral entry in the NRA Act. If the request for withdrawal is denied, the area would remain subject to mineral entry and mineral extraction activities would be managed in accordance with Forest Service policies and procedures.



MANAGEMENT OF ROADS

Under all alternatives, the road management program at the NRA would involve construction, removal, upgrading and maintenance of roads.

Paved and gravel roads are designed for highway vehicles and managed primarily for recreation access into specific parts of the NRA from Highway 101. The alternatives provide differing amounts and levels (paved versus gravel) of road access into the Oregon Dunes NRA. The miles of road that would be constructed, removed or upgraded varies by alternative and is presented below. Roads would be maintained to meet specified standards under all alternatives.

	ALTERNATIVE							
Action	A	B	C	D	E	F(PA)	G	H
Construct	7	1	1	2	0	2	2	1
Remove	0	0	0	5	8	0	0	2
Upgrade	3	2	0	0	0	0	1	0

Alternative C, the existing plan, would add 1 mile of new road to the existing inventory (25 miles) because construction of a road into Butterfield Lake is still planned. Alternatives that would upgrade Threemile Road (A and B) would require the Forest Service to obtain a full public easement from International Paper Company, the owners of the road. Also, plans to pave the road under these 2 alternatives would require mitigation to protect existing improvements.

Alternatives that remove the South Jetty Road (D and E) would actually gate the road to public vehicle access, but maintain it for administrative use by the Forest Service, the Army Corps of Engineers, and other agencies needing access to the area. The road would also remain available for bicyclists, walkers, people in wheelchairs, horseback riders, and others.

Alternative F(PA) would construct road access into Butterfield and Beale lakes and remove the Waxmyrtle Road. Bicycle lanes would be added to the 4 primary access corridors into the NRA.

Upgrading roads, in all the alternatives, would involve paving roads that are currently gravel or gravelling roads that are currently sand. Specific road activities planned in each alternative are displayed in Appendix G.

MANAGEMENT OF CULTURAL RESOURCES

Management of cultural resources on the Oregon Dunes NRA consists of 4 major components: 1) resource identification through field inventory; 2) determination of scientific and/or historical value and potential for site listing on the National Register of Historic Places; 3) protection and monitoring of cultural resources; and 4) interpretation and enhancement of cultural resources for the benefit of the public. Management levels of all 4 vary by Alternative.

In addition, special considerations and requirements may be implemented for cultural resources based on consultation with the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians in response to the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act and National Park Service Bulletin 38 which provides guidelines for implementing the "traditional cultural properties" criteria of the National Historic Preservation Act.

Cultural Resource Inventory

All Alternatives require cultural resource inventory of any ground-disturbing projects by qualified NRA Cultural Resource Technicians and/or the Forest Archaeologist. Alternatives that accelerate the pace of recreation and other developments (Alternatives A, B, D, F(PA), G, H) would require additional project-specific cultural resource inventory help which could be achieved through the increased use of the Forest Archaeologist, training of other Cultural Resource Technicians, or contracting with private archaeological firms to complete the work. Therefore, Alternatives with a high level of recreation and other development will have a higher than current cultural resource support cost.

Currently, non-project related cultural resource inventory is rare on the NRA. If funding and personnel were available, cultural inventory in areas of the NRA with high cultural resource potential (e.g., Tahkenitch Creek) would significantly enhance the NRA's cultural resource information base, help in future project-level planning, and highlight archaeological and historical sites with potential for scientific investigation through public education programs such as "Passport in Time". Further, this information would be valuable for public interpretation on the NRA. Funding for non-project specific cultural inventory could be generated in 2 ways: 1) impact studies on cultural resources may be necessary for Alternatives A, B and C that significantly increase recreational traffic on the NRA (the Hauser archaeological site, and several prehistoric firehearths and rockclusters, were discovered in ORV areas); and 2) planning-level studies related to Alternatives B, D, E, F(PA), G and H which nominate streams and rivers as wild and scenic or include Research Natural Areas.

Cultural Site Evaluation of National Register Significance

Alternatives with high levels of ground-disturbing activities (Alternatives A, B, D, F(PA), G, H) could accelerate the need to evaluate the scientific or historical value (and thus, National Register of Historic Places eligibility) of sites that stand in the way of proposed projects. These investigations would be conducted by either the Forest Archaeologist and NRA Cultural Resource Technicians or through a contract or cooperative agreement with a private consulting firm or university. Increased cultural resource funding would likely be required in all alternatives which accelerate the pace of development and ground disturbance to ensure that the necessary evaluation work is completed. The same consideration is true of projects that ultimately would require cultural resource mitigation through archaeological or historical "data recovery" prior to implementation.

None of the alternatives emphasize non-project cultural site evaluations—those that are completed solely for the sake of scientific research, American Indian involvement and public interpretation and education. The only example of this type of investigation on the NRA is the multi-year archaeological fieldwork at the Hauser archaeological site which is being cooperatively funded by the Forest Service, the University of Oregon and the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians under the framework of the "Passport in Time-America's Great Outdoors" national recreation initiative. However, funding opportunities and priorities for this type of effort would be greatest in those Alternatives that place an emphasis on recreation (Alternatives A, B, G) and integrated natural and cultural resource interpretation.

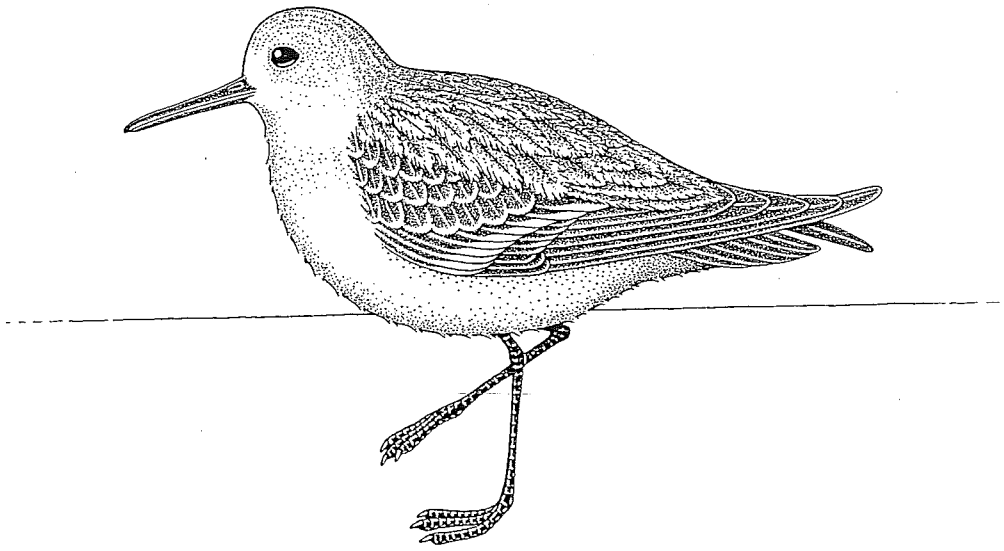
Cultural Site Protection

In all alternatives, cultural resources are protected through application of the cultural resource standards and guidelines in the NRA and Siuslaw National Forest Plans. Specifically, once cultural resources are identified through inventory and determined to have scientific value, they are protected in place and are excluded from the boundaries of ground-disturbing projects. They are periodically visited by the Forest Archaeologist and NRA Cultural Resource Technicians.

Beyond this, none of the Alternatives emphasize cultural site protection by requiring the development of site management plans or placement of protective barriers, fencing, and signing at sites such as the Tahkenitch Landing archaeological site or the North Spit of the Umpqua River. However, this eventually could be an outgrowth of those Alternatives that increase recreation use, wildlife, and wetlands management substantially (Alternatives A, B, D, F(PA), G and H). As additional sites are discovered, and known sites are investigated and interpreted, the incidences of artifact theft and site looting may increase, thus requiring additional law enforcement help including criminal investigations. Site protection and monitoring would also require a higher level of cultural resource funding than currently allocated to the NRA.

Cultural Site Interpretation

Interpretation and public education could be emphasized in any Alternative, though support funding for this activity would most likely come with those Alternatives that increase public use of the NRA (Alternatives A, B, D, F(PA), G, H). Currently, funding for interpretation is project-specific and contingent on available capital investment and other dollars. Additional funding could be generated through cooperative and partnership ventures with the Confederated Tribes and other publics. An accelerated interpretation and public education program would require greater Forest Archaeologist involvement and more time allocated to cultural interpretation at the Area level. Alternatives that support investigations and interpretation solely to better understand, enhance and protect cultural resources would move the Oregon Dunes NRA's program from one that meets minimum compliance standards to one that practices resource stewardship.



OUTPUTS AND EFFECTS

This section presents resource outputs, some environmental effects (see Chapter IV for a complete description), activities, and costs associated with each alternative assuming the alternatives would be implemented as described. Figure II-17 includes those outputs and effects which can be reasonably quantified. Figure II-18 includes those outputs, effects, activities, and costs which are qualitative and which cannot (or should not) be quantified. The content of the 2 tables (see the following pages) have equal significance; the only reason for separating them is that qualitative information requires more space to present in tabular form.

Figure II-17. Quantitative resource outputs and environmental effects

ISSUE/Indicator [1]	Units	Existing	ALT. A	ALT. B
RECREATION MIX/ORV USE				
ROS Classes provided				
Semi-primitive non-motorized	Acres	11,100	5,110	21,680
Semiprimitive motorized	Acres	14,000	19,260	3,290
Roaded natural	Acres	3,570	4,180	3,570
Rural	Acres	230	350	360
Projected recreation use				
Developed site use	Index	Moderate	High	High
Dispersed area use	Index	Moderate	High	Moderate
MANAGEMENT OF ORV USE				
Area open to ORV use	Acres	6,090	7,675	2,165
ORVs restricted to designated routes	Acres	8,220 [2]	11,800	885
Area closed to all ORV use	Acres	14,590	9,425	25,850
DEVELOPED FACILITIES [3]				
Overnight facilities	Total number	14	21	21
Overnight facilities	PAOT [4]	2,610	4,155	3,235
Day-use facilities	Total number	21	38	41
Day-use facilities	PAOT [4]	2,725	3,755	3,810
Concessions (sand rides, etc.)	Total number	4	8-10	7
Average annual construction costs	Dollars	100,000	630,000	530,000
ROADS AND TRAILS				
Paved road	Total miles	23	31	26
Gravel road	Total miles	2	4	2
Trail (accessible/urban)	Total miles	1	6	8
Trail (hiking and other) [5]	Total miles	24	28	37
Trail (ORV)	Total miles	0	10	0
Designated ORV routes	Miles	11	35	5
INTERPRETATION/LEARNING OPPORTUNITIES				
Visitor centers/contact stations/sites	Number	2	10	14
Capacity of interpretive sites	PAOT [4]	210	730	770
REMOVAL OF NON-NATIVE AND OTHER ENCROACHING VEGETATION				
Average annual vegetation removed	Acres	0	15	10
Average annual cost	Dollars	0	45,000	30,000

[1] Additional information on issue indicators is found in Chapter I under "Issues, Concerns and Opportunities."
[2] Management direction is not fully implemented at this time.
[3] This is the total of all facilities even though some are included in other categories, e.g., Interpretation, Fish and Wildlife.
[4] PAOT is a measure of capacity which means "people at one time".
[5] This is the total of all trail miles even though some are included in other categories, e.g., Fish trails

ALT. C	ALT. D	ALT. E	ALT. F (PA)	ALT. G	ALT. H
11,030	19,100	25,260	12,500	8,430	25,000
13,990	6,070	0	12,440	16,540	0
3,630	3,490	3,480	3,660	3,590	3,660
250	240	160	300	340	240
Moderate	Moderate	Low	Moderate	High	Moderate
Moderate	Low	Low	Moderate	High	Moderate
6,090	2,870	0	5,930	7,295	0
8,220	3,810	0	4,455	7,830	0
14,590	23,220	28,900	19,055	13,775	28,900
15	14	10	16	20	14
2,910	2,050	1,335	2,720	4,055	2,435
23	25	10	34	36	32
2,905	2,790	1,200	3,650	3,505	3,270
4	3	0	4	6-8	3-5
241,000	200,000	20,000	330,000	280,000	230,000
24	18	17	23	25	23
2	4	0	4	3	1
1	5	0	4	6	8
30	29	4	33	28	35
0	0	0	0	7	0
26	9	0	20	26	0
4	10	2	10	9	8
390	610	210	610	580	610
0	10	0	100-500	15	16
0	30,000	0	350,000	45,000	48,000

Figure II-17. Quantitative resource outputs and environmental effects (continued)

ISSUE/Indicator	Units	Existing	ALT. A	ALT. B
FISH				
Fish habitat managed	Acres	20	80	80
Fish-related facilities	Number	6	9	12
Fish-related facilities	PAOT [4]	240	650	460
Trails for fishing access	Miles	0	0	4.0
Trails for fishing access	Number	0	0	6
Fishing use	Index	Moderate	Moderate	High
SPECIAL HABITATS MANAGED FOR WILDLIFE				
Wetlands	Acres	605	920	660
Upland forest	Acres	0	240	240
Meadows	Acres	0	0	0
Riparian	Acres	0	0	0
Aquatic	Acres	20	80	80
HABITATS MANAGED FOR PETS [6]				
Snowy Plover	Acres	0	0	0
All other species	Acres	50	50	50
WILDLIFE RECREATION				
Wildlife-related facilities	Number	0	2	6
Wildlife-related facilities	PAOT [4]	0	45	275
Hunting and non-game wildlife use	Index	Moderate	Moderate	Moderate
HABITATS MANAGED FOR GLOBALLY SIGNIFICANT PLANT COMMUNITIES				
Red fescue	Acres	0	0	0
Bog blueberry/tufted hairgrass	Acres	0	0	0
Shore pine/hairy manzanita-bearberry	Acres	0	0	0
Port Orford cedar/evergreen huckleberry	Acres	0	0	0
Shore pine/ slough sedge	Acres	0	0	0
RESEARCH NATURAL AREAS				
Research natural areas allocated	Number	0	0	1
	Name			Umpqua Spit
WILD AND SCENIC RIVERS				
Streams recommended for designation	Number	0	0	3
	Classification			recreational
ROADLESS AREAS				
Total amount	Acres	19,295	16,545	18,910
Change in total amount	Acres	0	-2,750	-385

[6] PETS - Proposed, endangered, threatened, and sensitive species.

[7] Although neither proposed RNA is allocated in Alt C, the research values would be preserved so the decision whether or not to allocate them could be made in the future.

[8] Eligibility of all 3 streams would be maintained.

ALT. C	ALT. D	ALT. E	ALT. F (PA)	ALT. G	ALT. H
20	290	0	290	100	200
6	11	5	10	9	11
240	510	0	470	650	510
0	3.0	0	2.0	0	2.0
0	5	0	4	0	5
Moderate	High	Low	High	Moderate	High
605	3,395	0	2,540	910	2,315
0	3,085	0	2,530	240	660
0	50	0	50	0	50
0	250	0	250	100	250
20	290	0	290	100	200
20	340	330	1,010	300	330
50	240	240	240	50	240
1	7	0	7	2	7
30	250	0	250	45	250
Low	High	Low	High	Moderate	High
0	0	0	95	0	0
0	0	0	10	0	0
0	0	0	100	0	0
0	0	0	100	0	0
0	0	0	40	0	0
0 [7]	1 Tenmile Cr.	2	1 Tenmile Cr.	0	2
0 [8]	3 scenic	2 Tahkenitch-wild Tenmile-wild	2 Tahkenitch-wild Tenmile-scenic	2 Siltcoos-recreation Tahkenitch-scenic	3 Siltcoos-recreation Tahkenitch-wild Tenmile-wild
19,245 -50	19,275 -20	21,175 +1,880	18,995 -300	18,880 -415	19,350 +55

Figure II-17. Quantitative resource outputs and environmental effects (continued)

ISSUE/Indicator	Units	Existing	ALT. A	ALT. B
EFFECTS ON LOCAL COMMUNITIES				
Average annual payments to counties [9]	Dollars [11]	55,600	65,100	65,110
Average annual payments to local counties [10]	Dollars [11]	26,800	33,200	33,200
Average annual total income [12]	Dollars [11]	73,600,000	91,101,000	89,666,000
FEDERAL GOVERNMENT CASHFLOW				
Average annual program costs	Dollars [11]	1,305,000	2,450,000	2,077,000
Average annual vegetation removal costs	Dollars [11]	0	45,000	30,000
Average annual facility construction costs	Dollars [11]	100,000	630,000	530,000
Average annual receipts	Dollars [11]	222,200	260,300	260,300

[9] Payments shown are from Oregon Dunes NRA revenues only, to seven counties surrounding the Siuslaw National Forest.
[10] Payments shown are from Oregon Dunes NRA revenues only, to three local counties: Coos, Douglas, and Lane.
[11] All dollar estimates are in 1993 dollars.
[12] Total income estimates are limited to visitors for whom the Oregon Dunes NRA was a primary destination.

ALT. C	ALT. D	ALT. E	ALT. F (PA)	ALT. G	ALT. H
63,600	55,700	42,700	63,600	65,100	63,600
32,400	28,400	21,800	32,400	33,200	32,400
90,632,000	89,202,000	30,357,000	89,607,000	91,101,000	65,235,000
1,500,000	1,778,000	759,000	2,100,000	2,231,000	1,938,000
0	30,000	0	350,000	45,000	45,000
241,000	200,000	20,000	330,000	280,000	230,000
254,400	222,900	171,000	254,400	260,300	254,400

Figure II-18. Qualitative resource outputs and environmental effects

ISSUE/Indicator	ALT. A	ALT. B	ALT. C
CHANGES IN RECREATION USE PATTERNS	More use concentrated in developed facilities and more ORV use in undeveloped portions of the NRA than now; ORV users higher percentage of user population than now	More use concentrated in developed facilities and in close proximity to paved access corridors than now; fewer people using undeveloped portions of the NRA; non-ORV users higher percentage of population than now	Current situation; moderate use in developed facilities and in undeveloped portions of the NRA; user population is roughly 30% ORV versus 70% non-ORV
CHANGES IN DEVELOPMENT LEVEL OF FACILITIES	Many campgrounds with amenities such as RV hookups, showers and dump stations; many facilities and trails accessible to people with disabilities	Same as A	Current situation; mid-development level facilities; few amenities beyond tables, fire rings, and toilets in campgrounds; moderate number of accessible facilities
RESEARCH ON NATURAL SYSTEMS	Relatively poor opportunities for research on natural systems	Good opportunities provided on 1,200 acres	Excellent, but temporary, opportunities provided on 3,025 acres of RNAs
INTERPRETIVE OPPORTUNITIES	Many highly-structured learning activities led by interpretive specialists for both motorized and non-motorized recreationists	Same as A except that activities are mainly for non-motorized recreationists	Fewer guided learning activities than Alts. A and B; provides moderate level of unstaffed learning opportunities
PLANT AND ANIMAL HABITAT DIVERSITY	Moderate Diversity	Moderate Diversity	Moderate Diversity

ALT. D	ALT. E	ALT. F (PA)	ALT. G	ALT. H
Less use in developed facilities and close to paved roads than now; less use, but more concentrated at specific sites in undeveloped portions of the NRA than now; more wildlife-based recreation use; ORV users smaller percentage of population than now	Much less use in developed and undeveloped portions of the NRA than now because of reduced road and trail access and many fewer developed facilities; entire user population will be non-ORV because area is closed to ORVs	Use level and pattern similar to now; slightly less ORV use in undeveloped portions of the NRA; more wildlife-based recreation use; non-ORV users slightly higher percentage of user population than now	More use concentrated in developed facilities and more ORV use in undeveloped portions of the NRA; ORV users higher percentage of user population than now	Use level similar to now, but more concentrated in developed facilities and along paved corridors; less use of undeveloped portions of the NRA; entire user population will be non-ORV because area is closed ORVs
Similar to C; some low development level walk-in type camps	Same as C	Similar to D	Same as A	Similar development level to C, but more accessible facilities and trails
Good opportunities provided on 1,825 acres of RNA	Excellent opportunities provided on 3,025 acres of RNAs	Good opportunities on 1,190 acres of RNAs	Same as A	Same as E
More unstaffed interpretive sites aimed at non-motorized recreationists than any of the other alternatives	Fewest number of guided and unstaffed interpretive sites; people learn about the area on their own	Nearly equal mix of guided and unstaffed learning opportunities with less guided interpretive activities than Alt. A but more than Alt. D; more unstaffed sites than any of the alternatives except D and H	Same as A	Similar to D except for more unstaffed interpretive sites
High Diversity	Moderate Diversity	High Diversity	Moderate Diversity	High Diversity

Figure II-18. Qualitative resource outputs and environmental effects (continued)

ISSUE/Indicator	ALT. A	ALT. B	ALT. C
HABITAT QUALITY - Wetlands	Poor condition - highly fragmented and channelized; high levels of human disturbance; low diversity	Similar to A	Fair condition - moderately fragmented and channelized; moderate levels of human disturbance; low diversity
HABITAT QUALITY - Upland Forest	Poor condition - highly fragmented; high levels of human disturbance; low diversity	Fair condition - highly fragmented; high levels of human disturbance; low diversity	Fair condition - moderately fragmented; moderate levels of human disturbance; low diversity
HABITAT QUALITY - Meadows	Fair condition - high human disturbance; no management to maintain meadow or restore native plants	Similar to A	Fair condition - low/ moderate human disturbance; no management to maintain meadow or restore native plants
HABITAT QUALITY - Riparian	Poor condition - moderate level of human disturbance; few riparian components present	Similar to A	Fair condition - moderate level of human disturbance; few riparian components present
HABITAT QUALITY - Beach Strand	Poor condition - high levels of human disturbance	Fair condition - moderate levels of human disturbance	Similar to B
HABITAT QUALITY - Sand Dune Community	Poor condition - High level of human disturbance; any new habitat created by removing vegetation would be disturbed	Fair condition - Moderate level of human disturbance; any new habitat created by removing vegetation would be moderately disturbed	Fair condition - Moderate level of human disturbance; no new habitat created by removing vegetation
HABITAT QUALITY - Aquatic	Fair condition - high level of human disturbance; little habitat management; quality ranges from very good in several lakes to relatively poor in other lakes and streams	Similar to A	Fair condition - moderate level of human disturbance; moderate habitat management; quality varies from very good in a few lakes to relatively poor in many other lakes and some streams

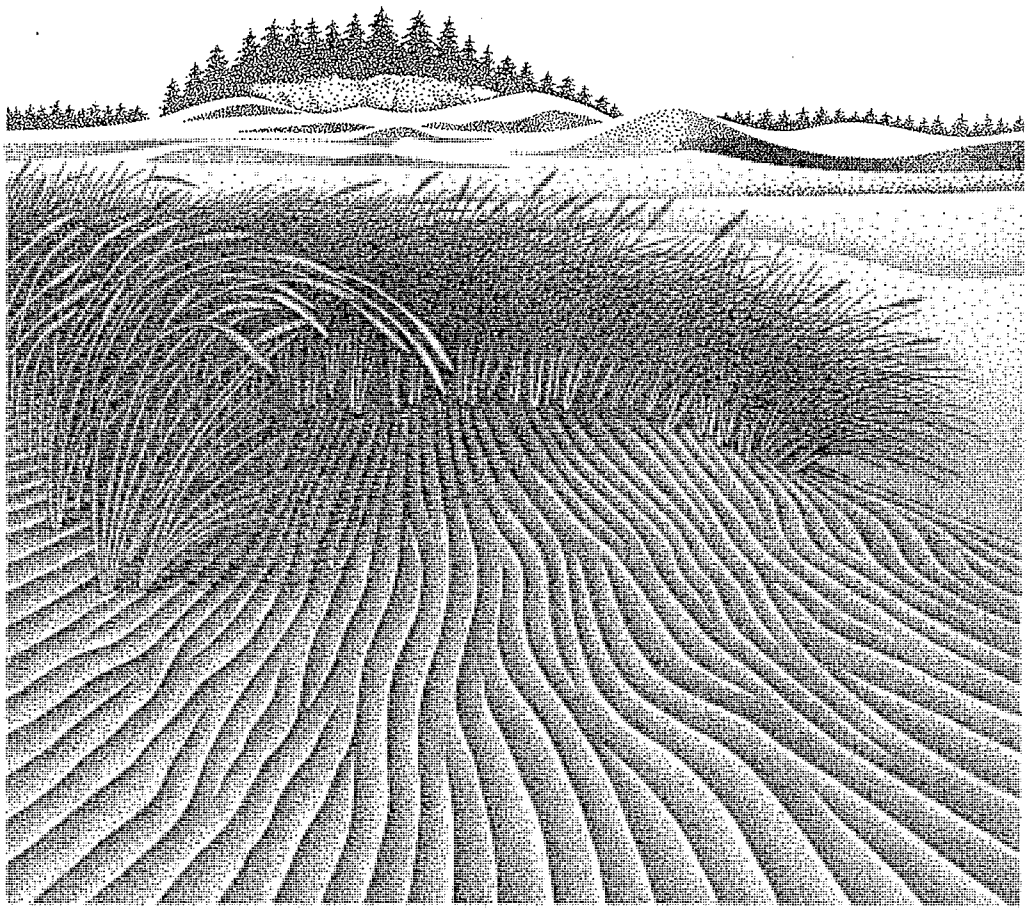
ALT. D	ALT. E	ALT. F (PA)	ALT. G	ALT. H
Excellent condition - little fragmentation or channelization; low levels of human disturbance; high diversity	Good condition - very little fragmentation or channelization; very low levels of human disturbance; low diversity	Good condition - moderately fragmented and channelized; moderate level of human disturbance; high diversity	Similar to A	Similar to F
Excellent condition - little fragmentation; little human disturbance; high diversity	Good condition - almost no fragmentation; very little human disturbance; low diversity	Good condition - moderate fragmentation; moderate human disturbance; high diversity	Similar to A	Similar to F
Excellent condition - low human disturbance; active management to maintain meadow and restore native plants	Fair condition - very low human disturbance; no management to maintain meadow or restore native plants	Similar to D	Similar to A	Similar to D
Excellent condition - moderate level of human disturbance; many riparian components present	Good condition - very low level of human disturbance; few riparian components present	Good condition - mostly similar to D but slightly higher disturbance	Similar to A	Good condition - mostly similar to D but slightly higher disturbance
Excellent condition - low levels of human disturbance	Similar to D	Good condition - moderate levels of human disturbance	Similar to A	Similar to F
Excellent condition - Very little human disturbance; any new habitat created by removing vegetation would not be disturbed	Good condition - Very little human disturbance; no new habitat created by removing vegetation	Fair condition - Moderate level of human disturbance; some new habitat created by removing vegetation would be moderately disturbed	Similar to A	Similar to F
Excellent condition - low level of human disturbance; substantial habitat management; quality varies from excellent in many lakes to relatively poor in a few other lakes and some streams.	Fair condition - low level of human disturbance; no habitat management; quality varies from very good in a few lakes to relatively poor in many other lakes and some streams.	Good - similar to D but slightly higher level of human disturbance	Similar to A	Similar to F

Figure II-18. Qualitative resource outputs and environmental effects (continued)

ISSUE/Indicator	ALT. A	ALT. B	ALT. C
HABITAT QUALITY - Globally Significant Plant Communities	Poor condition - high level of human disturbance; motorized vehicle recreation in or near most plant communities. No active management of globally significant plant communities.	Good condition - low level of human disturbance; non-motorized recreation activities.	Fair condition - moderate level of human disturbance; some plant communities within areas designated for motorized vehicle recreation.
WATER QUALITY	Good	Good	Good
LAND ACQUISITION	High priority program focused on acquiring high recreation-value lands	Same as A	Moderate priority program focused on acquiring high recreation-value lands
SPECIAL FOREST PRODUCTS	Similar to C	Smaller program than currently; fewer permits and more restrictions on amount, type and locations of miscellaneous products collection	Current situation; moderate program issues permits for nursery plants, greenery, Christmas trees, and mushrooms; most NRA lands are available for such use
NOISE	Same as C, except campground quiet hours used in all non-ORV and several ORV focus campgrounds	Reduced ORV use results in less noise; buffers closed to ORVs and night-riding curfews in localized areas to reduce noise impacts to nearby residents; campground quiet hours in most campgrounds reduce impacts to campers	Current situation; no special actions designed to manage noise impacts to nearby residents and NRA recreationists
MANAGEMENT FOR COMPLIANCE	Program twice as large as now; more emphasis on both enforcement and education	Slightly larger program with much more emphasis on education	Current situation; program consists of 4+ full-time law enforcement officers, and a low level visitor/local resident education program

ALT. D	ALT. E	ALT. F (PA)	ALT. G	ALT. H
Good condition - similar to F(PA) but slightly higher potential for human disturbance; some communities are in MA 10(F) but fish or wildlife resource objectives may take precedence.	Good condition - no motorized vehicle recreation; low level of human disturbance.	Excellent condition - active management to protect and maintain all known globally significant communities that are in good to excellent condition. No motorized vehicle recreation.	Fair condition - majority of communities within areas designated for motorized vehicle recreation.	Good condition - no motorized vehicle recreation; low level of human disturbance.
Very good, low risk of contamination by disease organisms	Excellent, low risk of contamination by toxic spills and disease organisms	Very good	Good	Very good, low risk of contamination by toxic spills
High priority program focused on acquiring high habitat-value lands	Low priority program focused on acquiring habitat lands	Same as D	Same as A	High priority program focused on both high recreation- and high-habitat value lands
Small program; many NRA lands unavailable for such uses to protect habitats; more restrictions than now	Same as D	Moderate program; some NRA lands unavailable for such uses to protect habitats; program priorities would be ecosystems, recreational gathering, then commercial uses; more restrictions than now	Similar to C	Same as B
Reduced ORV use results in less noise; buffers closed to ORVs and night-riding curfews in localized areas; quiet hours in all NRA campgrounds	No ORV use results in less noise; quiet hours in all NRA campgrounds	Same as D, except no quiet hours in Horsfall and Spinreel campgrounds	Similar to A; stricter separation of ORV and non-ORV users in campgrounds results in less noise in some campgrounds	Similar to E, except no quiet hours in Horsfall Campground
Program 20% larger than now with increased emphasis on enforcement.	Program 25% smaller than now with lower emphasis on enforcement than now	Program 75% larger than now; more emphasis on both enforcement and education	Similar to F	Similar to C in program size; more balanced program between enforcement and education than now

Chapter III
Affected Environment



CHAPTER III

AFFECTED ENVIRONMENT

This chapter describes the environment which will be affected by revising the current management plan. First, physical and biological characteristics of the Oregon Dunes NRA are briefly described, followed by short discussions of landownership patterns and social and economic settings of the NRA.

Later in the chapter, specific resources, environmental conditions and land uses that would be significantly affected by the alternatives are discussed in resource element sections. Emphasis is on past, current and projected conditions, as well as the role of each resource in managing the NRA.

CHANGES BETWEEN DRAFT AND FINAL

Plant Communities & Wildlife Habitat

A new discussion entitled "Plant Species" was added under Plant Species and Communities. It lists dune-maritime endemic and uncommon plant species that were described in Wiedemann (1984).

A Fire discussion was added.

Additional information was added concerning a new species of *Daphnia* discovered on the NRA.

A Special Forest Products discussion was added.

Additional information was added to the T&E Plant Species discussion describing which species occur on the Oregon Dunes NRA and a 1993 survey for pink sandverbena.

A discussion entitled "Globally Significant Plant Communities" was added.

In Figure III-15, marbled murrelet and western snowy plover were changed from Federal candidate C2 to Threatened species.

In Figure III-16, two of the plants are now Federal candidate C2 species, meaning they are being studied for possible threatened or endangered status.

Recreation Section

The discussion of the NRA enforcement/compliance program under Management Practices was expanded and a figure (III-8) was added.

Two figures (III-10 and III-11) displaying national, statewide, and local ORV trends were added under Historic Trends.

A figure (III-12) showing projected growth for various recreation activities was added under Future Trends.

The discussion of demand for the various NRA ROS settings under Recreation Settings was enlarged.

Fish Section

More discussion of the roles of wild, non-native, and hatchery fish was included.

W&S River

Recreation was added as an outstandingly remarkable value for Tenmile Creek.

Water Section

More reference was made to the current study by the Coos Bay-North Bend Water Board and to possible relationships between amounts of vegetation and quality of groundwater.

Lands

A discussion of ownership of the beds of navigable waterbodies was added.

PHYSICAL AND BIOLOGICAL SETTING

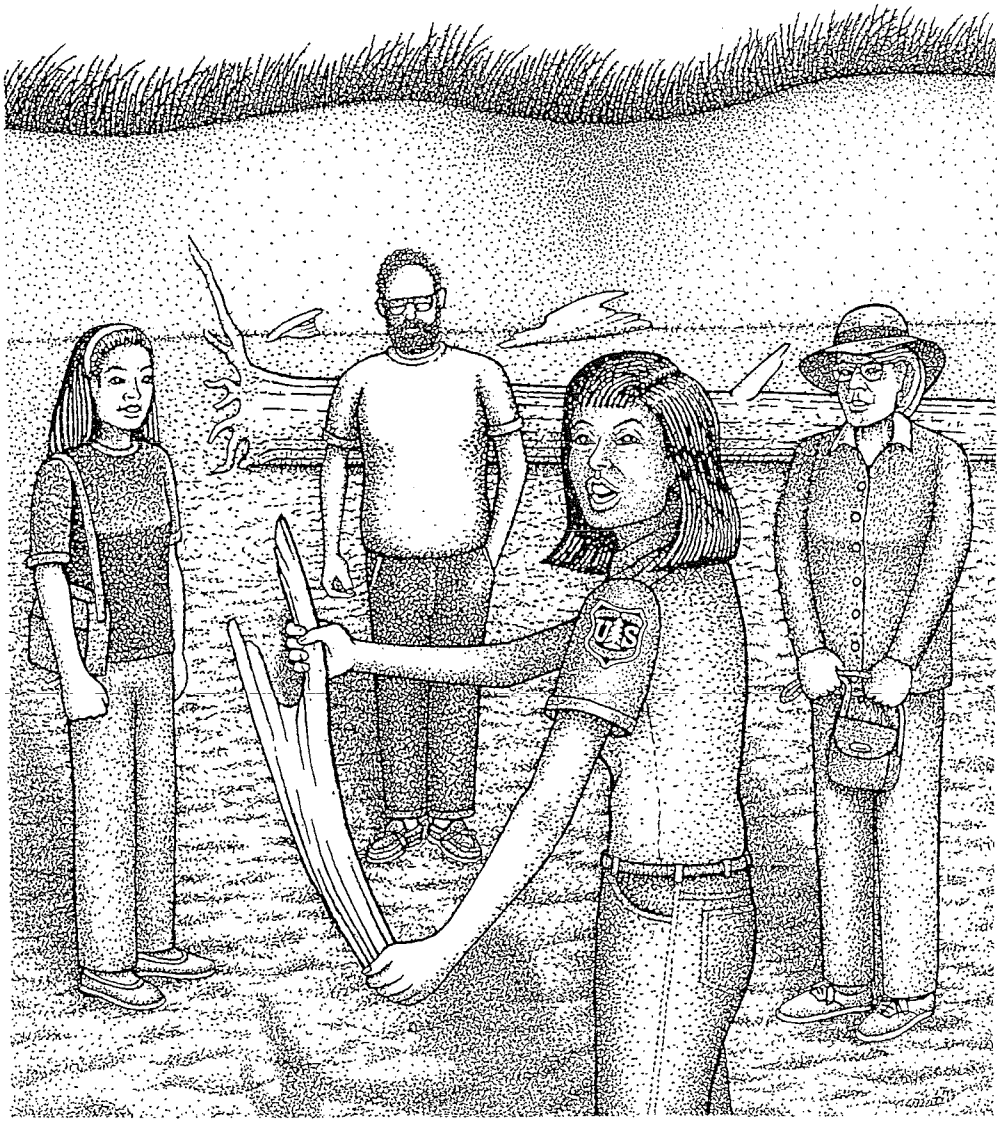
The Oregon Dunes NRA manages 28,900 acres of federally-owned land within the boundaries of the Siuslaw National Forest (Figure III-1). It extends for 40 miles along the Pacific Ocean from Florence and the Siuslaw River on the north to Coos Bay/North Bend on the south. The width of the NRA varies from a few hundred feet to approximately 3 miles, and averages 1-1/2 miles. The area includes parts of Coos, Douglas and Lane counties. Access to the NRA is provided by U.S. Highway 101, which roughly parallels its eastern boundary. State highways 126, 38 and 42 connect Highway 101 with Interstate 5.

Topography, Geology, and Soil

The Oregon Dunes NRA derives its name from the extensive sand dunes that comprise the singlemost important feature of the area. About 20% of the area is active unvegetated sand dunes, which range from small undulating dunes with crests 6-8 feet high to large dunes up to 300 feet high and 5,000 feet long. These large oblique dunes are unique to the NRA; coastal dunes of this magnitude occur nowhere else.

An additional 50% of the area has a sand base, and consists of older naturally vegetated dunes and areas where the sand has been removed by wind action down to or near the water table. The remaining 30% is forested foothills of the Coast Range with predominantly clay soils.

The 40 miles of ocean beach along the NRA are broad and sandy, interrupted only by mouths of streams and rivers as they enter the ocean. Rock outcroppings, cliffs and headlands are missing, and beaches stretch for as far as the eye can see.



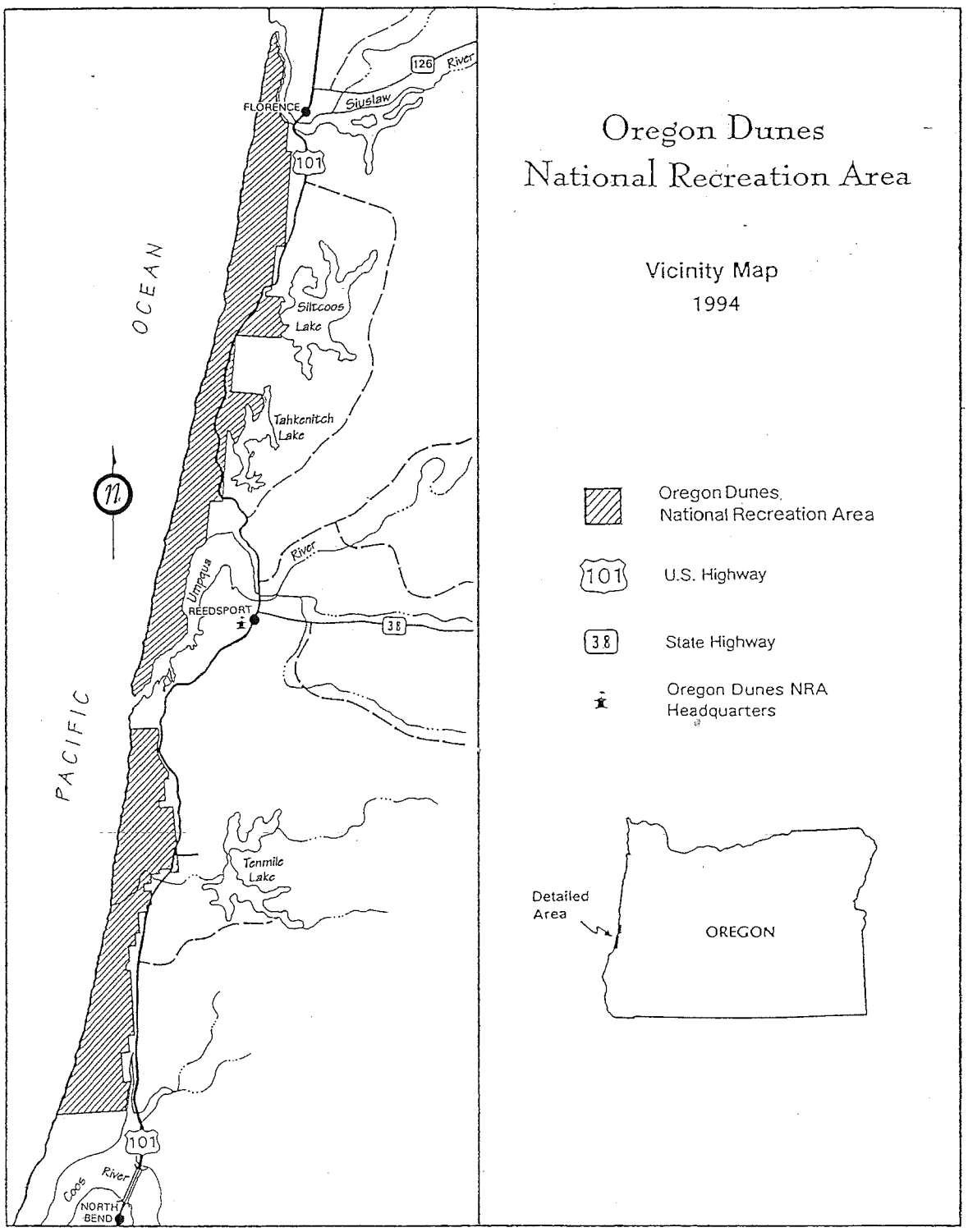


Figure III-1. Location of the Oregon Dunes NRA

Climate

The Central Oregon Coast has a temperate maritime climate due to the nearness of the Pacific Ocean and the influence of the Japanese Current. In particular, the Oregon Dunes NRA is characterized by relatively cool, dry summers and mild, wet winters. Average annual precipitation of 65-70 inches occurs mainly from November through March, when low pressure systems feed a stream of cool, moist air from the North Pacific onto the Coast. This moist air rises in the foothills of the Coast Range and drops large amounts of precipitation.

Summer temperatures generally range from highs of 65-75 degrees to lows of 45-55 degrees. Winter temperatures range from highs of 40-50 degrees to lows mostly in the 30s. Temperatures above 90 and below 20 degrees are rare.

Prevailing winds are moderate northwesterly in summer and strong southwesterly in winter. Dry easterly winds can occur for 2-3 days at any time of the year. Also, during the winter there will generally be several windstorms each year that reach up to 100 miles per hour velocity. Relative humidity is generally above 40%, except during easterly wind conditions.

Summer weather is characterized by foggy mornings, warm, sunny afternoons and cool evenings. The northwesterly wind which blows almost every afternoon is quite cool. Precipitation is light and spotty. Fog or low overcast sometimes lasts all day, and fog drip may contribute significantly to available moisture during the summer. Winter weather is characterized by frequent rains with intermittent clearing periods. Snow may fall on the beach once every few years when Arctic air meets an onshore flow of moist air.

Water

The Siuslaw River borders the Oregon Dunes NRA on the north and the North Slough of Coos Bay lies adjacent to the extreme southeast boundary. The Umpqua River, and smaller streams like the Siltcoos River and Tahkenitch, Threemile, and Tenmile creeks dissect the NRA. The mouths of these smaller streams in the Pacific Ocean create relatively small areas of brackish water. Although these areas may not have all the physical attributes of estuaries in terms of size, shape and stability, much of their biology is characteristic of estuaries.

The NRA boundary is also contiguous with the western boundary of Siltcoos and Tahkenitch lakes, while smaller freshwater lakes like Cleawox, Carter, Threemile, Beale, and Horsfall lie within the NRA. In all, 32 lakes are in or adjacent to the NRA.

Plant Communities

Although sand dunes are not hospitable to many forms of life, a wide variety of plant communities exist within the Oregon Dunes NRA. They include: European beachgrass and American dunegrass communities on the foredune; European beachgrass and other species on hummocks; plantations of European beachgrass, Scot's broom, and shorepine; various communities in the deflation plain that are dominated by either grass, rush, sedge, low shrub, tall shrub or shorepine; shorepine forest; clearcut or second-growth transition forest; communities in salt and freshwater marshes that are adapted to continuous or periodic flooding; and aquatic plant communities in rivers, streams, lakes and ponds. The variety of communities is due partly to blending of ocean and coastal forest ecosystems and introductions of exotic species. Some of the plant communities found on the Oregon Dunes NRA are globally significant, occurring only in a very few other places in the world.

Fish and Wildlife

The Oregon Dunes NRA and nearby offshore waters support 316 species of birds, 54 mammals, 12 amphibians, 3 reptiles, 54 estuarine fish, 20 freshwater fish, 9 anadromous fish and 2 shellfish. Of these, over 30 species of fish and 50 birds and mammals are taken by anglers, hunters and trappers, while several species of anadromous salmon have commercial value. Wildlife observation is a major activity on the NRA.

Populations of some animals found on the NRA are either low or limited; 10 have been classified as threatened and endangered (T&E) or sensitive species. Also, 5 plants found on the NRA are considered sensitive species.

LAND OWNERSHIP

There are 31,500 acres within the boundaries of the Oregon Dunes NRA. A total of 27,450 acres are managed by the Forest Service within the NRA boundary. The remainder is in private, State of Oregon and county ownership. The NRA also manages an additional 1,450 acres of non-NRA, National Forest land immediately south of the NRA boundary. See the Navigability section in Lands and Special Uses, Chapter III for a discussion of ownership of the beds and banks of navigable waterbodies.

SOCIAL AND ECONOMIC SETTING

History

American Indian occupation on the Oregon Coast dates back at least 8,000 years according to evidence from a shell midden near Tahkenitch Landing. Permanent settlements of these early people were clustered along shores of estuaries which empty into the Pacific Ocean. Siuslaw Indians settled the area from Heceta Head to the north, and Siltcoos River and Tahkenitch Creek to the south. The Lower Umpqua Tribe's territory stretches from these two streams to the Tenmile Lake area. The area south of Tenmile Lake to Coos Bay and the Coquille River was settled by the Coos Indians.

Fort Umpqua was built at the mouth of the Umpqua River in 1856, only to be abandoned in 1862. Umpqua City, the first town platted in Douglas County, was established even earlier on the North Spit of the Umpqua River in 1850. The spit also housed an Indian village and cemetery until 1859, when the Indians were removed from the site to Yachats. Just prior to that, trappers and explorers first visited the area. Because of thick coastal underbrush found inland, beaches and waterways became the natural routes of transportation.

Lumbering turned into a commercial venture in 1856 when Captain Asa Mead Simpson began cutting trees for his mill near Coos Bay, exporting the lumber to booming California. As the logging business continued to expand, the fishing industry also emerged when the area's first cannery was built near Gardiner in 1877.

In 1908 the Oregon Dunes area was placed under Forest Service management as part of the Smith River Ranger District. Soon after, many businesses and families moved to Reedsport, which was established in 1900. With new railroad lines connecting the Willamette Valley with coastal communities, people flocked to the Coast for a change of pace. Completion of the first road between Reedsport and Winchester Bay made the latter a popular resort area. Traveling the Coast became much easier when river bridges and the Coastal Highway were built in the 1930s.

Area of Influence

The Oregon Dunes NRA's area of influence has been defined as Lane, Douglas and Coos counties. This is the area in which NRA resources influence economies and quality of life of local communities. Residents of these counties gain employment and income from expenditures by NRA visitors (most of whom are non-residents and therefore bring in dollars from outside the area). A portion of Forest Service receipts from camping and other uses is shared with the counties to fund roads and schools. Residents also benefit from close proximity to the recreational opportunities and amenities provided by the NRA.

Communities in the Area of Influence

Florence marks the northern tip of the Oregon Dunes NRA boundary. With a population of 5,126, the community's economy is based on commercial and sport fishing, tourism, and lumber and wood products. Within the last 10 years, Florence has had an influx of people, making it the second-fastest growing community in Oregon. Many newcomers are making Florence their retirement or vacation home.

Reedsport is located at the midpoint of the Oregon Dunes NRA. Primarily supported by resource-based industries such as commercial and sport fishing, and lumber and wood products processing, the community is becoming more dependent on tourism with recent development of a nearby elk refuge and addition of the Umpqua Discovery Center and the Hero, a retired Antarctic research vessel. The community's population is nearly 4,800.

The communities of **Coos Bay/North Bend** are located at the southern terminus of the Oregon Dunes NRA. With a combined population of 24,530 in the Bay Area, the communities are dominated by lumber and wood products processing, shipping and commercial fishing. Tourism also plays an important role due to sport fishing; the Oregon Dunes NRA; and nearby attractions such as museums, theaters, and state parks.

Lakeside is an example of a smaller community, with a population around 1,500. Many residents are retirees or vacationers. The community's main support is trade, tourism and other related services. Unincorporated communities include Glenada (just south of Florence), Gardiner (two miles north of Reedsport), and Winchester Bay (south of Reedsport).

Population

The Bureau of the Census lists the population of Oregon as 2,930,000 people (Center for Population Research and Census, personal communication) Most people in the state currently live in the Willamette Valley, a situation expected to remain the same by the year 2000. Figure III-2 gives the current population, a projection for the year 2000 (made in October 1989), and the populations of the incorporated communities within the Oregon Dunes NRA boundary.

Figure III-2. Current population and population projected for the year 2000 for representative communities in the 3 counties located within the Oregon Dunes NRA boundary.

COUNTY	Current Population	Population in Year 2000	Incorporated Community	Current Population
Lane	290,000	334,220	Florence Dunes City	5,126 1,081
Douglas	96,100	114,709	Reedsport	4,796
Coos	61,200	69,539	Coos Bay/ North Bend	24,530
Total	447,300	518,468		

Employment and Income

Figure III-3 shows how current employment is distributed by sector for the counties in the area of influence (see below for sources of information).

Figure III-3. Percentage of employment in several main sectors by county.

COUNTY	Lumber & Wood Products	Tourism-Based	Trade	Government
Lane	10%	11%	27%	18%
Douglas	26%	11%	21%	21%
Coos	13%	10%	25%	23%

Although the timber industry has traditionally been a strong factor in the economic base of Lane, Douglas and Coos counties, employment is shifting to other sectors. In Lane County, employment in the lumber and wood products industry is expected to shrink 20% by the year 2010. Growth in other manufacturing sectors is expected to more than offset the projected job losses (Lane Council of Governments 1989).

In Douglas and Coos counties, most growth has occurred in the non-manufacturing sector, especially in the services industry. This trend reflects that the two counties are favorite destinations for tourists and retirees.

Increases in the manufacturing sector in Douglas County are largely because of non-lumber and wood products firms moving to or re-opening in the county. The lumber and wood products sector's share of manufacturing is at the lowest point in 7 years (CCD Business Development Corp. 1990). Coos County expects the growing number of retirees and expansion of tourism to be the major driving factors in the southern county's economic development in the 1990s (State of Oregon 1992; Figure III-3).

The median family income in the three counties is $29,200 for Douglas, $29,300 for Coos and $32,200 for Lane. These compare to a median family income of $34,300 for the state of Oregon; the state's metropolitan areas average $36,500 and non-metropolitan areas average $30,100 (T. Afton, pers. commun.).

A 1991 economic impact analysis (USFS 1991) showed that the Oregon Dunes NRA contributes significantly to the economies of Coos, Douglas and Lane counties. The study was based on a detailed 1990 survey of activities and expenditures of Oregon Dunes visitors. Using the IMPLAN model[1] it was estimated that in 1990 approximately 1.5 million Oregon Dunes NRA visitors contributed 5,214 jobs and $161.4 million[2] in total income to local economies. This indicates a strong interdependence between the Oregon Dunes NRA and local firms and industries. The study broke out relative economic contributions of different types of Dunes recreationists (Figure III-4).

Figure III-4. Estimated total income supported by Oregon Dunes NRA recreationists in 1990 in Coos, Douglas, and Lane counties.

TYPE RECREATION USE	Total Income $Millions[2]	Percent of Total
Non-beach day use	96.4	60
Other	35.2	22
ORV use	21.6	13
Fishing	4.6	3
Camping	3.6	2
TOTAL	161.4	100

[1]The IMPLAN model is a computer model that simulates the economic interdependence between firms, industries and government in a local economy.
[2]1993 dollars.

Oregon Dunes NRA Receipts and Expenditures

Campground fees collected in the Oregon Dunes NRA for fiscal year 1990 totaled $165,000, with $185,000 for fiscal year 1991. Nearly 90% of campground revenues accrue during the peak season of May through September. Special use permit receipts (for collection of mushrooms, greenery and live trees, shrubs and boughs, for commercial dunes-ride concessions, etc.) totalled $25,000 in fiscal year 1991.

Twenty-five percent of a national forest's annual receipts are distributed to the counties within which the forest's lands lie. Receipts from timber sales, recreation fees, special use permits and other uses are pooled; 25% of the total is then distributed among the counties on the basis of the proportion of the forest's total acreage within each county.

Of the $210,000 in recreation and special use fees collected by the Oregon Dunes NRA in 1991, $52,500 (25%) were distributed among the 8 counties in which the Siuslaw National Forest is located; $27,000 of that total went to the 3 counties in the area of influence. Timber receipts make up the largest portion of annual payments to counties; with timber receipts included, total payments to Lane, Douglas and Coos counties in 1991 amounted to $7.8 million.

With changes in traditional industries, local residents, communities and counties are looking to the Oregon Dunes NRA for expanded commercial and special use opportunities, as well as rural economic development assistance through provisions of the 1990 Omnibus Farm Bill. Commercial harvest of mushrooms and other special forest products has become a multi-million dollar industry in the state of Oregon. Demand for commercial mushroom harvesting on the Oregon Dunes NRA is increasing annually at a rapid pace. Management is increasingly having to balance this and other commercial uses with the legislatively mandated outdoor recreation and resource conservation purposes of the area.

Current annual operating costs for the NRA are approximately $1.3 million; average facilities construction costs are roughly $100,000 per year.

RECREATION

Overview

The Oregon Dunes NRA, spanning about 40 miles of Pacific Ocean frontage and home for the largest tract of coastal sand dunes in the western United States, is a unique recreation area in the Pacific Northwest. The Oregon Dunes NRA hosts about 1.5 million visitors annually from throughout the United States and many other countries and is one of the most heavily visited Forest Service areas in the Pacific Northwest.

The area provides a wide variety of recreational opportunities including hiking and walking, horseback riding, warm-water and cold-water fishing, off-road vehicle (ORV) riding, wildlife and scenery viewing, picnicking, mushroom and berry picking, deer and waterfowl hunting, boating and canoeing, photography, nature study and environmental education, camping, sightseeing and driving for pleasure, and dog (retriever and sled-dog) training. Many recreationists also use the Oregon Dunes NRA as an access point to the beach, administered by the State of Oregon, that runs the length of the area. To facilitate and support recreation use, the Forest Service provides 14 developed campgrounds, 21 day-use sites, 25 miles of access roads and 25 miles of trail.

In addition to Forest Service facilities, the State operates three campgrounds and Douglas County operates two campgrounds immediately adjacent to the Oregon Dunes NRA. There are numerous private motels, resorts, campgrounds and recreational vehicle parks nearby. The Bureau of Land Management provides opportunities for dispersed recreation on the North Spit of the Coos River adjacent to the area's southern boundary. The Mapleton Ranger District of the Siuslaw National Forest also provides a variety of recreation opportunities and facilities in the Sutton area just north of Florence.

Current Situation

Recreation Visitation

The Oregon Dunes NRA's 1.5 million annual visitors ranks it in the top 5% of recreation sites managed by the Forest Service in the Pacific Northwest. It is a major tourist attraction on the Oregon Coast which, in turn, is the most popular destination location for tourism in the state (Dean Runyan Associates 1989). Visitation to the Oregon Dunes NRA stimulates expenditures that eventually generate about $245 million of total industrial output (including income and other outputs) for the three counties in which it is located (USFS 1991).

While people come from around the world, most NRA visitors originate from Oregon, Washington and California. A surprisingly large percentage (32%) of visitors travel over 500 miles to reach the Oregon Dunes NRA (USFS 1991). This percentage is high when compared to most other outdoor recreation locations.

Visitors participate in a variety of recreation activities at the Oregon Dunes NRA. The relative amount of time spent at various recreation activities can be represented by percentage of total visits and percentage of total Recreational Visitor Days (number of visitors times average time spent per activity) accounted for by each recreation activity (Figure III-5).

Figure III-5. Percent of visits and use (RVDs) attributed to various recreation activities (1989-1990 traffic counter survey)

Primary Activity	Percent of Visits	Percent of Rec Use (RVDs)
Sightseeing	46	9
ORV Riding	13	30
Pleasure Driving	7	2
Walking/Day Hiking	7	5
Collecting Berries, Shells, Mushrooms, etc.	5	3
Beach/Sand Play	5	6
Fishing (Anadromous, Surf, Cold/Warm Water)	3	5
Wildlife Viewing/Nature Study & Photography	3	1
Picnicking	2	1
Camping	3	36
Other Activities	6	3
TOTAL	100	100

Some conflicts between incompatible recreation uses and between recreation and other resource values are inherent to settings that accommodate a variety of recreation activities. A primary use conflict at the Oregon Dunes NRA, since its inception, has been between ORV recreation and non-motorized recreation, nearby residents, and resources such as plants and wildlife.

Several long-standing issues focus on ORV use in sections of the Oregon Dunes NRA. To many nearby residents and non-motorized recreationists, the engine noise from ORV riding areas (often well into or all through the night) degrades their quality of life or recreation experience. Some adjacent property owners have experienced ORVs trespassing onto their land. Mixing of ORV and non-motorized recreationists within the same sand areas, on the same roadways, and in the same developed facilities has also been cited by both groups as an unsafe situation. Currently all 4 major access corridors into the Oregon Dunes NRA mix ORVs with other recreationists. ORV trespass into areas closed to protect wildlife, plants, sensitive habitats and non-motorized recreation has also been a recurrent problem. Even within areas open to ORV operation, impacts to plants, wildlife, water and other resources are a concern for many people. ORV management at the Oregon Dunes NRA is one of the primary issues to be addressed in this planning effort.

Recreation Supply and Demand

The supply of recreation resources at the Oregon Dunes NRA consists of facilities, settings and programs that encourage or allow visitors to participate in various activities. The amount of use and mix of recreation activities that people engage in at the Oregon Dunes NRA is at least partly a product of the recreation facilities, settings and programs provided.

Facilities

Facilities are designed to promote or allow a specific recreation activity and experiences resulting from that activity. At the Oregon Dunes NRA, recreation facilities are designed for broad categories of overnight and day use.

Overnight facilities at the Oregon Dunes NRA consist of 14 campgrounds ranging in size from 3 to 70 camping units. The campgrounds' maximum annual capacity is 952,650 PAOT-days. PAOT-days are computed by first mutiplying the number of campsites by the number of persons using the campsite, and then multiplying that figure by the number of days the campsite is available for use (managed use season). Since some campgrounds are closed during low visitation periods, the current managed capacity of overnight facilities is 721,785 PAOT-days. Current demand (1991 use) for this supply is represented in Figure III-6.

Figure III-6. Percentage of use (occupancy) of the Oregon Dunes NRA campground capacity (1991).

Campground	Percent Occupancy (Year Round)[1]	Percent Occupancy (May - September)
Lodgepole	29	70
Lagoon	28	65
Waxmyrtle	49	66
Driftwood II	20	57
Spinreel	29	87
Horsfall	19	54
Bluebill	28	77
Wildmare	11	31
Horsfall Beach	20	25
Tyee	29	79
Carter Lake	44	80
Tahkenitch Landing	30	104
Tahkenitch	19	65
North Eel	31	72

[1] **Based on 1991 managed capacity.**

Figure III-6 illustrates that during the high visitation summer season demand for overnight facilities approaches available supply at some locations, but that overall, even during the busy season, there are overnight facilities available. For summer, campgrounds that serve primarily motorized recreationists have an average occupancy rate of 63%. Campgrounds serving primarily non-motorized recreationists are, on the average, 80% full during the summer.

Typically the campgrounds (including three overflow locations) are full during Memorial Day, July 4th and Labor Day holiday weekends. Periodically, some campgrounds may be full during nice-weather on summer weekends. During fall, winter, and spring there is adequate supply to meet current demand.

Day-use facilities can be further broken down into those designed primarily to gain access to undeveloped areas, such as trailheads, staging areas, trails, parking lots and boat ramps; and those designed primarily to provide a recreation experience at the facility itself, such as viewing platforms, picnic areas, overlooks and interpretive sites.

There are 21 day-use facilities, of which most are designed primarily to promote recreation use of undeveloped areas. Annual capacity of day-use facilities designed for such use of the Oregon Dunes NRA is 917,975 PAOT-days. The annual capacity of day-use facilities designed to concentrate use at developed locations is 76,650 PAOT-days. There are 25 miles of maintained trail on the Oregon Dunes NRA. Trails vary in length from 1/4 to 7 miles, and provide primitive to fully-accessible experiences. Trails are primarily designed for hiking with only limited opportunities for mountain bikers or horseback riders. However, newly acquired lands near Tahkenitch Lake could provide additional bike and equestrian trail opportunties.

Few day-use facilities in either category are currently used to capacity even during summer. Again, some facilities may be fully utilized during summer holidays and nice weather on weekends, but most have space available. The only day-use facility that seems to be consistently used weeklong at or very near capacity during the summer is the Oregon Dunes Overlook. Day-use staging for ORVs at several locations is at or near capacity on good weather weekends during summer, fall and spring. Trails are, for the most part, moderately used year round.

Recreation Settings

The percent of Oregon Dunes NRA land area within the different Recreation Opportunity Spectrum (ROS) settings is presented in Figure III-7.

Figure III-7. Relative amount of ROS settings.

ROS Setting	Acres [1]	Percent of NRA
Primitive	0	0
Semiprimitive Nonmotorized	11,030	38%
Semiprimitive Motorized	13,990	48%
Roaded Natural	3,630	13%
Rural	250	1%
Urban	0	0

[1]Includes National Forest lands within the Oregon Dunes NRA and within the mile-wide buffer south of the NRA boundary.

Specific demand figures for various ROS settings at the Oregon Dunes NRA are unknown. However, the 1991 Recreational Needs Bulletin published as a component of the Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP) 1988-1993 (Oregon State Parks and Recreation Division 1988) provides some insights. The Needs Bulletin compares ROS settings people actually use for various recreation activities versus the ROS setting they would prefer to use for their activity. Examining those SCORP regions applicable to the NRA (Regions 5 and 6) and those activities that occur on the NRA, the following relationships are found:

1) preference for semi-primitive settings exceeds actual use of these settings

2) use of roaded natural setting exceeds preference for this setting

3) use of rural setting exceeds preference for this setting

Taken together these relationships would seem to indicate that in the area covered by the NRA, outdoor recreationists are using settings (rural and roaded natural) that are for some, more developed than they would prefer. Conversely fewer people than would prefer are actually using less developed settings (semi-primitive). Both conclusions indicate that there may be a shortage of semi-primitive (non-motorized and motorized) settings available in the area for the types of outdoor recreation engaged in at the NRA.

Generally ROS settings are operating in a manner consistent with ROS guidelines for the various settings found at the NRA: Rural, Roaded Natural, Semi-Primitive Motorized, and Semi-Primitive Non-Motorized. A primary exception would be in the Semi-Primitive Motorized ROS class, where user densities and frequency of encounter levels (encounters with other recreationists) usually exceed ROS guidelines on holiday weekends and summer weekends when the weather is good. User densities at these times, assuming that users are perfectly distributed within available riding areas, are between 1 and 2 riders per acre. Actual densities (acknowledging that use is not perfectly distributed) exceed this 1 to 2 riders per acre in some portions of the riding areas and are less than this density in other portions. This higher than intended density of use results from staging occurring on National Forest lands, as well as private and state lands adjacent to the NRA boundary. When existing staging capacity is fully utilized it results in user densities that exceed ROS guidelines for SPM settings.

Recreation Programs

Recreation programs at the Oregon Dunes NRA include dispersed recreation, developed recreation and information services/interpretation. Dispersed recreation is away from developed facilities and accounts for approximately 54% of use. Developed recreation is based at facilities, such as campgrounds or overlooks, and accounts for about 46% of total use. Information services and interpretation is provided at developed sites (campgrounds), in dispersed settings (along trails), and away from the NRA (schools and community group meetings). It consists of both personal contacts and indirect contacts through printed information and signs. It is estimated that 80% of all visitors to the Oregon Dunes NRA have contact with some aspect of the information services and interpretive programs.

Management Practices

A wide variety of practices can be used to manage recreation resources at the Oregon Dunes NRA. A basic step is an inventory of the area's recreation resources and capabilities. This is accomplished through the ROS which allows managers to categorize lands according to their ability to provide various recreation experiences. A more detailed recreation inventory also employed at the Oregon Dunes NRA records the number, type and capacity of various recreation facilities. A third inventory records recreation use of the area. Using all these inventories along with statewide and nationwide recreation demand projections, managers estimate how well resources are meeting current user needs, as well as what trade-offs of future options are involved in commiting additional resources to current demand.

Specific management practices include development and maintenance of roads and trails leading to recreation settings or locations. Campgrounds, trailheads or staging areas, parking lots, picnic areas, overlooks, fishing piers, boat ramps and docks, and viewing platforms encourage and facilitate specific recreation activities and experiences. In addition to promoting access and recreation use, developed facilities help to minimize impacts on other resources by focusing and concentrating human uses. Developed facilities are regularly maintained to ensure they are useable for the intended purpose, safe and sanitary, and attractive and pleasant for users. Some portions of the Oregon Dunes NRA are purposely maintained in an undeveloped condition to provide for more primitive and self-reliant types of recreation experiences.

Two additional on-the-ground practices are education and enforcement. These practices protect resources and public safety by promoting compliance with regulations and enhance visitor enjoyment through increasing visitor knowledge. The NRA, with 4 full-time law enforcement officers, has the highest level of law enforcement staffing for any management unit in Forest Service Region 6 (Oregon and Washington). Figure III-8 compares the level of law enforcement activity on the NRA to that of other Region 6 management areas with similar levels of recreation visitation. As can be seen, the NRA has approximately 4 times more law enforcement activity than other national forest units with similar visitation levels.

Figure III-8. NRA law enforcement activity (1989-1992) compared to other R-6 units with similar recreation visitation (from USFS R-6 Law Enforcement, Portland.

Location	Annual RVDs[1]	Warnings 1989-1997	Incidents 1989-1997	Violations 1989-1992	Total LE[2] Activity 1989-1992
Oregon Dunes NRA	Approximately 1.54 million	2,595	1,305	475	4,375
White River Ranger District (Mount Baker-Snoqualmie National Forest)	Approximately 1.43 million	490	610	211	1,311
Diamond Lake Ranger District (Umpqua National Forest)	Approximately 1.63 million	335	131	100	566
Naches Ranger District (Wenatchee National Forest)	Approximately 1.55 million	194	423	95	712

[1] RVD - Recreation Visitor Day
[2] LE - Law Enforcement

Historic Trends

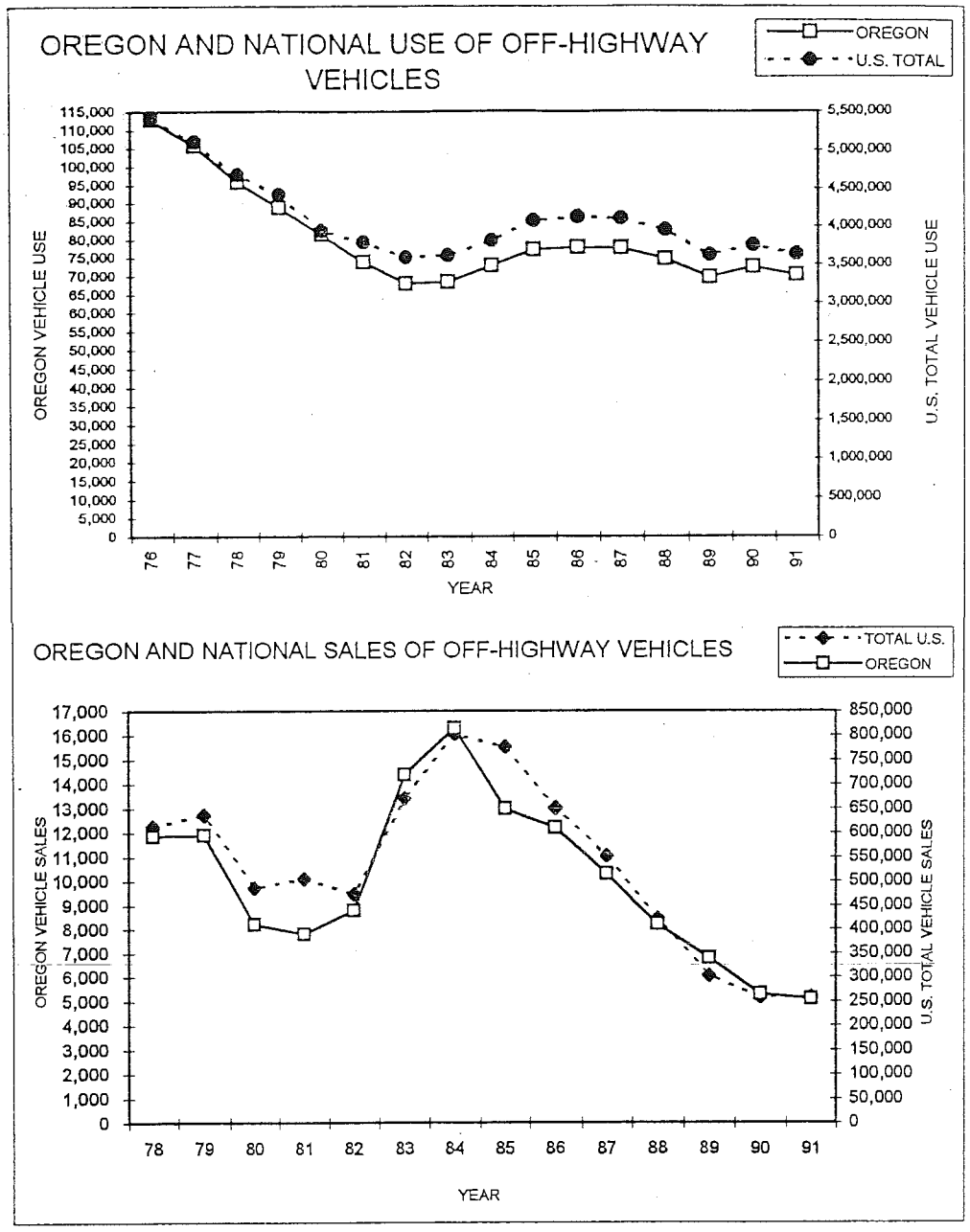
Visitation to the Oregon Dunes NRA has slowly increased since the NRA was established. Numerous entry points without access controls such as entry booths, and dispersal of many visitors into undeveloped portions of the NRA make accurate measurement of visitation difficult. Nevertheless, a trend of increasing visitation to the Oregon Coast, traffic counter data collected at some locations on the NRA, increasing use of state parks adjacent to the NRA, and perceptions of long-time NRA employees indicate that use at the NRA is generally increasing over time. The first systematic estimate of annual NRA visitation since 1977 (in 1989-1990) was 1.5 to 2 million. There were only slight shifts in the primary recreation activities of NRA visitors between 1977 and 1989-90 (Figure III-9).

Figure III-9. Percentage of 1977 and 1990 use made up of various recreation activities

Primary Recreation Activity	Percent of 1977 Recreation Use	Percent of 1990 Recreation Use
Sightseeing	11	9
ORV Riding	28	30
Pleasure Driving	3	2
Walking/Day Hiking	2	5
Collecting Berries, Shells, Mushrooms, etc.	1	3
Beach/Sand Play	5	6
Fishing (Anadromous, Surf, Cold/Warm Water)	5	5
Wildlife Viewing/Nature Study and Photography	1	1
Picnicking	2	1
Camping	38	36
Other Activities	5	3
TOTAL	100	100

Relatively stable ORV-use percentages at the NRA as reflected in the above figure run contrary to national/state and regional trends as represented in Figures III-10 and III-11 respectively.

Figure III-10. National and Oregon trends for use and sales of vehicles used off highways (1976-1991).[1]



[1] From Motorcycle Industry Council and Specialty Vehicle Institute in America.

Figure III-11. Regional ATV trends as represented by vehicle registration (from Oregon Department of Transportation statistics).

County	1986	1987	1988	1989	1990	1991
Coos	1,349	1,768	1,554	1,752	1,624	1,696
Douglas	2,060	2,723	2,279	2,369	2,054	2,206
Lane	3,111	3,916	3,134	3,406	3,090	3,218
3-County Total	6,520	8,407	6,697	7,527	6,768	7,120
Oregon Total	25,369	31,568	25,343	26,775	24,365	25,754

(1) Coos County ATV registration increased by 7% between 1986 and 1991.
(2) Douglas County ATV registration decreased by 11% between 1986 and 1991.
(3) Lane County ATV registration decreased by 10% between 1986 and 1991.
(4) Three NRA county ATV registration decreased by 7% between 1986 and 1991.
(5) State of Oregon ATV registration decreased by 12% between 1986 and 1991.

While primary recreation activities and their relative percentages of total visitation have changed only slightly, technological changes have resulted in different patterns of use and amounts and types of impacts. Among these trends are growth in size of vehicles that must be accommodated on NRA roadways and in campgrounds and parking areas; proliferation in the number of ORVs in developed and undeveloped settings resulting from a shift from multiple passenger dune buggies and rails to single operator ATVs; and a series of technological changes in ORVs (including more powerful engines, new tire designs, and light-weight plastic bodies) have made once inaccessible areas accessible.

Future Trends

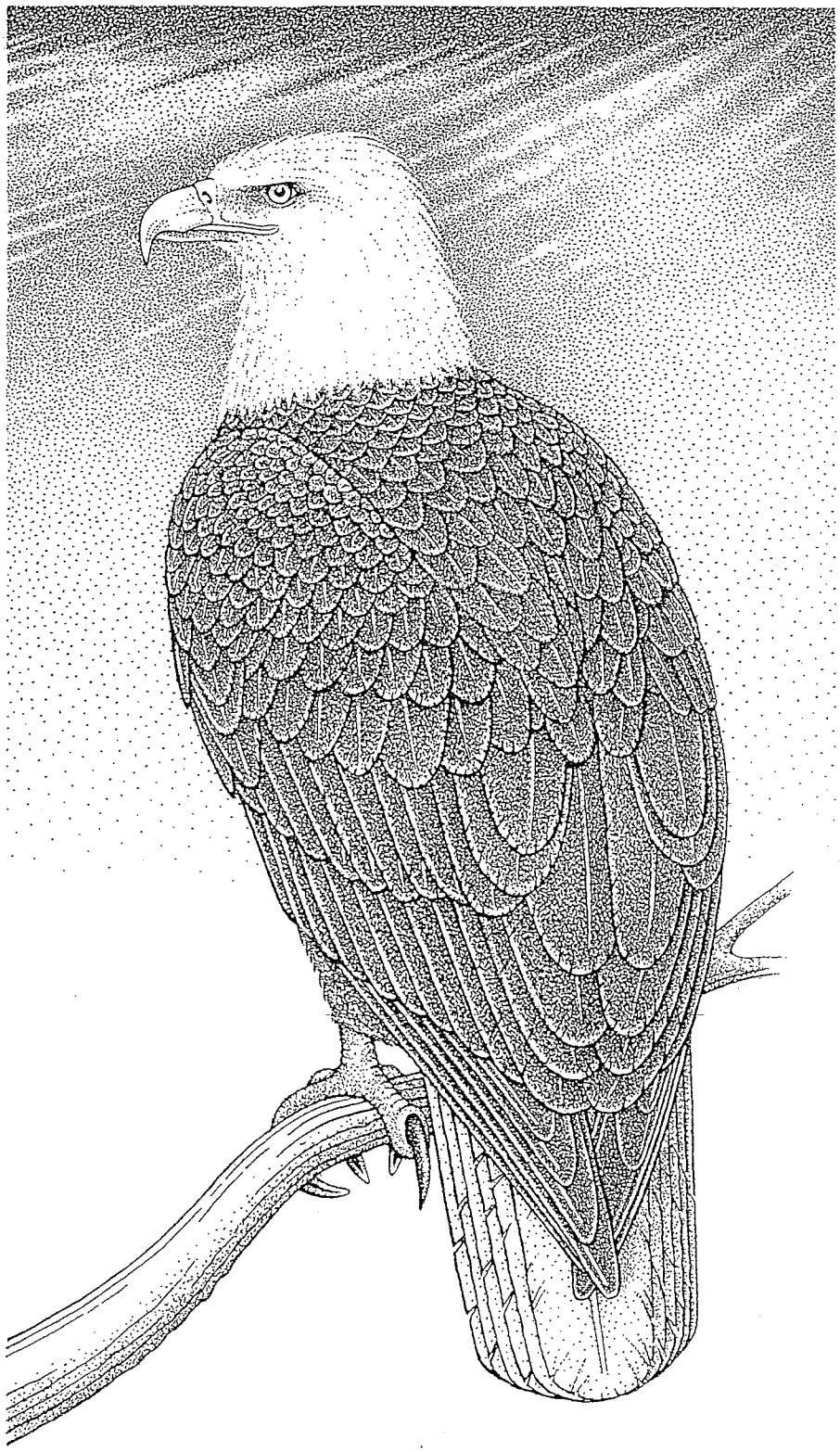
Outdoor recreation experienced tremendous growth in the decades after the Second World War up to the mid-1970s. Since that time, nationwide outdoor recreation growth has leveled off to about 1% annually (Task Force on Outdoor Recreation Resources and Opportunities 1988). However, outdoor recreation in Oregon continues to grow faster than the national average. A 1989 study for the Oregon Tourism Department reports about a 30% statewide growth rate in travel/tourism-related business from 1975 through 1987. Much of this growth is related to outdoor recreation and the study cites the Oregon Coast as the most popular destination for visitors to the state (Dean Runyan Associates 1989). Many outdoor pursuits are growing at rates well in excess of the state's population growth of 1.2% annually. Figure III-12 represents projected statewide annual percentages of increase for various outdoor recreation activities that occur on or near the Oregon Dunes NRA

Figure III-12. Projected statewide annual percentage increases for various outdoor recreation activities (from SCORP, 1988).

Activity	Projected Yearly Increase %
Bicycle on road day trip	12.0
Day hiking on trails	11.9
Lake nonmotor boating	9.7
Outdoor photography	9.3
Nature study/wildlife observation	8.6
Visiting interpretive center	6.6
Recreation vehicle camping	6.1
Boat fishing (fresh water)	5.5
Sightseeing/exploring	4.9
ATV	4.3
4-Wheel Off-road	4.0
Tent camping/motor vehicle	3.7

Resource Relationships

The varied recreation opportunities found at the Oregon Dunes NRA are partially compatible with other resource capabilities of the area. Activities of a low density, low impact nature such as hiking, photography, nature study, angling, and wildlife viewing would generally not conflict with resources such as fish, wildlife, plants, geology, water or scenery. Higher density or higher impact recreation uses such as developed camping or ORV use would be incompatible with other resource uses in many cases, but could be managed to reduce impacts to an acceptable level in some of those situations. In other cases, needs of other resources may preclude or restrict most or all recreation uses in some areas.



SCENERY

Overview

The Oregon Dunes NRA is nationally renowned for its scenic quality. Visual variety is evidenced by bold contrasts in ever-changing sand dunes, vegetation and water body patterns. Most of the landscape is natural appearing with very few human-made deviations. Ample opportunities exist for panoramic or undisturbed views with little sense of boundary or human intervention. There are also opportunities to view the detailed landscape at a pedestrian pace along one of the many hiking trails throughout the dunes, or by cross-country travel. Detailed elements of the landscape and their relationship to each other often create desirable visual variety.

The dunes have a very distinct landscape character, or overall impression one gets when viewing the landscape, that consists of the following features (including landform, rock, vegetation, and water):

Foredunes -- Creates barrier to ocean. Covered with beachgrass and driftwood.

Hummocks -- Curious formations. Inviting to explore. Partially covered with beachgrass.

Deflation Plain -- Variety of plant textures. Interesting water forms.

Open Sand -- Extremely inviting to explore. Spectacular landforms. Fine textures.

Tree Islands -- Bold vertical contrast to surrounding sand. Color contrast between dark vegetation and light sand.

The composition of these features is what gives the dunes its distinctive landscape character. Landscapes, such as the dunes, with the greatest diversity have the greatest visual value.

Current Situation

Viewsheds are the land seen from popular locations such as roads, rivers, trails and developed recreation sites. Figure III-13 lists the name of each viewshed and linear miles it contains. Such viewing locations are generally more important than those viewing locations used by few people. However, the dunes are seen from all angles because visitors meander through them. Thus, it is important that all lands be managed for scenery.

The Forest Plan has established the Visual Quality Objective (VQO) along Highway 101 through the NRA as Retention in the foreground (0-1/4 to 1/2 miles) and Partial Retention for the middle-ground (3-5 miles).

Visual management practices are evaluated on a project-by-project basis. Sand trails created by ORV use and other activities are part of the existing condition that do not necessarily conform to the desired landscape character.

Figure III-13. Viewsheds

VIEWSHED	MILES
Roads	
Highway 101	26.0
Overlook	0.4
Major Road Corridors	
Horsfall	2.4
Siltcoos	2.0
South Jetty	5.2
Umpqua Beach	2.2
Minor Road Corridors	
Threemile Rd.	1.0
Trails	
High Use Trails	
Carter Dunes	1.0
Eel Dunes	1.0
Lagoon	0.8
Overlook Loop	3.2
Waxmyrtle	1.4
Umpqua Dunes	1.8
Moderate-Low Use Trails	
Bluebill	1.2
Chief Tsiltcoos	1.4
Siltcoos Lake	3.5
Tahkenitch	6.8
Threemile Lake	1.8

Management Practices

Visual resources are managed by establishing VQOs for each viewshed. VQOs are measurable standards against which activities can be evaluated (see Scenery, Chapter II). Viewsheds are managed by controlling how the scenery is altered from a natural appearance and introducing or maintaining variety in the seen area. Since this landscape is so dynamic, areas of high aesthetic value require some management activities of both types to retain the valued character.

Resource Relationships

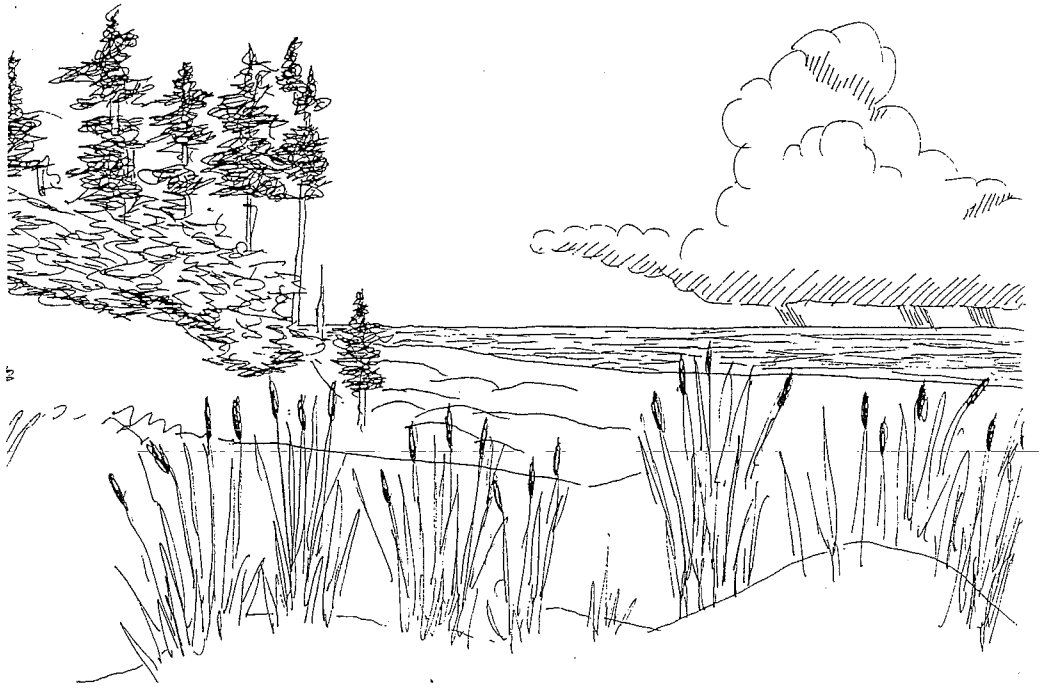
Scenery contributes to high-quality recreation experiences. Such things as developed recreation areas, structures, and some vegetation and wildlife habitat manipulation projects can detract from a natural appearance. Also, vegetation that is allowed to spread unchecked will create a less diverse landscape and growing vegetation may block views from popular roads and trails. Activities such as building roads and structures not in keeping with the natural character of the land will detract from visual quality.

Historic Trends

A major factor in visual management of the dunes is the introduction of European beachgrass. It has caused a tremendous change in character of the dunes scenery. Vegetation has modified the landscape by beachgrass and native vegetation migrating into previously unvegetated areas, and shore pine blocking views in some areas. ORV activity in some areas leaves travelways through previously vegetated areas resulting in an unnatural appearance. Management activities have addressed visual quality only on a project-by-project basis.

Future Trends

If there is no intervention, major portions of the dunes will most likely become vegetated. If this happens, visual variety will be lessened and some natural landscapes and unique visual features will be lost.



PLANT COMMUNITY AND WILDLIFE HABITAT DIVERSITY

Overview

Planning regulations define diversity as "the distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan" (36 CFR 219.3). The environmentally determined occurrence of plant associations, natural disturbance and succession, and management activities all affect diversity on the Oregon Dunes NRA. This section will focus on habitat diversity and the assumed coinciding diversity of animal species. Diversity will only be considered within the Oregon Dunes NRA with the assumption that maintenance of plant and wildlife diversity in the NRA is important because these species and habitats may be threatened within the coastal eco-region. Although most wildlife and plant populations will not be considered in detail, federally-listed T&E species, species proposed for such listing, and sensitive species and plant communities will be specifically addressed.

Available specific diversity indices do not adequately describe the diverse character of the Oregon Dunes NRA. Landforms and plant associations indicate the range of habitats present (Figure III-14). Information on the numbers and types of wildlife species associated with particular habitat types is presented when known. Note that some habitats support a more diverse flora and fauna than others, and are therefore considered more "diverse". Thus, to determine area diversity, one must consider the type of habitat present as well as the area (abundance) and spatial distribution of habitats.

Figure III-14. Acres per landform on the Oregon Dunes NRA and number of wildlife species supported by each (from USFS 1972)[1]

Landform	Acres	Species
DEFLATION PLAIN		
Deflation Plain - Carex	287	92
Deflation Plain - Grasses	199	92
Deflation Plain - Rushes	393	92
Deflation Plain - Low Shrub	1,575	70
Deflation Plain - Tall Shrub	909	40
Deflation Plain - Shore pine Forest	1,868	113
FLOOD PLAIN		
Flood Plain - Active	155	96
Flood Plain - Saltmarsh	67	77
Flood Plain - Stabilized (Shore pine Forest)	77	--
Flood Plain - Stabilized (Transition Forest)	73	--
HUMMOCKS		
Hummocks - Dry	1,370	47
Hummocks - Dry, Plantation	46	(a)
Hummocks - Dry, Stabilized	173	--
Hummocks - Wet, Occasionally	1,915	54
Hummocks - Wet, Occasionally, Stabilized	1,807	54
Hummocks - Wet, Occasionally, Stabilized Plantation	29	(a)
STABILIZED DUNES		
Stabilized Dune - Plantation	666	(a)
Stabilized Dune - Shore pine Forest	314	137
Stabilized Dune - Transition Forest	1,485	
Stabilized Dune - Transition Forest Clearcut	36	96
Stabilized Dune - Transition Forest Second Growth	105	102 (70) (b)
Stabilized Eroding - Shore pine Forest	114	--
Stabilized Eroding - Transition Forest	551	--
Stabilized Eroding - Transition Forest Second Growth	155	--
MOUNTAIN FRONT		
Mountain Front - Marsh	15	58
Mountain Front - Transition Forest	1,323	70
Mountain Front - Transition Forest Clearcut	9	96
Mountain Front - Transition Forest Second Growth	691	102 (70) (b)
Mountain Front - Transition Forest Hardwood	28	
OBLIQUE RIDGE		
Oblique Ridge	3,461	--
Oblique Ridge - Plantation	139	(a)
PARABOLA		
Parabola	383	--
Parabola - Plantation	15	(a)

Landform	Acres	Species
PRECIPITATION RIDGE		
Precipitation Ridge	378	--
Precipitation Ridge - Transition Forest	54	144-135
Precipitation Ridge - Threatening	122	--
ROLLING		
Rolling - Partially Stabilized, Shore pine Forest	233	Up to 135
Rolling - Partially Stabilized Plantation	221	(a)
CONDITIONALLY STABLE		
Conditionally Stable - Slipface	162	--
Conditionally Stable - Slipface Plantation	6	(a)
TRANSVERSE RIDGE		
Transverse Ridge - Dry	1,321	--
Transverse Ridge - Dry, Plantation	45	(a)
Transverse Ridge - Occasionally Wet	1,339	--
Transverse Ridge - Occasionally Wet, Plantation	2	(a)
AQUATIC		
Creek	29	--
Lagoon	5	--
Lake	395	63
Marsh	205	85
River	47	34
Riparian	38	--
FOREDUNE	291	21
BREACH	5	--

[1]Some acres of NRA land were not classified and are not included.
(a) All Plantations may be used by up to 52 species.
(b) 13-25 year old clearcut vs 26-50 year old clearcut

Current Situation

The existence of a variety of habitats ranging from sandy beaches and estuaries to upland transition forests on the Oregon Dunes NRA is due in part to the interface of two highly diverse ecozones, the ocean and coastal mountain forest. In addition, introduction of European beachgrass in the early 1900s created other habitats through vegetation of open sand dunes. While the sand dunes themselves are not particularly hospitable to plants and wildlife, they do support unique plant communities and are used by wildlife traveling between resting, foraging and breeding habitats dispersed throughout sand dune landforms. A landform is a specific land structure such as the foredune, deflation plain, hummocks, and oblique dunes. These landforms may be completely unvegetated (as is the case with oblique dunes, parabola dunes, and active slip faces) or may support one or more plant communities with associated wildlife species. The major landforms associated with plant communities include the beach, sand dunes, hummocks, deflation plain wetlands, upland forests, rivers, aquatic habitats (rivers, streams, lakes, ponds, estuaries), riparian areas, meadows and plantation. More detailed information on these landforms and the plant and animal communities they support is available in Appendix H.

The level of fire hazard present at the Oregon Dunes NRA is related to plant communities and changes in vegetation. As the area becomes more vegetated, fire hazard increases because vegetation provides fuel that supports and carries fire. Fire risk also increases because more area becomes potential ignition points. Fire severity also tends to increase because bare sand areas fill with vegetation creating continuous fuel loading that allows fires to spread farther. Persistent summer winds and a high percentage of early seral stage vegetation, such as grasses and shrubs can create dry conditions conducive to extremely fast-moving fires. In combination with high numbers of people often recreating in or adjacent to vegetated areas, with limited escape opportunities, this situation creates not only fire risk, but also public safety concerns at the Oregon Dunes NRA. The NRA has the highest incidence of fire starts on the Siuslaw National Forest.

Wildlife Species Supported by Plant Communities

General

Habitats found within the Oregon Dunes NRA and nearby offshore waters support 316 species of wildlife; 247 birds, 54 mammals, 12 amphibians and 3 reptiles (USFS 1972). Approximately 38% of the birds are yearround residents, 28% are summer residents or visitors, 28% are winter residents, and 14% use the area on migration stopovers. The 50 species of terrestrial mammals are mostly yearround residents. Of the 4 marine mammals which use the beaches and estuaries, only the harbor seal is a common yearround resident; Stellar's and California sea lions are seasonal residents and the elephant seal is an occasional visitor. All 15 reptiles and amphibians present are yearround residents.

At least 50 native species of birds and mammals found on the Oregon Dunes NRA are classified as "game" or "furbearers" (Mills et al. 1980). Their harvest - by hunting or trapping - is regulated by the Oregon Department of Fish and Wildlife (ODFW). Game species include black-tailed deer, black bear, California quail, Canada goose, band-tailed pidgeon, common snipe, ring-necked pheasant, and a variety of duck species; furbearers include beaver, mink, nutria, muskrat, river otter and raccoon.

Since publication of the DEIS, researchers from the University of Oregon have found a unique species of black daphnia (*Daphnia* sp.) in ephemeral (temporary) pools in open sand in the South Jetty area and below Umpqua Lighthouse State Park. Daphnia are small freshwater crustaceans commonly called water fleas. Similar black daphnia are known to occur only in the Arctic. This is the first time they have been found in a temperate climate. Detailed information regarding habitat needs, geographic range, and effects of various management activities on them is currently unavailable, but is being studied.

T&E

Ten species of animals classified as T&E by the U.S. Fish and Wildlife Service (USFWS) or as sensitive by the Regional Forester have been documented on the Oregon Dunes NRA. Suitable habitat for an additional 5 T&E or sensitive species also exists, although the presence of these species has not been documented (Figure III-15). Suitable habitat for the other 5: the California mountain kingsnake, the California wolverine, the ferruginous hawk, the northern spotted owl and the Oregon silverspot butterfly is not present on the Oregon Dunes NRA; therefore these species were not considered further.

Plant Species and Communities

T&E

Thirty-two plant species are on the Siuslaw National Forest's Sensitive Plant List. Of these, 4 species occur on the NRA: salt-marsh bird's beak, which, as the name implies, occurs in salt marshes, and water pennywort, bog clubmoss, and adder's tongue, which occur in dune deflation plains. Historical records report that pink sandverbena occurred on the Oregon Dunes NRA. In 1993, Oregon Department of Agriculture Botanists surveyed foredune habitats on the Oregon Dunes NRA for this species. No populations were found. This species has declined due to encroachment by European beachgrass and disturbance from off-road vehicles.

An additional 12 species are suspected to occur because suitable habitats are present (Table III-16). The following four sensitive plant species that may or do occur on the Oregon Dunes NRA are under consideration (Category 2) as Federal candidate species: pink sandverbena, tall bugbane, salt-marsh bird's beak, and Frye's moss.

Figure III-15. Occurrence or potential occurrence of federally-listed T&E animals, species proposed for listing (federal candidate C2), and species listed as sensitive by the Regional Forester on the Oregon Dunes NRA.

Common Name	Species	Designation	Occurrence
Alsea micro caddisfly	*Ochrotrichia alsea*	Federal candidate C2; R-6 sensitive	Small streams, springs and seeps. Suitable habitat exists on the NRA.
Aleutian Canada goose	*Branta canadensis leucopareia*	Federal endangered; R-6 sensitive	Winter migrant along coast in estuaries and wetlands. Historically documented migrant on the NRA.
American peregrine falcon	*Falco peregrinus anatum*	Federal endangered; R-6 sensitive	No known nest sites; potential foraging habitat exists. Several winter sightings on NRA.
American white pelican	*Pelecanus erythorhynchos*	R-6 sensitive	Coastal shores and off-shore island migrant. Suitable resting habitat exists on NRA.
California brown pelican	*Pelecanus occidentalis*	Federal threatened; R-6 sensitive	Common visitor along coastal shores, off-shore islands; does not nest in Oregon. Many fall sightings on NRA.
Common loon	*Gavia immer*	R-6 sensitive	Coastal lakes, rivers and estuaries. Documented non- breeding sightings on the NRA.
Long-billed curlew	*Numenius americanus*	Federal candidate C2; R-6 sensitive	Oregon coast migrant using salt marshes, mudflats and beaches. Migratory documentations on NRA.
Marbled murrelet	*Brachyramphus marmoratus*	Threatened; R-6 sensitive	Mature and old-growth forests. Uses coastal streams as flight corridors. Suitable flight corridors exist on NRA.

Figure III-15 Cont. Occurrence of T&E and sensitive animals

Common Name	Species	Designation	Occurrence
Northern bald eagle	*Haliaeetus leucocephalus*	Federal threatened; R-6 sensitive	No known nest sites on NRA. Several known foraging locations documented on NRA.
Pacific western big-eared bat	*Plecotus townsendii townsendii*	Federal candidate C2; R-6 Sensitive	No known roost sites on NRA. Suitable foraging habitat exists on NRA.
Red-legged frog	*Rana auroa*	R-6 sensitive	Moist wooded habitats and riparian zones. Breeding documented on NRA.
Northwestern pond turtle	*Clemmys marmorata marmorata*	Federal candidate C2; R-6 sensitive	Lakes, ponds and sloughs of large rivers. One documented sighting on NRA.
Western snowy plover	*Charadrius alexandrinus nivosus*	Threatened; R-6 sensitive	Nests in sandy spits associated with estuaries. Documented during both breeding and wintering season on NRA.
White-footed vole	*Arborimus allbipes*	Federal candidate C2; R-6 sensitive	Woodland species in coniferous forests. Documented breeding on NRA.

Figure III-16. Occurrence or potential occurrence of federally-listed T&E plants, species proposed for listing (federal candidate C2), species listed as T&E by the State of Oregon, and species listed as sensitive by the Regional Forester on the Oregon Dunes NRA.

Species	Common Name	Designation	Occurrence
Abronia umbellata breviflora	Pink sandverbena	Federal candidate C2; State of Oregon - Endangered; R-6 sensitive	Beaches and foredunes; open sand. Historically documented on NRA, but not located since 1978.
Anemone oregana felix	Oregon anemone	R-6 sensitive	Coastal marshes; sphagnum bogs. Suitable habitat exists on NRA.
Carex macrochaeta	Large-awn sedge	R-6 sensitive	Moist or wet open places. Suitable habitat may exist on NRA.
Carex pluriflora	Several-flowered sedge	R-6 sensitive	Sphagnum bogs. Suitable habitat exists on NRA
Cimicifuga elata	Tall bugbane	Federal candidate C2; State of Oregon - candidate for listing; R-6 sensitive	Moist forest edges. Suitable habitat exists on NRA.
Cordylanthus maritimus palustris	Salt-marsh bird's beak	Federal candidate C2; State of Oregon - candidate for listing; R-6 sensitive	Coastal salt marshes. Documented in one location on NRA.
Hydrocotyle verticillata	Water pennywort	R-6 sensitive	Dune deflation plains; bogs; marshes. Documented in one location on NRA.
Limbella fryei	Frye's moss	Federal candidate C2; State of Oregon - candidate for listing; R-6 sensitive	Sphagnum bogs. Suitable habitat exists on NRA.
Lycopodium inundatum	Bog clubmoss	R-6 sensitive	Dune deflation plains; lakeshores. Documented in several locations on NRA.
Ophioglossum vulgatum	Adder's-tongue	R-6 sensitive	Dune deflation plains; lake, bog, pond edges. Documented in one location on NRA.

Figure III-16 Cont. Occurrence of T&E and sensitive plants

Species	Common Name	Designation	Occurrence
Plantago macrocarpa	North Pacific plantain	Possibly extinct	Sphagnum bogs. Suitable habitat exists on NRA.
Pohlia sphagnicola	Moss	R-6 sensitive	Sphagnum hummocks. Suitable habitat exists on NRA.
Scirpus cyperinus	Wool-grass	R-6 sensitive	Wet, low ground. Suitable habitat may exist on NRA.
Utricularia gibba	Humped bladderwort	R-6 sensitive	Standing or slow moving water. Suitable habitat exists on NRA.
Utricularia minor	Lesser bladderwort	R-6 sensitive	Standing or slow moving water. Suitable habitat exists on NRA.
Wolffia columbiana	Water-meal	R-6 sensitive	Ponds. Suitable habitat exists on NRA.
Wolffia punctata	Water-meal	R-6 sensitive	Ponds. Suitable habitat exists on NRA.

Plant Species

Wiedemann (1984) lists 10 plant species that are "dune-maritime endemics", meaning that they occur only on the beaches and dunes of the Pacific Coast of North America. Of these, 7 (yellow sandverbena, dune bentgrass, silver burweed, American glehnia, seashore bluegrass, black knotweed, and dune tansy) are known to occur on the Oregon Dunes NRA in beach strand, sand dunes, and wetland habitats.

Wiedemann (1984) also listed uncommon plant species that occur in sand dunes of the Pacific Northwest Coastal Region. Of these, 4 (leathery grape-fern, giant helleborine, Labrador tea, and bog clubmoss, which is on the Forest's Sensitive Plant List) occur on the Oregon Dunes NRA in wetland and sand dune habitats; one (Scouler's polypody) occurs in forest habitats. Other species that Wiedemann listed as common in 1984 may actually have decreased in abundance, such as the large-headed sedge, which is found in sand dune habitats. Information is still needed regarding the distribution and abundance of this species as well as others, including Hind's sedge, pale sedge, and green sedge.

Globally Significant Plant Communities

Since the DEIS was released for public comment in April 1993, Oregon Natural Heritage Program ecologists have surveyed the NRA and provided information regarding the presence and status of several unique plant communities. These communities, found only along the North American Pacific Coast, have declined throughout the region for various reasons, including invasion by introduced plant species, ORV recreation, and residential development and logging on private lands. Globally, these plant communities are becoming scarce and, therefore, their occurrence on the Oregon Dunes NRA, where they can be afforded recognition and protection, is significant.

A commonly accepted 5-point ranking system is used by Natural Heritage Progams in about 100 offices worldwide for determining global significance of plant or animal species or natural communities. Global, or "conservation priority" ranks are assigned to "elements", which can be plant and animal species, or natural communities. Global ranks are based on number, quality and condition of occurrences, narrowness of range and habitat, trends in populations and habitats, and threats to and fragility of the element being assessed. This information is routinely documented in a computerized "element global rank" record. The global ranks are:

G1 - critically imperiled globally (typically 5 or fewer occurrences);
G2 - imperiled globally (typically 6 to 20 occurrences);
G3 - rare or uncommon but not imperiled (typically 21 to 100 occurrences);
G4 - not rare and apparently secure, but with cause for long-term concern (usually more than 100 occurrences);
G5 - demonstrably widespread, abundant, and secure.

The globally significant plant communities on the Oregon Dunes NRA ranked as G1 (critically imperiled) are red fescue, American dunegrass, seashore bluegrass, and Port Orford cedar/evergreen huckleberry. The globally significant plant communities ranked as G2 (imperiled) are shore pine/hairy manzanita, bog blueberry/tufted hairgrass, and shore pine/slough sedge. These communities are described below.

Red fescue (G1)

Few remaining occurrences exist of this formerly widespread community that occurs on open dunes. Once common on partially-stabilized dunes inland from the deflation plain, most stands have been overrun by European beachgrass. High quality areas have no European beachgrass and are at least 5 acres in size. Five high quality sites occur on the NRA. Red fescue communities continue to decline as European beachgrass, Scot's broom and shore pine invasion intensifies. These communities can tolerate heavy hiking if traffic is confined to trails. Some casual hiking without trails probably has little effect.

Port Orford cedar/evergreen huckleberry (G1)

Old-growth coniferous forests on coastal sand dunes that are dominated by Port Orford cedars are unique to the immediate vicinity of the NRA and are probably the last such occurrence in the world. The 150-350 year-old Port Orford cedars occur with evergreen huckleberry in the understory and Sitka spruce, Douglas-fir and western hemlock in the overstory. The geographical range of Port Orford cedar is extremely limited, and most low-elevation old growth has been logged. Only 6 occurrences are known, 5 on the NRA. The community is fragile due to vulnerability to root rot and disturbance from ORVs. High quality stands have both reproducing and mature Port Orford cedar, and no disturbance from vehicle entry or road construction. These stands may serve as refugia from the root rot *Phytophthora lateralis* that is decimating Port Orford cedar throughout its range. The fungus spreads in the soil by water-borne spores, and is spread further by soil adhering to machinery and livestock. The droughty sand of the dunes, and isolation from areas of infestation, may inhibit dispersal of the spores and protect the trees from infection. Although there is currently no indication of root rot infection in these stands it could be present but not yet evident if recently introduced.

American dunegrass (G1)

Once the dominant native grass on partially stabilized foredunes from northern California to British Columbia, this community has largely been replaced by introduced European beachgrass. It also occurred in areas further inland that were subject to ongoing sand burial. Small patches of American dunegrass occur on the NRA, but the community itself (American dunegrass and its associated species) is not known to exist any longer on the NRA.

Seashore bluegrass (G1)

This community occurs on sparsely-stabilized coastal sand dunes, both on the foredune and inland from the deflation plain. The seashore bluegrass community often occurs mixed with stands of red fescue, though it seems to be more tolerant of sand burial than the red fescue dune community. European beachgrass has replaced nearly all stands throughout its range and this once widespread community is rarely found. The Nature Conservancy's global database states that few occurrences are known, and this community is more rare than either the red fescue or American dunegrass community. No high quality sites are known to occur on the NRA.

Shore pine/hairy manzanita-bearberry (G2)

This long-lived pioneer community occurs on partially-stabilized dry sand ridges and slopes. The ground layer is a fragile mat of mosses, lichens and bearberry. The lichen flora is diverse and includes several rare species, some disjunct from populations in the southern hemisphere. Globally, only 5-8 high quality sites are known, almost all on the NRA. Quality is determined by presence and amount of Scot's broom and type and amount of recreational damage (e.g., high quality stands are greater than 20 acres, contain varied age classes of trees and shrubs, include a variety of conditions ranging from open sand to mature stands, and have no Scot's broom or recreational damage). The community is declining from succession, damage to plants caused by ORVs, and residential development. It is easily destroyed by trampling and vehicular traffic. Conifers and Scot's broom are invading stands.

Bog blueberry/tufted hairgrass (G2)

Never large in extent, this community occurs infrequently in seasonally-flooded depressions on old deflation plains and marine terraces, and around margins of shallow dune lakes. Tufted hairgrass dominates openings in the shore pine forest or at the edge of coastal lakes, with bog blueberry forming low thickets around margins or scattered through the interior. The community is flooded in winter because of iron hardpan in the sand. Sphagnum moss is nearly always present among the stems of bog blueberry. This community is declining throughout its range from recreational and residential development, and possible dewatering of coastal aquifers by groundwater pumping. It is not tolerant of excessive trampling or manipulation of the water regime. High quality sites are 2-5 acres in size, with less than 2% cover by introduced species. Only 3 sites are known to occur on the NRA.

Shore pine/slough sedge (G2)

This unique community occurs in depressions on perennially to seasonally wet deflation plains, where a perched water table in winter precludes invasion by shrubs. Characterized by old-growth shore pine (80-130 years old), the understory is dominated by slough sedge, with bog blueberry and sphagnum moss frequently present. Sites are determined to be high quality if they are larger than 5 acres in size, dominated by old age classes, seasonal flooding is extensive, and bog blueberry is well established on hummocks with sphagnum moss forming mats on the ground.

This community is restricted to ancient marine terraces of the southern Oregon coast and ancient deflation plain areas of the NRA. Although considerable acreage of this community appears to be developing on deflation plains as an artifact of the foredune formed by European beachgrass, it is not clear that these young 50-year-old stands will develop into the same community described here. Old-growth stands are rare and contain elements such as sphagnum moss that are absent from younger stands. Threats include recreation, groundwater pumping and road building. Motorized recreation and camping during the dry season decimate the understory. Stands off the NRA are being destroyed by residential development. Currently, one known site exists on the NRA.

Management Practices

The Forest Service is responsible for managing habitats of all existing native plant and wildlife species and desirable non-native species (36 CFR 219.12g). Close coordination between the Oregon Dunes NRA and a variety of other agencies is essential, however, to effectively managing plant communities and wildlife habitats because other state and federal agencies retain responsibility for managing wildlife populations. In particular, the state of Oregon is responsible for managing most wildlife populations within the state. The USFWS has jurisdiction over federally listed species, species proposed for federal listing, and migratory birds. The National Marine Fisheries Service (NMFS) is responsible for managing marine mammal populations. Coordination and cooperation in the management of plant species and communities occurs between the Forest Service and Oregon Natural Heritage Program, Oregon Department of Agriculture, and university botanists and ecologists.

Cooperation with ODFW generally includes consulting the District Biologist and/or District Nongame Biologist on all habitat enhancement projects and other projects which may affect wildlife habitats and assisting with state programs including population surveys. Coordination with USFWS may include either formal or informal consultation when a proposed management activity may affect species listed as threatened or endangered. The Oregon Dunes NRA manages very little habitat used by marine mammals, but assists NMFS through the Marine Mammal Stranding Network.

Plant community and wildlife habitat management practices on the Oregon Dunes NRA consist of protecting existing communities and habitats, restoring or enhancing habitats, and providing plant and wildlife-related recreation and education. Protection is accomplished primarily through reviewing proposed NRA projects and policies for potential affects on populations and habitats and incorporating resource needs in project design. Special protection is afforded federally listed species and species proposed for listing to ensure that proposed management activities will not jeopardize their existence. Activities are also planned so that they are compatible with habitat requirements of sensitive and globally significant species to prevent their listing as T&E. In addition, protective measures may be implemented to remedy site-specific incidences of resource damage (e.g., fencing a heron rookery, closing an ORV trail near a special habitat).

Habitat restoration and enhancement projects can also be used to manage plant communities and wildlife habitats. Plant and animal habitat conditions may be altered through management practices to provide food, water, cover, or a suitable microclimate for a particular species or group of species. Restoration and enhancement projects may also include protective measures (discussed above) designed to reduce human or other disturbance to plant and wildlife habitats. Past habitat improvements on the Oregon Dunes NRA have primarily focused on enhancing important wetland habitats for waterfowl and other wetland-related species. The program has included such activities as maintaining snags for cavity nesters, constructing berms to inundate wetland habitat, excavating potholes for waterfowl and other wetland-related wildlife, flooding forested areas, maintaining early seral stages by clearing brush mechanically or with fire, planting desirable food or cover species, and placing nest boxes for small birds, osprey and mammals.

Providing plant- and wildlife-related recreation is also a management strategy used on the NRA. Managing to increase recreation opportunities may include activities like enhancing habitats to make huntable or viewable populations more abundant, constructing viewing structures such as platforms or boardwalks, providing signs and other interpretive materials, and speaking to visitors, local civic groups, and schoolchildren about plant and wildlife resources on the NRA.

Resource Use

Human uses of plants and wildlife may be consumptive (hunting and plant gathering) or nonconsumptive (viewing, photographing). Few statistics are available regarding the numbers of individuals participating in wildlife or plant-related activities on the Oregon Dunes NRA, although the following is known.

Some waterfowl hunting occurs, most notably on the North Spit of the Umpqua River, in the South Jetty deflation plain, and near the mouth of Tenmile Creek. However, waterfowl hunting is limited to a few local individuals, most likely because: 1) wintering waterfowl populations are much lower than populations found in the nearby Willamette Valley, 2) the most productive wetland areas are difficult to access, 3) the NRA has not marketed or encouraged hunting in the past, and 4) dark goose hunting is prohibited west of Highway 101 to protect the endangered Aleutian Canada goose. Black-tailed deer hunting is popular with local residents, but is limited by lack of road access, heavy brush cover, and shotgun-only regulations north of Tahkenitch Creek. Several mineral springs along Tahkenitch Creek, Tenmile Creek and the Siltcoos River are locally popular band-tailed pigeon hunting areas. Upland bird hunting is not popular because game birds such as grouse and quail are scarce; a few ring-necked pheasants are present as a result of pre-1983 releases by ODFW.

Consumptive uses of plant species include both recreational and commercial gathering of special forest products including firewood gathering, mushroom picking, bough and greenery collection, transplant collection (small shrubs, European beachgrass, slough sedge, coast strawberry, willow), and occasionally cascara bark collection. In 1992, the following special forest product collection permits were issued: 38 commercial mushroom permits, 2 commercial bough/ greenery permits, 100 Christmas tree permits, 9 commercial transplant permits, and approximately 45 commercial permits for miscellaneous plant and shrub collection. Although no data is available, recreational gathering of special forest products, including mushrooms, is suspected to be increasing.

While consumptive uses of wildlife appear to be declining nationwide, nonconsumptive uses of plants and wildlife are rapidly growing in popularity. Both motorized and non-motorized recreationists on the Oregon Dunes NRA appreciate the value of seeing, and learning about plants and wildlife species. Bird watching is popular, particularly in accessable areas such as the Siltcoos Corridor and South Jetty deflation plain. Whale watching is also growing in popularity during peak migration periods. Nature hiking and photography are also common. An increased focus on natural resource interpretation in recent years will likely continue to increase public interest in the unique plant and wildlife species found on the Oregon Dunes NRA.

Resource Relationships

Many factors can affect abundance and health of plant communities and wildlife habitats, diversity and size of habitats, and abundance and diversity of species within a particular habitat. Changes in condition of water, soils and climate can affect types of habitat present, while introducing exotic plants and/or animal species may affect native species through increased competition. For example, introduction of European beachgrass to the Oregon coast has dramatically reduced habitat for native beach and sand dune plant communities and is a major cause for the decline of the western snowy plover.

On the Oregon Dunes NRA, the factor which most notably affects plant communities and wildlife habitats is recreation. Both recreation development and recreation activities may affect types of habitat present, species present within a particular habitat, and diversity of habitats over the landscape. Some habitat types and species are more sensitive to change or disturbance than others. Thus, recreation and other activities must be managed differently in different habitats to ensure that a wide range of habitats and species continues to exist on the NRA.

Historic Trends

Plant and animal habitats are constantly changing as a result of human activities and naturally-occurring events such as fire, disease and succession. Major wildfires are rare on the Oregon Dunes NRA and timber harvest has been very limited. The main factors which have changed - and continue to change - plant and wildlife habitats and habitat diversity are introduction of European beachgrass, natural succession, and recreation use in specific areas.

European beachgrass was introduced in the early 1900s to stabilize the mouths of major rivers. Within 30 years, this tenacious species had spread along much of the Oregon Coast, causing formation of a large foredune. This foredune blocked further inland sand movement, allowing a scoured out area (the deflation plain) to form immediately east of the foredune. As succession proceeds, habitats within the deflation plain, transition forests and stabilized sand dunes continue to change.

The following trends between 1900 and the present have greatly affected plant and wildlife habitat diversity on the Oregon Dunes NRA:

- Amounts of open beach and sand spits associated with stream mouths declined;
- Open water habitats declined;
- Vegetated deflation plain widths (and thus area) increased as winds continued to scour and carry sand inland, east of the foredune;
- Rapid succession in the deflation plain resulted in more acres of tall shrub and shore pine deflation plain habitat and fewer acres of grass/sedge/rush and low shrub deflation plain habitat;
- Amounts of open, unvegetated sand east of the foredune decreased as beachgrass spread inland;
- Amounts of undisturbed habitats decreased as recreation use expanded into new areas (this resulted, in part, from advances in ORV technology and the increased number of ORV's operating due to shifts from multiple passenger ORV's to single operator ORV's); and
- Habitat fragmentation increased as new ORV paths and hiking trails cut through vegetated areas, isolating habitats.

Although detailed survey information is not available regarding associated changes in wildlife use, suspected changes include:

- Species associated with open sand spits, open sand, and open water declined;
- Species associated with early successional deflation plain habitats first increased as the deflation plain expanded eastward; then decreased as succession proceeded;
- Species requiring dense forest shrub communities (transition forest clearcuts and early stages of second growth transition forest) declined as these habitat types succeeded;

- Exotic plants such as European beachgrass and Scot's broom increased; thus wildlife using such stands for either breeding, loafing, wintering or travel increased;

- Species requiring minimal disturbance or large, unfragmented tracts decreased.

Future Trends

The historic trends identified above are expected to continue unless natural events and/or human activities change. Vegetative succession will proceed, replacing early seral stages with later stages. If management activities are not planned to maintain a range of seral stages, most deflation plain habitats will advance toward the climax seral stage (shore pine), and transition forests will advance toward mature coniferous stands. Over time, plant and wildlife habitat diversity is likely to decline. Plant and wildlife populations will shift, favoring those associated with later successional stages of wetlands and forest. Drying conditions will also favor succession toward forested conditions.

The overall level of recreation use at the Oregon Dunes NRA is expected to increase only gradually over time, although use patterns may change. Those plant and animal species tolerant of high human activity levels will be favored over those less tolerant of human disturbance. Non-native plant species, which are typically more tolerant of disturbed sites, will increase and may outcompete and eventually replace native species. Some wildlife species and individuals within the species will acclimate to human disturbance; others may not.

FISH

Introduction

The unique dunes environment at the Oregon Dunes NRA provides fish habitats unlike those elsewhere on the Siuslaw National Forest. The Forest in general is noted for its dense network of rapidly flowing streams supporting native anadromous salmonids (species of salmon and trout that mature in the sea and migrate back to their native streams to spawn). In contrast, the Oregon Dunes NRA is characterized by relatively slow moving streams and freshwater lakes that support introduced warmwater species as well as anadromous and resident salmonids.

The Oregon Dunes NRA is also noted for its 6 estuaries, the downstream portions of river systems that widen under the influence of tidal action. These are transition zones between fresh and salt waters. Physical, chemical and hydrologic conditions vary quickly and greatly, resulting in high biological productivity. Estuaries are particularly important because sensitive young stages of fish, shellfish and other aquatic organisms often rear there.

Current Situation

Appendix III of the 1979 Oregon Dunes NRA plan listed 85 species, including 54 estuarine, 20 freshwater, and 9 anadromous fish, as well as 2 shellfish. That list was a rough estimate based on a checklist of species in Coos Bay (Cummings and Schwartz 1971) and personal communications with ODFW biologists. A list of fish and shellfish harvested in the Siuslaw River estuary (Gaumer et al. 1974) includes a few others.

Warmwater fish include largemouth bass, bluegill, black crappie, yellow perch, warmouth, and brown bullhead (see Appendix F for scientific names). Additionally, harvestable-size rainbow trout are stocked in some of the lakes at various times in the spring and summer by ODFW. Bay and ocean fish that are commonly found within estuaries are Pacific herring, numerous species of surfperch and greenling, sculpins, tomcod, sand sole and starry flounder. Important anadromous species are the American shad, striped bass, steelhead and cutthroat trout, and coho and chinook salmon.

A number of lakes reportedly served as coho salmon rearing areas in the past, and several currently support naturally reproducing coho and cutthroat trout populations. Wild salmon and steelhead stocks at the Oregon dunes NRA are relatively pure genetic strains compared to those in bodies of water which are heavily stocked with anadromous salmonids from hatcheries, and could serve as gene pools in the process of ultimately restoring such wild runs.

Parsons (1982, 1983) surveyed the lakes to determine their potential for fisheries development. Species present and relative abundance (from 1973-74 gill net sampling), ODFW trout stocking programs, and ease of access formed the basis for identifying lakes as having either developed (high-use) or undeveloped (low-use) recreational potential. Extensive aquatic plant cover in some lakes and substantial declines in water levels during the summer in others were mentioned as creating "problem conditions". Developing both cold- and warmwater fisheries in lakes where conditions are suitable was emphasized as a means for expanding fishing opportunities at the Oregon Dunes NRA. More intensive surveys of fish populations in particular lakes were made by ODFW (Woolington 1983a, 1983b, 1983c) and the Forest Service (Merritt and Davies 1991).

The Forest Service has not widely advertised freshwater fishing opportunities on the Oregon Dunes NRA. Brochures and maps depicting fishing opportunities associated with hiking and wildlife viewing are available at information centers in Reedsport, Florence and Coos Bay-North Bend. However, no information has been provided on basic biology of fish species inhabiting the area's waters, or the likely species/size composition of the catch. Interpretive signs on lakes are limited to information to help identify species caught.

ODFW has responsibility for managing fish populations on federal lands in Oregon. Current fishing regulations (1992) restrict harvest to not more than 5 largemouth bass per day with no more than 3 bass over 15 inches in length. Special regulations are in effect for Siltcoos River (mainstream above tidewater to Siltcoos Lake), Tenmile Lake, Tenmile Creek, Tahkenitch Creek and Tahkenitch Lake. There are no creel limits or special closed seasons on bluegill, catfish, crappie, other sunfish and yellow perch. Trout, salmon and steelhead season and harvest regulations vary by lake or stream. At this time, all wild steelhead must be released unharmed back into the stream.

Lakes

Thirty-two named freshwater lakes, many of which do not have significant inlets or outlets, are usually associated with forested deflation plains between two sand ridges, and are contiguous with the water table. Lake levels fluctuate with the season (3 to 6 feet on the average), and there is outflow only when they are at their highest level (Robinson 1973), if there is outflow at all. Submerged and floating aquatic plants (called macrophytes) are well established in those lakes that either have limited drawdown, or have extensive areas of shallow water throughout their basin. Deeper lakes with mostly steep banks and lakes with seasonal water level fluctuations of more than 10 feet, such as Carter and Threemile, do not have extensive growths of macrophytes (Parsons 1982, 1983).

Larger lakes east of Highway 101 (Woahink, Siltcoos, Tahkenitch, Clear, Eel, and Tenmile) are valleys of streams flooded by rising ocean levels and dammed by advancing sand dunes. Water typically flushes rapidly through these lakes (in 1 to 3 months) and into the ocean, and the lakes have historically supported large runs of anadromous fish (Johnson et al. 1985) that have been important to commercial and recreational fisheries. Some of these runs probably are relatively pure genetic strains, with little influence from hatchery fish.

Coastal lake waters typically contain low nutrient levels, and the transparency of the water often exceeds 6 feet in depth. In the deeper, more protected lakes, maximum surface temperatures reach 72-75 degrees, while water temperatures deeper in the lake may be as low as 50 degrees in the summer. In more productive lakes, dissolved oxygen concentrations may decline to near zero near the bottom. Even large, shallow lakes subject to strong summer winds may have reduced dissolved oxygen levels during periods of relative calm in summer (Larson 1974).

Most lakes except Tenmile and Siltcoos have concentrations of particulate organic matter of less than 5 parts per million (ppm). Such low concentrations limit potential growth of various fish species and produce only one-third to one-half as much total weight of fish as do fertilized ponds, or ponds receiving nutrients from the watershed (Boyd 1990). Nutrient levels appear to be lower in those lakes closest to the ocean and not connected to any other waterbodies by well defined channels (e.g., Beale and Snag lakes).

Macrophytes

The proportion of the lake bottom or surface that is covered with submerged or floating higher plants depends on average depth, nutrient levels, steepness of shoreline, and the percentage of water less than 6 feet in depth. Largemouth bass feed less efficiently in structurally complex environments, and high densities of prey species resulting from inefficient bass predation can ultimately reduce the number of bass surviving to adulthood (Swingle 1956). Conversely, insufficient cover in a lake environment can result in prey populations being decimated by predation to the extent that larger largemouth bass can not find enough larger prey and suffer reduced growth and condition.

Aquatic macrophytes respond to any increase in nutrients by increasing their coverage. Snag and Beale lakes and Siltcoos Lagoon have macrophyte cover that exceeds 40% of the surface area. Carter Lake, which characteristically fluctuates over 10 feet between summer and winter, has virtually no macrophytes. Any increase in nutrients entering Carter Lake would very likely be recycled through microscopic floating algae (plankton), rather than macrophytes (Merritt and Davies 1991). Tenmile, Tahkenitch and Siltcoos lakes are relatively large bodies of water that have had extensive beds of macrophytes.

Fish Populations

Most of the fish populations at the Oregon Dunes NRA are introduced warmwater species that to a large degree have displaced the few native species of salmonids and sculpins in the lakes. Since total removal of warmwater fish is neither desirable nor feasible, this situation limits how much can be done to increase native populations. Nevertheless, the NRA takes advantage of opportunities to restore populations and habitats of wild anadromous salmonids whenever possible.

The structure of the fish community (e.g., species, sizes, and ages of fish present) is important in deciding how to manage a given lake. Both Siltcoos and Tahkenitch lakes, for example, have large populations of yellow perch, while none are present in Tenmile Lake. Large numbers of species like yellow perch and black crappie may eat largemouth bass eggs, and/or compete with young bass for food (Davies 1976, 1987). These species spawn before largemouth bass, and therefore are preyed upon very little by largemouth bass hatched the same year. Bluegills, however, spawn about one month later than largemouth bass, and are easily eaten by bass hatched the same year (Davies et al. 1982). For these reasons, and probably others, there is a higher density of largemouth bass and more bass larger than 9 inches in Tenmile Lake compared to Tahkenitch and Siltcoos lakes (Merritt and Davies 1991).

Other Oregon Dunes NRA lakes are relatively small and unproductive compared to Tenmile, Siltcoos and Tahkenitch lakes. Yet their fish populations may reflect the same predator-prey relationships that influence abundance of desirable sport fish in the larger lakes. There are no yellow perch in Butterfield and Hall lakes, and both have relatively high largemouth bass populations compared to lakes with similar amounts of nutrients and macrophytes that have yellow perch.

Management Practices

Several types of strategies can be used to manage fish habitat and improve recreational fishing opportunities. The most important are those to **protect** fish habitat by maintaining water quality, lake levels, streamflows and vegetation along lakes and streams. Such protective actions should be coordinated closely with appropriate state and federal agencies, and aimed at maintaining present diversity of fish habitats.

Another management practice is to either **improve or restore** habitat. Habitat improvement for streams consists of building structures to create gravel beds for spawning and pools for rearing, modifying blockages to fish passage, and planting beneficial vegetation along the banks. Habitat improvement in lakes includes various types of aquatic macrophyte control, placing structures for cover, and planting shoreline vegetation such as native grasses and shrubs.

ODFW can **regulate** fishing to manage populations. Such regulations should reflect angler attitudes and expectations, as well as abundance and growth of largemouth bass, the key warmwater predator. Small largemouth bass populations in the presence of macrophytes have limited surplus fish available to be caught, while fish in the 8- to 12-inch range often "stock-pile" in larger populations. Usually a high minimum size limit is appropriate for the former, while harvest of only moderate-size bass is appropriate for the latter. The current state largemouth bass harvest regulation for Tenmile Lake is appropriate in that fishing harvest is focused on fish in the 8- to 12-inch size range where a surplus exists (Merritt and Davies 1991).

Potential for harvest greater than 20% is needed to make such regulations for largemouth bass meaningful and effective. This should be the case in most Oregon Dunes NRA lakes, where relatively low nutrient levels and potentially low abundance and growth of largemouth bass mean that 20% of the bass could be caught by a relatively few, but persistent, anglers.

ODFW can also **stock** fish, usually trout, in selected lakes to provide a range of recreational fishing experiences. Stocking rates should reflect access and desired angling pressure, size of lake, and proportion of the year that the lake is suitable for these coldwater species.

Any stocking of resident fish should also consider goals to restore anadromous salmonid runs into some of the lakes, and be curtailed if negative impacts on anadromous stocks from increased fishing pressure, competition, or predation are likely.

Resource Use

Anglers fish for salmon and steelhead in Tahkenitch and Siltcoos lakes and larger streams and for warmwater fish and trout in the lakes. Largemouth bass tournaments have been popular on Siltcoos, Tahkenitch and Tenmile lakes. Bay and surf fishing are increasing in popularity. Angling methods vary widely, depending on the type of water fished and the species sought. Clamming is primarily confined to the mudflats within the estuaries of the Siuslaw, Umpqua and Coos rivers.

Although most fishing on the Oregon Dunes NRA is by Oregon residents, people travel from throughout the United States to fish along the Oregon Coast. The heavy dependence of economies of coastal communities like Florence and Reedsport on summer sport salmon fishing in the Pacific Ocean and Siuslaw and Umpqua estuaries has been demonstrated by hardships created in recent years by dwindling salmon runs and shortened fishing seasons. Diversification of recreational fishing to focus more on family trips to the Oregon Dunes NRA freshwater lakes could lessen these impacts to a small degree.

Resource Relationships

Major factors affecting quality and quantity of fish habitat are toxic materials and organic waste that reach water, dense growths of aquatic macrophytes in shallow areas of some lakes, and declining surface water levels in the south end of the Oregon Dunes NRA (see Water, Chapter III). Habitat in larger streams with anadromous fish runs is affected by dams, existing and proposed water withdrawal, and activities on private and state land upstream from the large lakes. Chronic changes in streamflow and sediment delivery in the contributing watersheds can significantly alter plant and animal communities in lakes and estuaries.

Ultimately, the amount and type of angling use is determined by providing a variety of access points, facilities and recreational opportunities that attract people to the Oregon Dunes NRA to fish.

Historic Trends

Fishing pressure on the smaller freshwater lakes has traditionally come from a relatively few local people. The streams, larger lakes like Siltcoos and Tahkenitch, and estuaries have had heavier use from a broader spectrum of the angling public.

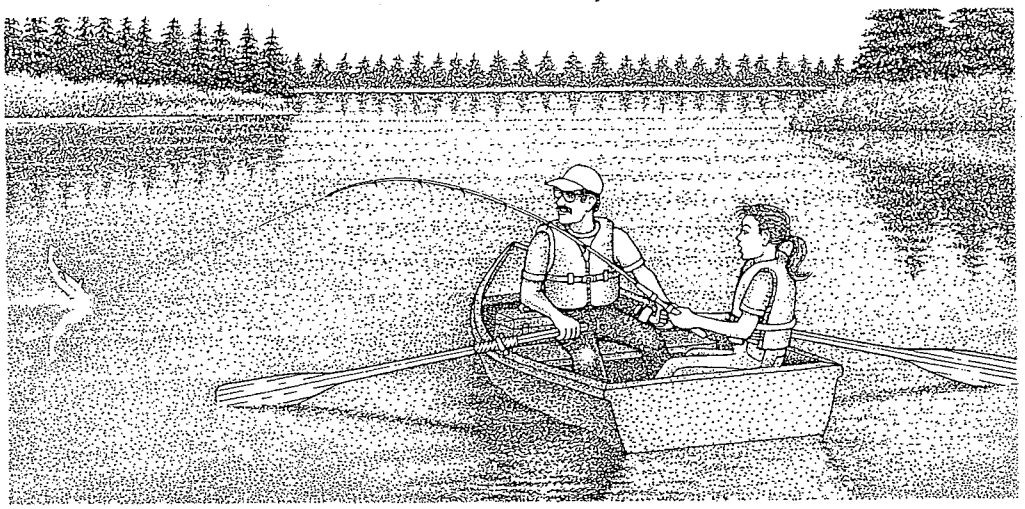
Future Trends

Freshwater sport fishing and fish viewing have been growing in popularity and are expected to continue to do so, particularly in the West (USDA Forest Service 1980). Demand for fish and fishing is clearly affected by factors such as the amount of leisure time available and economic conditions, although how these interact is not totally clear. Even if an unlimited supply of fish were available for recreational fishing, the fish may not all be utilized because of limited access to fishing areas and the amount of crowding that anglers will tolerate.

Visitor numbers at the Oregon Dunes NRA Headquarters Office increased from 15,000 in 1987 to approximately 22,000 in 1989. The majority of respondents to a recent marketing survey rated the area's natural attractions as "above average" compared to other areas they had visited, and indicated "vacation" and "fishing" were the dominant reasons for visiting (Moore 1990). Public relations efforts to promote fishing opportunities in many of the smaller lakes could increase angling on the Oregon Dunes NRA.

Runs of anadromous salmonids in streams on the Oregon Dunes NRA, like those elsewhere on the Oregon Coast, have been severely reduced in recently years. Possible causes include loss of freshwater habitat in streams from land management activities, loss of rearing habitat for the young in the large lakes due to introduction of warmwater species and invasion of aquatic plants, detrimental effects of hatchery fish, dams, overharvest and environmental changes in the ocean, and increases in marine mammal populations. Undoubtedly, a combination of factors is responsible.

Future trends in stream fishing on the Oregon Dunes NRA are not clear at this time. Many anadromous salmonid runs in Oregon have suffered serious declines and are considered to be at risk of becoming threatened and endangered (Nehlsen et al. 1991). These runs include those of the coho salmon and searun cutthroat trout, which are found in several area streams. Angling regulations are being made more restrictive by the Pacific Fishery Management Council and ODFW in an effort to preserve the runs.



RESEARCH NATURAL AREAS

Overview

Research Natural Areas (RNAs) contain specific biological or physical attributes. Maintained in their natural condition as much as possible, they preserve biologically important ecosystems and ecosystem processes. An area that contains unique or representative plant communities, aquatic ecosystems or geologic resources is a candidate for RNA status. Federal, state, municipal and territorial governments, as well as private individuals and organizations have cooperated to form a national system for preserving these natural areas.

RNAs serve several purposes. Existing in a relatively undisturbed state, they may be used as control areas to measure effects of management and recreation activities on other natural systems. Research may be conducted to better understand development, structure and function of natural systems. RNAs also preserve gene pools of threatened and endangered species and associated habitats. They are permanently protected and ensure the public of continued aesthetic enjoyment of natural systems.

The Oregon Dunes NRA is a very unique area containing great biological and geological diversity. Although a major emphasis of this area is recreation, the 1972 Act that established the NRA states that the area will be created for, among other things, "the conservation of...scientific...and other values contributing to public enjoyment of such lands..." In order to protect qualities of the dunes over the long term, it is desirable to have baseline data and monitoring sites to evaluate management actions. RNAs are a vehicle for accomplishing this.

Current Situation

The Tenmile Creek area (Figure III-17) is a 2,019-acre area that is an excellent representation of the coastal dune mosaic described in Dryness et al. (1975). It includes all major dune features, except parabola dunes, that exist in the Umpqua Dunes Scenic Area. This site also contains deflation plains in various successional stages, tree islands, stabilized forests, and small freshwater lakes typical of the Oregon Dunes NRA. Establishment of an RNA here would provide opportunities for research into coastal ecosystem development and dune movement. Studies on tree island stability are currently underway in this area, and can provide useful information for management of these isolated systems. This site could serve as a control to help monitor dune stabilization efforts on adjacent lands, as well as effects of beachgrass control, recreation, and special forest products gathering. Public use on this site is low, although the Umpqua Dunes Trail runs through its southern section.

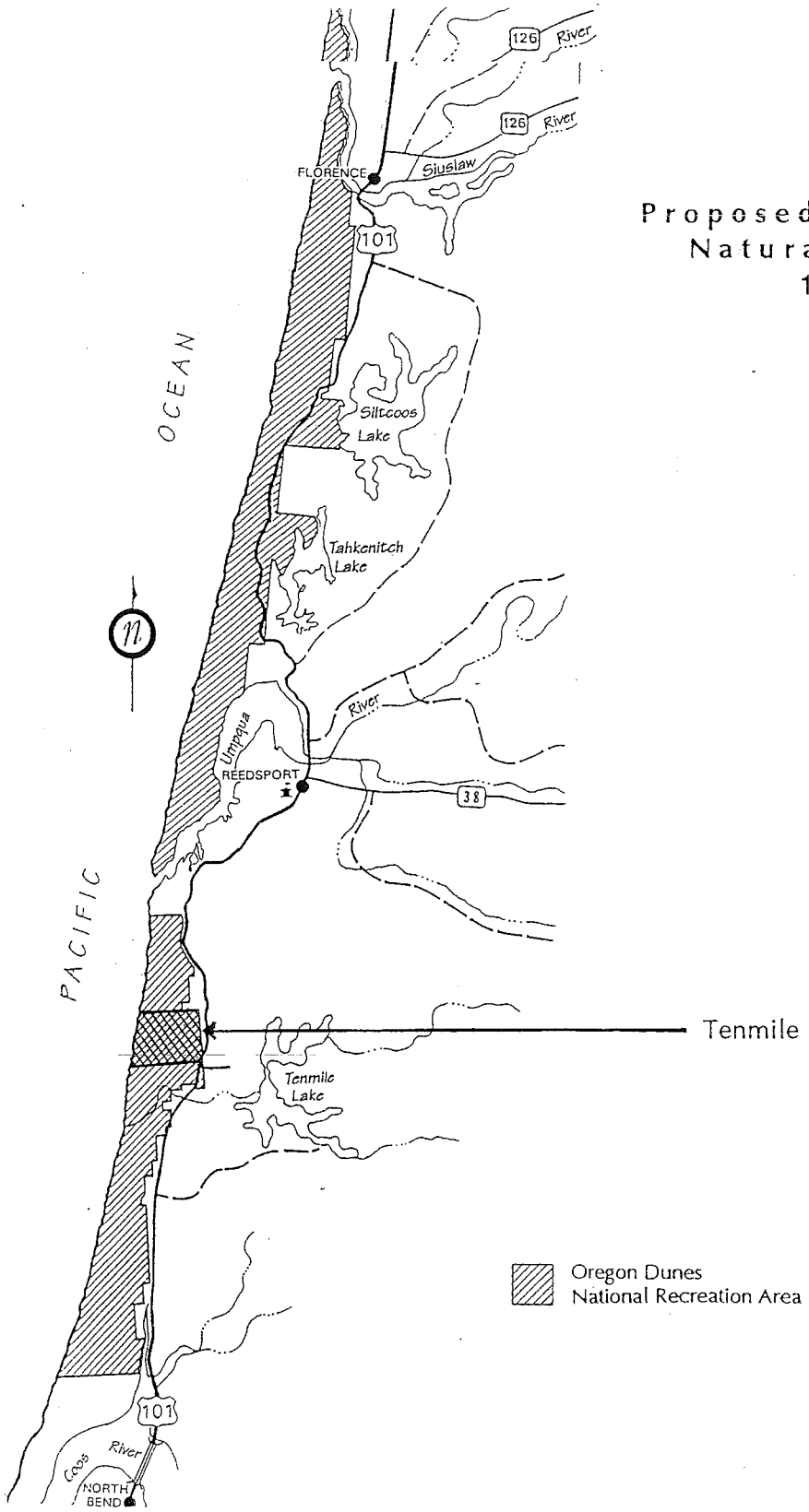


Figure III-17. Proposed Natural Research Areas, 1994

The Umpqua Spit site (formerly called Threemile Creek) occupies 2,103 acres (Figure III-17). This area contains several large parabola dunes, found most commonly on the North Coast. There is also a red alder/willow sedge marsh (on the south side of Threemile Creek), and partial representation of a coastal dune mosaic. This area supports the most extensive grass, sedge and rush deflation plain communities in the Oregon Dunes NRA. Studies of early successional stages of deflation plains could shed light on rates of change of this feature on the landscape. Public use of this area is low and limited primarily to dispersed hiking and waterfowl hunting. An established ORV corridor (the Clambed Road) is used intermittently for access. About 770 acres of private land within the area that was recently patented for mineral use (see Lands and Special Uses, Chapter III) must be included in the RNA for it to be viable.

Management Practices

RNAs are managed to allow ecological patterns and processes to occur naturally. Although some recreation use would be allowed in addition to research activities, emphasis would be more on preservation than on active manipulation.

Resource Relationships

Allocation of land for an RNA would protect plant and wildlife habitat, scenery, and roadless areas. It could result in attempts to remove European beachgrass from the area. Intensive recreation activities and wetland management would not be allowed.

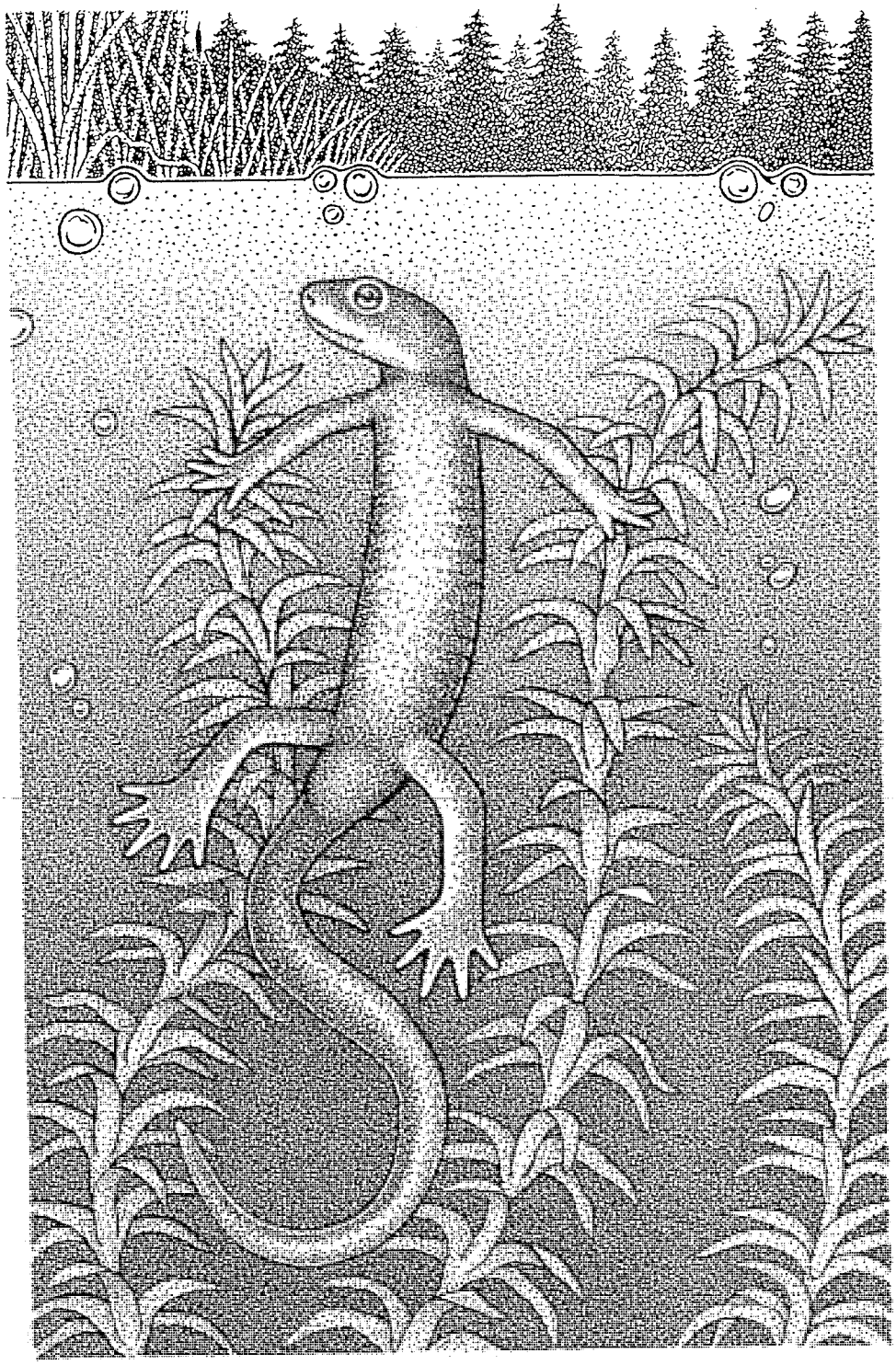
History

Potential for RNAs on the Oregon Dunes was first investigated in 1969. After considerable exploration and discussion, Franklin and Dyrness (1973) formally proposed an RNA, stating "suitable locations for an RNA do not exist outside the NRA in terms of full representation and typicalness of desired features. Further it appears that the best overall location is in the Umpqua Scenic Dunes area" (now called Tenmile Creek).

In the following 10 years, more studies on dune ecosystems along the Oregon Coast reaffirmed the importance of Tenmile Creek as the best and only active coastal dune mosaic on the Coast. These studies added to our understanding of dunes ecosystems, and resulted in a proposal for another RNA on the North Spit of the Umpqua River. Of four similar areas of fescue-dominated dunes along the Oregon Coast, Umpqua Spit was found to contain the most remote and diverse example.

Future Trends

More emphasis on ecosystem management by the Forest Service in the future will increase needs for baseline information provided by RNAs. Movement to preserve gene pools for T&E and sensitive species could enhance values of habitats protected in RNAs.



WILD AND SCENIC RIVERS

Overview

A Wild and Scenic River is a river, or river segment, designated by Congress, which is free-flowing and contains at least one outstandingly remarkable value (such as scenery, recreation, wildlife, fish, geology, history, or archeology). Congress adds rivers to the National Wild and Scenic River System in order to preserve their free-flowing condition and protect them and their immediate environments.

The Wild and Scenic Rivers Act requires the federal government to determine if additional rivers or streams are eligible for inclusion in the National System, and if so, to recommend to Congress whether or not they should be designated. If a river is determined to be eligible, it must be given one of three potential classifications: wild, scenic or recreational. This classification is based primarily on currently existing amounts of road access and development of the shoreline.

Segments of the Siltcoos River, Tahkenitch Creek and Tenmile Creek, all streams which flow through the Oregon Dunes NRA, have been found to be free-flowing and possess outstandingly remarkable river-related values. Therefore, these streams are eligible for inclusion in the National System. This process of revising the management plan for the Oregon Dunes NRA is being used to determine whether any of these streams is suitable for inclusion in the National System and should be so recommended to Congress.

River Segments

Following are brief descriptions of current conditions along the streams and conclusions about their eligibility and potential classification. For more detailed descriptions of these streams, see Appendix E, Wild and Scenic Rivers.

Siltcoos River

Description - The Siltcoos River is located in southwestern Lane County, about 6 miles south of Florence. It is about 3 miles long from its source at the outlet of Siltcoos Lake to its mouth at the Pacific Ocean. There is a small metal and concrete dam owned and operated by International Paper Company (IP) about 1¾ miles upstream from the ocean, but the river is free-flowing below the dam. Approximately 30% of the land along the river is privately owned, although all but 10 acres of land along the lower 1¾ miles is federally owned.

The Siltcoos River is one of only three small perennial streams flowing completely through the active, coastal sand dune complex at the NRA. It is an unusual feature in a rare geologic area. Flow of the river through the sand dunes provides a textbook example of geologic and hydrologic processes.

The river and estuary provide habitat for several T&E species and is home to a wide range of "special interest/watchable wildlife." The salt marsh is a limited coastal habitat within the Oregon Coast region.

The Siltcoos River corridor is a popular recreation complex with easy access from a paved parallel road. Recreation opportunities available along this river are fairly diverse, including several developed recreation sites, trails, and potential for interpretation of a broad array of themes.

Conclusions - The 1¾ miles of the Siltcoos River between the dam and the Pacific Ocean are eligible for inclusion in the National Wild and Scenic River System. Wildlife and geology are the outstandingly remarkable values of this river. Based on the current level of road access and human modifications along the river, its potential classification is recreational.

Tahkenitch Creek

Description - Tahkentich Creek is located in western Douglas County about 11 miles south of Florence. It is about 3 miles long from its source at the outlet of Tahkenitch Lake to its mouth at the Pacific Ocean. There is a small metal and concrete dam, owned and operated by IP, just below the outlet of Tahkenitch Lake. Within the river corridor, all but about 30 acres of land is owned by the federal government.

The stream and its corridor appear very natural with few modifications. Even though traffic on Highway 101 can be heard for the first 1/2 mile below the dam, there is a strong sense of remoteness which makes this is one of the few streams along the Oregon Coast which provides semi-primitive recreation opportunities.

The scenery along Tahkenitch Creek is diverse and striking due to contrasts between sand dunes, conifer trees, and the open estuary near the crashing surf of the Pacific Ocean. Like the Siltcoos River and Tenmile Creek, geologic and hydrologic features and processes of Tahkenitch Creek are textbook examples.

The Tahkenitch estuary provides habitat for several T&E species. In addition, freshwater and saltwater marshes within the corridor provide habitat types which are limited within the region.

Conclusions - The 3 miles of Tahkenitch Creek between the dam and the Pacific Ocean are eligible for inclusion in the National Wild and Scenic River System. Scenery, semi-primitive recreation, wildlife and geology are the outstandingly remarkable values. Because roads and human development are absent along the river, its potential classification is wild.

Tenmile Creek

Description - Tenmile Creek is located in northwestern Coos County about 10 miles north of Coos Bay/North Bend. It is about 5 miles long from its source at the outlet of Tenmile Lake (in the City of Lakeside) to its mouth at the Pacific Ocean. This stream is free-flowing for its entire length. There are just under 1,500 acres of land within the ½–mile-wide river corridor. Of this, about 525 acres is privately owned, Coos County owns about 150 acres and the remaining 825 acres is federally owned.

The upper 2½ miles of the stream have stretches of private residences, docks and bridges, interspersed with stretches of open fields and dense riparian vegetation. The lower 2½ miles lack roads and human development but, due to the occasional sight and sounds of vehicles on the south bank, they do not provide quite as much solitude and remoteness as Tahkenitch Creek does.

Scenery along the lower 2½ miles of Tenmile Creek is similar to Tahkenitch Creek, with active sand dunes spilling into the creek, patches of conifers and rhododendrons lining the banks, dramatic viewpoints, and striking contrasts of light, color and textures. Unusual geologic features and processes of Tenmile Creek are similar to those of the Siltcoos River and Tahkenitch Creek.

Wildlife habitats along Tenmile Creek, especially the estuary at the mouth and an extensive salt marsh, are also similar to those of the Siltcoos River and Tahkenitch Creek. They supply habitat for several T&E species.

Conclusions - Although the outstandingly remarkable values of scenery, recreation opportunities, geology and wildlife are concentrated along the lower 2½ miles of the stream, the whole 5 miles is eligible for inclusion in the National Wild and Scenic River System. Due to the interspersed stretches of development and open fields in the upper 2½ miles, this upper area is split into four segments whose potential classifications alternate between scenic and recreational. The lower 2½ miles have a potential classification of wild.

Summary

All three of the streams being studied for suitability as components of the National Wild and Scenic River System have been found to be eligible. Figure III-18 summarizes information about each of these streams.

Figure III-18. Rivers eligible for the Wild and Scenic River System

River	Miles	Potential Classification	Outstandingly Remarkable Values
Siltcoos	1¾	Recreational	Geology, Wildlife
Tahkenitch	3	Wild	Scenery, Recreation, Geology, Wildlife
Tenmile	5	Wild, Scenic, Recreational	Scenery, Recreation, Geology, Wildlife

LANDS AND SPECIAL USES

The NRA Act provides direction for the land acquisition and real estate management program. Land acquisition and use within the area must support public outdoor recreation use and enjoyment of the area and must contribute to conservation of scenic, scientific, historic and other values of the area within the NRA boundary. In addition, the Act establishes a Dunes Sector and Inland Sector. (See Figure III-19.) Private lands within the Inland Sector may not be acquired without the consent of the owner so long as certain conditions are met. Through this provision, the Forest Service was given oversight responsibilities to ensure uses on private lands within the Inland Sector are consistent with the objectives of the Act.

Management of other aspects of the Lands Program are also guided by these objectives described in the Act. Special use authorizations, rights-of-way grants and acquisitions, landline location and maintenance, and encroachment and title claim resolution all must be accomplished within the context of the special emphasis given this area.

Current Situation

There are 31,500 acres within the boundary of the Oregon Dunes NRA. Of this total 27,450 acres have National Forest System (NFS) status. As of January 1, 1975, the NRA contained 21,632 acres of NFS land. The increase in the amount of NFS land since 1975 has come about through land exchanges, land purchases and donations.

In March 1994 the Forest Service completed acquisition of 2,059 acres of land within the NRA boundary adjacent to Tahkenitch Lake (Figure III-20). Since these lands are new acquisitions, detailed planning has not been completed for this area, but the lands will be managed as part of Management Area 10A (non-motorized undeveloped recreation). Potential uses include fishing, wildlife viewing, hiking, mountain biking, and dispersed camping.

Authority to use eminent domain (or condemnation) differs between the area adjacent to Highway 101 (Inland Sector) and the area to the west of it (Dunes Sector). Within the Inland Sector, eminent domain authority can only be used if conditions described in Section 7 of the Act are satisfied. There are currently approximately 3,280 acres of private land within the Inland Sector. Most of the Inland Sector lands are undeveloped; current uses include dispersed recreation, timber management and agriculture. As long as use patterns remain as they were when the NRA was established, these lands are protected from the use of eminent domain authority. In the Dunes Sector, private lands are afforded no protection from the use of eminent domain authority.

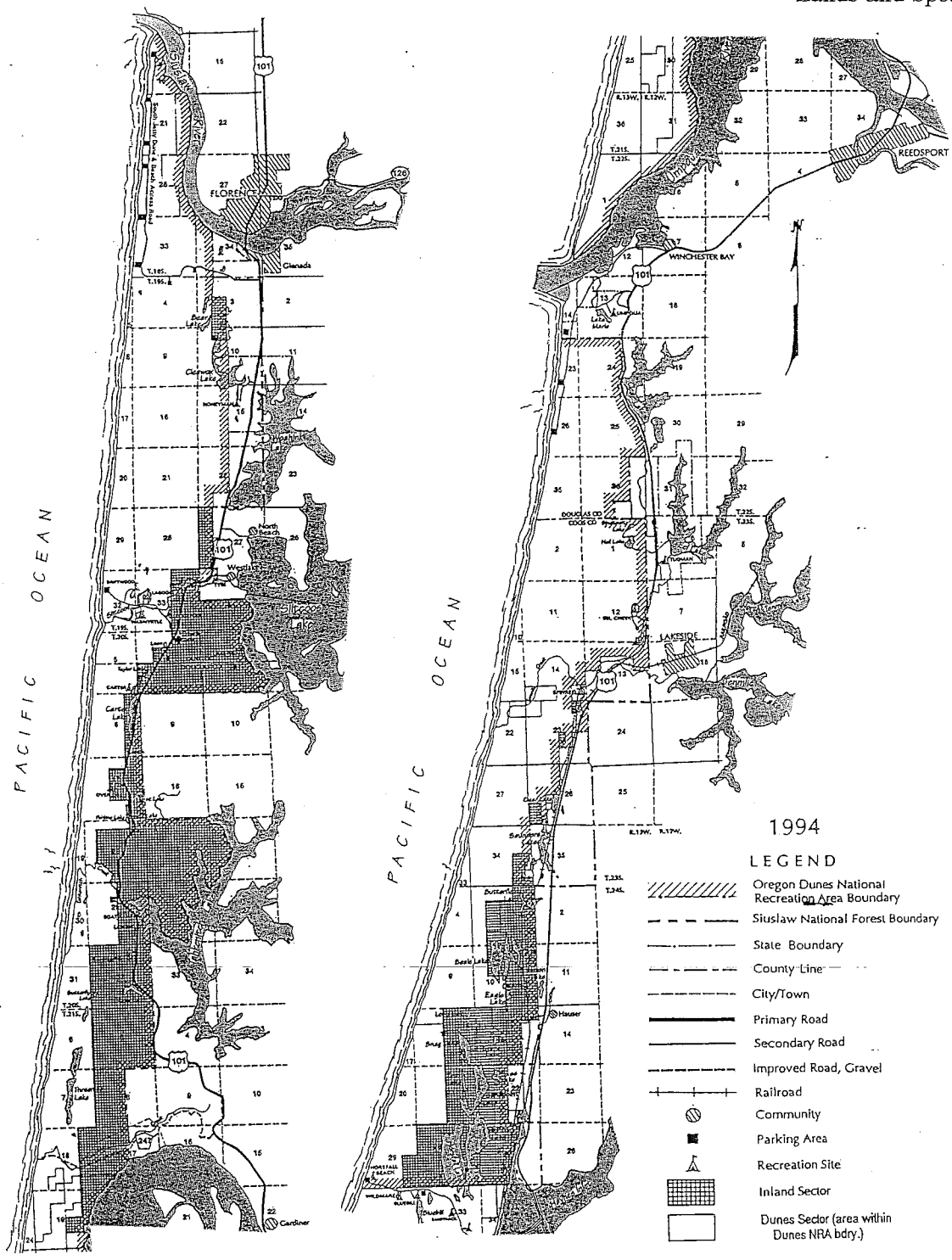


Figure III-19. Inland and Dunes Sector Lands at Oregon Dunes NRA.

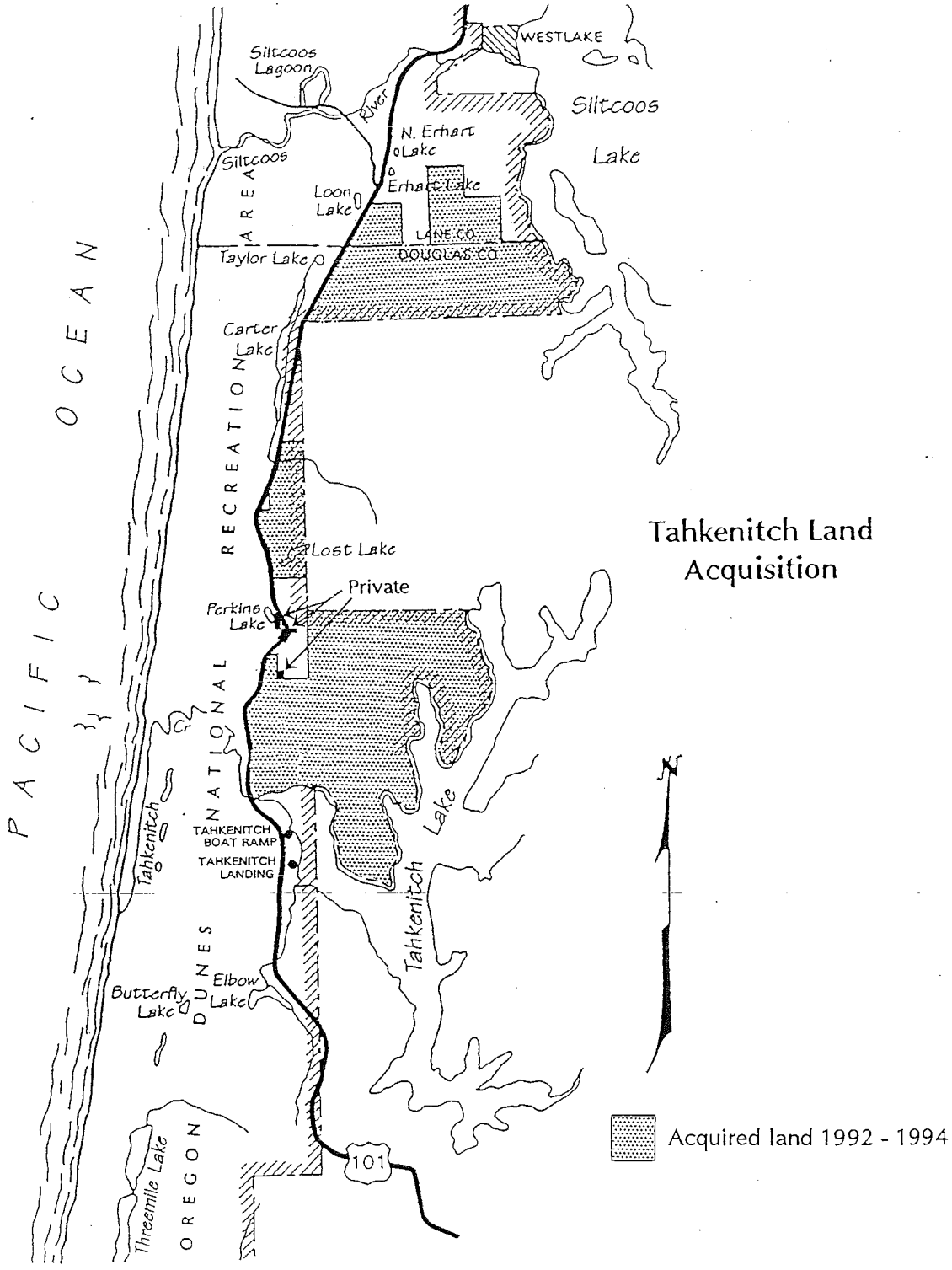


Figure III-20. Tahkenitch land acquisition

There are currently 770 acres of private land within the Dunes Sector. This land exited from federal ownership in 1990 under terms and conditions of the 1872 Mining Act. This private land is located on the North Spit of the Umpqua River in an area allocated as an RNA in some alternatives. This area is currently undeveloped and land use patterns have not changed from what they were when the land had NFS status. The Forest Service currently has no plans to re-acquire this land.

In addition, there are 1,450 acres of NFS land, administered by the Oregon Dunes NRA, outside of the established NRA boundary. Almost all of these acres are located along the southern boundary of the NRA in the Horsfall area and serve as a buffer to the developed area to the south. As National Forest, but not NRA lands, the management focus on these lands may at times be different than that on the NRA.

There are 34 special use permits issued for the NRA. The majority of these are for roads and transmission lines.

There are 75.4 miles of property line boundary between NFS lands and other lands within the NRA boundary. Of this total, approximately 48 miles were resurveyed and posted to current standards. Resurveys and better identification of property boundaries revealed several cases of occupancy trespass. Most were resolved by either removing the encroachments in trespass, using the Small Tracts Act, or authorizing the encroachment with a special use permit.

Navigability

State ownership to the beds of navigable waterbodies and to lands subject to natural tidal influence was granted to Oregon in 1859 as an incidence of statehood and is an inherent attribute of state sovereignty protected by the U.S. Constitution. The beds of non-navigable waterbodies remained in the ownership of the United States or its grantees. The navigability of those portions of the Siltcoos River and Threemile, Tenmile and Tahkenitch creeks within the NRA boundary has not been established. Currently, both the state and federal government claim ownership of these stream's beds and banks. This plan does not propose to address the issue of navigability. Rather, this plan is intended to provide a management philosophy for the above stream segments.

Under state law, the Division of State Lands (DSL) is responsible for the management of the beds and banks of navigable waterbodies (ORS 274.005-274.590). DSL is the administrative arm of the State Land Board (the Board), composed of the Governor, Secretary of State, and State Treasurer. Under constitutional and statutory guidelines, the Board is responsible for managing the assets of the Common School Fund. These assets include the beds and banks of Oregon's navigable waterways and are to be managed for the greatest benefit of the people of this state, consistent with the conservation of this resource under sound techniques of land management. Protection of public trust values of navigation, fisheries, and public recreation are of paramount importance, too.

The original federal test for determining navigability was established in *The Daniel Ball* case over 100 years ago. This U.S. Supreme Court admiralty case clarified that rivers "are navigable in fact when they are used, or susceptible of being used, in their ordinary condition, as highways of commerce ...." Interpreting this requirement, subsequent court decisions have adopted this test for title purposes and have ruled that a waterbody is navigable if it was capable of use, at the time of statehood, as a public highway for transporting goods or for travel in the customary modes of trade and travel on water.

DSL has determined that there is sufficient evidence to support a claim of navigability and state ownership for the beds and banks of the Siltcoos River and Threemile, Tenmile and Tahkenitch creeks within the NRA boundary. The position of the Forest Service is that the navigability of these streams has not been established.

For purposes of managing the above portions of these streams (where navigability has not been established), any non-federal activities or land uses such as new utility or transportation corridors and boat ramps or similar facilities that impose into or cross a waterway below ordinary high water will require an easement from the Board. Existing non-federal facilities will require an easement at such time as they undergo major structural alteration, replacement, or relocation. In addition, removal of sand and gravel requires a royalty lease and any non-federal use that occupies any area of submerged or submersible land requires a waterway lease.

Further, the DSL also administers the State's Removal-Fill Law which protects Oregon's waterways from uncontrolled alteration. The law requires a permit for fill or removal of more than 50 cubic yards of material within the State's waterways. The permit-review process involves coordination with the natural resource and land use agencies from the local through the federal levels.

Nothing set forth herein shall limit the ability of the Forest Service to administer these stream segments.

As with any jointly managed resource, jurisdiction is not as important as care for the resource. The DSL and the Forest Service will continue to work together to assure that the public trust interest is met.

Management Practices

The primary management focus over the course of the present plan was to acquire private lands in the Dunes Sector on a willing-seller basis or through land exchange. A total of 7,660 acres have been acquired since the NRA was established in 1972. A secondary emphasis was administering requests for private use of NFS lands through the Special Use Permit process. Commercial uses of NRA lands were discouraged and most special use permits issued to private individuals or non-profit groups for short-term events. Compatibility analyses were conducted on private lands in the Dunes Sector to determine whether protection from the use of eminent domain would be maintained when uses change on those private lands. Property boundaries are surveyed, posted and maintained to ensure NFS lands are identified to users and adjacent landowners. Encroachments and title claims are resolved using provisions of law.

Resource Relationships

Management of lands and associated property rights of the Oregon Dunes NRA is a fundamental stewardship responsibility. Land and property rights are the underlying foundation for all other management activities. Acquiring land can help accomplish other resource management objectives and ensure that the unique features Congress recognized when it enacted the NRA Act are protected. Analysis of compatibility of uses of private lands within the Dunes Sector redeems responsibilities given to the Forest Service in the legislation and maintains the basic values the legislation was designed to protect. These analyses are conducted using a process described on pages 41-43 of the present Dunes Plan (USDA Forest Service 1979). Policies for how special use applications will be evaluated and permits administered facilitate adjacent uses and ensure consistency with the Act.

Future Trends

Most of the high priority land has been acquired within the Oregon Dunes NRA. As additional properties become available for purchase or land is offered for exchange, acquisition would be aggressively pursued. New encroachments would be identified and remedied as remaining miles of property boundary are surveyed and posted. Once all the lines are properly posted and provided routine maintenance is conducted, future instances of encroachments and boundary disputes should lessen considerably. Special use applications would continue to be received at about the same rate as in recent times and for generally the same kind of uses.

ROADLESS AREAS

Four areas within the Oregon Dunes NRA meet the definition of roadless areas because they lack roads, major structures and recreation facilities. These areas are mostly unvegetated sand, wetlands and deflation plains.

Current Situation

Four inventoried roadless areas within the boundary of the Oregon Dunes NRA were evaluated for wilderness potential in both 1976 (USFS 1976) and as part of the subsequent Roadless Area Review and Evaluation II (RARE II) process. It was determined that none of the areas were suitable for wilderness designation, and none were included in the Oregon Wilderness Act of 1984.

The areas are Woahink (5,060 acres), Threemile Lake (4,770 acres), Umpqua Spit (2,360 acres which includes 770 of recently patented private land), and Tenmile (7,800 acres). The areas are described in detail in Appendix D. Together they total almost 20,000 acres, which is about two-thirds of the NRA.

Dispersed recreation uses such as hunting, hiking, horseback riding and photography occur within all four areas. In addition, there is extensive ORV use within the Woahink and Tenmile areas. Although general ORV use is not allowed in the Threemile Lake or Umpqua Spit areas, each contains a travel corridor which is open to ORV use. The Tenmile area contains a number of water well developments which help supply water to the Coos Bay/North Bend area.

Resource Relationships

Roadless areas support undeveloped recreation. They are generally natural appearing and help ensure high quality water and fish and wildlife habitat. Development of roads, utilities and other facilities eliminates or diminishes roadless conditions.

Trends

If present trends continue, almost all present roadless acreage will remain undeveloped. Any further developments, such as recreation facilities, special use developments and roads should be concentrated in, or adjacent to, existing road corridors.

WATER

Current Situation

Streams

Streams in the Oregon Dunes NRA are characterized by low gradient, meandering channels with sand substrates and banks. This is in marked contrast to the steep, highly dissected streams on the rest of the Siuslaw National Forest. The Siuslaw, Umpqua and Coos rivers pass through the Oregon Dunes NRA, as do three other major streams, the Siltcoos River and Tahkenitch and Tenmile creeks.

Two dams managed by International Paper Company (IP) on the Siltcoos River and Tahkenitch Creek maintain lake levels and supply water to a pulp mill at Gardiner. Provisions in the Oregon Dunes NRA Act protect the company's right to obtain water from these lakes. The dams were installed in 1968 with an original agreement with the State to assure withdrawal of 20 cubic feet per second of water at the Siltcoos site and 15 cubic feet per second at the Tahkenitch site.

An additional agreement for the Siltcoos dam with local residents and ODFW is designed to deal with tidal upstream flow which causes flooding. The agreement provides that the dam level is dropped an extra foot during the winter storm months and that it is closed as a barrier to high tidal upstream flows to prevent flooding. Following high tide, all 4 gates are opened to exit accumulations during the period when the system is closed. The Tahkenitch dam is 15 feet higher, and is not influenced by the tide. This dam is occasionally flushed of debris by opening all the gates at once.

Gates are operated to ensure adequate flows through the fish ladders at both dams. IP opens the gates on the dams to cut a channel for incoming anadromous fish based on reports of concentrations of seals at the stream mouths. ODFW concurs with this activity.

Lakes

Larger lakes in the Oregon Dunes NRA include Cleawox, Siltcoos, Carter, Tahkenitch, Elbow, Threemile, Eel, Beale, Sandpoint, Saunders, Clear and Horsfall. There are about 20 smaller lakes in the area (see Fish, Chapter III). Factors that affect quality and quantity of water in the dune environment include water withdrawal, dams, pollutants and sand intrusion into lakes and streams.

Groundwater

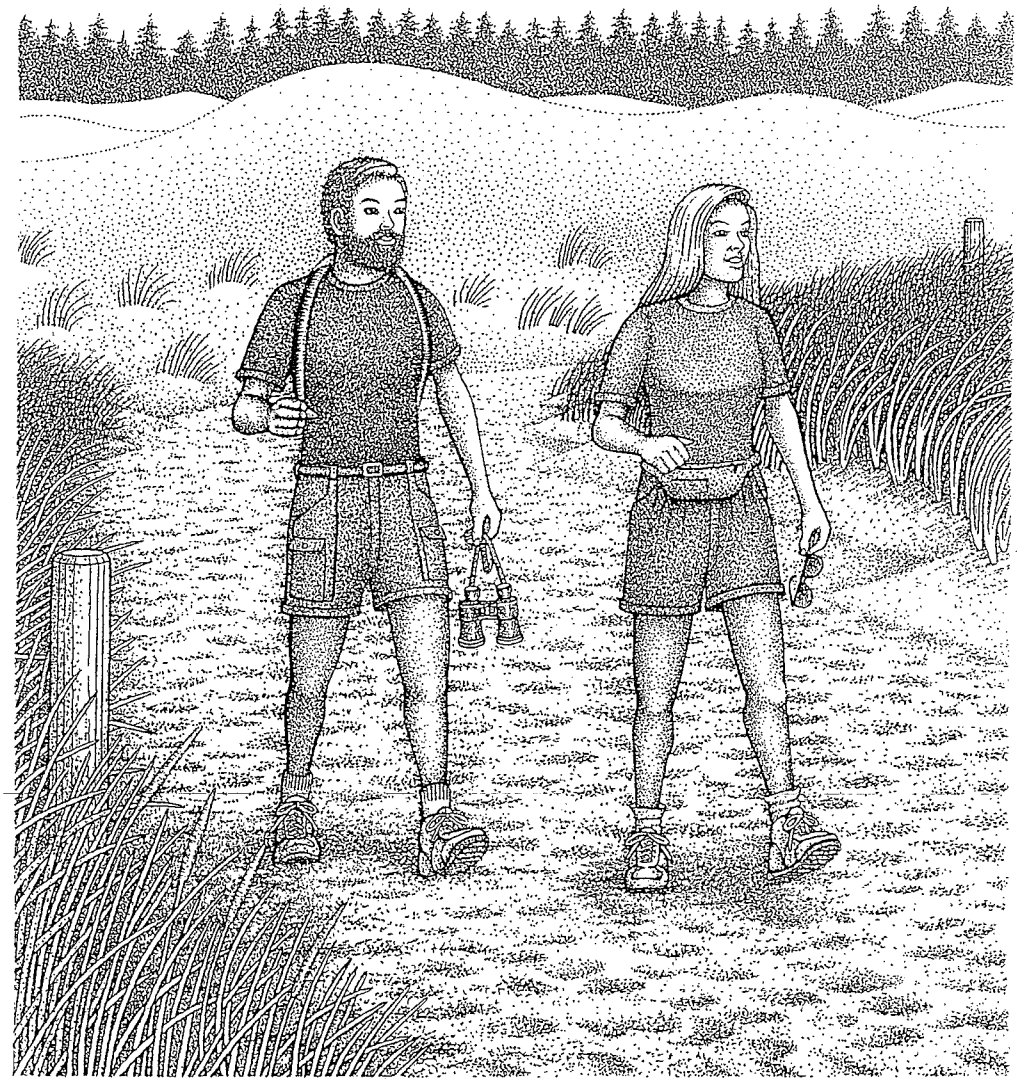
Sand dunes are an excellent aquifer. The sand absorbs and stores a large percentage of the average annual 70 inches of precipitation as fresh groundwater. There are 53 State Water Right permits inside the Oregon Dunes NRA boundary or within a quarter of a mile of the boundary. This includes 22 groundwater permits with 71 groundwater intakes, 31 surface water permits and 2 reservoir permits. Seawater (salinity) has not been found in test wells drilled in the area, including those immediately behind the foredune. Groundwater south of Tenmile Creek discharges naturally into the ocean, Coos Bay, and the North Slough through seeps and springs.

Quality of the groundwater is soft and generally of good chemical quality, except it is slightly basic, and in some areas requires iron removal for certain uses. Bortleson et al. (1990) noted a significant increase of iron in 12 of the 20 wells used by the Coos Bay-North Bend Water Board, which has a 30-year special use permit for removal of groundwater. The Board currently has 20 wells in production, using approximately 5 million gallons per day (MGD) of water for both industrial and municipal purposes. Their long range plans would increase the number of wells to 64. The Water Board can provide more detailed information on the economic value of their collection systems and the water provided to their users.

Initial studies in the 1970s by the U.S. Geological Survey (USGS) indicated that up to 30 MGD could be withdrawn from the aquifer without salt water intrusion. Recent research, as discussed below in Management Practices, indicates a much lower level of available salt-free water. Provisions in the NRA Act protect continuance of this operation provided natural resources are not significantly degraded by drawdown of the water table. Determining such impacts of pumping is complicated by the possibility that concurrent increases in vegetation increase loss of groundwater through transpiration. Subsequent decay of the added vegetation may also increase iron in the groundwater.

Although considerable information is available on groundwater in the southern dunes of the Oregon Dunes NRA, very little is known about the northern portion. At this time, it is assumed that similar relationships exist between the bedrock, marine sand, dune sand, annual precipitation and groundwater storage. Freshwater stands free during the late winter and spring in many areas. These small bodies of water have permeable sand bottoms and undoubtedly are continuous with the groundwater. Widespread and numerous areas of "quicksand" conditions along the edge of the transverse dunes indicate that hydraulic pressure of the ground water is sufficient to buoy up the sand and greatly reduce its ability to support concentrated loads.

Many summers in the Oregon Dunes NRA are dry, with frequent water shortages, and increasing demands from local communities for water may require examination of alternative sources. There already have been efforts to explore the possibility of using surface water from streams and lakes upstream from the Oregon Dunes NRA. These efforts may conflict with recreation and water quantity requirements for fish and wildlife habitats downstream.



Estuaries

The lower reaches of coastal streams, called estuaries, are influenced by tides and flows are altered dramatically in very short time periods. Estuaries are also subject to dynamic changes in their chemical and biological components.

The Siuslaw, Coos and Umpqua rivers are navigable and used by large barges moving lumber to market and by commercial and sport fishing boats as sanctuaries. Large jetties extend seaward from the mouths of these rivers.

Management Practices

The most significant issue in management of water resources in the Oregon Dunes NRA is groundwater withdrawal. Under natural conditions, an equilibrium is maintained whereby recharge to the aquifer balances discharge from it. Pumping of water from wells is an additional discharge, and there is a great deal of controversy about the consequences of this pumping. The most complete assessment of effects of withdrawals on surface water levels concluded that "pumping 15 to 16 MGD can lower the lakes to levels that may be considered undesirable or unacceptable for some uses" (Robinson 1973).

Current research by USGS focuses on a different groundwater issue - potential for salt water intrusion due to pumping from the aquifer. Jones (1991) found that 10 MGD could be pumped with little risk of intrusion. His model simulations indicate that up to 17 MGD could be pumped without intrusion, although the effects of this much pumping remain uncertain. Certainly much more information is needed to accurately assess the effects of groundwater withdrawal on surface water resources of the Oregon Dunes NRA, and just recently, the Coos Bay-North Bend Water Board initiated a thorough study of the causes of historical changes in water levels.

Other management considerations related to water resources include maintenance of streamside vegetation to assure bank stability and maintenance of stream flows to assure adequate flows for biological and recreational entities.

Resource Use

Streams and lakes of the Oregon Dunes NRA provide recreation activities such as fishing, boating, sight-seeing, swimming and photography. Waterways are habitat for many plants and animals, and are also important for municipal and industrial use. Lakes and streams of the NRA support anadromous salmonids, several species of which may be "at risk" (see Fish, Chapter III). Water is enjoyed by both local and out-of-state visitors.

Future Trends

All uses of water resources in this unique area are expected to grow in the near future. Recreation use in particular will continue to expand, while demand for high-quality drinking water is becoming a critical issue. As conflicting uses of lakes, streams and groundwater continue to grow, it will be essential that water quality and quantity are carefully managed on a long-term basis.

SOILS AND GEOLOGY

Overview

The Oregon Dunes NRA consists of a complex assembly of foredunes, deflation plains, dune lakes, and active and vegetated parabolic and transverse dune systems nestled between the Pacific Ocean and foothills of the Coast Range. These primary geomorphic features form the signature landscapes of the Oregon Dunes NRA; their appearance and functioning are being changed rapidly by profound long-term alterations in erosional and depositional processes in the sand dune terrain.

Current Situation

The Oregon Dunes NRA is underlain by mudstones and sandstones developed over long periods of successive uplifting and subsidence of the coastal strip, and great changes in sea level associated with major glacial periods. Soils developed on these rocks include undeveloped sands, weakly developed forested dune sands and bog soils, and deep, moderately well developed soils over bedrock. A specific detailed description of the geologic sequences of coastal uplift and submergence, and rock and sand forming processes can be found in The Oregon Dunes NRA Resource Inventory (USFS 1972). Since that document was written, new discoveries about plate tectonics and sand migration have added to our understanding of coastal land forming processes. However, basic concepts of formation of dunal features remain essentially unchanged.

The large unvegetated active dunes move fluidly as ponderous sandy sculptures to the north and east. They eventually are halted along the face of prehistoric vegetated dunes, or at nearshore foothills of the Coast Range. As these remnant open dunes flow onto steep inland slopes, their sandy windblown surfaces are stilled, and they finally are covered by brush and trees.

The open dune systems are being replaced by vegetated deflation plains at a rate that could eliminate much of the open sand in the near future. This evolution towards broad marshy thickets and vegetated inactive sand dunes is a direct result of introduction of European beachgrass and subsequent development of the foredune, and could be a dramatic change in a very short geologic time.

The foredune is a long, essentially continuous ridge of grass-covered sand paralleling the beach just above the high tide line. The foredune has developed since the 1930s due to the earlier introduction of European beachgrass to control sand movement along harbors and roads. Beachgrass eventually spread to all central Oregon beaches through tidal and current drift. It effectively traps sand that blows inland from the beach. The grass grows through the added sand and slowly raises the elevation of the area adjacent to the beach and eventually forms the foredune. Over the past several decades, the foredune has grown to 25 or more feet in height and has essentially cut off the supply of wind-blown sand to the inland open sand dunes. Onshore winds continue to move the remaining inland dune sands eastward toward the older vegetated dune systems, stripping sand from the area immediately east of the foredune and exposing the water table. The yearly cycle of sand removal by wind erosion and consequent exposure of the water table has formed the ever-widening strip of densely vegetated lowland known as the deflation plain. Because the soil surface of the deflation plain is at the summer ground water level, only plants tolerant of perennially wet soils can survive. Deflation plains are true wetlands.

Grassy hummocks have developed and persisted as interspersed elevated landforms throughout the deflation plain areas. The grassy hummocks are up to 6-8 feet in diameter, and 3-4 feet in height above the surrounding deflation plain. They formed on remnant patches of open sand within the deflation plains where isolated communities of beach grass have become sufficiently established to prevent wind erosion. They generally occur at the periphery of, or occasionally within, the deflation plain. The hummock surfaces are well above the summer or winter groundwater levels.

Management Practices

Sand still moves onto roads, railroads, campgrounds and other facilities (which originally prompted planting of European beachgrass). To mitigate this encroachment, beachgrass is still occasionally planted by the Forest Service and State of Oregon where other solutions are not feasible.

The Forest Service has considered rejuvenation of the inland sand dunes by altering the foredune. An experiment by the Oregon State University Department of Geography tested potential for reinstating a sand supply to the open dune system through physically removing a portion of foredune north of the Siltcoos River in 1985. Since then, field measurements have shown that beachgrass establishment in the flotsam that collects in the mouth of the breach has begun reestablishment of the foredune. Little new sand has moved from the beach to inland areas since the breaching, and, if the foredune rebuilds, the source will again be eliminated. Another experiment along the Northern California Coast attempted to eliminate the foredune by killing beachgrass with chemicals. It was found that herbicides did not effectively eradicate European beachgrass because of it's ability to propagate from roots and broken pieces of stalk. Since control is so difficult, the beachgrass and foredune could be permanent features of the Oregon Dunes NRA.

Resource Relationships

Gradual, persistent stabilization by encroaching vegetation of many of the open dunes could rapidly alter future potential for recreation in many areas. Since there may be no practical solutions to the effects of the foredune on the inland dune sheet, alternate strategies should be developed for the "new" landscapes that may eventually define the area.

Historic Trends

The dunes have undergone periodic submergence and uplifting associated with cycles of continental glaciation. Since the last general submergence, the sand dunes have undergone several cycles of stabilization and rejuvenation depending upon the type of vegetation, and degree and type of disturbance. By far the greatest impacts on the dunes in this century have been from introduction of European beachgrass in the early 1900s.

Future Trends

Except immediately along the beach, amounts of open, drifting sand within the Oregon Dunes NRA could diminish considerably in the next several decades. Lakes and streams that now have open sand at their margins could have their shorelines covered with brush and trees.

MINERALS

Current Situation

Mineral commodities are classified by law into three categories: locatable, leasable, and salable. The manner in which each is managed, and the authority of the Forest Service to control exploration for, and development of, each commodity varies.

In the legislation creating the Oregon Dunes NRA, Congress withdrew all lands within it's boundary from further mineral entry. And, on October 10, 1989 the last of the Oregon Dunes NRA outstanding mining claims were resolved when the Bureau of Land Management issued mineral patents covering 770 acres.

Management Practices

Although removal of small amounts of sand from roadsides and parking areas has been allowed under free use permits issued to the public, no outstanding leases or mineral material permits exist within the Oregon Dunes NRA, nor new permits established. The Forest Service control of mining activity in the buffer zone is limited to minimizing impacts on surface resources.

Resource Use

Eight unpatented placer mining claims were located and are currently being maintained in the buffer zone south of the Oregon Dunes NRA boundary which is open to mineral entry. These claims, covering approximately 160 acres, were located for silica sand, a major component in the manufacture of glass. Mining activity has not occurred or been proposed on these claims since their location in 1989. On April 21, 1992, these claims were deemed abandoned and void by the Bureau of Land Management since there wasn't an affidavit of annual assessment work performed (proof of labor) or notice of intention to hold the claims filed on or before December 30, 1991. Currently, this land continues to remain open to mineral entry; it is unknown if any new claims have been located or filed recently in this area.

There is an intermittent mining operation on private land adjacent to Forest Service lands in the buffer zone on the North Spit of the Coos River. The Duvals, under the name of CooSand Corporation, are mining silica sand from their site at Cordes. The sand is loaded onto boxcars and transported to a plant in Clackamas, Oregon for processing into brown glass bottles.

Trends

Mining operations are required to be conducted in accordance with an approved plan of operations. This ensures compliance with environmental protection standards. There are no current leases or lease applications for the area within the buffer zone.

CULTURAL RESOURCES

Overview

The Oregon Dunes NRA lies within the ancient tribal homelands of the Coos, Lower Umpqua and Siuslaw Indians. This coastal region was subsequently explored, then settled by Euroamericans by the mid-19th century. As a consequence, the Oregon Dunes NRA contains a variety of prehistoric (before the coming of Europeans) and historic (after the arrival of Europeans) cultural resource sites. These include Indian shell gathering places and villages, and homesteads, wagon roads, military installations and other historic ruins.

Dense coastal vegetation and shifting sand dunes, however, have severely restricted opportunities for discovering cultural resources in the Oregon Dunes NRA and adjacent coastal areas. Few cultural resource inventories have been undertaken other than those related to disturbance from specific projects. Large projects such as timber sales that would create enough ground exposure to reveal the locations of cultural sites are uncommon. Consequently, the exact number of prehistoric and historic sites within the Oregon Dunes NRA is unknown. However, recent discoveries and research indicate that the area has high cultural resource potential.

Current Situation

The Tahkenitch Landing archaeological site is the oldest known Indian encampment on the Oregon Coast (Minor and Toepel 1982). Excavations revealed that the site was continuously inhabited from 8,000 to about 130 years ago and document a dramatic shift in the Central Coast's environment. The Tahkenitch Landing site is eligible for listing on the National Register of Historic Places.

The Hauser archaeological site is a "shell mound" where shellfish were once cooked and eaten by American Indians next to an ancient estuary that is now covered by sand dunes (Keyser 1991). It was continuously inhabited from about 3,000 to 2,000 years ago and may contain older archaeological evidence. The Hauser site is also eligible for inclusion on the National Register.

Other known but un-investigated shell mounds and villages have been identified at the mouths of Tenmile Creek and the Siltcoos River. In addition to these sites, observation of rock cracked by primitive campfires at other locations in the Oregon Dunes NRA indicates that hunting and butchering of wild game also ocurred. Some of these sites may also be partly exposed villages and shell mounds similiar to the Hauser site. These sites have not yet been fully documented and studied so their nature and values are unknown.

Within the Oregon Dunes NRA, the historic period is best documented by a variety of significant sites located on the North Spit of the Umpqua River. It was the site of the earliest settlement south of the Columbia River at Umpqua City (1850), the U.S. Coast Survey's second Astronomical Station (1853), the Bureau of Indian Affairs' Umpqua Indian Sub-Agency (1854-59), the U.S. Army post of Fort Umpqua (1856-61) built to protect refugee Coos Indians from settlers, the U.S. Life Saving Service Station (1888-1935), and the U.S. Army Corps of Engineers' North Jetty Construction Camp in the 1920s (Beckham 1990). Recent (1990) surveys on the North Spit also indicate the presence of a prehistoric shell mound, a cemetery and other archaeological remains.

Other properties of potential historical value include the 1826 fur trading sites of Alexander McLeod of the Hudson Bay Company and the 1828 exploration routes of the American fur seeker, Jedediah Smith. With the exception of a few homesteads, much of the Oregon Dunes NRA was unattractive for settlers, although stage and freight lines between Coos Bay and the Siuslaw River and surrounding areas crossed the dunes during this initial period of coastal settlement and commerce (Beckham et al. 1982a).

Management Practices

All potential land disturbing activities in the Oregon Dunes NRA are preceeded by a cultural resource survey to ensure that significant sites are protected. The surveys are designed in accordance with a cultural inventory plan agreed to by the Forest Service and the Oregon State Historic Preservation Officer (SHPO; Toepel and Beckham 1985). Cultural Resource Technicians complete the surveys under the direction of the Forest Archaeologist.

Inventory is followed by an evaluation of whether any identified cultural resource sites have scientific and/or historical value or "significance" according to criteria of the National Register of Historic Places. A determination of significance then leads to appropriate treatment and protection of the site in face of potential land disturbing projects and management activities. Projects may be canceled, relocated or redesigned to avoid damaging sites or include mitigation plans agreed to by the Oregon SHPO and the Forest Service. Mitigation may require archival research and/or archaeological excavations that remove portions of the site from harm's way prior to proceeding with projects.

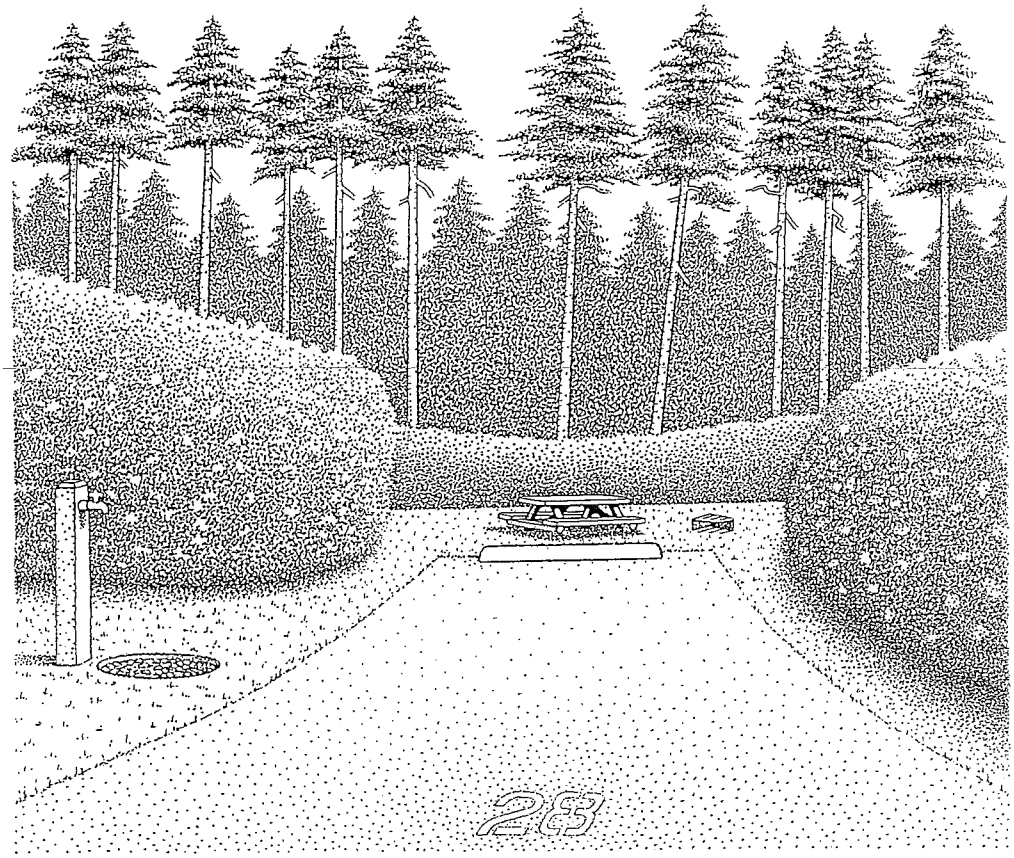
Resource Relationships

Cultural resource surveys preceeding proposed land disturbing projects, particularly those related to recreational development, are the primary means by which cultural resources are identified, evaluated, and studied. Therefore, rate of discovery of cultural resources is directly related to rate of project activity.

Future Trends

To date the number and diversity of cultural resources, particularly prehistoric (archaeological) sites, within the Oregon Dunes NRA is largely unknown. However, cultural resource inventory, evaluation and mitigation work in advance of recreation-related (and other) projects is gradually adding to the knowledge base. If the level of recreation and other developments in the area remains approximately the same, this situation will eventually produce a reliable, though piece-meal, record of ancient and historic human use of the Oregon Dunes NRA. An increase in the number of projects, especially those in heavily-used areas around lakes and streams, will proportionately increase the cultural resource knowledge base, but at the same time may place limits on recreation (and other) developments.

Accumulating cultural resource knowledge about the Oregon Dunes NRA will greatly enhance opportunities for integrated natural resource and cultural heritage interpretation. Further, identification, interpretation and protection of cultural resources within the area is very important to the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; this interest is likely to accelerate following the recent Tribal restoration by Congress.



AMERICAN INDIAN RELIGIOUS PRACTICES

Overview

Historically, American Indians have used some parts of the Oregon Dunes NRA for traditional religious practices. It is the policy of the United States to protect and preserve the Indians' inherent right of freedom to believe, express and exercise their traditional religions (Joint Resolution on American Indian Religious Freedom 1978).

Current Situation

In 1954, the United States ended federal trusteeship of the tribes in the area through a process called termination. Several tribes, however, have recently reestablished the trust relationship, and the local Confederated Tribes of Coos, Lower Umpqua and Siuslaw had federal recognition restored in 1984. The 1980 Census identified about 4,700 American Indians living in Coos, Douglas and Lane counties.

A study of traditional practices of the tribes found no continuing religious practices on either the Oregon Dunes NRA or elsewhere on the Forest (Beckham et al. 1982b). Two quarries for paint and two quest areas were identified on other parts of the Forest which were once important to native inhabitants.

Historic Trends

Several tribes occupied lands now in and around the Oregon Dunes NRA. They include the Alsea, Coos, Lower Umpqua and Siuslaw tribes. In the 1770s, the Indians' religious practices were focused on unique, individual linkages with the natural world. Their primary religious use of surrounding areas appears to have been for spiritual quests and quarries for materials used for facial and body paint. In the mid-19th century, the tribes underwent a period of calamitous change, population loss and uprooting. Epidemics from introduced disease, white-Indian warfare, removal by whites to alien lands, reservation life, and Christian missions disrupted the Indians' traditional religious practices.

Future Trends

Oregon Dunes NRA personnel will continue to cooperate with the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians in identifying and maintaining their traditional uses of the area. If any sites once important for religious purposes are discovered, their setting and location would be protected from disturbance and made available for use.

TRANSPORTATION SYSTEM

Current Situation

All visitors to the Oregon Dunes NRA travel highly scenic U.S. Highway 101 for at least a portion of their journey. State Highways 36, 38, 42 and 126 connect Highway 101 with Interstate 5 in the Willamette Valley. During the summer months, U.S. 101 is heavily laden with tourist traffic all week. The connecting highways become congested on weekends with visitors to the Coast.

In addition to being the major transportation artery supplying visitors to the Oregon Dunes NRA, Highway 101 is also a focus for recreation opportunities with many campgrounds, developed day-use facilities, and access points to undeveloped portions of the NRA located along it. Current Oregon Department of Transportation scenic highway planning efforts for Highway 101 provide opportunities for additional integration of the highway into the mix of recreation opportunities that could be provided at the NRA in the future.

About 500,000 vehicles annually use NRA roads, which are constructed and maintained by the Siuslaw National Forest. This traffic figure represents about 1.5 million visitors. At present, there are 23 miles of double-lane paved roads open to the general public, and 2 miles of "sand access" roads used by ORVs to reach the dunes.

The Southern Pacific Railroad maintains a rail line that extends along the eastern boundary of the NRA from the southern boundary north to Tenmile Creek. At this point the line veers eastward and leaves the NRA. The railroad right-of-way is recognized in the NRA Act, which also prescribes that the Secretary of Agriculture may obtain easements across the right-of-way for public ingress and egress. The line is currently used only for the movement of freight.

Management Practices

Roads on the Oregon Dunes NRA (such as the major roads into the South Jetty, Siltcoos, Umpqua Beach, and Horsfall areas) are generally double-lane, paved, and of a high standard, suitable for most types of traffic. Maintaining these roads includes resurfacing (when needed), sweeping the pavement to remove sand and other debris, cleaning drainage ditches, replacing and/or repairing signs, and striping (painting) to aid traffic flow and define driving lanes. Maintenance work is similar to that which occurs on a rural county road. Sand roads and gravel roads like the Threemile Road receive less maintenance.

Resource Relationships

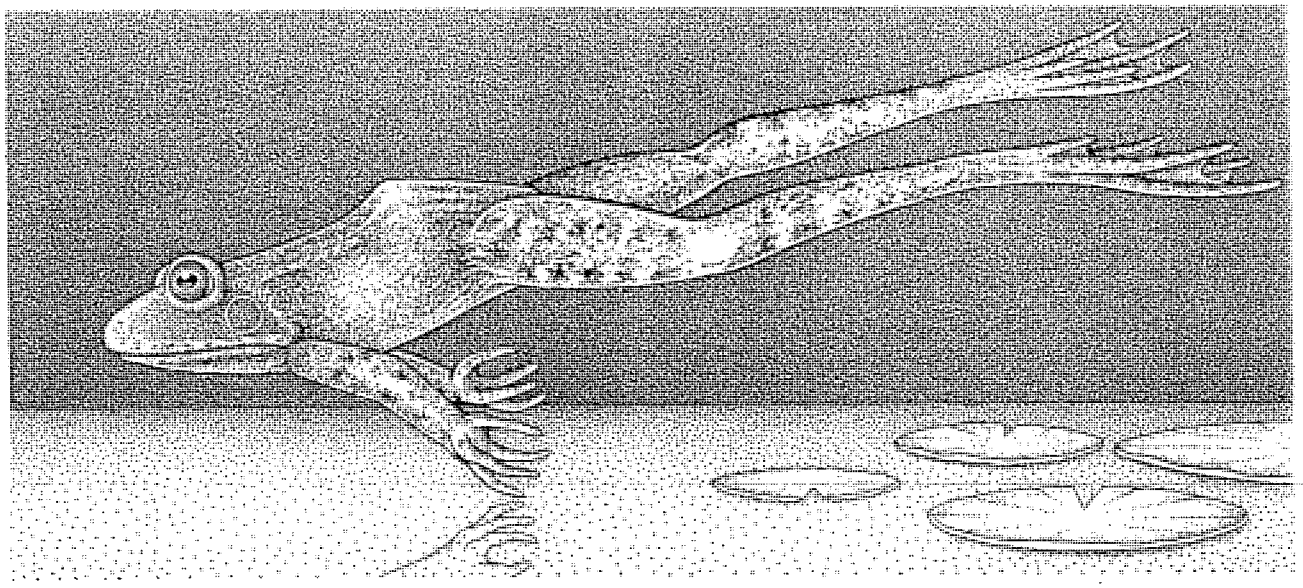
Recreation opportunities are affected by a visitor's ability to reach the sites of interest. Thus, the road system on the Oregon Dunes NRA is a major factor in the quality of recreation that may be experienced. Day-use, bicycling, many overnight, and all ORV-using visitors use Forest Service roads in the NRA.

Future Trends

Any additional roads will provide recreation access, and will be built to reach a specific facility (i.e., viewpoint, parking area, picnic area, campground). Although some alternatives include graveled access, roads will generally be double lane, and asphalt surfaced, with the exception of one-way ingress and egress where the roads will be single lane and asphalt surfaced. Roads will be designed and constructed to accommodate typical visitor traffic.

Roads will be designed to reduce problems with flooding, wind scour and sand deposits and to minimize impacts on wildlife, scenery, and other aspects of the sensitive NRA environment. Any additional roads constructed to provide ORV access to dune "play" areas will be paths or lanes of native (sand) material or aggregate. Parking facilities, some with toilets or potable water, will be located to provide access for the public, so visitors may enjoy the dunes environment, and have the minimum impact on the land, visually and physically.

Chapter IV
Environmental Consequences



CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

Environmental consequences are the estimated physical, biological, social and economic effects that would result from implementing each of the alternatives described in Chapter II. The analysis of these effects provides a basis for comparing the alternatives.

This chapter describes the projected direct, indirect, and cumulative effects of the alternatives and summarizes the planned mitigation measures. It also describes conflicts between the effects of the alternatives and other plans and policies. Figures and text often refer to the planning period which could be as long as 15 years. Implementation of any alternative, and thus resultant effects are contigent on available funding.

The environment can be directly changed by activities included in a given alternative (e.g., riparian habitat may be affected by streamside campground construction). Changes to one aspect of the environment may trigger changes in other environmental factors (e.g., changes in riparian habitat resulting from campground construction may affect adjacent fish habitat). These are termed indirect effects. Cumulative effects are those which result from the total actions taking place on Forest lands and neighboring lands for the foreseeable future. Mitigation measures are activities planned to prevent, rectify, compensate for, or reduce projected adverse effects on the environment. Most effects are described qualitatively; some may be described quantitatively.

All activities with an environmental effect are grouped under major headings which include: recreation (which may include actions such as facility and trail construction, opening/closing an area to ORVs), plant and wildlife habitat management (which may include actions such as thinning timber stands, burning meadows to maintain early seral stages), fish habitat management (which may include actions such as fertilizing lakes, placing artificial structures), wetlands management (which may include burning to maintain early seral stages, excavating ponds), vegetation management (which includes actions such as breaching the foredune, hand pulling European beachgrass), RNA allocation, and Wild and Scenic River designation. More detailed descriptions of the types of actions called for in each alternative can be found in Chapter II.

In cases where information was unavailable or incomplete, assumptions were made about resource trends or relationships between resources. All assumptions used in determining the effects of alternatives on resources are outlined at the end of each section. In no case was unavailable or incomplete information essential to making a reasoned choice between alternatives; all information needs are also detailed at the end of each section.

CHANGES BETWEEN DRAFT AND FINAL

Recreation Section

Effects of alternatives on dispersed camping opportunities are included in Figure IV-1.

The discussion of the effects of vegetation management on recreation is expanded.

The effects of Alternative F(PA) on proposals for changes in beach management are more fully explained.

The preferred alternative [F(PA)] no longer has the effect of closing the Siltcoos corridor to ORV use.

The cumulative effects discussion is expanded to acknowledge that ORV use displaced from the NRA may cause adverse impacts on other ORV riding areas.

The potential effects of recreation on municipal watersheds (south of Tenmile Creek) is added to the Effects of Recreation on Other Resources section.

Plant Communities & Wildlife Habitat

Additional discussion of potential environmental effects associated with European beachgrass management as proposed in Alternative F(PA).

Comparison of Alternatives concerning protection of globally significant plant communities and sensitive plants was added.

Increased discussion of potential impacts to sand dunes.

Analysis of potential impacts to newly discovered *Daphnia* species.

Increased discussion concerning biodiversity and habitat fragmentation.

Changed miles of remote beach in Table IV-7.

Recomputed acres of wetland interface for all alternatives in Figure IV-4.

Fish Section It was clarified that angling regulations and habitat restoration would be used to preserve the valuable wild stocks of anadromous salmonids.

Watershed Section Relationships between amount of vegetation and quality of groundwater were mentioned.

Effects of European beachgrass control were discussed in some detail.

Social and Economic Setting Discussion on costs for non-native vegetation control was modified.

MITIGATION COMMON TO ALL ALTERNATIVES

Any use or management of Oregon Dunes NRA lands will have some adverse impacts. Mitigation measures are actions, policies or procedures intended to avoid, minimize, rectify, reduce, eliminate or compensate for these adverse effects. Many mitigation measures are built into the standard procedures and policies used by the Forest Service in its day-to-day management of the Oregon Dunes NRA. Long-range planning, facility design, and operation standards are intended, at least in part, to mitigate potential adverse impacts that could result without such forethought. This policy and procedural level of mitigation is common to all of the alternatives considered in this Final Environmental Impact Statement (FEIS).

Management area allocations serve an important mitigation role through separation of competing uses. Additional mitigation measures are prescribed in Forest-wide Standards and Guidelines (S&Gs) developed during the Siuslaw National Forest planning process (Appendix C of the FEIS and Chapter III of the Dunes Plan). These S&Gs, which apply to all the management units of the Forest including the Oregon Dunes NRA, were reviewed by the Interdisciplinary Team (IDT) during this planning process. Although some of the Forest-wide S&Gs have no, or limited, applicability to the Oregon Dunes NRA, all comprise mitigation common to all of the alternatives considered in this action.

The IDT also identified more specific mitigation measures which may apply to one or more (but not necessary all) alternatives (Appendix C of the FEIS or Chapter III of the Dunes Plan). Project level mitigation measures which could be applied are also discussed, when appropriate, in various sections in Chapter IV, Environmental Consequences. The potential effectiveness of mitigation measures are described, unless measures are to be applied at the project level in which case effectiveness cannot be determined until project planning begins.

ENVIRONMENTAL CONSEQUENCES ON RECREATION

Direct and Indirect Effects

The alternatives are designed to provide varying mixes of recreation settings, varying types and amounts of other resource emphases, and varying recreation management standards and philosophies. This variation results in the alternatives having different effects on:

- recreation opportunities available;
- anticipated and potential recreation use levels; and
- current management problems identified by users and managers that degrade recreation experiences.

Effects on Recreation Opportunities

Alternatives would affect recreation opportunities primarily through the recreation settings each alternative provides and the types and amounts of other resource emphases each prescribes (Figure IV-1). Recreation settings, as defined in the Recreation Opportunity Spectrum (ROS) system of classification, set standards for the type and amount of access and facilities provided, recreation activities (experiences) provided, and management control and information provided.

Mix of Recreation Settings - The mix of recreation settings would affect the types and amounts of specific recreation opportunities and experiences available at the Oregon Dunes NRA. Alternatives that would provide higher levels of Rural (R) settings (Alternatives A, B, F(PA), G) would increase opportunities for activities such as overnight camping, viewing wildlife or scenery from a developed facility, watching the ocean from a vehicle or a viewing structure, and visiting interpretive sites/centers. There would be more opportunity to use and experience the Oregon Dunes NRA in a low-risk way with the security of designed and managed facilities and many other users nearby.

Alternatives that provide higher levels of Roaded Natural (RN) settings (Alternatives A, B, C, G, H) would include more opportunity for activities such as walking/hiking/bicycling on easy trails, riding ORVs (except Alternative H) near road corridors, and fishing/wildlife viewing close to road corridors. RN settings would provide opportunities to use and experience the Oregon Dunes NRA in a more self-reliant and less managed/regulated way than R settings, but usually with the security and convenience of designed facilities and other people nearby.

Alternatives that provide higher levels of Semi-Primitive Motorized (SPM) settings (Alternatives A, C, G) would provide more opportunities for activities such as riding ORVs in open sand areas, ORV trail riding in vegetated areas, ORV-accessible

wildlife viewing/fishing, or ORV-accessible interpretive sites/routes. SPM settings would allow people to use and experience the Oregon Dunes NRA in a motorized and highly self-reliant manner. They would be in relatively remote and minimally disturbed areas with few to moderate numbers of other people and few management controls present.

Figure IV-1. Effects of alternatives on various recreation opportunities as compared to existing condition.

	ALTERNATIVE							
Recreation Opportunities	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Developed/ Facility Based	Many More	Many More	Same	Less	Many Less	More	More	Same
ORV	More	Less	Same	Less	None	Same	More	None
Non-motorized	Less	Many More	Same	Less	Many Less	More	Same	More
Interpretive	More	More	Same	More	Less	More	More	More
Remote, quiet	Less	Less	Same	Many More	More	More	Less	More
Easy/Safe	Many More	Many More	Same	Same	Less	More	More	More
Higher risk	More	Same	Same	More	Many More	More	More	Same
Wildlife/Fish	More	More	Same	Many More	Less	More	More	More
Dispersed Camp Motorized	More	Less	Same	Less	None	Less	More	None
Dispersed Camp Non-Motor	Less	More	Same	Less	Less	Same	Less	More

Alternatives that provide higher levels of Semi-Primitive Non-Motorized (SPNM) settings (Alternatives B, D, H) would provide more opportunities for activities such as hiking/horseback riding away from road corridors, foot/horseback/bicycle accessible wildlife viewing/fishing, hike/horse/bike-in camping, and remote exploration and scenery viewing. SPNM settings would provide opportunities to use and experience the Oregon Dunes in a highly self-reliant manner with few management controls or other users present in these relatively remote, largely undisturbed areas.

Alternative E would provide the highest level of SPNM settings, but is different from all other alternatives because it also greatly reduces maintained roads, trails

and access points into much of the Oregon Dunes NRA. Without these improvements, seasonal flooding, thick brush and dense forests would make access to large portions of the area difficult for many people. The result would be that even though the SPNM settings would be increased, the level of recreational opportunities would likely be lower than under any other alternative, due to the extreme difficulty of access. SPNM settings in Alternative E would provide opportunities to use and experience the Oregon Dunes NRA in an extremely self-reliant manner with very few management controls or other users present. These areas would be very remote and largely undisturbed.

Alternative F(PA) includes similar amounts of both SPM and SPNM settings. It provides a balanced mix of motorized and non-motorized recreation opportunities in undeveloped settings.

Other Resource Emphasis Areas - Lands managed for other resource emphases (for example, plant and wildlife habitat, wetlands, Research Natural Areas, etc.) would also contribute to the spectrum of recreation settings and opportunities represented at the NRA. Generally, across all alternatives, lands allocated to other resource emphases would favor recreation uses that involve few people and low impacts to physical and biological resources. These areas would also favor non-motorized over ORV recreation. Where ORV use is permitted within management areas emphasizing other resources, use would be limited in amount and restricted to designated travel routes. Thus, areas emphasizing resource uses other than recreation would generally contribute to SPNM settings; SPM settings to a lesser extent; and only rarely to RN or R settings.

Larger areas emphasizing fish, wildlife and plant habitat proposed in Alternatives D, F(PA), G and H would contribute primarily to the SPNM setting because highly developed settings (R), easily-accessed settings (RN) and motorized settings (SPM) are generally less compatible with habitat management objectives and may result in more human disturbance and greater impact to, and fragmentation of, habitat areas. Alternatives A, B, C, and E propose relatively small areas of fish, wildlife and plant habitat management. These smaller allocations would not affect recreation settings, but could, as in the case of fish or snowy plover habitat management, affect the recreation opportunities available in the localized areas of management. For example, fishing opportunities would be enhanced at some lakes, while ORV riding or hiking/walking opportunities would be restricted in areas being managed as snowy plover nesting habitat.

Wetlands management (MA 10G) levels proposed under any of the alternatives would not affect recreation settings for the current planning period. Because Federal law prohibits wetland degradation, wetlands (whether they are actively managed or not) are not prime areas for recreation development and thus contribute primarily to the SPM and SPNM recreation settings. To meet legal wetland protection requirements, ORV use in wetland areas (SPM) would be limited in amount and restricted to designated travel routes under all alternatives.

The primary effect of wetland management levels proposed under the alternatives would be on future (beyond this planning period) recreation settings. Alternatives with higher levels of wetland management (Alternatives D, F(PA), H) maintain more wetland acres over time, reducing future options to develop those areas into higher development/access recreation settings (R or RN). Alternatives with fewer acres of managed wetlands (Alternatives A, B, C, E, G) would permit more wetland areas to evolve into non-wetlands thereby increasing the possibility of developing them in future planning periods.

Proposed research natural areas (RNAs) would contribute acres to the SPNM setting in Alternatives B, D, E, F(PA), and H but not to R, RN or SPM because the level of environmental impact associated with these latter settings is incompatible with RNA management objectives. Alternatives which allocate both RNAs for establishment (Alternatives E, H) would contribute more acres to SPNM than alternatives which allocate only 1 RNA for establishment (Alternative B, D, F(PA)). Alternative F(PA) would allocate a smaller RNA, but this will not reduce SPNM acreage in the area because that portion not allocated as RNA would still be managed for SPNM recreation opportunities. Alternative C would defer proposing either area for RNA status until the next planning period, but their eligibility would be maintained and they would continue to be managed as SPNM recreational settings.

River designations of wild or scenic (Alternatives D, E, F(PA), H) would preclude future options to manage those river corridors as R or RN recreational settings because the amount and types of facilities and access associated with these latter settings would be inconsistent with the desired conditions prescribed by Wild or Scenic designation. Non-designation or a designation as recreational (Alternatives A, B, G) would have no direct effects on recreation settings, but could indirectly effect settings by allowing additional development that would ultimately reduce the amount of SPM and/or SPNM settings. Maintaining eligibility (Alternative C) would have the same effect as designation at the level at which the river is currently eligible. For example, rivers classified as wild or scenic, such as Tahkenitch and Tenmile, would have to be managed to preserve that eligibility and would therefore not be developed to provide R or RN recreational settings.

Surface Water Levels - Reduced surface water levels have been observed and documented for 10 years in portions of the NRA. If this trend continues, major long-term impacts on recreation opportunities including angling, canoeing, scenery viewing, waterfowl hunting, and wildlife viewing could result. Under any of the alternatives, fully implementing the special use permit regulating ground water pumping from the Dunes aquifer could eliminate or at least reduce this effect.

Vegetation Management - Another factor effecting recreation opportunities is the spread of vegetation across much of the Oregon Dunes NRA. The continued spread of European beachgrass and other vegetation would, in time, lead to the loss of many unique recreation opportunities dependent on, or enhanced by, the characteristic open, unvegetated sand dunes. These opportunities include ORV riding, sand surfing, unique hiking and scenery viewing. All alternatives except C and E include

plans to control European beachgrass. Acreages planned for beachgrass control and other vegetation management activities are the greatest under Alternative F(PA). Alternative F(PA) identifies areas where vegetation could be managed for visual and recreation purposes. If fully and successfully implemented, it would do the most to slow or reverse the spread of vegetation, and thus the most to maintain recreation opportunities that benefit from an open sand environment.

Beach Management - Beach-related recreation opportunities on State lands would also be effected by the alternatives. NRA roads and parking lots provide the primary access to State-managed beaches along the entire length of the NRA. Alternatives D, E and H would reduce access to the beach by shortening roads and eliminating parking lots. Alternative E would reduce access the most by eliminating 5 of the 6 South Jetty parking lots and the northern portion of South Jetty Road. It would also shorten Siltcoos, Horsfall and Threemile roads. Alternative D would also eliminate South Jetty Road and parking lots and would shorten Siltcoos Road. Alternative H would convert Threemile Road to a foot/bicycle access once inside the NRA boundary. Alternatives A and B would increase beach access by constructing a paved road the length of the North Spit of the Umpqua River and (Alternative A) and upgrading Threemile Road (Alternative B).

If Alternatives A, B, D, E or H were implemented, the NRA would recommend to the State that beaches be managed consistent with NRA upland management in regard to vehicle access. This action would change beach recreation opportunities. Depending on the alternative and the State's concurrence, additional beach areas could be either opened or closed to vehicle access. With state concurrence more beach open for motorized use under Alternative A and less would be open for motorized use under B, D, E and H. Alternative F(PA) would, pending state concurrence, close approximately 5 miles of beach currently open for motorized use and restrict motorized use to certain vehicle types and seasons on South Jetty and N. Spit Umpqua beaches.

Effects on Recreation Use

To accurately predict the effects of alternatives on future recreation use of the Oregon Dunes NRA, the specific supply-demand relationship for recreation settings and opportunities must be understood. This relationship is not clear, but certainly depends on several factors beyond the scope of this planning effort and the control of the Forest Service including: larger questions about the place of outdoor recreation in the total spectrum of leisure time activities available; the place of NRA recreation opportunities in the spectrum of opportunities along the entire Oregon coast or even across the nation; changes in outdoor recreation activity preferences over time; and changes in regional or even nationwide travel patterns over time.

Because supply-demand information is incomplete, assumptions about future demand must be made to determine the effects alternatives will have on recreation use (see Assumptions Used to Predict Environmental Consequences on Recreation in this section). These assumptions include expectations that recreation use will slowly

increase during the planning period, that use will, at some point, exceed existing facility capacity, and that use patterns would remain fairly constant over time.

Accurate information about existing use levels in undeveloped settings (SPM and SPNM) and the capacity of such settings is also lacking. Without this information, it is not possible to precisely predict capacity available in the future under various alternatives. Collecting this information and refining use-capacity ranges for undeveloped settings would be a recreation management priority in all of the alternatives, except C.

The more precise and detailed, but incomplete information mentioned in the above paragraphs would be helpful in more fully assessing the effects of the alternatives. It is not, however, essential to making a reasoned choice among alternatives because that level of understanding of effects is seldom available and has not proven necessary in similar past decisions. Historic and current trends and current use pattern information is available and has proven adequate for similar past decisions.

Based on these factors, estimates of use levels for each alternative are necessarily very general. Recreation use is determined in part by the overall capacity of the Oregon Dunes NRA. In turn, overall capacity is a function of the type and amount of recreation settings provided within different alternatives.

Desired conditions within the more developed recreation settings, such as R and RN, allow higher concentrations of users than the less developed settings, such as SPM or SPNM. Thus, alternatives with greater amounts of R and RN settings (Alternatives A, B, G) would result in a higher overall capacity for the NRA. Alternatives with fewer acres of R and RN settings (Alternative D, E, F(PA), H) would result in less capacity.

In designing the alternatives, the IDT assumed that recreation use at the NRA could increase by 30-50% over a 10-15 year period. Based on the designed intent of the alternatives and the level, type and amount of facilities and access planned, use would probably be highest under Alternative A. Alternative B would probably result in more modest use increases and Alternative G in more modest increases still. For Alternatives F(PA) and H, the IDT assumed that use would increase moderately (increasing 15-30% over a 10-15 year period) up to the capacity of the developed facilities. Alternatives D and E would increase the total amount of semi-primitive settings (SPM + SPNM) and thereby decrease the theoretical capacity of the entire NRA. We assumed that Alternative D would continue use at about the current level. Alternative E would reduce many of the developed facilities and much of the access into the interior portions of the NRA. We assumed that with most access, developments and amenities focused along Highway 101 recreation use would decline perhaps as much as 50% over the planning period.

Managing lands for other resource emphases would affect recreation use levels through their effect on the recreation settings as discussed in the previous section. Additional recreation use standards (such as night-riding curfews, stricter ORV

noise goals, dispersed camping restrictions, etc.) in all alternatives, except Alternative C, would change the nature of some current recreation opportunities and experiences. This, in turn, may promote or constrain growth in use. However, the exact effect cannot be predicted. Use limits for recreation settings would also be established under all alternatives, except Alternative C. Eventually these use limits for specific settings would constrain total use of the NRA when all settings are 100% used. No information is available to predict when this capacity point would be reached.

Effects on Current Management Problems

The alternatives were designed to address several current recreation management problems and opportunities (Figure IV-2). Four primary factors which degrade the quality of recreation experiences were identified by user groups and NRA managers during the issue-identification phase of this planning effort. These concerns are: 1) crowding is causing unsafe riding conditions in ORV riding areas and developed facilities; 2) mixing ORV and non-motorized recreationists in the same setting(s) is resulting in unsafe and unpleasant recreation conditions; 3) noise from ORVs is not confined to ORV-open areas and degrades recreation experiences of non-motorized visitors and 4) lack of coordinated management between State-managed beaches and Forest Service-managed uplands is resulting in confusion and degraded recreation experiences. Alternative C, the No Action alternative would continue current management and thus do little to address any of these problems or opportunities, except as noted below.

Crowding and Unsafe ORV Riding Conditions - Under current or even moderately increased use levels, crowding and unsafe riding conditions for ORV recreationists would be reduced under Alternatives A and G. These alternatives would open up more area (RN and SPM) for ORV riding, allowing riders to spread themselves out in undeveloped portions of the NRA. These alternatives would also develop more facilities, such as campgrounds and staging areas for ORV users. This would reduce perceptions of crowding in the developed settings (R and RN) while spreading access to, and hopefully rider distribution within, the undeveloped riding areas.

In addition, all alternatives except C would establish use limits in SPM settings (see Management of Recreation, Chapter II). Such limits are designed, in part, to increase ORV-rider safety. This would result in safer riding conditions even in Alternatives B, D and F(PA) which reduce the amount of available riding area. Similarly, enforcement of designed capacity limits in developed settings serving ORV users should alleviate crowding even under those alternatives that reduce ORV-focused facilities (Alternatives B, D, F(PA)). Other administrative tools such as zoning for different levels of use or ability, issuing permits for peak use periods, and implementing more stringent safety and ORV use standards would also remain available under any alternative as means of reducing crowding and unsafe riding conditions.

Alternatives that would implement designated travel routes through undeveloped (SPM) vegetated areas (Alternatives A, B, C, D, F(PA) and G) may also increase

safety and reduce perceptions of crowding for some users because more riding opportunities would include visual screening from other users and would emphasize slower speeds.

Mixing of ORV and Non-Motorized Recreationists - Mixing ORV and non-motorized recreationists is a source of concern for users from both groups. Mixing ORV riders and hikers/horseback riders in the same areas (RN and SPM settings) can be an unsafe situation for all parties. Also, mixing uses within the same corridors, campgrounds, and day-use facilities may degrade recreation experiences due to noise, fumes and unsafe situations.

Alternatives A, B, C, D, F(PA) and G would clearly designate areas where ORVs could operate. Beyond such designations and diligent efforts to clearly inform people of those designations, the Forest Service has no authority to close ORV use areas to non-motorized recreationists. As a result, the mixing of uses in some undeveloped areas may remain a concern under all alternatives, except Alternatives E and H which would close the entire NRA to ORV use.

Alternatives B and D would increase the physical separation between ORV and non-motorized recreationists. These alternatives would close all or portions of some developed corridors to ORV operation. Visitors with ORVs would be permitted to use facilities, but would not be allowed to operate their ORVs within these areas. Alternative G and F(PA) closes some facilities, but not entire corridors to ORV operation. It would provide less use-separation, than Alternatives B and D, but more than currently exists (Alternative C) and more than Alternative A.

Increased separation of ORV and non-motorized uses in developed (R and RN) settings would reduce problems for some recreationists by alleviating adverse impacts from noise and fumes. It would also reduce the unsafe situations resulting from mixing ORV and non-motorized recreationists in the same developed areas. In addition to separating uses in some developed corridors, Alternatives B, D, F(PA) and G would also establish quiet hours (10 p.m. to 6 a.m.) within some campgrounds. This would alleviate concerns of both ORV and non-motorized users disturbed by nighttime ORV engine or RV generator noise. Alternatives A and C would continue to allow 24-hour operation of engines in NRA campgrounds.

Alternatives A, C, and G would continue to mix ORV and non-motorized recreationists within all NRA corridors and in all, or many of, the developed facilities along these corridors. Under Alternative A some of the currently non-motorized facilities along Highway 101 would be converted to an ORV focus. Existing concerns of both user populations would likely persist. Some could be alleviated by constructing designated routes designed to remove ORV from roadways, but ORVs and passenger vehicles would continue to share the same roadways within campgrounds and developed day-use facilities. Administrative authorities, such as imposing curfews and enforcing quiet hours would still be available should it become desirable or necessary in the future to address noise concerns. Alternative F(PA) would keep all NRA corridors open to both ORV and non-ORV use, but would better separate

uses among various facilities in the corridors. It would also close corridor roads to ORV use, thereby alleviating the mixing of ORV and highway vehilces on the same roadways.

Alternatives E and H would increase the quality of recreation for some non-motorized recreation users. Mixing ORV and non-motorized recreation would not occur because the entire NRA would be closed to ORVs. However, under Alternative E reduced passenger vehicle and trail access into many of the interior and undeveloped portions of the NRA would make access more difficult and probably increase the quality of experience for those recreationists seeking quiet, solitude and a feeling of remoteness. Some, perhaps many, non-motorized recreationists would be unable to experience the interior portions of the Oregon Dunes because of the difficulty of access and facilities. Recreation access to beaches along the Oregon Dunes portion of the coast would be most restricted under this alternative.

Off-Site ORV Noise - Alternatives E and H would eliminate the problem of off-site ORV noise by closing the NRA to ORV use. Alternative C would do nothing to alleviate this problem. Alternatives B and D would reduce off-site ORV noise by imposing campground quiet hours, night-riding curfews in limited areas, and noise-reduction buffers along portions of the NRA boundary. Alternatives A and G would reduce off-site noise only slightly by imposing quiet hours in many campgrounds. Alternative F(PA) while less effective than E and H, would be more effective than all other alternatives in reducing off-site ORV noise. Alternative F(PA) would impose quiet hours in all NRA campgrounds, establish night-riding curfews in 2 of the 3 areas open for ORV use, establish a noise-reduction buffer in the Woahink-Cleawox lake area, and establish stricter ORV noise goals for the NRA. This alternative would require ORVs which currently operate at 99 decibels (dB) to operate at 95 dB by 1997 and at 90 dB by 1999. Reduced decibel outputs from ORVs would significantly reduce off-site noise impacts.

Beach - Upland Management Coordination - All of the alternatives, except Alternative C, F(PA) and G would recommend to the State that beaches be managed consistently with adjacent Forest Service uplands in terms of being open or closed to ORV use. This coordination would alleviate problems of noise, unsafe mixing of uses, and degraded recreation experiences for people who inadvertently change recreation setting by crossing jurisdictional boundaries. Alternatives C and G would make no additional efforts at coordination. Alternative F(PA) would strive to improve management coordination over the current situation, but not make upland and beach management entirely consistent with regard to motorized access. It would, pending concurrence from the State, close beaches currently open to motor vehicles south of the Siltcoos River and south of Horsfall Beach parking lot to the national forest boundary. It would also, again pending concurrence from the State, limit access to N. Spit Umpqua beach and seasonally-open South Jetty beach only to street legal class II vehicles (600-8000 pounds GVW) or ATVs for people with disabilities.

Figure IV-2. Effects of alternatives on current management problems compared to existing condition.

	ALTERNATIVE							
Recreation Problems	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Amount of mixed uses on roads	Less	Less	Same	Less	None	Less	Less	None
Amount of mixed uses in campgrounds	Same	Less	Same	Less	None	Less	Less	None
Amount of mixed uses in undeveloped areas	Same	Same	Same	Same	None	Same	Same	None
Amount of night-time campground noise	Same	Less	Same	Less	None	Less	Same	None
Amount of off-site ORV noise	More	Less	Less	Less	None	Less	Less	None
Degree of crowding in ORV developed sites	Less	More	Same	More	N/A	Same	Less	N/A
Degree of ORV crowding in undeveloped areas	Less	More	Same	More	N/A	Same	Less	N/A
Amount of ORV trespass on private land	Same	Less	Same	Less	None	Less	Same	None

Cumulative Effects

The demand for recreation at the Oregon Dunes NRA is affected not only by Forest Service actions, but also by other coastal outdoor recreation providers. These include private providers in the immediate vicinity of the Oregon Dunes NRA; the Oregon Parks and Recreation Department; and Lane, Douglas and Coos counties. State projections indicate coastal destination recreation is growing and yet neither the State of Oregon nor any of the adjacent counties have current plans to increase their coastal recreation facilities or capacities during the next 10-15 years (J. Phillips, pers. commun. G. Combs, pers. commun. R. Berry, pers. commun.). The seasonal nature of outdoor recreation along the coast makes it difficult for many potential private providers; there are no known major increases in private capacity planned in the areas immediately adjacent to the NRA.

The Oregon Dunes NRA is widely known as a premier ORV riding area. It currently attracts significant ORV use from as far away as Washington and California. Without private, state, county or other federal development of additional ORV riding areas elsewhere in Oregon or in neighboring states, this use could reach a capacity point at the Oregon Dunes NRA within the planning period. Continued development of ORV staging and rental facilties on private land adjacent to the NRA boundary could increase ORV use of open areas and hasten the need for management strategies (e.g. permits) to keep use levels within available capacity. ORV use displaced from the Oregon Dunes NRA, as a result of management changes or capacity considerations, could contribute to crowding and experience degradation in other riding areas.

Many visitors to the Oregon Dunes NRA are touring the Oregon coast via Highway 101 and the NRA is one among several destinations or points of interest. Plans are currently being developed by Oregon Department of Transportation (ODOT) to upgrade much of Highway 101 along the entire length of the coast. This would likely increase the volume of tourist traffic along the route and thus the amount of visitation to the NRA.

Effects of Recreation on Other Resources

Plant Communities and Wildlife Habitat

- Increased recreation development in corridors, development of additional corridors, and increased recreation use in undeveloped areas would eliminate or adversely impact the habitat for some plant and wildlife species or populations.

- Alternatives that encourage ORVs (Alternatives A, C, F(PA), and G) would sustain open sand in wheeltracks where there is repeated cross-country ORV traffic. Alternatives with a moderate amount of ORV traffic (Alternatives B and D) would produce a smaller amount of open sand in those areas where ORVs are allowed. Alternatives E and H would result in revegetation of vehicle tracks everywhere.

- Recreational gathering of forest products, such as mushrooms, berries or firewood could adversely affect some plant and wildlife species or populations.

- Recreational use may cause increased predation on and harassment of wildlife by domestic pets.

- Recreational use may cause wildfire, erosion, water pollution, vegetation composition changes or other problems that would direstly of indirectly reduce habitat suitability for some species.

Water

- High dispersed recreation levels in riparian and wetland areas without adequate waste disposal facilities would increase risk of contamination of water sources with human and/or domestic animal disease organisms.

- High amounts of dispersed ORV use in riparian and wetland areas would increase risk of contamination of water sources with petroleum products.

- High amounts of dispersed ORV use in riparian and wetland areas would increase risk of sedimentation of water sources.

- Recreation use and development in the area south of Tenmile Creek could adversely impact water quality in an aquifer that serves as a municipal watershed.

Soils and Geology

- Recreation use in wetland and riparian areas would increase the potential for soil compaction and subsequent erosion and/or habitat change in these areas.

- Dispersed recreational use off trails in vegetated areas could create routes that would channel water, increase soil erosion, and cause changes in plant and animal habitats through wetland drying.

Fish

- Increased recreation access and fishing pressure on smaller NRA lakes could increase harvest and contribute to reduced fish populations.

- Increased recreation access and fishing pressure on NRA streams could increase harvest and adversely affect already diminished runs of anadromous species, such as salmon and steelhead.

- Recreation development and use in riparian areas could increase sediment and otherwise reduce water quality in NRA lakes and streams and adversely affect resident fish populations.

- More fishing pressure from recreationists could reduce wild fish populations and increase demand for non-native or hatchery stocked species.

Social and Economic Setting

- More recreation opportunities could attract greater numbers of visitors which could overtax some elements of community infrastructure and services such as roads, sanitation services, and emergency services.

- More recreation opportunities would enhance the appeal of areas adjacent to the Oregon Dunes NRA and could increase jobs and income in tourist industries.

Assumptions Used

- Increases in tourism in western Oregon (Dean Runyon Assoc. 1989), increased traffic on Highway 101 (on-going ODOT traffic counts; P. Mather, pers. commun.), and active Forest Service marketing of recreation opportunities available will result in increasing recreation demand at the Oregon Dunes NRA.
- Growth of recreation use at the Oregon Dunes NRA will be held to levels consistent with facility, biological resource, and desired-experience capacity (except in Alternative C).
- An average 3% annual growth in tourism will continue in the State of Oregon for the next decade.
- Visitation to the Oregon Dunes NRA will also grow by approximately 3% annually to the point where the supply of settings and opportunities is fully used during the peak season (May through September).
- Current seasonal use patterns will continue and the supply of recreation settings and opportunities will remain less than fully used during the "off" season (October through April).
- Current recreation setting preferences and recreation activity growth projections presented in the State Comprehensive Outdoor Recreation Plan (SCORP 1989) and Recreation Needs Bulletin (1991) are accurate and will continue through the next decade.
- Changes in recreation settings, such as from ORV to non-motorized or vice versa, will not in the long term effect the amount of use those settings receive.
- There will be no radical changes from current regional and nationwide trends relating to outdoor recreation activities and leisure time in general for the next decade.

Incomplete/ Unavailable Information

- Future demand for recreation opportunities at the Oregon Dunes NRA.
- The capacity and current use levels of the undeveloped portions of the NRA.
- The effect of changes in quality of recreation experiences on visitation.

ENVIRONMENTAL CONSEQUENCES ON WATERSHED (SOIL AND WATER)

Direct and Indirect Effects

The primary direct effects of implementing the alternatives are:

- continued decreases in areas of open, drifting sand and increases in areas of deflation plains and vegetated dunes;
- changes in soil structure (compaction) adjacent to and within developed recreation areas; and
- changes in water quality.

Reduction of Open, Drifting Sand

Long-term persistent invasion of European beachgrass has encouraged the formation of a continuous high foredune adjacent to the beach. This foredune has reduced the sand supply to the inland open drifting dune system. Wind scour of the areas between the foredune and the remaining drifting dunes has formed a low, water-dominated deflation plain vegetated with sedges, rushes, shrubs and trees. The remaining open, drifting dunes are slowing in their easterly movement as they approach the Coast Range foothills, and are becoming vegetated as trees and brush encroach on their flanks. This process is expected to continue for the next several decades until much of the open sand disapears. Except for the most active dunes, local areas where intense efforts are made to remove beachgrass, and where breaches in the foredune are made and maintained, much of the NRA could ultimately become a patchwork of grassy hummocks; wet, brushy deflation plains; small patches of open sand; and high dune ridges covered with brush and trees.

The current rate of vegetation encroachment on open sand is approximately 2% per year (J. Kertis, pers. commun.). If this rate continues, the open sand that exists today will be mostly vegetated and stabilized within 50 years.

The general process of sand scour and deflation plain formation could be reversed by destroying the foredune. Preliminary data from a study being conducted at Oregon State University by Dr. Charles Rosenfeld indicates that even if European beachgrass could be successfully eradicated, the majority of the foredune would have to be physically removed to revive the inland open sand system. Sand below the first few feet of the surface is resistant to wind and wave erosion because the foredune is reinforced by logs, a discontinuous iron pan, and dense beachgrass root systems.

Some minor, localized movement of sand would occur following vegetation control activities planned in Alternatives A, B, D and G. Where local attempts are made to remove beachgrass and where narrow breaches are cut in the foredune, some sand would move inland, although probably not more than several hundred yards beyond the foredune directly behind the breach. The breaches would have to be maintained on a regular basis to prevent beachgrass invasion and rebuilding of the foredune.

Alternatives F(PA) and H include major efforts to control European beachgrass. Alternative H proposes beachgrass eradication in the area that lies between the third beach parking lot on the Umpqua Spit to Tenmile Creek. This area would become part of a demonstration project to test various methods that might change the effects of beachgrass on native vegetation and open, drifting sand. Alternative F(PA) identifies a broader area where beachgrass control could occur following site specific analysis. Methods used in either of these alternatives may include very large breaches of the foredune, chemical applications or hand pulling grass.

Alternatives C and E do not provide for any actions that would result in changes in beachgrass or sand movement beyond the foredune. No manipulation or removal would probably lead to some increases in extent of the deflation plain; vegetation encroachment on to the dunes; and consequent loss of open sand.

None of the alternatives, except F(PA), include provisions that would remove the foredune over large portions of the NRA. Alternative F(PA) proposes beachgrass control along several foredune sections. The extent of the control areas will depend on site specific analysis, finding effective control methods and funding. However, in areas where there is little or no conflict with other resources and funding is available, beachgrass control could result in renewed sand movement. Continued vegetation encroachment will probably occur in areas where no beachgrass control takes place or is unsuccessful.

Changes in Soil Structure

In areas where ORV and administrative vehicles are concentrated, or where there are trails, unimproved roads, recreation sites or administrative travelways, various degrees of soil compaction and loss of soil structure would occur. The degree and longevity of compaction would depend upon soil texture and the degree of soil development. Areas of free drifting sand would not experience compaction regardless of the amount of traffic, while moderately to well-developed sandy loam soils in vegetated areas near streams and lakes can be compacted by vehicles to the point that growth of vegetation may be adversely affected. Most day-use and camping facilities are in areas where the more well developed, easily compacted soils are found.

Alternatives A, B, C, F(PA) and G would result in some compaction from concentrated use of facilities such as campgrounds, staging sites and interpretive sites. No measurable changes in soil structure over natural levels are expected in Alternatives D, E, or H.

Changes in Water Quality

Sediment/turbidity - Alternatives A, B, C, F(PA) and G would be most likely to cause short duration increases in management-associated sediment and turbidity from construction of new facilities such as campgrounds, staging sites and interpretive sites. No measurable changes in turbidity or sediment over natural levels are expected in Alternatives D, E, or H.

Since sand is the primary component of the soils in the inland dune sector, these sediment increases are expected to be small and only last a few hours. Sediment would have negligible short-term effects on either water quality or aquatic habitat.

Physical removal of aquatic vegetation in lakes may contribute sediment and organic residues to downstream areas.

Toxic Materials - Contamination of soils and water with petroleum products is expected in areas where motor vehicles including ORVs are concentrated. Areas where vehicle storage, staging and maintenance activities occur inevitably experience inadvertent spills, and even indiscriminate disposal of petroleum waste. Also, petroleum or herbicide may be spilled occur in streamside areas where there are recreation, wildlife or fish enhancement projects. These materials move rapidly through the sandy soils to surface and ground water. The actual amount of such contamination is highly variable and cannot be predicted. Some amount of contamination with petroleum products would be likely in all alternatives. Mitigation measures such as standards and guidelines that limit motorized dispersed camping (Alternatives A, B, D, F(PA) and G) would reduce, but not eliminate the potential for this impact. Spills would be minimal in size, and very rare in Alternative E and H.

Disease Organisms - Although disease organisms are uncommon in Forest streams, there is some risk that intestinal diseases could spread through water when waste from humans or other animals enters streams. This risk would be highest in those alternatives that support fairly high to high recreation levels (Alternatives A, B, C, F(PA), G, H), and least in those alternatives that restrict or discourage access (Alternatives D, E).

Mineral Content - There is evidence of increasing mineral content in the water of the dunes aquifer which provides industrial and domestic water to the communities of Coos Bay and North Bend. The increased mineral content (mostly iron) is the result of decomposing vegetation increasing the acidity of water percolating into the aquifer. The more acidic water picks up iron as it moves through the fine-grained sand and carries it into the aquifer. Alternative F(PA) is the only alternative that proposes treating vegetation to reduce mineralization of the dunes aquifer.

Cumulative Effects

Streams which drain private and state land upstream from the NRA may have elevated temperatures and higher levels of sediment and toxic materials where logging activities disturb streamside vegetation, cause erosion, or introduce human waste or petroleum products. These effects would accumulate in the large lakes downstream, and in the outlet streams that flow through the NRA. Activities on the NRA create far less disturbance, and should not noticeably increase these cumulative changes in sediment and temperature.

Mitigation Measures

- Use permits and designated dispersed camping sites to control vehicle concentrations, particularly near streams and wetlands, to prevent petroleum spills and dumping. Provide education and enforcement to encourage compliance. This would greatly reduce the likelihood of contamination of surface water.

- Provide toilets at all recreation sites especially where large concentrations of people are likely (including undeveloped areas). Toilets would discourage the practice of using areas near camping and staging areas for human waste disposal, greatly reducing the likelihood of bacterial contamination of surface and ground waters.

- Minimize administrative and recreational activities near riparian habitats. Reducing the amount of vehicle and foot traffic would allow sufficient time for recovery and regeneration, and would provide a high likelihood of long-term stability of the ecosystem.

Indirect Effects on Other Resources

Recreation

- As the area becomes more vegetated it becomes less suitable for some types of recreation.

Plant Communities and Wildlife Habitat

- As the dunes change from open sand to deflation plains, wildlife habitat would increase.

- As deflation plains continue to advance and become larger, total area of wetlands would increase proportionally.

Fish Habitat

- Further decline in lake water levels from groundwater pumpint would result in more losses of fish habitat.

Scenery

- Predicted changes in dune systems resulting from spread of European beachgrass would dramatically affect scenery by changing the area from an open sand dune landscape to a vegetated complex of hummocks, low hills and steep ridges.

Assumptions Used

- European beachgrass can be eradicated only through means applied consistently over many years to the entire beach/foredune complex within the NRA.
- The foredune is not likely to be removed in the forseeable future by natural forces (ocean waves or wind) even if European beachgrass is eradicated.
- Foredune removal is impractical and too expensive to be considered for any significant portion of its extent in the NRA.
- Some motorists (ORV and other) are likely to spill or dump crankcase oil on the sand in camping and staging areas.
- Rates of spread of vegetation on to open sand will remain constant over time.
- Sand is available off-shore to replenish the beach and dunes.

Incomplete/ Unavailable Information

- Site-specific effects of wind erosion rates on movement and revegetation of existing dunes.
- Long-term rates of expansion of deflation plains and of advance of European beachgrass.
- Long-term potential supply of sand from the beach and offshore areas.

ENVIRONMENTAL CONSEQUENCES ON SCENERY

Direct Effects

All land disturbing activities have a direct effect on the visual resource. These effects can be either positive of negative depending on a variety of things like location, size, color and viewing location.

Recreation Mix

Alternatives with high levels of recreation development (Alternatives A, B and G) have the highest potential for decreasing scenic quality. Ground disturbing activities, like road and facilities construction have a high potential of not harmonizing with the natural character of the landscape. The development of dispersed camping opportunities also have the potential of degrading the landscape, but at a much smaller scale.

Plant, Fish and Wildlife Habitat Management

Alternatives that prescribe management activities for plant, fish and wildlife habitat would have little direct effect on the visual resource. Generally, these facilities would be naturally appearing and to the average dunes visitor would have very little impact.

Wetlands Management

Management activities in all alternatives would contribute to the natural appearing landscape.

Vegetation Management

Alternatives (A, B, C, D, F(PA), G and H) that remove non-native and other encroaching vegetation would increase the visual variety. The degree to which variety is increased is a direct result of ground, both foredune and inland area, that is treated.

Research Natural Areas

Research Natural Areas would add to the naturally appearing condition of the landscape because most resource-modifying management activities, as well as road and facility development would be precluded .

Wild and Scenic Rivers

Alternatives that designate rivers for this category would maintain rivers and riparian zones in a naturally appearing state.

Indirect Effects

Scenery protected within a viewshed would usually improve the quality of recreation experiences.

Alternatives where people are encouraged to gather, either along a shoreline, at a developed site, or other facility have an indirect effect on the visual resource. Vegetation can be trampled or unrooted, user-built trails tend to appear, and litter detracts from the naturalness of the scenery.

Projects that fall within a protected viewshed would have to be designed and located in such a way as to meet the VQO of that viewshed. This may affect the appropriateness of some project is these areas.

Cumulative Effects

Cumulative effects would be identical to direct effects with the exception of the Highway 101 viewshed. This viewshed is the only one where effects of what other land managers/owners do may affect the appearance of the viewshed. Where this occurs, the cumulative effects would be a more altered appearance than predicted.

Mitigation Measures

The best way to mitigate the adverse effects of management activities is to design them to harmonize with the natural landscape. The degree to which an activity harmonizes is based on whether its form, color, line and texture replicate those of the characteristic landscape.

Another option to improve or maintain visual quality is to physically locate or relocate activities so that they are seen by few visitors. This may include locating them away from important corridors, viewing locations and existing recreation facilities.

Two other short-term management alternatives are rehabilitation and enhancement.

Rehabilitation - this includes activities which return a landscape to a desired level of visual quality. Such rehabilitation projects might include:

- Vegetating areas to eliminate obtrusive edges, shapes, patterns, colors, etc.
- Altering the terrain to blend with natural-appearing slopes.
- Revegetating cut and fill slopes.
- Treating vegetation to restore natural geologic processes (e.g. sand movement) and native plant communities.
- Removing or concealing structures containing obtrusive form, color, line or texture.

Enhancement - a short-term management alternative aimed at increasing positive visual variety where little variety now exists. Examples of this might include:

- Manipulating vegetation to open up vistas or screen out undesirable views.
- Adding native plant materials to enhance color, form or texture to an area.

Assumptions Used

- It is physically possible to locate proposed activities so that they would meet the visual quality objectives.
- Breaching the foredune would create visual variety and landscapes affected by the breach would appear natural.
- If European beachgrass is not controlled or eradicated it would continue to spread and visual diversity would be lost.
- The more concentrated an area with facilities, the more difficult it is to retain a natural-appearing landscape.

Incomplete/ Unavailable Information

- The exact acres and location of the seen area of each viewshed.
- The existing condition and visual quality of all seen areas.
- Impacts of proposed projects. Impacts cannot be fully determined until plans are more fully developed for each alternative.

ENVIRONMENTAL CONSEQUENCES ON PLANT COMMUNITIES AND WILDLIFE HABITATS

Direct and Indirect Effects

Actions described for alternatives can affect the amount and quality of wildlife and plant habitats, the diversity and spatial arrangement of these habitats, and the species composition and richness within a particular habitat. The amount of habitat provided would vary between alternatives depending on how much is created, maintained or removed in that alternative. Alternatives can also affect the quality of a particular habitat by affecting physical characteristics of the habitat (soil, water, etc.) or by changing biological features. Biological changes which affect the quality of a habitat include natural or human-induced plant succession, habitat fragmentation, changes in species composition and diversity of plant communities, and loss and/or change in habitat components (dead and down wood, well-developed shrub layer, snags, decomposers). Conversely, alternatives may include management activities which enhance existing habitats by providing vegetation structure or other important habitat components.

The quality of a plant or wildlife habitat also depends on the extent and degree of human use of the area (both recreation and administrative). Both motorized or nonmotorized use may impact plant species either directly by physical trampling or removal of individual plants or indirectly by changing water regimes, introducing toxins, introducing fire, etc. Trampling may increase the rate of spread of non-native plant species which are more adapted to colonizing disturbed sites. Excessive human use may result in soil erosion and water channelization, effectively changing the numbers and kinds of plant species supported by a particular habitat.

Additionally, numerous studies indicate that increased human use of an area disturbs many wildlife species (Sampson 1983). Nests, eggs or young may be crushed by foot travelers, equestrians, vehicles or dogs. Human disturbance can alter normal behavior patterns of birds and mammals resulting in disrupted nest attentiveness; abandonment of nests, young, or breeding territories; reduced productivity; or changes in foraging behavior (Pomerantz et al. 1988, Knight and Skagen 1987). Many birds and mammals flee or flush when disturbed, resulting in increased stress levels (which may increase incidence of disease), increased use of important energy stores, and increased risk of predation on nests or young. If the disturbance is frequent and prolonged, individuals may permanently abandon a habitat. Human disturbance of preferred habitats may cause individuals to shift to less than optimal habitats (Erwin 1980).

Moreover, human disturbance almost always decreases wildlife species diversity. Some species are quite tolerant of human disturbance and may habituate even to frequent interactions with humans or vehicles. However, many intolerant species may permanently abandon a disturbed area; species including the great-blue heron, the bald eagle, and numerous shorebirds intolerant of human disturbance may

leave otherwise suitable habitats. Therefore, habitats which receive heavy recreation or administrative use may support large populations of tolerant wildlife species which replace intolerant species (Josselyn et al. 1989). Many tolerant scavenger species including bears, racoons, opposums, skunks, crows and jays are actually highly associated with areas of high recreation concentration such as campgrounds or picnic areas. Concentrations of these species in recreation areas often results in recreation conflicts and may impact wildlife populations by changing natural feeding patterns and by increasing the rate of wildlife disease spread.

Human use is more likely to result in wildlife disturbance in open habitats with little escape cover; disturbance is also more significant during the breeding season when flight may result in egg cooling, increased predation on nests or young, or permanent abandonment of nests or young. Heavy human use in an area may also affect plant and animal habitats through contamination from human waste disposal, toxins, petroleum spills, garbage dumping or by introducing fire.

Much discussion has taken place regarding the amount of disturbance resulting from motorized traffic versus non-motorized traffic. Foot, equestrian, bicycle and motorized vehicle traffic can disturb plant and wildlife habitats. However, in general, the impacts of motorized traffic are greater than those produced by non-motorized traffic largely because: 1) the physical impact of a heavy, power-driven machine is greater, 2) the range or area covered by a motor vehicle in a given amount of time is larger, and 3) the area disturbed by sight and/or sound is typically greater for motorized traffic (Fowler 1978). Thus habitats open to ORVs and those open to restricted riding sustain greater effects than similar habitats open only to non-motorized traffic. For the most part, areas open for unrestricted riding (Management Area B) were selected because they are relatively unvegetated and support few wildlife species; however, the alternatives allocate restricted riding areas in several vegetated habitat types (Figure IV-3). These habitats would receive greater impacts and would be impacted for longer periods of time than similar habitats not available for ORV riding.

Figure IV-3. Acres of ORV restricted riding area for wetland and forested habitat types.

	ALTERNATIVE							
Habitat Types	A	B	C	D	E	F(PA)	G	H
Deflation Plain	4,330	650	3,640	1,560	N/A	3,945	3,630	N/A
Upland Forest	2,540	10	1,440	60	N/A	510	1,340	N/A

Habitats in closed or ORV restricted areas may be disturbed by vehicles operating in adjacent areas open to ORVs or by violations of vehicle closures. Vehicle violations (ranging from occasional to frequent) do occur in various habitat types, as evidenced

by vehicle tracks, although the exact number of violations is not known. Alternatives which open large areas to ORVs or those with more complex patchworks of open/closed areas increase the potential for disturbance of, or vehicle violations into, closed areas (Figure IV-4).

Figure IV-4. Miles of interface between areas open to ORVs and vegetated areas closed to ORVs.

	ALTERNATIVE							
Habitat Types	A	B	C	D	E	F(PA)	G	H
Deflation Plain	38.5	2.5	30.4	5.6	N/A	28.8	38.2	N/A
Hummock	25.0	17.4	21.5	6.7	N/A	14.8	23.4	N/A
Upland Forest[1]	9.6	1.6	8.3	4.7	N/A	7.0	8.7	N/A
Other Vegetated Areas	5.6	2.3	5.7	0.9	N/A	3.4	6.0	N/A
Total	50.2	30.7	48.4	16.3	N/A	34.3	47.2	N/A

[1] Tree island perimeters not included in these figures.

Effects on Specific Habitat Types

Upland Forest Habitats - Forested areas within the NRA, including both shore pine and transition forests, provide habitat for many plant species and for a wider array of wildlife species than any other habitat. Species dependent on upland forests have widely differing requirements; therefore, changes in forest habitat may affect one species quite differently than another. Two major categories of species may be described: forest interior species which require large, undisturbed tracts of forest habitat, and forest edge species which benefit from roads and clearings. Important biological components of forested areas include snags, dead and down wood, layering or vertical structure, trees of diverse age classes, large diameter trees, clearings to increase horizontal diversity, and an undisturbed litter layer. The presence and abundance of these components will vary between alternatives as a result of construction activities, recreation activities and habitat management activities.

Forested habitat would be physically altered (trees or other important habitat components removed) by construction activities associated with building new roads, trails, designated travel routes and facilities. Alternatives which include high levels of road, trail and facility construction (Alternatives A, B, G) would remove more habitat than those which include the addition of only a few miles of roads and trails and few new facilities (Alternatives D, F(PA), H; Figure IV-5). Alternative E would actually allow some forested habitat to regenerate on abandoned trails, roads and facilities.

The construction of roads, trails and designated travel routes can also affect the suitability of forested habitat by increasing forest fragmentation. Fragmented forest habitat would be less suitable for forest interior species which require large, undisturbed tracts of woodland. Although the construction of both hiking and ORV trails or designated routes in these alternatives would slightly enhance habitat for those species benefiting from travel corridors and increased edge habitat, forest edge is not limited on the NRA, while undisturbed forest interior may be. Those alternatives which include many miles of roads, trails and designated travel routes (Alternatives A, B, G) would result in highly fragmented forested areas. Alternatives C, F(PA) and H would be slightly fragmented and the remaining alternatives would exhibit very little or no forest fragmentation.

In addition to the effects of facility and trail construction, recreationists themselves may physically disturb plant and wildlife habitats by removing or altering important forest habitat components or by directly disturbing wildlife. These effects would be limited primarily to areas within a short distance of facilities, roads and trails; however, recreationists leaving trails and/or designated travel routes would impact greater areas of forested habitat. Both developed and dispersed campers decrease the presence of dead and down woody material (important to insect eaters, scavenger species and amphibian populations) in forested areas. Dispersed camping also disturbs underbrush and herbaceous material and increases the risk of fire damage in forest habitats. Mushroom gatherers may decrease populations of fungi in localized areas, decreasing the amount of mushrooms available to small mammals and deer which rely on these for food. These effects would be most pronounced in alternatives which provide substantial access to forested habitat interiors (Alternatives A, B, C, F(PA), G), those with many miles of interface between ORV riding and forested habitats (Alternatives A, C, F(PA), G), and those which are expected to substantially increase developed and dispersed camping (Alternatives A, B, G). Alternatives A and G would result in the most disturbance, Alternatives B, C and F(PA) would exhibit moderate levels of disturbance. Restrictions on motorized dispersed camping in Alternatives A, B, F(PA) and G would mitigate, but not eliminate these effects. The remaining alternatives (Alternatives D, E, H) would exhibit few or none of these effects.

Alternative F(PA) would provide the highest level of protection to globally significant plant communities that occur in upland forest habitats (shore pine/hairy manzanita-bearberry and Port Orford cedar/evergreen huckleberry). This alternative allocates globally significant plant communities to MA10(F), which provides for active monitoring and management of these communities to protect and maintain them. Alternatives B, D, E, and H provide protection to forested globally significant plant communities from motorized vehicle recreation, but do not provide the active monitoring and management provided by Alternative F(PA). Alternatives A, C and G have at least some of these communities in areas designated for off-road vehicles on designated routes, and, therefore, a greater potential for disturbance from off-road vehicle recreationists leaving designated routes.

In addition to the effects of general recreation, ORV recreationists can affect forested habitats by leaving designated routes, by violating closures and physically impacting vegetation, by eroding sand on forest edge or tree island banks, by disturbing forest edge species, and by precluding undisturbed wildlife travel between tree islands and other habitats. ORV activity in or adjacent to tree islands or adjacent to other forested habitats can either compact or erode soil, which in turn damages tree roots and soil microorganisms that are beneficial to plants, such as mycorrhizal fungi. This would impact the health and vigor of plants. Benefits of mycorrhizal fungi to plants include enhanced uptake of nutrients and water, protection against pathogens, improved resistance to drought, enlarged root systems, and tolerance of heavy metals (Molina and Amaranthus 1991). Tree island habitats and forest edges would be impacted under alternatives which support high levels of ORV use (and therefore expose more tree islands to these effects) (Alternatives A, G) and/or those which have many miles of interface between unrestricted riding areas and forested habitats (Alternatives A, C, F(PA), G) (Figure IV-4). These effects would be less under Alternatives B and D which include fewer ORV riding areas and would be nonexistant under Alternatives E and H which include no riding area.

Habitat management activities would also have a great affect on the quality of forested habitats. Management actions would be designed to enhance vegetative diversity within a given stand as well as to increase the diversity of forest habitat types across the NRA. Alternatives D, F(PA) and H would provide the most suitable forested habitat because some forested areas would be managed to optimize wildlife and plant needs. Alternatives A, B, C, E and G do not include extensive management of forested habitats. Under these alternatives, forested areas would provide moderately-diverse habitat for wildlife and plants, although diversity would likely decrease over time as transition forest clearcuts convert to second growth stands.

In summary, Alternatives D, F(PA) and H would provide the most diverse, least fragmented, least disturbed forested areas. Forested areas would be undisturbed and unfragmented in Alternative E, but would not exhibit vegetative diversity while forested areas under Alternatives A, B, C and G would be more fragmented and disturbed and less diverse than forested areas in other alternatives.

Figure IV-5. Condition of various components of upland forest habitat.

	ALTERNATIVE							
	A	B	C	D	E	F(PA)	G	H
Amount of forest removed by construction	Mod.	Mod.	Low	Low	None	Low	Mod.	Low
Degree of forest fragmentation	High	High	Mod .	Low	V. Low	Mod.	High	Mod.
Loss of important habitat components (snags, dead and down wood, mushrooms, litter layer, etc.)	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Low
Level of general recreation disturbance	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Mod.
Amount of disturbance to forest edges	High	Mod.	Mod.	Low	None	Mod.	High	None
Degree of forest diversity	Low	Low	Low	High	Low	High	Low	High
Overall Habitat Condition	Poor	Fair	Fair	Excell.	Good	Good	Poor	Excell.

Riparian Habitat - Riparian habitats would be most affected by long-term changes in water levels, types and levels of recreation use, and long-term changes in plant succession. Although water levels have been declining in some places on the NRA, water levels are not expected to change between alternatives. Therefore, the alternatives would affect riparian habitat primarily through recreation construction, recreation activities, and habitat management.

Recreation opportunities are often focused in riparian habitats because water is an attractive component of recreation experiences for many people. Trails and roads are often designed to follow creek or river courses or lead to lakes, ponds or other water bodies and recreation facilities are often placed near water sources as well. Construction activities - and the resulting trails, roads or facilities - would physically alter riparian habitat and could increase bank erosion and water contamination. Because riparian areas are typically quite narrow (less than 100 feet wide), construction within the riparian strip may effectively reduce the quality of riparian habitat in the area. Alternatives which include many roads, trails and facilities along rivers and lakes (Alternatives A, B, C, G) would impact riparian habitat the most (Figure IV-6). Alternatives D, F(PA) and H include several new angling facilities on lake edges which would impact a small localized area of riparian habitat. Alternatives D and F(PA) would reduce impacts to some riparian habitats by removing or rerouting trails out of riparian habitat and by removing or otherwise mitigating the effects of campsites adjacent to water bodies. Alternative E minimizes impacts to riparian areas by eliminating many trails and campgrounds adjacent to water. Riparian habitat would be further protected in Alternatives D, E, F(PA)

and H which would nominate NRA streams for Wild and Scenic River status which would preclude most construction activities).

Both water-based (fishing, boating, fish-viewing) and non-water based (hiking, dispersed camping) recreationists may also affect riparian habitats by physically removing or altering important habitat components or by increasing human disturbance within the riparian corridor (Brown 1985). Recreation use in adjacent aquatic habitats may also affect the quality of riparian habitat by affecting bank stability. Alternatives which include high recreation levels (Alternatives A, B, G), high ORV recreation levels (which allows access to more remote riparian habitats) (Alternatives A, G), and those which substantially increase angler access to lakes and streams (Alternatives D, F(PA), H) would impact riparian habitats by increasing vegetation disturbance and human disturbance of wildlife, and potentially decreasing wildlife and plant diversity. However, facilities constructed under these latter alternatives would be designed to focus angler use in small areas, thereby reducing overall riparian impacts.

In general, most negative effects on riparian habitat associated with both construction and recreation disturbance can be minimized or eliminated at the project planning level through various means including: routing trails away from riparian habitats, screening trails and designated campsites away from water bodies, designing new trails or regrading existing trails to reduce erosion, prohibiting or limiting dispersed camping and ORV riding near water bodies (Alternatives A, B, D, F(PA) and G), providing information on low-impact camping to visitors, and restricting motorized boat use in aquatic habitats.

Habitat management activities in Alternatives D, F(PA) and H would enhance existing riparian habitats. Under these alternatives, management activities could be directed at providing important riparian components which currently are limited or nonexistant. The remaining alternatives do not include riparian habitat management objectives.

In summary, Alternative D would provide the most diverse, least disturbed riparian habitat. Riparian habitat in Alternatives A, B, and G would be highly disturbed and no habitat management would be planned; riparian areas would be least suitable in these alternatives. Alternative E would provide unmanaged, but undisturbed riparian areas while Alternatives F(PA) and H would provide somewhat disturbed, but managed riparian areas; all 3 of these alternatives would provide a relatively high amount of suitable riparian habitat for wildlife and native plant species.

Figure IV-6. Condition of various components of riparian habitat.

	ALTERNATIVE							
	A	B	C	D	E	F(PA)	G	H
Amount of riparian habitat removed by construction	High	High	Mod.	Low	None	Low	High	Mod.
Level of localized human disturbance (from fishing facilities)	Mod.	Mod.	Low	High	Low	High	High	High
Level of general recreation disturbance	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Mod.
Amount of riparian habitat managed	Low	Low	Low	High	None	High	Low	High
Overall Habitat Condition	Poor	Poor	Fair	Excell.	Good	Good	Poor	Good

Meadows - Meadow habitats within the NRA would be most affected by ground-disturbing activities within the meadow, recreation use and habitat management activities. All alternatives except for C and E include some level of construction in or near meadow habitat; more meadow habitat would be removed in Alternatives A, B and G than in Alternatives D, F(PA) and H.

Increased human use would also affect the quality of meadow habitat because meadow vegetation is particularly susceptible to trampling and disturbance. Excessive physical disturbance may allow non-native weed species to outcompete and replace native vegetation. Alternatives A, B, and G would substantially increase recreation use in both Butterfield and Lodgepole meadows. Alternatives C, D, E, F(PA) and H provide for no or low-level human use in meadow habitat; therefore, human disturbance to the meadows would be low under these alternatives.

The level of habitat management in meadows would also largely determine meadow quality. Habitat management objectives for meadow habitat would include managing for native plant species and maintaining meadow habitat over time. Alternatives D, F(PA) and H include actions designed to enhance meadow habitat and would therefore provide the most suitable habitat for wildlife and meadow plant species over time. Alternatives which do not include active meadow management (Alternatives A, B, C, E, G), meadow habitat would gradually be replaced by low shrub habitat and eventually transition and/or shore pine forest.

In summary, Alternatives D, F(PA) and H would provide the least disturbed meadow habitat over time that would be the most suitable for wildlife and meadow plant species. Alternatives C and E would provide relatively undisturbed meadow habitat in the short term, but this habitat would eventually convert to upland forest. The remaining alternatives would provide somewhat disturbed meadow habitat within

the planning period; meadow habitat under these alternatives would convert to upland forest.

Beach Strand - The alternatives can affect the amount and quality of beach habitat through recreation activities which compact sand, physically disturb plant and wildlife habitat, or directly disturb wildlife. Though protective measures would be taken to protect sensitive plant populations and communities, such as the globally significant American dunegrass community, the amount and quality of potential habitat available for these plant species and communities to colonize would be affected by beach strand activities. Plant species of beach strand habitats, such as yellow sandverbena, which is not currently on the Forest's Sensitive Plant List but appears to be declining on the NRA, would also be affected by activities in these habitats. Sand compaction can destroy subsurface invertebrates which are important food sources for many shorebirds (Boyd and DeMartini 1977). ORVs would compact sand more severely than foot traffic and can cover greater distances along the beach than can foot travelers in the same time period. Therefore, alternatives which open large areas of beach to ORVs (Alternatives A, C, G) would result in the most sand compaction (Figures IV-7 and IV-8). Alternative F(PA) would result in a moderate amount of sand compaction. The remaining alternatives would result in very little or no sand compaction.

Recreationists may also reduce the suitability of beach habitats by trampling native beach plants, shorebirds or their nests or by increasing human disturbance of foraging or resting wildlife. The NRA beaches support some of the highest populations of wintering sanderlings along the Pacific coast; these small shorebirds are particularly susceptible to human disturbance and may switch their foraging period to dusk and night when disturbed (Burger and Gochfeld 1991). A comparative study on the eastern U.S. coast found that shorebird populations were twice as numerous and bird species richness was higher on beaches closed to ORVs as compared to those open to vehicles (Florschuts and Williamson 1978). Some nesting bird species are also disturbed by foot traffic (Godfrey et al. 1975). Marine mammals including the harbor seal, elephant seal and sea lion use the beach for loafing and basking during the spring molt; these species are quite intolerant of human disturbance.

The degree of trampling would depend on the type of recreation, the number of recreationists expected, the number of access points provided, and the amount of beach open to vehicle traffic. In all alternatives, human disturbance of some wildlife and native plant species would be quite high on beaches adjacent to parking lots or other foot travel access points; disturbance would decrease with increased distance from an access point. Disturbance would be lowest in stretches of beach closed to ORVs and far from foot access points. All alternatives, except E include many access points along the beach; thus the number of visitors expected and the amount of beach open to vehicle traffic will better predict the amount of suitable beach habitat. Alternatives A and G are expected to increase the number of recreationists and the amount of beach open to motorized traffic; these alternatives would provide very little suitable beach strand habitat. Alternatives C also provides little suitable beach habitat because it supports moderate recreation use levels and opens large

areas of beach to ORVs. Alternatives B, F(PA) and H increase recreational use of beaches, but close some or all beaches to ORVs. These alternatives would support a range of suitable beach habitat. The remaining alternatives (Alternative D and E) would reduce use of beaches and would close most beaches to ORVs; these alternatives would provide the most suitable beach strand habitat for wildlife and native plant species.

Figure IV-7. Approximate miles of undisturbed beach.

	ALTERNATIVE							
Habitat Types	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Miles of beach closed to vehicles	10.6	35.8	6.8[1]	30.9	39.2	16.5[2]	7.8[1]	39.2
No. of beach access points	14	12	12	11	3	12	12	11
Miles of remote beach[3]	6.0	26.5	2.8[4]	23.2	34.6	9.0	0.0[5]	18.9

[1] 8.9 additional miles are seasonally closed to ORVs
[2] 5.0 additional miles are seasonally closed to ORVs.
[3] Remote beach includes beaches closed to vehicle traffic and greater than 1 mile from vehicle access
[4] 4.1 additional miles are seasonally "remote" due to season vehicle closures
[5] 4.4 additional miles are seasonally "remote" due to seasonal vehicle closures

A second important factor affecting the amount of beach habitat available is the presence of European beachgrass. Significant amounts of beach, including sand spit areas critical to the nesting snowy plover, have been lost due to the creation of the foredune. Removal and control of European beachgrass on the foredune would expand beach habitat eastward widening the beach strand. Creating new beach strand habitat would facilitate colonization of the area by native beach plant communities unless the area is used by ORVs. More open sand would also be available for those species which forage and/or nest above the mean high tide line.

Alternatives C and E do not provide for beachgrass control so no new beach habitat would be created under these alternatives. Beachgrass control in the remaining alternatives would create additional beach habitat. Those alternatives which include beachgrass control in areas with limited human access (Alternative D and H) would provide more suitable wildlife and native plant habitat than those in which beachgrass control is aimed at enhancing recreation (Alternative A, B, G). Alternative F(PA) proposes beachgrass control in a mixture of settings. RNA management could include beachgrass control; therefore alternatives which designate one or more RNAs (Alternatives B, D, E, F(PA), H) may increase beach acreage. These segments of beach would receive little human use and would therefore provide relatively undisturbed beach habitat.

In summary, those beaches which receive the greatest human disturbance (Alternatives A, C, G) are the least suitable for plant and wildlife habitats. Alternatives B,

F(PA) and H provide some undisturbed suitable habitat, while Alternatives D and E which include many miles of undisturbed beach would provide the most suitable beach strand habitat.

Figure IV-8. Condition of various components of beach strand habitat.

	ALTERNATIVE							
	A	B	C	D	E	F(PA)	G	H
Amount of sand compaction	Mod.	Low	Mod.	Low	V. Low	**Mod.**	Mod.	V. Low
Miles of disturbed beach	High	Low	High	Low	Low	Mod.	High	Mod.
Level of general recreation disturbance	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Mod.
Amount of new undisturbed beach created[1]	None	Low	None	Mod.	Mod.	Mod.	None	Mod.
Overall Habitat Condition	Poor	Fair	Fair	Excell.	Excell.	**Good**	Poor	Good

[1]Includes beach created through non-native beachgrass control in, and outside of, RNAs

Wetlands - Wetland habitats would be most affected by construction activities, types and levels of recreation, and habitat management activities. Constructing roads, trails, designated ORV routes and facilities in wetland habitat would slightly reduce the wetland landbase (by removing actual road and/or trail portions from the habitat base) and by potentially channelizing and thereby draining wetlands. ORV trails and designated routes are more likely to channelize wetlands than are foot or equestrian trails because tires scour and throw sand more than foot traffic (Fowler 1978). Draining, or even partially draining, wetlands may alter the water regime enough to result in plant community changes. Channelized wetlands may not hold water long enough into the breeding season to be suitable for waterfowl breeding habitat. Dissecting wetlands with roads and trails would also increase habitat fragmentation making the areas less suitable for interior wildlife species and potentially affecting long-term viability of native plant populations. Ground-disturbing activities within a wetland may also increase the risk of spreading non-native plant species. These effects would be fairly high in Alternatives A, B, C, F(PA) and G which include many miles of roads, trails, designated routes and/or facilities (Figure IV-9). Of these, Alternatives A, C, F(PA) and G would potentially affect more wetland areas because more wetland area is allocated for ORV restricted riding. Regular maintenance of designated ORV routes in Alternatives A, F(PA) and G would reduce, but not eliminate vehicle impacts in wetlands. The construction of wetland-related wildlife viewing areas in all alternatives except E would cause some localized physical disturbance of wetland vegetation. However, viewing areas would be constructed outside of critical wetland habitats and would be designed to reduce physical impacts to wetlands vegetation.

High levels of recreation use would also affect wetland habitats because wetland soils are compacted easily and wetland vegetation is particularly sensitive to trampling. Human disturbance may also affect species using wetland habitats. In one California study, recreation use in wetlands resulted in decreased use of the area by particularly sensitive species; sensitive birds flushed at distances of 75-175 feet from human disturbance (Josselyn et al. 1989). Alternatives which support high recreation levels (Alternatives A, B, G), particularly those with high levels of off-road restricted riding (Alternatives A, G) would result in some vegetation trampling and human disturbance of wetland-related wildlife. These alternatives also have the greatest potential to impact wetland endemic plant species and globally significant plant communities (shore pine/slough sedge and bog blueberry/tufted hairgrass). Though populations of plants on the Forest's Sensitive Plant List are protected, these alternatives have the greatest potential to reduce the amount and quality of potential habitat available for sensitive plants to colonize and expand their range. The Forest's Sensitive Species which occur in wetland habitats are Oregon anemone, large-awn sedge, several-flowered sedge, water pennywort, Frye's moss, bog clubmoss, common adder's tongue, North Pacific plaintain, Pohlia moss, and wool-grass. ORV activities in non-vegetated habitats can also affect adjacent wetlands by: increasing the risk of violations in wetlands, changing water flow patterns into wetlands, and reducing or precluding the growth of wetlands vegetation in the eastwardly expanding deflation plain. Alternatives with many miles of interface between open riding areas and wetlands (Alternatives A, B, C, F(PA), G) will exhibit these effects more than the remaining alternatives.

These effects could be partially mitigated by designating relatively few ORV routes or trails through wetland habitat, by creating a buffer around wetland habitat, by screening trails and designated routes, by prohibiting concentrated dispersed camping in wetlands areas, by designing boardwalks and/or raised surfaces for foot and vehicle traffic through wetlands, and by providing educational signing and/or other information about the value of wetlands.

The Oregon Dunes NRA has issued a special use permit that allows for extraction of groundwater under an existing water right. The permit establishes terms that must be met in accordance with Congressional records indicating an expectation that surface waters be protected from excess drawdown and other federal regulations protecting wetland loss. Currently, there is controversy over the effects groundwater pumping is having on surface water and wetland vegetation. The permitee has contracted a study to assess this situation. Study results will provide a basis for assessing current and proposed future increased pumping effects. The permit expires in 1999 and is included in all alternatives.

The level of wetlands management in each alternative would also have a great affect on the amount, quality and diversity of wetland habitat. Although deflation plain wetlands continue to expand eastward as wind scours the eastern deflation plain edge down to the water table, rapid succession quickly converts early seral stage wetlands (grass, sedge, rush, low shrub) into later seral stages (tall shrub, shore pine). Thus, over time, the deflation plain wetlands would convert to habitat

types which resemble upland types in terms of vegetation structure and the types of plant and wildlife species they support. All of the alternatives, except Alternative E, contain some level of wetlands management. Alternatives D, F(PA) and H which include moderate to high levels of wetlands management would maintain more wetland habitats, and more diverse wetland habitats than the remaining alternatives (Alternative A, B, C, E, G). Managed wetlands in Alternatives A, B, C, F(PA) and G are in areas adjacent to ORV riding areas or are near roads and/or trails; thus few remote, undisturbed early seral stage wetlands would exist. Alternatives D and H would manage a range of easily-accessible to remote wetlands and would thus maintain undisturbed, early seral stage wetlands. Under Alternative E, no wetlands management would take place so later seral stage wetlands would predominate.

Because all deflation plain wetlands are a direct result of the foredune establishment, successful attempts to control beachgrass along the foredune would result in some loss of wetlands due to inland sand movement. This loss of wetlands is expected to be minimal as the amount of foredune removed and the subsequent influx of sand would be minimal during this planning period, and because treatment areas may be selected adjacent to narrow deflation plains or those in later successional stages.

Alternatives which include more beachgrass control (Alternatives A, F(PA), G, H) could result in the most (but still minor) wetlands loss. Alternative F(PA) now incorporates a much more aggressive beachgrass control effort due to public input during DEIS review. Locations are general and will require in-depth analysis through development of a strategy and further environmental analysis including potential impacts to wetlands.

Predictions as to the extent of beachgrass management and sand movement are difficult. Currently, management techniques have not been refined into a cost-effective method. Further research and experimentation will be needed before large acreages of beachgrass will be eradicated. In addition, sand movement may be curtailed or reduced by deflation plain vegetation or not enough beach sand available for recruitment. Therefore, at present predictions cannot be made as to the capability of the Forest Service achieving an agressive beachgrass management goal or as to the extent this management will have on a loss of deflation plain wetlands.

Based on current knowledge available concerning beachgrass management success and lack of sand movement; the ability to control adverse wetland effects in planning beachgrass management locations and further review through site specific analysis, implementation of Alternative F(PA) could result in a slight loss of deflation plain wetlands. This potential loss would represent a small percent of deflation plain wetlands on the Oregon Dunes NRA.

Alternatives which nominate one or more RNAs for study (Alternatives B, C, D, E, F(PA), H) may result in some protection of wetlands habitat due to beachgrass control. For example, the proposed Tenmile RNA contains inland deflation plain

habitats that are dominated by native plant species. Removing beachgrass adjacent to these areas may help maintain these wetlands as native plant communities. Also, human disturbance of wetland vegetation and wildlife could be reduced in RNAs.

In the event that the beachgrass management goal in Alternative F(PA) is met there could be a return in some areas to more natural processes where some wetlands would be kept in early seral stages from continual loss through sand inundation and creation through scouring. This change would be offset to some extent by the fact that wetlands have been gradually increasing on the NRA and that there will be active management in areas to maintain and enhance wetlands.

In summary, Alternative D would provide the most diverse, least disturbed wetland habitats. Alternative E would provide undisturbed wetlands, but would not manage these wetlands to maintain diversity. Conversely, Alternatives F(PA) and H would manage many wetland acres, although disturbance would be moderate in these alternatives. High disturbance levels in Alternatives A, B, C and G would reduce the suitability of many wetlands and little management would take place in these alternatives to maintain diversity.

Figure IV-9. Condition of various components of wetlands habitat.

	ALTERNATIVE							
	A	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Amount of wetland fragmentation	High	High	Mod.	Low	V. Low	Mod.	High	Mod.
Amount of wetland channelization	High	High	Mod.	Low	Low	Mod.	High	Mod.
Level of general recreation disturbance	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Mod.
Degree of wetland diversity	Low	Low	Low	High	V. Low	High	Low	High
Amount of wetlands lost to sand encroachment	Low	Low	None	Low	Low	Mod.	Low	Low
Overall Habitat Condition	Poor	Poor	Fair	Excell.	Good	Good	Poor	Good

Sand Dunes - While sand dunes are not particularly hospitable to either vegetation or wildlife, they do support unique plant communities and are used by a variety of wildlife species. Few construction activities are planned for open sand areas; thus native sand dune vegetation would be most affected by recreation activities and control of non-native vegetation. Wildlife species using sand dune habitats are most likely to be affected by loss of cover due to recreation-related vegetation trampling or beachgrass control.

High recreation levels, particularly ORV recreation levels, would reduce native plant species and their habitat in 2 ways. First, native sand dune species are particularly susceptible to trampling. Not only are the plants themselves impacted, but soil conditions are altered. Liddle and Greig-Smith (1975) report that off-road vehicles in a dune ecosystem cause a 30 percent greater increase in soil bulk density and a 100 percent increase in soil penetration resistance than trampling by non-motorized types of recreation, frequently breaking the organic soil crust. Second, excessively disturbed areas are often colonized by weedy, aggressive, non-native plant species which outcompete native plant species. High recreation use may contribute to the spread of European beachgrass by transporting pieces of rhizomes on tires, clothing, etc. (A. Buell, unpublished data). Uncleaned ORV tires may accidentally transport seeds of exotic plant species into an area. Vogt (1979) cites several studies demonstrating that ORV recreation impacts vegetation. Native plant species whose numbers are reduced by ORV activity include large-headed sedge, American dunegrass, seaside daisy, coast eriogonum, American glehnia, seashore bluegrass, and seashore bluegrass (Wiedemann 1984). Globally significant plant communities that occur in sand dunes are red fescue, American dunegrass, and seashore bluegrass.

Alternatives which support high (Alternatives A, G) or moderately high (Alternatives C, F(PA)) levels of ORV recreation would decrease overall sand dune plant species richness and diversity the most (Figure IV-10). Alternatives with little area open to ORV's (Alternatives B, D) would be only slightly affected. Alternatives E and H would have none of the above effects on vegetation.

American dunegrass and seashore bluegrass globally significant plant communities may no longer exist on the NRA. Therefore, the effects of the alternatives on these two globally significant plant communities can only be evaluated in terms of how the alternatives affect potential habitat for these communities. The greatest threats to sand dune plant communities and potential habitat is from off-road vehicles and encroachment from invasive vegetation, specifically European beachgrass. Alternatives A, C, G and F(PA) (as discussed in the above paragraph), which decrease overall sand dune plant species richness and diversity, will be reducing the opportunities for these two plant communities to develop. Alternatives B, D, E and H would possibly allow recovery of areas to the point where the American dunegrass and seashore bluegrass communities develop.

In Alternatives D and F(PA), all known globally significant red fescue plant communities (5 total) are in MA10(F). Alternative F(PA) provides for active monitoring and management of these communities to protect and maintain them, while Alternative D provides equal emphasis to fish and wildlife habitat. The long-term protection for red fescue globally significant plant communities is greater in Alternative F(PA) because these areas will be specifically managed. In Alternative D, they will be protected from disturbances, such as motorized recreation, yet other fish and wildlife resource objectives may take precedence.
Non-native vegetation management can also affect sand dune plant communities and wildlife habitats. The spread of European beachgrass has resulted in a decline

in the numbers of native sand dune plants and the amount of habitat available for them. Depending on the amount of control or eradication included in each alternative, native plant species habitat may be enhanced, allowing native species such as American dunegrass, yellow sandverbena, and beach morning glory to increase. In addition, vegetation management proposed in Alternative F(PA) may include seeding or planting native species after beachgrass treatment which would provide further enhancement for native species.

Non-native vegetation management levels would be greatest in Alternatives A, F(PA), G and H. The objectives of management in Alternatives A and G, however, is to increase the amount of open sand for ORVs. Alternative F(PA) proposes vegetation management in a variety of areas for a variety of objectives including recreation. Because native plant species are susceptible to ORV activity, these alternatives would not enhance habitat for native plant communities. Non-native vegetation management in Alternatives B, D, F(PA) and H, in areas where the objectives are to enhance non-motorized recreation or to enhance native species habitat, would increase the existing cover of native plant species. These alternatives also recommend one or more RNA for designation, as does Alternative E; beachgrass management in RNAs would provide additional undisturbed native plant habitat. Non-native vegetation management would not occur at all in Alternative C; therefore, species composition within plant communities may remain about the same as existing conditions or additional habitat and populations of native plant species may be lost as beachgrass continues to expand its range .

While controlling beachgrass may enhance native plant communities, alternatives which include any attempt to control beachgrass (Alternatives A, B, D, F(PA), G, H) would slightly reduce habitat for wildlife species relying on beachgrass cover including various small mammal and bird species, birds of prey and predatory mammals which rely on small mammals and birds as food sources, and for species moving between other habitat types. Although native plants may colonize sand dune habitat following beachgrass eradication, native vegetation would not colonize as densely as does European beachgrass. Alternative F(PA) could result in the greatest loss of cover depending upon success of the beachgrass treatment.

Figure IV-10. Condition of various components of sand dune habitat.

	ALTERNATIVE							
	A	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Amount of area disturbed	High	Low	Mod.	Low	V. Low	Mod.	High	Mod.
Level of general human disturbance	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Mod.
Amount of new undisturbed open sand created	Low	Low	None	Mod.	Mod.	Mod.	Low	Mod.
Overall Habitat Condition	Poor	Good	Fair	Excell.	Good	Fair	Poor	Fair

Aquatic Habitats - Lakes, rivers, creeks and estuaries support not only water-dependent plant and animal species (such as submergent and emergent plants, beaver, nutria, many amphibians), but provide escape cover for waterfowl and an important source of dietary water for many other species. Although most water bodies experience some seasonal or annual water level fluctuation, dramatic changes in water level over time would decrease the suitability of this habitat type for both plants and wildlife. However, long-term water level changes (currently evidenced by declining lake levels in some portions of the NRA) are not expected to vary between alternatives. Factors which would affect aquatic habitats and which would vary by alternative include facility construction, recreation levels, and habitat management.

Construction activities in or near aquatic habitats would impact these habitats by temporarily introducing sediments or by changing water flow patterns. Boat dock and pier construction included in all alternatives would have temporary and limited effects on aquatic habitats. These temporary effects would be greatest in Alternatives D, F(PA), G and H which include the construction of several new aquatic-based facilities on NRA lakes (Figure IV-11). However, construction in NRA streams would be limited under Alternatives D, E, F(PA) and H because these alternatives would recommend wild or scenic status for NRA streams (except Alternative D which recommends Siltcoos for recreational status and Alternative F(PA) which does not recommend Siltcoos for any type of Wild and Scenic River status). The remaining alternatives would include some moderate to low level of aquatic-based construction in lakes, but would recommend rivers only for recreational status (which provides little protection against aquatic development) or no Wild and Scenic River status.

Recreation activities in or near water (for instance, in riparian areas) can also affect the quality of aquatic habitats by destroying native aquatic plants, by accidentally introducing exotic aquatic plants which may displace native plants, by introducing toxins or human waste, and by disturbing wildlife species. Aquatic sensitive plant species, which may occur on the NRA, are humped bladderwort, lesser bladderwort, and water-meal. Though areas would be surveyed for these sensitive species prior to allowing recreation or construction activities in an area, potential habitat could be affected by these activities. In addition, a unique melanic (black) aquatic crustacean (*Daphnia* sp.) has been discovered in ephemeral (temporary) pools on the Oregon Dunes NRA. A similar species is found in the Arctic, but none have been described in temperate climates. Temporary pools can be adversely affected by encroaching vegetation, declining water levels and possibly ORVs.

Alternatives which include high levels of aquatic- or riparian-based recreation (Alternatives A, B, D, F(PA), G, H) would slightly reduce the suitability of aquatic habitats. However, general recreation use levels would be lower in alternatives D and H. Facilities constructed in alternatives D, F(PA) and H would be designed to channel users and thereby reduce impacts; these alternatives also include actions designed to reduce riparian impacts which would also reduce impacts to adjacent

aquatic habitats. Wetland management in D, F(PA) and H could reduce impacts from encroaching vegetation by keeping these communities in early seral stages. Proposed beachgrass control that could re-establish sand movement into the deflation plain (Alternative F(PA)) would also maintain or enhance ephemeral pools habitat for this *Daphnia* species.

Because aquatic systems on the NRA are relatively sterile (i.e., support few plant and fish species), aquatic habitats would be highly affected by fish habitat management activities within the aquatic habitat and by plant and wildlife management activities in adjacent riparian habitats. Alternatives D, F(PA) and H include activities designed to enhance both riparian and aquatic habitats; management in these alternatives would enhance fish production and therefore increase populations of fish-eating wildlife species and would provide additional cover for aquatic species. Alternatives A, B and G include some aquatic and riparian habitat management and would enhance some habitats for fish and fish-eaters.

Rapid succession, with concurrent increases in transpiration rates, and groundwater pumping have been suggested as explanations for declining water tables in NRA lakes. Management activities designed to reduce shrub encroachment in wetland habitats may help to maintain water levels in adjacent aquatic habitats. Thus, water levels in aquatic habitats may be maintained longer in Alternatives D, F(PA) and H which emphasize wetlands management.

Figure IV-11. Condition of various components of aquatic habitats.

	ALTERNATIVE							
	A	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Amount of localized disturbance (from fishing facilities)	Mod.	High	Mod.	Low	Low	Low	High	Low
Level of general recreation disturbance	V. High	High	Mod.	Low	V. Low	Mod.	V. High	Mod.
Amount of fish habitat management	Mod.	Mod.	Low	V. High	None	V.High	Mod.	High
Amount of wetland management	Low	Low	Low	High	V. Low	High	Low	High
Overall Habitat Condition	Fair	Fair	Fair	Excell.	Fair	Good	Fair	Good

Effects on Plant Community and Wildlife Habitat Arrangement and Diversity

Alternatives not only affect specific habitat types, but can also affect the arrangement of habitats and the number of different habitat types present across the landscape (landscape diversity). Habitat arrangement is most important when species require more than one habitat type to meet their life-cycle needs. For example, the red-legged frog spends 3-4 months each year in aquatic habitats, but migrates to upland forests for other parts of the year. The arrangement of aquatic and upland forest habitats is essential to the survival of the red-legged frog. Fragmentation of habitats can affect the long-term viability of native plant species and communities by reducing opportunities for genetic exchange. Habitat fragmentation similarly affects wildlife with limited range of movement as well as losing larger species when habitats become too small to support them. An area is said to be diverse if a variety of habitat types are present in suitable amounts. Increased landscape diversity generally allows for increased species diversity.

Alternatives can affect habitat arrangement, fragmentation and diversity by removing a particular habitat, by providing a physical barrier between adjacent habitats (thereby preventing movement between habitat types), by making a particular habitat unsuitable for plant and/or wildlife, or by removing a plant community. Alternatives can also increase habitat diversity by managing for a range of seral stages within a particular habitat type.

Alternatives A, B and G which increase roads, trails, facilities and recreation use may reduce plant and wildlife community diversity by reducing and/or eliminating those sensitive species, communities (including globally significant plant communities) or habitats which cannot tolerate physical alteration or human disturbance including native sand dune plant communities, early seral stage wetlands and tree islands (Figure IV-12). Reducing the presence of these habitat types would reduce overall area diversity. This loss could have far reaching affects if similar habitats within the coastal-ecoregion continue to be lost. Alternatives which increase ORV use would impact larger areas and could therefore eliminate larger portions of (or entire) communities.

Plant and wildlife habitat diversity can also be affected by recreation use. High recreation use may make some habitats unsuitable for use by wildlife species and result in the loss of some plant communities; as these habitat types are removed from the mosaic of "suitable" habitat, diversity declines. Alternatives A, B and G, which substantially increase recreation use in sensitive areas including beach strand habitats, wetlands habitats, and aquatic/riparian habitats may essentially remove these habitats from the diversity mosaic and further reduce populations of endemic native plant species. Figures II-17 and II-18 compare the quantitative and qualitative effects of the different alternatives on globally significant plant communities. Alternative F(PA) provides the highest level of protection to globally significant plant communities by allocating all known globally significant plant communities

that are in good to excellent condition to MA10(F), which will provide for active monitoring and management to protect and maintain these communities.

Heavy recreation use may also affect the arrangement of wildlife habitats by reducing or eliminating travel between habitat types. Alternatives with high levels of recreation (A, B, G) may result in habitats becoming effectively "isolated" from one another; wildlife species which rely on more than one habitat may decrease.

Stablization of foredunes by European beachgrass has allowed the European beachgrass community to dominate many sand areas. Control or eradication of European beachgrass may increase plant community diversity by increasing the habitat available for colonization by native plant species.

Plant and wildlife habitat management activities, particularly wetlands management and control of non-native vegetation would affect overall landscape diversity. Alternatives D, F(PA) and H include high levels of both wetland and plant and wildlife habitat management. These alternatives would continue to provide a range of habitat types and seral stages over time. These alternatives also include beachgrass management efforts which would enhance the diversity of native dune vegetation communities. Alternatives A, B, C and G include low levels of wetland and habitat management; the NRA would exhibit lower landscape diversity in these alternatives. Although these alternatives include higher levels of beachgrass management than alternatives D and H, beachgrass control efforts would be focused in areas of high recreational use (both off-road and non-motorized). Therefore, native species habitat would not be enhanced because heavy foot or ORV use prohibits most vegetation from becoming established. There would be minimum or no efforts to control non-native vegetation in Alternatives C and E. The diversity of sand dune plant communities would not be significantly affected by either of these alternatives.

Conversely, controlling non-native vegetation would slightly decrease the amount of wetland plant communities and wetland habitat types. Alternatives which include large areas of beachgrass control west of deflation plain wetlands may slightly reduce wetland plant community diversity if sand encroaches on limited wetland types. Alternative D directs beachgrass control near estuaries rather than adjacent to wide deflation plains. Alternative F(PA) proposes beachgrass control in both estuaries and deflation plains. These alternatives would enhance plant and wildlife habitat diversity the most by creating additional habitat for native plant communities while maintaining important wetland plant communities and habitats.

Figure IV-12. Selected factors affecting habitat diversity and arrangement and overall amount of both provided by each alternative.

	ALTERNATIVE							
	A	B	C	D	E	F(PA)	G	H
Amount of general recreation disturbance	V. High	High	Mod.	Low	V. Low	Mod.	High	Mod.
Amount of non-native vegetation control	High	Low	None	Low	None	High	High	V. High
Amount of habitat managed to maintain diversity	Low	Low	Low	High	None	High	Low	High
Overall Habitat Diversity	Fair	Fair	Fair	Good	Fair	Good	Fair	Good

Figure IV-13. Condition of various plant communities and wildlife habitats.

	ALTERNATIVE							
	A	B	C	D	E	F(PA)	G	H
Condition of forest habitat	Poor	Fair	Fair	Excell.	Good	Good	Poor	Excell.
Condition of riparian habitat	Poor	Poor	Fair	Excell.	Good	Good	Poor	Good
Condition of beach strand habitat	Poor	Fair	Fair	Excell.	Excell.	Good	Poor	Good
Condition of wetland habitat	Poor	Poor	Fair	Excell.	Good	Good	Poor	Fair
Condition of sand dune habitat	Poor	Good	Fair	Excell.	Excell.	Fair	Poor	Fair
Condition of aquatic habitat	Fair	Fair	Fair	Excell.	Fair	Good	Fair	Good
Condition of habitat diversity/juxtaposition	Fair	Fair	Fair	Good	Fair	Good	Fair	Good

Effects on Proposed, Endangered, Threatened and Sensitive Species

Aleutian Canada Goose - None of the proposed alternatives are expected to have any adverse direct, indirect or cumulative effects on Aleutian Canada geese. Because these geese are off-shore migrants which only occasionally use inland bodies of water even high levels of recreation use are not expected to affect them. Further,

none of the alternatives are expected to substantially increase fall use of wetlands or open water habitat which the goose frequents. European beachgrass control may result in eventual sand inundation of portions of deflation plain wetlands. However, larger bodies of water will not be affected by beachgrass control. Those alternatives that include wetland management activities would provide additional potential migratory habitat for this species.

American Peregrine Falcon - The NRA does not provide suitable breeding habitat for the peregrine falcon; foraging habitat consists primarily of early seral stage deflation plains. The importance of the Oregon Dunes NRA as a foraging area and what, if any, level of human disturbance affects foraging peregrine falcons is currently unknown.

None of the alternatives are expected to substantially increase recreation levels in early seral stage deflation plains. High levels of recreation use in or adjacent to wetlands result in adverse impacts to wetlands and associated wildlife. Impacts increase with the amount of interface between ORV riding areas and wetlands. Alternatives A, B, C, F(PA) and G which include many miles of roads, trails, designated routes and or facilities (Figure IV-9) will exhibit the most disturbance and degredation of wetlands. The greater the interface the greater the potential affect could be on foraging peregrine falcons.

European beachgrass management may result in indirect impacts to portions of deflation plain wetlands through eventual sand inundation. Wetland impacts are expected to be minor under all alternatives that propose beachgrass control. Alternatives that include wetland management activities aimed at maintaining early seral stages would provide additional foraging habitat for peregrine falcons.

California Brown Pelican - California brown pelicans rest on dry sand beaches of the NRA during their migration. Increased public use of beaches (either motorized or non-motorized) would increase stress on pelicans and reduce important energy stores. Some minor effects on California brown pelican populations through the reduction of suitable resting habitat could occur in alternatives with miles of beach open to public use. Impacts will range depending on the amount of open beach. Alternatives A, B, C, G provide the most open beach.

Long-billed Curlew - Long-billed curlews use dry sand beaches on the NRA during migration and the wintering period. Increased public use of beaches (either motorized or non-motorized) would increase stress on curlews and reduce important energy stores. Therefore, alternatives that allow public use of beachs could have minor effects on long-billed curlew populations by reducing suitable migratory habitat. Impacts will vary depending on the amount of open beach. Alternatives A, B, C, G provide the most open beach. Because curlews also use deflation plain wetlands during migration and wintering, alternatives that impact this habitat such as recreational use and European beachgrass control could indirectly affect migrating long-billed curlews. Potential for impacts would be the greatest in alternatives that allow for greater recreational use (Alternatives A, C, F(PA) and G) in or adjacent

to wetlands. Alternatives that include wetlands management would provide additional migrating habitat for curlews.

Northern Bald Eagle - No bald eagles are known to nest on the NRA although suitable nesting habitat may exist. Alternatives which greatly increase public use of estuary habitats may slightly decrease the suitability of such areas for foraging eagles. Conversely, alternatives which reroute trails away from estuary habitat or eliminate riparian trails (Alternatives D, E, F(PA)) would enhance those habitats for bald eagle foraging.

Northwestern Pond Turtle - Northwestern pond turtle breed and winter in lakes, ponds and slow-moving streams. Because, none of the alternatives are expected to negatively affect these habitat types, the proposed alternatives are not expected to have any adverse direct, indirect or cumulative effects on northwestern pond turtles. Alternatives which include wetlands management activities aimed at increasing open water would provide additional habitat for pond turtles.

Red-legged Frog - The red-legged frog breeds in lakes, ponds and slow-moving streams and winters in a variety of coastal forest types. None of the alternatives are expected to negatively affect these habitat types. Because red-legged frogs use deflation plain wetlands, management activities in these areas could impact this species. Potential for impacts would be the greatest in alternatives that allow for greater recreational use in or adjacent to wetlands (Alternatives A, C, F(PA) and G). Alternatives which include wetlands management activities would provide additional breeding habitat for frogs.

Pacific Western Big-eared Bat - The Pacific big-eared bat breeds in caves, hollow trees and abandoned buildings; these bats forage near water sources. Because none of the alternatives are expected to substantially decrease snag availability and none would substantially reduce the suitability of deflation plain foraging habitat, none of the proposed alternatives are expected to have any adverse direct, indirect or cumulative effects on Pacifc western big-eared bats. Alternatives which include wetlands management activities would provide additional foraging habitat for bats.

Western Snowy Plover - Alternatives with many miles of beach open to ORVs (Alternatives A, C, G), particularly Alternative A which also adds additional foot access, have the greatest potential to disturb both wintering and/or breeding snowy plovers. However, alternatives that allow public use in snowy plover habitat (Alternatives A, B, C, F(PA), G and H) may potentially impact this species. Alternatives which include beachgrass control efforts near the mouths of rivers and creeks (Alternatives D, F(PA) and H) would increase suitable nesting habitat for plover. Other alternatives which proposed vegetation removal would provide some habitat, although human disturbance in these areas might preclude plover use of them.

Several alternatives include actions which would reduce public use in snowy plover nesting habitat including closing portions of the Siltcoos Beach Road (Alternatives D and E), rerouting the Waxmyrtle Trail (Alternatives D and F(PA)) and removing the Tahkenitch Trail (Alternative D). These alternatives would not only reduce loss of plover due to human disturbance, but may also reduce predation on plover in closed areas because predators (opposum, racoon, ravens, crows) are attracted to areas of human use, most likely because of the edible refuse left by human visitors. Alternatives that emphasize wildlife habitat management (Alternatives D, F(PA) and H) would also further enhance snowy plover nesting areas through additional restrictions on human use of snowy plover nesting areas. Alternatives C, D, E, F(PA), H include actions to enhance snowy plover nesting habitat on the North Spit of the Umpqua River. It should be noted that in all alternatives future management for plovers will be dependent on critical habitat designation and recovery plan development by the USFWS. Potential impacts to snowy plover nesting habitats could be partially mitigated for by:

- Prohibiting public use in snowy plover nesting habitat during breeding season (approximately 15 March - 15 September) either by signing and roping, fencing or otherwise designating the area. This action would effectively reduce disturbance to nesting plovers and would decrease the attraction of such areas to predators.

- Requiring that all dogs be leashed adjacent to snowy plover nesting habitat during the breeding season (approximately 15 March - 15 September). This action would be very effective in reducing disturbance of nesting plover if enforcement was a priority.

- Increasing the vehicle closure distance from snowy plover nesting habitat to provide a buffer and decrease the likelihood that closure violations would adversely impact nesting areas. This action would most likely reduce violations somewhat but would be less effective than closing entire beach stretches.

Sensitive Plants - The alternatives are not expected to have any adverse direct effects on known populations of plants with sensitive status. Planning for site-specific projects would include investigations for these plants and appropriate protective actions would be taken if they are found.

However, the alternatives may affect the amount and quality of habitat available for colonization by sensitive plant species. ORV activity on beaches and foredunes decreases the amount of potential habitat available for pink sandverbena. A significant portion of the beach and foredune habitat on the NRA is open to ORVs under Alternatives A and G; these alternatives would reduce potential sandverbena habitat the most. Alternatives C and F(PA) reduce a moderate amount of potential sandverbena habitat and the remaining alternatives maintain greater amounts of potential habitat.

Wetland management is proposed in all alternatives except Alternative E. In general, the types of wetland management activities proposed by the various alternatives would not reduce existing or potential habitat for TES plant species if human use is restricted or channeled away from sensitive areas. Wetland management activities which maintain dune deflation plains in early seral stages would maintain or increase habitat for bog club-moss, water pennywort, and common adder's tongue. Wetland management activities which maintain bogs, marshes and wet habitats would maintain or increase habitat for other TES plant species which have potential habitat within the Oregon Dunes NRA including : Oregon bog anenome, large-awn sedge, several-flowered sedge, Frye's limbella moss, North Pacific plantain, Pohlia moss, wool-grass, humped bladderwort, lesser bladderwort, and water-meal. There are no anticipated environmental impacts to salt marshes, and, therefore, habitat for salt-marsh bird's-beak would not be reduced.

Cumulative Effects

The cumulative effects of a particular alternative on plant communities and wildlife habitats will depend on: 1) the absolute abundance of a particular plant community or wildlife habitat across its regional range, and 2) management activities planned on other lands in similar plant communities or wildlife habitats.

The NRA supports several unique or regionally-limited habitat types including coastal sand dunes, deflation plain wetlands, forested wetlands, tree islands, and salt marshes. In addition, the NRA contains unique, rare and sensitive plant communities and wildlife species. Adverse effects to these communities and/or species as a result of management actions on the NRA may affect regional distribution and abundance. Thus, even minor loss and/or disturbance of communities or species may affect overall species/community abundance over its range. This will be particularly true for such species as the western snowy plover for which the NRA provides breeding habitat for a full one-half of the existing coastal breeding population.

Cumulative effects on more common plant communities and wildlife habitats will also depend on management activities taking place on other state, county, and private lands. The NRA has the opportunity to manage habitats quite differently than adjacent state, federal and private landowners; for instance, NRA forested areas are not subject to commercial harvest and the NRA currently contains many miles of relatively "remote" beach. As tourism and coastal development pressure increases along the Oregon coast, it is expected that beach, sand dune, deflation plain wetland and coastal upland forest habitat will become even more limited. NRA habitats and plant communities may become even more unique and/or rare.

Thus, alternatives which emphasize heavy recreation use, particularly those which emphasize motorized recreation, would have the greatest cumulative effects on the overall distribution, species richness, and diversity of plant communities and wildlife habitats. ORV use has reduced the distribution and numbers of many native plant species which occur in sand dune and beach habitats (Wiedemann 1984). Increased use would further reduce population numbers and fragment their habitat, which

may have a cumulative impact on the genetic diversity and long-term viability of these native species. Impacts to the native plant communities would affect the biodiversity of the region. High recreation use may also have cumulative effects on sensitive wetland habitats, tree islands, and the western snowy plover.

All alternatives allow continued collection of special forest products, such as mushrooms. Depending on harvesting method and the amount of mushrooms collected in upland forested habitats, there could be cumulative effects on the overall health of these ecosystems. A reduction in mushroom populations may affect the future health of tree and shrub species by altering the balance between mycorrhizal fungi and host species.

Mitigation Measures

- Any new trails or facilities in or near riparian areas are not highly developed. Some disturbance would still occur.
- Trails and facilities are designed to channel visitors and to reduce impacts to important wildlife and plant habitats. Disturbance would still occur, but would be localized.
- Campsites in riparian habitat are removed or screened from lakes, rivers or creeks. Removing campsites would significantly reduce impacts; screening would partially reduce impacts.
- Motorized dispersed camping is restricted to designated sites available by permit. Limiting dispersed camping in vegetated, riparian and wetlands would partially reduce impacts.
- Trails in riparian habitat are designed to contact lakes, streams or rivers only periodically or are otherwise screened from water bodies. Disturbance would still occur but would be periodic and limited in time.
- Create buffer zones closed to ORVs around all important habitats. Some adverse effects could still occur if closure violations continued at the present rate.
- ORV designated travel routes are at least 200 feet from waterbodies. Some adverse effects could still occur if closure violations continued at the present rate.
- Recreation facilities designed near meadow habitat are restricted to meadow edges or are screened from some portions of the meadow. Adverse effects would be somewhat reduced.
- Concentrated dispersed camping is limited or prohibited in wetland habitats. Adverse effects would be substantially reduced.

- Dispersed camping is prohibited in tree islands. Adverse effects would be substantially reduced.

- All trails (foot, equestrian, ORV) passing through wetland habitat are maintained at or above adjacent land level. Wetland channelized would be greatly reduced by this action.

- Interpretive signing and/or information is provided to inform visitors about sensitive plant and wildlife habitats. Some effects would be slightly reduced.

- Prohibit ORVs above the toe of tree island slopes to protect soil and soil microorganisms and reduce undermining of trees. Some adverse effects could still occur if closure violations continued.

Effects of Plants and Wildlife on Other Resources

Fish Habitat

- Many actions designed to enhance wildlife habitats in riparian, aquatic and wetland habitats would enhance habitats for fish.

Recreation

- Maintaining diverse plant and wildlife habitats would enhance recreation opportunities for visitors interested in hiking, nature study, nature photography, and wildlife study.

- Some plant and wildlife habitat enhancement activities may affect the visual quality of an area, reducing recreation value for some visitors.

- Some plant and wildlife viewing areas may concentrate visitors, reducing the quality of the area for visitors who prefer remote and/or unstructured recreation opportunities and enhancing the experience for those recreationists who prefer structured recreation.

- Some plant and wildlife enhancement actions may result in closures or voluntary closures of critical or particularly sensitive habitats and reductions in some recreation opportunities.

- Some measures to reduce wetland impacts could limit some recreation opportunities, such as those for dispersed camping.

- Vegetation management under Alternative F(PA) would reduce likelihood and improve ability to control wildfires, thereby enhancing public safety. Vegetation management under other alternatives would do little to reduce the likelihood or danger from wildfire.

Scenery

- The predicted changes in the dune system resulting from the action of the foredune would dramatically affect the scenery by changing the area from an open sand dune landscape to a vegetated complex of hummocks, low hills and steep ridges.

- Changes in plant communities and vegetation patterns may affect scenic views from overlooks, trails, designated travel routes, etc.

Cultural Resources

- There are no anticipated adverse environmental effects on cultural resources that result from predicted changes in plant and wildlife habitats conditions associated with management activities of the alternatives.

- Plant and wildlife habitat enhancement actions would result in more area being surveyed for cultural resources.

Social and Economic Setting

- Managing plant and wildlife habitats would affect local communities by increasing wildlife-related recreation opportunities.

- Managing plant and wildlife habitats would affect local economies by limiting commercial forest products gathering to specific areas and only to those resources in excess of ecosystem health needs.

Assumptions Used

- If European beachgrass is not controlled or eradicated, it would continue to spread and most open sand would eventually disappear.

- The degree of vehicle closure non-compliance would remain constant over time and across alternatives. Non-compliance can be mitigated, but probably not eliminated through education, management and enforcement.

- Plant and wildlife habitat management activities would achieve the desired results.

- Some habitat management activities would not be permitted within an RNA or within a Wild and Scenic River corridor.

- If demand for mushroom picking is not managed, there would be a decrease in mushroom populations, such as the commercially valuable Matsutake mushroom.
- Tolerance levels of some wildlife species would be exceeded by some alternatives.
- Pink sandverbena may be present on the Oregon Dunes NRA in suitable habitat that has not been surveyed.
- The NRA may support endemic plant species and/or plant communities which are not found elsewhere in the geographic region.

Incomplete/ Unavailable Information

- Cumulative effects on viability of maritime plant species that are endemic to our area, such as: yellow sandverbena, dune bentgrass, silver bursage, American glehnia, beach pea, seashore bluegrass, black knotweed and dune tansy.
- Cumulative effects from a reduction or loss of native plant communities and their habitats.
- Effectiveness of habitat improvement projects in various habitats.
- Tolerance levels of various wildlife species residing and/or using NRA habitats.
- Relative number of snags and dead and down material per acre.
- Compatibility of riparian habitat management with Wild and Scenic River management.
- Distribution and abundance of the sensitive plant, pink sandverbena on NRA beaches and foredunes.
- Distribution and abundance of melanic *Daphnia* on NRA lands. Effects of management activities on the long-term viability of this species.
- Long-term cumulative effects from recreational and commercial harvesting on population viability of mushroom species and associated wildlife and on the ecology of mycorrhizal fungi.
- Cumulative genetic effects on viability of native plant populations due to habitat fragmentation by ORVs.

ENVIRONMENTAL CONSEQUENCES ON FISH

Direct and Indirect Effects

Long-term changes in groundwater levels and resultant declines in lake surface areas is a major factor determining quantity of fish habitat in lakes. Reduction in lake surface areas is expected to continue in all alternatives given continued water pumping (see Water, Chapter III) and/or continued changes in climate and vegetation.

Further declines in lake water levels will result in more losses of fish habitat. Habitat has disappeared in lakes such as Bluebill that have dried up completely during he last 20 years. Elsewhere, both lake depth and lake acreage have declined, contributing to heavy aquatic plant growth. It appears that a critical stage is reached in many lakes when the maximum depth drops to 10-15 feet. Merritt and Davies (1991) found that Snag Lake - with a maximum depth of 10 feet - was choked with aquatic plants to the point that they could not locate any of the 4 species of fish present 18 years before. (Snag Lake dried up in September 1992.) Although data has not been collected recently, maximum depths in nearby lakes are also approaching 10 feet.

For a more thorough discussion of effects of the alternatives on sediment, water quality and lake levels, see Environmental Consequences on Watersheds, Chapter IV.

Fish Habitat

Increases in amount of recreational fishing resulting from more access and facilities in all alternatives except Alternatives C and E probably would not significantly affect fish habitat in lakes and streams. Effects would be largely limited to more indirect ones on vegetation and soil surrounding these water bodies (see Watersheds, Chapter IV).

The greatest effects of the alternatives on fish habitat would be improved habitat quality resulting from various types of habitat enhancement projects. Alternatives D, F(PA) and H include projects that would add nutrients, increase structure, and control macrophytes (aquatic vegetation) in 200-300 acres of water. Alternative E does not include fish habitat enhancement projects, while the other alternatives (Alternative A, B, C, G) include intermediate amounts (Figure IV-14).

Figure IV-14. Aspects of the fishery program and their effects on fishing and fish populations.

	ALTERNATIVE							
Relative Effects	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Habitat Improved (Acres)	80	80	20	290	0	290	100	200
Fish-Related Facilities (Number)	9	12	6	11	5	10	9	11
Fishing Trails (Miles)	0	4	0	3	0	2	0	2
Fishing Pressure (Relative)	Mod.	High	Mod.	High	Low	High	Mod.	High
Potential for Overharvest Lakes Streams	 Low Mod.	 Mod. High	 Low Mod.	 Mod. High	 Low Low	 Mod. High	 Low Mod.	 Mod. High

Log and boulder structures placed in selected streams (like Saunders, Clear and Eel creeks and tributaries of Elbow Lake) would create resting pools for young salmonids, gravel beds in sand-bottomed areas, and unimpeded flows for adult salmonids migrating upstream to spawn.

In these same alternatives, wood and brush structures would be placed in selected lakes (like Carter and Butterfield lakes) to provide additional cover for warmwater fish. Rigid and floating platforms and bundles of brush and small trees would provide refuge from predation and surface area for food items.

These alternatives could also add nutrients to relatively sterile lakes (like Carter) to increase primary production and the lake's capacity for fish production. Nutrients would increase floating microscopic organisms (plankton) and limit penetration of light into the water, thus reducing dense growths of rooted macrophytes. This would diversify structure of fish habitat in the lake, result in more balanced predator-prey relationships, and improve growth rates within the fish community. Other ways to control macrophytes include drawdown of lake levels to dry out the plants, cutting and removing plants mechanically or by hand, placing mats of various materials that cover up the lake bottom and prevent plants from becoming rooted, and biological control using organisms such as vegetarian crayfish or grass carp. Herbicides may also be considered.

Management for certain Wild and Scenic Rivers in all alternatives except A and C would preclude dam construction, thus maintaining free flows, unimpeded passage, and other aspects of fish habitat present at this time. Wild and Scenic designation could limit opportunities to create new fish habitat because of restrictions on the type of enhancement structures that would be appropriate.

Presence of cultural sites along lakes and streams may require relocation or modification of planned fish habitat enhancement projects.

Fish Populations in Lakes and Estuaries

All alternatives except Alternatives C and E provide more access to lakes and estuaries and additional facilities such as lakeside campgrounds, boat ramps, and fishing docks (Figure IV-14) and would increase numbers of anglers and harvest of fish and shellfish. This is not likely to harm (and may actually benefit) populations of warmwater panfish like bluegills and yellow perch, but may reduce numbers of large predators like largemouth bass and stocked rainbow trout.

As discussed in the Fish section of Chapter III, appropriate regulation of catch by ODFW will be important in minimizing any negative effects of the alternatives on fish populations. Increases in angling pressure would increase the possibility that ODFW would stock more fish in given lakes, including more non-native species.

Overharvest to the degree that it threatens population viability would not be acceptable, and would be prevented by more restrictive angling regulations by ODFW and/or limitations on access by the Forest Service.

The magnitude of benefits of habitat projects to lake fish can not be predicted precisely. In general, project objectives would include either increasing or reducing vulnerability of prey fishes to sport species like largemouth bass. Additional structure would increase shaded habitat and would provide interstitial hiding places and overhead protection from predators. Reduction of macrophytes would have opposite effects by making smaller fish more vulnerable. The type of project appropriate for a given lake depends on the environmental conditions and fish community present (see Fish, Chapter III) and opportunities to provide access and facilities for anglers. Adding fertilizer would favor those species and life stages of fish that feed directly on plankton.

Fish Populations in Streams

Adult fish pass quickly upstream through 2 miles of sand-dominated stream on the Oregon Dunes NRA, and young salmonids also migrate rapidly downstream to the ocean through these same reaches. These areas contain little habitat other than some holding pools for adults; thus population size is determined largely by spawning and rearing conditions in streams (and interconnected lake systems) upstream from the NRA boundary.

Providing more access and facilities near streams in Alternatives B, D, F(PA) and H could increase harvest of wild adult coho salmon and steelhead, which may not be desirable in view of the depressed runs at this time. Any planning for such projects will consider current status of stocks as viewed by ODFW and other fisheries management agencies.

Any stream enhancement activities in tributaries in Alternatives like D and F(PA), and other aspects of all alternatives would at most have localized effects on salmonid habitat that probably would not influence size of anadromous fish runs.

Cumulative Effects

Timber harvesting and other development on Forest Service, private, and state lands in upper tributaries of streams that flow through the Oregon Dunes NRA have influenced fish habitat and runs of anadromous fish in those areas. Because such small portions of the basins of these streams occur on the NRA and because most activities are recreational in nature and have minimal impacts on riparian areas, none of the alternatives - even A and B which encourage large increases in human use - would have significant impacts on stream habitat when added to losses due to management activities upstream.

Because of the high value of local wild salmon and steelhead stocks, the Forest will seize opportunities through ongoing watershed restoration programs to work cooperatively with upstream landowners to protect and restore water quality and other components of fish habitat.

Larger lakes like Siltcoos and Tahkenitch are largely on private land, and any localized changes in fish habitat on the NRA portion due to the alternatives would not be significant when added to changes due to management activities on and around the rest of the lakes. Most of the smaller lakes do not have inlets and no cumulative effects are expected.

The small estuarine areas on the Siltcoos River and Tahkenitch and Tenmile creeks are almost entirely on NFS lands. Although the effects of all upstream management accumulate in these areas, none of the alternatives proposes actions that would make significant changes in estuaries when added to other impacts.

Mitigation Measures

- Trails or facilities in or near riparian areas would not be highly developed to limit the amount of recreational use and disturbance in these areas. Some disturbance from use is still expected, however.

- The primary measures taken at the project level to mitigate effects on fish habitat would be precautions taken to minimize sedimentation and other impacts of constructing such facilities on riparian soil and vegetation, and to prevent degradation of water quality. In part because of physical and ecological conditions at the NRA, these measures are expected to prevent any significant effects (see Watershed, Chapter IV).

Effects of Fish on Other Resources

Recreation

- Reducing dense growths of macrophytes that interfere with fishing would improve recreation opportunities. Other increases in fish habitat would also lead to increased fish populations and an increase in recreation opportunities.

- As fishing opportunities increase, interpretation would become important in reconciling angler expectations with a particular systems ability to produce fish.

Plant Communities and Wildlife Habitat

- Increases in fish habitat may affect amounts of habitat and food for other aquatic wildlife, and also increase food supplies for piscivorous species like otters, osprey and bald eagles.

- Increased angling activities may result in localized disturbance of aquatic and riparian plant and wildlife species.

Social and Economic Setting

- More recreational fishing would increase revenues in local communities. Increases in habitat that result in more salmon and higher commercial catches (expected to be small, at most) could also benefit local economies.

Cultural Resources

- Fish habitat improvement projects along streams and lakes could lead to discovery of cultural sites and require mitigation and protection of the sites.

Watershed

- Projects to reduce macrophyte levels in lakes could temporarily increase organic and inorganic sediments in outlet streams.

Assumptions Used

- Enhancement projects have their desired effects on habitat.

- Habitat is fully used by fish, and more habitat leads to greater and healthier fish populations.

- Increased angling pressure produced by more fishing opportunities will not seriously harm fish populations.

Incomplete/ Unavailable Information

- Angling pressure and catch rates on the NRA at the present time.
- Effectiveness of habitat improvement projects in lakes.
- Resiliency of warmwater fish populations in dunes lakes to angling.
- Whether some anadromous fish stocks should be federally listed.

ENVIRONMENTAL CONSEQUENCES ON THE RESEARCH NATURAL AREAS PROGRAM

Direct and Indirect Effects

Alternatives can affect opportunities for research, education, long-term monitoring and maintenance of biological diversity on National Forest System lands, depending on whether or not the alternatives allocate Research Natural Areas (RNAs) for establishment.

Currently, the Oregon Dunes NRA contains 2 potential RNAs: Umpqua Spit and Tenmile Creek. These areas were chosen because they contain typical and unique habitats found in coastal ecosystems and are considered the best possible examples of these features available for protection. Alternatives A and G would not allocate either RNA for establishment; hence opportunities would be lost for permanent protection of long-term research and monitoring of dune ecosystems. Alternatives B, D and F(PA) each allocate 1 RNA for establishment (although F(PA) designates a smaller area). This will allow limited opportunities for research, education and monitoring, as each RNA contains unique attributes. Alternative B allocates Umpqua Spit, while Alternatives D and F(PA) allocates Tenmile Creek. Features unique to Umpqua Spit are relatively inactive, red fescue-dominated dunes, a red alder/willow sedge marsh, parabola dune complex, mature dune ridge forest, and a population of bog clubmoss, a sensitive plant. Umpqua Spit would allow many research opportunities in deflation plains, as it supports the most extensive grass, sedge and rush deflation plain communities in the NRA. Features unique to Tenmile Creek are high, active, seashore bluegrass-dominated dunes, tree islands (2 islands contain Douglas-fir/western rhododendron dune ridge forests, which are only known from 2 other tree islands within the NRA), freshwater lakes and ponds, and interior dune complex. Tenmile Creek would allow research opportunities on coastal ecosystem development and dune movement as the area contains examples of all major dune features, except parabola dunes. The reduced Tenmile Creek RNA recommended in Alternative F(PA) contains the same range of attributes, but includes only 1 tree island. Alternatives C, E and H would allocate both Tenmile Creek and Umpqua Spit areas for RNA establishment thereby maximizing research, education and long-term monitoring opportunities and providing the greatest opportunity to preserve in perpetuity unique examples of coastal dune species and habitats.

Cumulative Effects

The 2 potential RNAs contain features such as seashore bluegrass-red fescue unstabilized dunes, which have largely been displaced in the Pacific Northwest by land development, stabilization of dunes with exotic and native species, and logging (Alpert 1984). Cumulative effects from alternatives which do not allocate both areas for RNA establishment would result in regional, and possibly a global, loss of opportunities to protect in perpetuity these unique coastal ecosystem features.

Mitigation Measures

Umpqua Spit and Tenmile Creek areas were selected for study as potential RNAs following lengthy study of available habitats in the Pacific Northwest. They are the best examples of typical and unique coastal features available for RNA designation. If alternatives do not allocate these areas for RNA establishment, no possible mitigation measures exist.

Effects of RNAs on Other Resources

Recreation

- Non-motorized recreationists would have opportunities to observe undisturbed, unique, natural dune features.
- Many recreation activities would be precluded from areas allocated for RNA establishment.

Plant and Wildlife Habitats

- Allocating the Umpqua Spit and Tenmile Creek areas for RNA establishment would afford long-term protection for native plant species and their habitats.
- Because RNAs do not permit high-impact recreation use, RNA allocation would provide suitable habitat for some wildlife species which require undisturbed habitats.
- Allocating RNAs for establishment would preclude some wildlife habitat management activities.
- Wetlands, such as dune deflation plains and willow sedge marshes, would be protected from human disturbance.
- Early seral stage wetlands would become uncommon as wetlands succeeded over time.
- Aquatic habitats, such as ephemeral pools, would be protected from human disturbance.

Scenery

- In Tenmile Creek, quality of scenery would remain the same as current conditions, or could decrease over time if European beachgrass significantly expands into the area and stabilizes the moving dunes. In Umpqua Spit, quality of scenery may increase due to exclosure of motorized vehicles, or could decrease due to European beachgrass encroachment.

Cultural Resources

- Few or no ground-disturbing activities would take place in lands allocated for RNA establishment. Undiscovered cultural resources would be protected, but data collection associated with site discovery would be precluded.

ENVIRONMENTAL CONSEQUENCES ON WILD AND SCENIC RIVERS

Direct and Indirect Effects

Effects on a potential wild and scenic river depend to some degree on whether or not it is designated as a wild and scenic river by Congress, and, if it is, what classification it is given and what land is included within the boundaries.

Figure IV-15 shows which streams would be recommended for wild and scenic river designation in each alternative. It also shows the total acreage which would be included within the river area boundaries (including private land), by classification (wild, scenic or recreational), assuming that the boundary would be located ¼ mile from the stream on each side, the maximum allowed in the Wild and Scenic Rivers Act.

Figure IV-15. Probable acreage of wild and scenic rivers recommended in alternatives

	Alternatives							
Stream	**A**	**B**	**C**	**D**	**E**	**F(PA)**	**G**	**H**
Siltcoos River								
Classification	*	Rec.	†	Scenic	*	*	Rec.	Rec.
Acres	0	525	0	525	0	0	525	525
Tahkenitch Creek								
Classification	*	Rec.	†	Scenic	Wild	Wild	Scenic	Wild
Acres	0	770	0	770	770	770	770	770
Tenmile Creek								
Classification	*	Rec.	†	Scenic	Wild/ Scenic	Scenic	*	Wild/ Scenic
Acres	0	1,500	0	1,000	830/170	1,000	0	830/170
Acreage by Classification								
Recreational	0	2,795	0	0	0	0	525	525
Scenic	0	0	0	2,295	170	1,000	770	170
Wild	0	0	0	0	1,600	770	0	1,600
Total Acreage	0	2,795	0	2,295	1,770	1,770	1,295	2,295

* not recommended for designation - river area allocated to other management area(s).
†not recommended for designation but eligibility would be maintained.

In general, a classification of wild would provide more protection of a river's values than scenic, and scenic more than recreational. From this standpoint, Alternative H would offer the most protection since all three streams are recommended for designation, two of them predominantly in the wild classification. However, if a stream is designated, final boundaries must be determined and a management

plan must be prepared. The specific boundaries and management direction included in the plan also play a key role in the effects which would likely occur.

Even though the specific details of a management plan are not available at this time, general effects can be described based on the designation and classification recommendations in each alternative and the general management program described in Chapter II.

General Effects

Generally, based on current information, there would not be major difference in effects on the streams under any of the alternatives, whether designated or not. This is because there are no known plans or proposals for dams, major developments, or other activities which would cause large changes in the streams or their adjacent land areas. And, since the streams are predominantly located within a National Recreation Area, the management direction would not be substantially different. Eligibility for all the streams would be maintained in all alternatives. The biggest exception to this would be in the Tenmile Creek area, where Alternative B would recommend designation of over two miles of private land. The reasonably foreseeable effects on these streams are described below.

Effects on Siltcoos River

Effects on the Siltcoos River come primarily from the recreation developments within the corridor and along the shoreline, and the recreation uses these facilities generate. In addition there would be some minor effects from wetland and wildlife habitat activities within the river area. The alternatives can be grouped into those which keep recreation development at about the same level as present, those which increase development, and those which reduce development.

Development About Same as at Present—In Alternatives C, F(PA), G and H, the developed recreation sites would all be essentially the same as at present. This is a river corridor in which there is a high-standard, paved road and several highly developed recreation sites. Many people use the corridor, and during the summer months it fairly bustles with activity. In Alternative C (designation not recommended but eligibility maintained), ORVs would be the predominant users, and associated with that is quite a bit of noise and traffic.

In alternative F(PA) (designation not recommended) existing facilities along the Siltcoos River and Road would be closed to use of ORVs. However, Driftwood II Campground (CG) and a new overflow campground/day-use staging area would be available for ORVs. Both these CGs are outside the corridor and would be staging areas for riding which would also be outside the corridor. Only street-legal ORVs would be permitted to operate on Siltcoos Road. Traffic and noise would probably be less than current. It is anticipated that the existing facilities would be used by non-ORV users, although it may take some time for this transition to occur.

In Alternative G (recreational river), existing facilities along the Siltcoos River and Road would be closed to ORVs. However, Driftwood II Campground (CG) and a new CG would be available for ORVs. Both these CGs are outside the corridor and would be staging areas for riding which would also be outside the corridor. ORVs would still use the Siltcoos Road for access to these CGs , but traffic and noise would probably be much less. It is anticipated that the existing facilities would be used by non-ORV users, although it may take some time for this transition to occur. It is expected that traffic and noise would be less in this alternative than in Alternative C.

In Alternative H (recreational river), the whole NRA is closed to use of ORVs, so this should result in noise and traffic somewhat less than in Alternative G. In all these alternatives there would be substantial presence of humans within the river area and along the shoreline.

Alternatives That Increase Development—Alternatives A and B increase the level of facility development within the corridor, although not substantially. Of all the alternatives, the Siltcoos corridor would be most highly developed in Alternative A (designation not recommended). There would be a major new CG developed, probably just north of the corridor, and the Waxmyrtle road would be gravelled and open year-round. The corridor would remain fully open to use of ORVs. Noise, traffic and the general level of activity would be highest in this alternative, but would not be substantially greater than at present.

Alternative B (recreational river) does not add any new major recreation developments but does add a few minor wildlife-related ones which could be located close to the river. They would generate a bit more use close to the river, but the impacts would not be great. The corridor would be closed to ORVs, so the overall effects would be fairly similar to those in Alternative H.

Alternatives That Decrease Development—Alternatives D and E eliminate the Siltcoos Beach parking lot and move the end of the Siltcoos Road back from the beach. In addition, they close the corridor to use of ORVs. Alternative E (designation not recommended) pulls the end of the road back the farthest, about ¾-mile, to the present location of the Lagoon CG entrance. Lagoon CG is eliminated and replaced with a parking lot. Driftwood II CG is eliminated. Waxmyrtle CG would be reduced in size, converted to a less highly-developed, walk-in CG, and the riverside units removed. This alternative still keeps both bridges, and much of the road that is adjacent to the river. However, it would reduce the number of facilities, people and traffic in the corridor substantially. This would make Alternative E the least developed and least crowded.

Alternative D (scenic river) shortens the Siltcoos Road to the Stagecoach Trailhead parking, a reduction of about ⅔-mile. The riverside units in Waxmyrtle CG would be eliminated as would Lodgepole and Driftwood II CGs. Some minor wildlife-related facilities would be added on or near the river bank. This alternative would be

somewhere between Alternatives H and E in terms of level of development and general activity.

Effects Common to All Alternatives—In all alternatives, wildlife habitat improvement activities would be aimed at protecting populations of snowy plover, a sensitive species, and maintaining or improving wetlands. Although the specific activities would vary somewhat in the different alternatives they all would generally be low-key and not visually intrusive. It could involve closing some areas during nesting season (approximately march 15 through June 30) which would restrict use of a small part of the river corridor for a portion of the year.

The dam that creates the upper end of the eligible segment of the Siltcoos River is operated by International Paper Company to maintain water in Siltcoos Lake for possible use in their Gardiner Mill if Tahkenitch Lake is not sufficient in a time of drought. Part of the operation involves a "flushing" of the stream just prior to the start of salmon runs to wash out any blockages and make the runs easier. This creates a short-term surge which could have a minor effect on any recreationists on the river. This is a traditional use which would be maintained in the future.

Effects on Tahkenitch Creek

The effects on Tahkenitch Creek would vary little among the alternatives. This is because, in all alternatives, even those where Tahkenitch Creek is not recommended for designation, there would be no developments (other than a trail and trail bridge in all alternatives), and the land on both sides of the river area would be closed to ORVs. The main difference is that in Alternatives D, E, F(PA), G and H there would be some minor work done near the mouth of the creek in order to improve habitat for the western snowy plover, a threatened species. This work could involve some relatively unobtrusive signing at the estuary, rope closures around nest sites during nesting season and European beachgrass control. These activities temporarily would slightly reduce the natural appearance of the area and could restrict a small part of the river area from access during the same portion of the year as the Siltcoos River.

Recreation use of the river area is expected to be relatively light in all alternatives due to the lack of recreation facility development. The presence of the trail will increase the numbers of recreationists over what presently use the area, but this will still be light use. In those alternatives where designation is recommended, slightly more people may use the stream than in the other alternatives due to the notoriety of designation. In all alternatives levels of solitude should be relatively high other than right at the trail.

International Paper Company's dam at the upper end of the eligible section is operated similarly to the Siltcoos River dam. The effect of flushing the channel prior to salmon runs could be more significant for recreationists on Tahkenitch Creek because the stream flows through a narrower and more restricted channel

so a minor "wall" of water could be created. This could be a hazard to someone on the stream who was not aware it was coming, although it would be at time of year when fewer people would likely be on the stream. As with the Siltcoos River, this is a traditional operating procedure which would not be affected by designation.

Effects on Tenmile Creek

All 5 miles of Tenmile Creek are eligible for inclusion in the National Wild and Scenic River System. However, the lower several miles of stream are predominantly National Forest land, while the upper 2 miles are all privately owned. In order to look at the full possibilities for designation, Alternative B recommends designation of the whole stream with a recreational classification. In the other alternatives where designation is recommended, D, E, F(PA) and H, the recommendation is limited to the lower 3 miles, the place where the stream first enters National Forest land, and where the outstandingly remarkable values are most evident.

In Alternative B (recreational river), development of all the private land along the stream would be reduced from what it would likely be without designation. This would result in this portion of the stream having a more natural appearance. In Alternatives A, C, D, E, F(PA), G and H, the streamside land in the upper 2 miles, which is already partly developed with homes, docks, marinas, etc., would likely continue to be developed due to its proximity to the community of Lakeside and Highway 101. This would reduce the natural appearance of this segment of the stream.

Approximately ¼-mile of land in the lower 3 miles of stream is privately owned. This land is included in the segment of stream which is recommended for designation in Alternatives D, E, F(PA) and H. It would be given a scenic classification in all these alternatives, so development of this land would be much less than it would likely be in alternatives where it would not be designated. The land would therefore appear much more natural, especially as seen from the stream.

There are no developments planned on National Forest land in the lower 3 miles of the stream in any alternative. The major effect in the lower 3 miles would come from ORV use. Some additional minor effects would come from wildlife habitat and wetland improvement work, and from recreation use of the river area.

In Alternatives A and G (designation not recommended) both sides of the stream are open to ORV riding in open sand or on designated routes. In Alternative G a bridge would be built across Tenmile Creek to allow uninterrupted off-road riding all the way from the Horsfall area to the Umpqua Beach area. In both these alternatives, the noise and impacts to vegetation from the ORVs would reduce the natural appearance and solitude of the river area.

In Alternative D (scenic river), and Alternatives E and H (wild river), both sides of the stream would be closed to ORVs. Since no trails are planned in the river area in these alternatives, recreation use would probably be relatively light except

right around Spinreel CG in Alternatives D and H. In all these alternatives, the natural appearance and solitude would remain high, but especially in Alternative E where Spinreel CG and day-use facilities would be removed.

In Alternative B (recreational river), Alternative C (designation not recommended but eligibility maintained), and Alternative F(PA) (scenic river), ORV use is allowed only on the south side of the stream. Effects on natural appearance and solitude would be intermediate between the alternatives where both sides of the stream would be open and the alternatives where both sides of the stream would be closed.

Effects caused by enhancement of snowy plover habitat and wetlands in Alternatives D, E, F(PA), G and H, would be similar to the minor effects of those activities on Tahkenitch Creek.

Cumulative Effects

No cumulative effects on potential wild and scenic rivers have been identified.

Effects of Wild and Scenic River Designation on Other Resources and Uses

No effects of designation have been identified on other Forest Service resource programs for the Oregon Dunes NRA. This is due largely to two reasons: 1) in general, the management purposes and goals of the Oregon Dunes NRA are similar to the purposes and goals of the National Wild and Scenic Rivers System, and 2) the classification options analyzed are compatible with the overall management strategies for the alternatives. For example, wild river classifications are recommended only in those alternatives where ORV use has been eliminated as part of the overall management direction.

On the other hand, wild and scenic river designation could very well have effects on use of other properties that would be located within the boundaries of a designated stream, or that, through their operations outside the boundary of a designated stream, might have direct and adverse effects on the values for which the river was established. An example of the first case would be private land included in the boundary of a Tenmile Creek Wild and Scenic River. In such a case, the Forest Service would negotiate with the owner of the private land to assure that the land was managed in a way compatible with the classification and management plan that would be developed. An example of the second case would be if the owner of land upstream from a designated portion of a stream wanted to construct a dam which would alter the flows of the stream to the point where the stream would no longer be considered to be free-flowing.

Assumptions Used

- The recommended designations in the alternatives would actually be enacted by Congress and implemented.

- Developments, activities and uses as described in Chapter II would be implemented.
- Management plans that would be developed for designated rivers would provide management direction similar to the management direction included in the FEIS.
- Boundaries of designated wild and scenic rivers would be ¼-mile from the high water mark on each side of the stream.

Incomplete/ Unavailable Information

- It is not known whether a preliminary administrative recommendation for wild and scenic river designation included in an EIS would be transmitted to Congress unchanged by the Chief of the Forest Service, Secretary of Agriculture and the President of the United States, and if it would be, whether Congress would follow the recommendation.
- Whether the other developments, activities and uses proposed in the various alternatives would be adopted and implemented as proposed.
- What management direction would be included by Congress in an Act designating a wild and scenic river, and what subsequent management direction would be included in the management plan which must be prepared for every wild and scenic river.
- What termini and boundaries Congress might establish for any of these streams it designates as a wild and scenic river.

ENVIRONMENTAL CONSEQUENCES ON SOCIAL AND ECONOMIC SETTING

Direct and Indirect Effects

The alternatives affect the social and economic settings of local communities primarily through the recreation mix each provides. Other resource objectives (vegetation management; RNA allocation; wetlands management; fish, wildlife, and plant habitat management; and Wild and Scenic River designation) would affect communities primarily through their influence on recreation resources and opportunities.

The effects of the alternatives on local communities are assessed in terms of:

- economic impacts resulting from Oregon Dunes NRA recreationists' expenditures;
- National Forest payments to counties; and
- quality of life for local residents.

Economic Impacts

Expenditures by Oregon Dunes NRA visitors contribute significantly to the economy of the surrounding area. A 1991 economic impact analysis of Oregon Dunes NRA visitors evaluated the economic interdependence between the NRA and local firms and industries (USDA Forest Service 1991). In 1990, under the current management plan, Oregon Dunes NRA recreationists generated an estimated $161.4 million in total income (1993 dollars) and 5,214 jobs in Coos, Douglas and Lane counties (the "area of influence" around the NRA). Of this amount, the relative proportion of total income dollars generated by 5 different categories of recreationists studied was: 60% by non-beach day users; 22% by other users; 13% by ORV users; 3% by anglers; and 2% by campers. Non-beach day-users include visitors who categorize themselves as sightseers, pleasure drivers, picnickers, horseback riders or bicyclists. Other users include categories such as hikers/walkers, birders, photographers, wildlife viewers, mushroom/berry collectors, windsurfers and participants in a variety of other activities.

Future contributions by Oregon Dunes NRA visitors to the local economy will depend on which recreation opportunities are available there, and on visitation levels (i.e., on supply and demand). Available recreation opportunities at the NRA will vary by alternative. Future visitation levels depend in turn on a number of factors (e.g., population growth, personal income, changing recreation preferences, other recreation options). Because these factors are difficult to predict, we have assumed that visitation levels at the Oregon Dunes NRA will increase 3% per year

over the ten-year planning period, based on a projected 30% increase in outdoor recreation in Oregon by the end of the decade (Dean Runyan Associates 1989).

To estimate future economic contributions by Oregon Dunes NRA visitors under different alternatives, we have limited analysis to recreationists for whom the NRA is the primary destination (excluding those for whom the NRA visit is incidental or secondary). On the basis of data contained in the 1990 visitor survey, we estimate that these recreationists generated $73.6 million of total income in the three-county impact area, with 41% coming from non-beach day-users, 28% from ORV users, 23% from other users, 5% from anglers, and 2% from campers. Using these figures, estimates of average annual total income generated by these visitors over the next decade were calculated and are displayed in Figure IV-16 (1993 dollars) for each of the alternatives. The assumption was made that recreationists' expenditures will increase at a rate of 3% per year (in proportion with visitation) through the ten-year planning period for all recreation activities until, for some activities, NRA capacities are reached (and expenditures thereafter level off).

For all alternatives except E and H, estimated average annual total income varies little ($89.2-$91.1 million). This small variation is due largely to the fact that non-beach and other uses, which together contribute 64% of the dollars, can increase with little or no constraint under these alternatives. Alternative H generates less income ($65.2 million) because of the elimination of ORV use. Alternative E generates the least income ($30.4 million) due to reduced capacities for all types of recreation use (including elimination of ORV use).

Figure IV-16. Economic effects on local communities.

	ALTERNATIVE							
	A	B	C	D	E	F(PA)	G	H
Total income, average annual (million dollars)[1]	91.1	89.7	90.6	89.2	30.4	89.6	91.1	65.2
Payments to counties, average annual (dollars)[2]	33,200	33,200	32,400	28,400	21,800	32,400	33,200	32,400

[1] Includes only visitors for whom the NRA was the primary destination.
[2] Payments to Coos, Douglas and Lane counties from NRA revenues only (i.e. campground fees, special use fees, etc.)

Payments to Counties

In the 1991 fiscal year, the Oregon Dunes NRA collected approximately $210,000 in recreation and special use fees, $27,000 of which was distributed to Coos, Douglas and Lane counties. The estimated average annual payments (over the next decade)

to Coos, Douglas and Lane counties derived from NRA receipts are shown in 1993 dollars in Figure IV-16.

These figures show that there is a slight increase in payments to counties from Oregon Dunes NRA receipts for all alternatives except Alternative E, and that there is relatively little variation among the other alternatives.

Quality of Life

The Oregon Dunes NRA contributes to the quality of life of local residents by providing employment income and a variety of amenities and nearby recreation opportunities. It is believed that none of the alternatives varies enough from the present management plan (Alternative C) to greatly alter community character, but that each modifies the physical environment, amenities or economic conditions of some local residents as described below.

Congestion - A multi-year Oregon Department of Transportation study of traffic on U.S. Highway 101 has indicated a 6-7% annual increase in traffic between Coos Bay and Florence (P. Mather, pers. commun.). Alternatives that increase recreation capacity (Alternatives A, B, G) may allow for higher visitation levels which could lead to further increased traffic and congestion, and increased pressures on community infrastructure and services.

Property Values - Generally the presence of large tracts of scenic, undeveloped land, such as the Oregon Dunes NRA, in close proximity to communities adds to property values. Some residential property values are likely to be impacted by changes in recreation activities offered at the Oregon Dunes NRA. The direction and degree of change in property values would depend on proximity of the property to the Oregon Dunes NRA, and whether prospective property buyers view the changes as positive or negative. For example, Alternatives B, D, E, F(PA) and H, which curtail or eliminate ORV use, may induce increases in values of some adjacent properties if buyers seek to avoid ORV-related disturbances. Likewise, Alternatives A, C and G (which maintain or expand current levels of ORV use) may result in reduced property values assuming homebuyers with similar concerns. Conversely, buyers seeking proximity to ORV recreation opportunities may have the opposite impact on property values under these alternatives.

Employment Opportunities - Estimated total income generated in the area of influence by Oregon Dunes NRA visitors will increase for all alternatives except Alternatives E and H, which show a decline due to reduction or elimination of some recreation activities. For the other alternatives, it is likely that total income increases would be accompanied by increases in total number of jobs, with little variation among the alternatives. It is still possible that there will be some job losses in businesses which are dependent on particular types of recreation. An example would be a decline in ORV-related jobs under alternatives which curtail ORV recreation in some parts of the Oregon Dunes NRA.

In addition to visitor's recreation expenditures, some employment opportunities would also be provided by Forest Service expenditures for removal of non-native and other encroaching vegetation. For all the alternatives except C, E and F(PA), 10 to 16 acres of non-native vegetation would be treated each year, at an estimated annual labor cost of $20,000 to $350,000 (see Figure II-17). Alternative F(PA) proposes a more aggressive vegetation management program. Annual acreages treated will vary depending upon cost effective technology development and funding. This work would most likely be accomplished through contracts, generating additional employment opportunities.

Commercial collection of special forest products on the NRA could provide limited employment opportunities. With a limited area and other management mandates, the NRA special forest products program would not be large nor a major contributor to local economies. 25 percent of fees collected for commercial and personal-use forest products gathering permits would be returned to the counties.

Cumulative Effects

The effects of Oregon Dunes NRA visitation on local communities would also depend upon the supply and prices of recreational opportunities on other ownerships (both public and private) in the area. Information on the relative economic importance of travelers to other recreation destinations in the area is unavailable. (The 1991 economic impact analysis discussed above and in Chapter III focused on economic contributions of recreationists whose primary destination was the NRA.)

Effects on Other Resources

Recreation - Commercial mushroom harvest may compete with recreational harvest opportunities and could discourage other recreational pursuits in harvest areas.

Plant Communities and Wildlife Habitat - Commercial gathering of special forest products, especially mushrooms, may reduce the suitability of the habitat for some plant and wildlife species.

Soils and Geology - Commercial mushroom harvest would increase the potential for excess trailing, soil compaction and/or erosion in harvest areas.

Assumptions Used

- Recreation demand (including that for overnight facilities) at the NRA will increase at an estimated rate of 3% per year over the next decade.
- Communities close to the NRA are affected by changes in NRA recreation use.
- Spending patterns and amounts for activty groups (e.g. non-beach day users, ORV recreationists, etc.) will remain similar to current patterns and amounts.

Incomplete/ Unavailable Information

- Future demand for recreation opportunities at the Oregon Dunes NRA.
- Detailed community- and industry-specific information on economic effects of the alternatives.

ENVIRONMENTAL CONSEQUENCES ON ROADLESS AREAS

Direct and Indirect Effects

A roadless area is a large area of land (usually 2,500 acres or more) in which there are no developed roads or other significant human modifications (such as developed recreation facilities, buildings, utility structures, and so on). Construction of roads and facilities eliminates some amount of the roadless condition through the loss of environments and habitats. This, in turn, causes a loss of semi-primitive motorized and non-motorized recreational opportunities.

Presently, there are four Roadless Areas on the Oregon Dunes NRA--Woahink, Threemile Lake, Umpqua Spit and Tenmile. The combined area of these four areas is almost 24,000 acres. (See Appendix D for a detailed description of the roadless areas and the effects of the alternatives on each.)

In all alternatives except Alternative A, proposed roads or other developments would not eliminate large areas of currently existing roadless condition. This is because proposed roads and developments would be located on the edges of the roadless areas so would only reduce their sizes by a small amount. Even the cumulative effect of a number of small developments in different locations in a roadless area would not reduce acres substantially in these alternatives.

In Alternative A, a new road would be constructed almost the full length of the Umpqua Spit to provide access to a new interpretive site and recreation complex. This new road and new facilities would cut through the existing roadless areas, making the remainder too small to qualify as a roadless area. Umpqua Spit Roadless Area would therefore be eliminated, significantly reducing total roadless acreage.

In Alternatives D and E, existing roads and recreation facilities are shortened or eliminated. Because the roads (Siltcoos and Threemile Roads) no longer split some of the existing areas, one or more of them merge to form fewer, but generally larger, areas. In Alternative E, this reduces the number of roadless areas to 2 much larger roadless areas, increasing total roadless area acreage.

Figure IV-17, below, shows the size of each of the roadless areas and the total roadless area acreage in each alternative.

Figure IV-17. Acres of roadless area remaining.

		ALTERNATIVE							
Roadless Area	Existing	A	B	C	D	E	F(PA)	G	H
Woahink	4,885	4,815	4,835	4,885	9,600	12,150	4,835	4,785	4,960
Threemile Lake	4,605	4,510	4,530	4,605	*	*	4,505	4,555	4,605
Umpqua Spit [1]	2,275	0	2,260	2,275	2,280	*	2,280	2,280	2,275
Tenmile	7,530	7,220	7,285	7,480	7,395	9,025	7,375	7,260	7,510
TOTAL	19,295	16,545	18,910	19,245	19,275	21,175	18,995	18,880	19,350

[1] Figures for Umpqua Spit include 770 acres of recently patented private land.
* This roadless area has become part of the Woahink Roadless Area so acreage is shown there.

Cumulative Effects

From the standpoint of the individual roadless areas, the cumulative effects of individual construction projects has been discussed under direct and indirect effects.

Since roadless areas in the Oregon Coast Range are limited to lands owned or administered by the Forest Service, BLM and State of Oregon, cumulative effects on roadless areas are confined to actions taken by these government bodies. Effects would be extreme if all agencies were to reduce or eliminate roadless conditions on the lands they manage.

On the other hand, recent and potential actions taken to protect species such as the spotted owl and marbled murrelet may result in large areas returning to a roadless condition in the future. These habitat areas are so different from the roadless areas on the Oregon Dunes NRA, that it is probably not accurate to consider them as substitutes.

Mitigation Measures

The major mitigating measures for reducing environmental effects on the roadless areas is to not build roads or other developments in existing roadless areas. The other major action is to locate new roads and facilities on the edge of the roadless area so the effect is limited and the amount of roadless area lost is minimized. Both of these measures are instituted during the planning level decisionmaking and the effectiveness of each of them is very high.

Effects of Roadless Areas on Other Resources

Roadless areas meet the minimum requirements for future Wilderness consideration by Congress. Alternatives which eliminate roadless areas would reduce opportunities for Congress to add new areas to the National Wilderness Preservation System. The environmental effects on other components of the environment of maintaining roadless areas in a roadless condition are minimal. See Appendix D for more discussion of effects on the physical environment.

Assumptions Used

- No more roadless areas will be found.
- Road and facility construction will eliminate areas from being considered roadless until the evidence of those activities is essentially gone. This will probably be never for some areas.
- Human impacts within undeveloped areas will be concentrated on developed trails and campsites.

ENVIRONMENTAL CONSEQUENCES ON CULTURAL RESOURCES

Direct and Indirect Effects

Direct effects on cultural resources are related to the amount of land disturbance created by the construction of new roads, facilities, fish and wildlife enhancements and other improvements for each alternative. Land-disturbing projects have both positive and negative direct effects. The mitigation that follows projects is an important tool for identifying, studying and interpreting cultural resources. Conversely, when a land-disturbing project cannot be designed to avoid adverse affects on a cultural site, mitigation measures are required to protect artifacts. Scientific knowledge is gained from the data recovery associated with mitigation efforts but, because archaeological excavation is inherently a destructive process, opportunities for permanent "in place" site preservation are lost.

Alternatives with high levels of ground-disturbing activities, whether resulting from recreation, wildlife management or wetlands management (Alternatives A, B, D, F(PA), G, H) increase site discovery opportunities since these projects frequently occur in areas containing ancient archaeological evidence. The harm caused by construction or enhancement projects can be partly mitigated by archaeological "data recovery" excavations.

Increased recreational access and activities also causes resource damage that is difficult to control. For example, inadvertent damage to cultural resources may be caused by hikers or ORV traffic cutting across ancient shell middens. Damage may also result from deliberately planned vandalism, artifact collecting or site looting. Thus alternatives which increase recreation use substantially (Alternatives A, B, G) would impact cultural resources more than alternatives which maintain (Alternatives C, F(PA), H) or decrease (Alternatives D, E) recreation use.

Alternatives A, B, D, F(PA), G and H which include efforts to control or eradicate European beachgrass would re-initiate dune movement which could, in turn, expose previously stabilized sites and cover exposed shell middens and historic remains. These sites would be at risk from accidental recreational damage and would be exposed to artifact hunters. Localized beachgrass control associated with RNA allocation in Alternatives B, C, D, E, F(PA) and H might also uncover cultural sites. However, recreation projects and other land-disturbing activities would be limited within RNAs so long-term site preservation would be enhanced and mitigation concerns would be alleviated.

Alternatives B, D, E, F(PA), G and H which would recommend nomination of streams and rivers as Wild and Scenic offer protection of cultural resources because they restrict the level of development that could occur within the riparian corridor. However, cultural sites located within the stream/river corridors would still be vulnerable to damage from uncontrolled recreation activities such as off-trail hiking and artifact collecting and site looting.

Indirect effects may result from human-created changes in the landscape that expose and endanger previously hidden and protected cultural resources. For example, recreation or wildlife habitat improvements that denude vegetation near a stream and increase streambank erosion could destabilize nearby sites such as prehistoric shell middens and contribute to their loss or destruction.

All alternatives have some level of indirect effect on cultural resources although precise prediction is difficult without project and site specific information. In general, Alternatives A, B, D, F(PA) and G which include high levels of land disturbance contribute to the destabilization and exposure of sites and pose the greatest indirect threat to cultural resources.

Cumulative Effects

Because the identified cultural resource base is very small, cumulative effects must be projected based on current site discovery rates and the amount of proposed development during the planning period. Alternatives that emphasize recreation improvements and vegetation manipulation/habitat enhancement have the greatest cumulative effect on cultural resources. These alternatives will have the highest site discovery rates and provide the greatest amount of scientific information through project mitigation work. In the short-term, these alternatives enhance opportunities for identification, study and interpretation of cultural sites. In the long-term, the pace of development and subsequent site mitigation needs could outstrip project budgets and work against the cumulative preservation interests of the NRA's cultural resource base.

Mitigation Measures

Mitigation measures for land disturbing projects affecting cultural resources would include project redesign, site avoidance, placing filter cloth or fill on top of sites, archival documentation, photography and removal of historic buildings, and archaeological data recovery at prehistoric sites. Mitigation measures would be site specific and based on consultation and agreement among the Forest Service, the Oregon State Historic Preservation Office, the federal Advisory Council on Historic Preservation and, when appropriate, the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians.

However, cultural resources are a fragile and non-renewable resource with important values to the scientific/history community, American Indian peoples, and the historic preservation-oriented public. To these groups, the direct, indirect and cumulative effects of land disturbing projects on irreplaceable cultural resources and National heritage sites cannot be entirely mitigated through any of the means described above.

Effects of Cultural Resources on Other Resources

Recreation

- The presence of cultural resource sites in areas set aside for recreation facilities, or trails may require moving the projects to other locations or redesigning them to avoid causing adverse impacts. This could delay the project and and create adverse environmental consequences if quick (seasonally-constrained) implementation is required.

- Identification, study and interpretation of Oregon Dunes NRA cultural resources would be an important tourist attraction and generate revenue for local economies. Interpreted coastal shell middens, American Indian villages, and historic sites associated with the settlement and maritime history of western Oregon provide unrivaled opportunities for public outreach and education on National Forest lands.

Plant Communities and Wildlife Habitats

- The presence of cultural resource sites in areas set aside for plant and/or wildlife habitat enhancement projects may require moving projects to other locations or redesigning them to avoid causing adverse impacts.

Fish Habitat

- Presence of cultural resource sites in areas set aside for fish habitat enhancement projects may require moving projects to other locations or redesigning them to avoid causing adverse impacts.

Assumptions Used

- Currently known cultural resources on the Oregon Dunes NRA are representative of the resource base at large.

- Land-disturbing projects which disturb cultural resources cause irreversible damage to non-renewable cultural resources. The amount and kind of damage to cultural resources is dependent on the level of land disturbance.

- Some forms of recreation and public use of the Oregon Dunes NRA (e.g., hiking, fishing, ORV riding) are difficult to control and contribute to archaeological/ historical site resource damage, artifact theft and site vandalism.

- The amount of artifact collecting and site looting will accelerate over time as more sites are discovered and the public is made aware of these finds in the local media and Forest Service public outreach/education projects.

Incomplete/ Unavailable Information

- Historic information specifically tied to places and sites on the Oregon Dunes NRA, especially information gathered through oral interviews with area "old timers" and local historical experts.
- Cultural resource site records for the NRA.
- Non-project related inventory data.
- Ethnographic information about the Coos, Lower Umpqua and Siulaw Indians, especially in regards to ancient village sites and traditional use areas on the Oregon Dunes NRA.
- Post-glacial geological information about the Dunes, especially as it relates to past climates and climatic change, opening and closing of estuaries and rivers by dune movement and sea level fluctuations.
- Post-glacial natural history information about the Dunes, especially as it relates to plant succession, wildlife range and fisheries habitat.
- Effects of modern vegetation manipulation and other activities on cultural resources.
- Information about how to stabilize and protect sites such as shell middens from the elements and public.
- Type and extent of artifact collecting, site looting and vandalism at cultural sites.
- Effective methods of interpretting the Oregon Dunes NRA's cultural history for the public without risking site damage and destruction.

ENVIRONMENTAL CONSEQUENCES ON OTHER RESOURCES

Direct and Indirect Effects

Human and Community Development Activities

The Oregon Dunes NRA participates in 2 U.S. Department of Labor funded programs designed to provide employment and training opportunities. The Umpqua Training and Employment Program serves economically disadvantaged young people, aged 15 to 18. The NRA typically provides training, supervision and employment to 4-5 individuals under this program. The Senior Conservation Employment Program serves individuals over 55 years of age. The NRA typically employs and trains 6 people under this program. Since both programs are funded independently of the U.S. Forest Service, the alternatives being considered would not affect these programs.

The Oregon Dunes NRA contributes both directly and indirectly to community development activities. Direct contributions result from NRA participation in community-sponsored programs and ventures intended to promote development. Indirect contributions result from NRA programs which take place on Forest Service lands within the NRA, but create business opportunities and foster tourism in local communities (see Environmental Consequences on Social and Economic Setting, Chapter IV).

Minorities and Women

The primary effect of the alternatives on minorities and women would be through changes in job and outdoor recreation opportunities. Job opportunities would vary in terms of Forest Service jobs and contracts for goods and services, and also, in terms of local jobs created in response to NRA outputs, payments to counties and expenditures. Forest Service policies ensure employment and contracting opportunities for people without regard to race, color, religion, national origin, sex, age or physical/mental disability. Although these policies would continue under all alternatives, the number of agency and contracting jobs would vary with program emphases and associated funding levels on the NRA (See Environmental Consequences on Social and Economic Setting, Chapter IV).

Recreation opportunities on National Forest lands are also available to people without regard to race, color, religion, national origin, sex, age or physical/mental disability. The types, amounts and locations of various recreation opportunities at the Oregon Dunes NRA would vary depending on the alternative implemented (See Environmental Consequences on Recreation, Chapter IV).

American Indian Religious Freedom

The primary use of the NRA lands by American Indians for religious purposes appears to have been to develop unique, individual links with the natural world. Although no continuing religious practices have been identified on the Forest, several sites which were once important to the area's native inhabitants are known (Beckham et al. 1982). Protection of these sites and cooperation with Indian Tribes to identify other sites would continue under all alternatives.

Prime Farmlands, Wetlands and Flood Plains

There are no identified prime farmlands on the Oregon Dunes NRA. Prime farmlands off the Oregon Dunes NRA would not be affected by activities proposed in any of the alternatives. Flood plains and wetlands would be protected in all alternatives by management requirements to meet Executive Orders 11990 and 11988. Roads, campground and picnic areas and facilities would not be built in these areas. Standards and guidelines would protect and enhance wildlife habitat, plant habitat, visual quality and water quality in wetlands and estuaries on the NRA. Treatment of vegetation to favor early succession stage vegetation over late succession stage vegetation in large areas of wetland in Alternatives D, F and H would slow the progression of wetlands into drylands in the treated areas (see Environmental Consequences on Plant Communities and Wildlife Habitats, Chapter IV). This would have implications for future as well as current management of the NRA.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Short-term use of the land includes the day-to-day and even year-to-year activities that visitors and Forest Service managers engage in at the Oregon Dunes NRA. It includes both activities that physically remove resources from the land, such as hunting, fishing, mushroom gathering and berry picking as well as activities that do not, such as scenery viewing, hiking, photography and ORV riding. Short-term actions also include management activities such as facility construction and vegetation management often performed to permit, encourage or discourage other activities, such as those noted above.

Long-term productivity refers to the land's continuing ability to produce both commodities (such as fish, wildlife and plant products), as well as amenities (such as scenery and recreation opportunities) for future generations. This ability depends on management practices and uses that do not impair soil productivity or water quality to the point they are no longer capable of providing habitat; alter the natural landscape beyond its ability to recover; or impair geologic features to the extent that they lose identity. In creating the Oregon Dunes NRA, Congress specifically recognized its unique recreational, scenic, scientific and historic values. NRA management decisions must, therefore, be based on the land's continuing capability to provide these values rather than on urgency, short-term economics or short-term needs.

- ORV use off routes designated and maintained for that purpose is a short-term use, but it affects long-term soil productivity through loss of vegetation, erosion and rutting (Alternatives A, B, C, D, F(PA), and G).

- The continued spread of non-native vegetation and the resulting accelerated spread of native vegetation affects the NRA's long-term ability to provide the unique recreation, scenic and scientific values for which it was established (All Alternatives)

- The continued decline of surface water levels in portions of the NRA affects the long-term productivity of the area by reducing habitat for some species of fish, wildlife and plants; as well as by reducing opportunities for some types of outdoor recreation, such as fishing, waterfowl viewing and hunting (All Alternatives).

- The use of ORVs in some areas (such as Tree Island #3) is temporary in nature, but has long-term affects on unique scenic and geologic features (tree islands) (Alternatives A, C, and G).

UNAVOIDABLE ADVERSE EFFECTS

Implementing any alternative would result in some adverse environmental effects that cannot be avoided. Standards and guidelines and mitigation measures are intended to keep the extent and duration of these effects within acceptable levels, but adverse effects cannot be completely eliminated. The following adverse environmental consequences would be associated to some extent with all alternatives.

Recreation

- Loss or reduction of some opportunities due to development and/or management for other recreation opportunities or other resource objectives.

Fish/Wildlife/Plant Habitat

- Loss or reduction of habitat for some species as a result of declining surface water levels in some portions of the NRA and/or competition from non-native species.
- Loss or reduction of habitat for some plant species as a result of ORV use, facility development, and/or ecological changes resulting from non-native species.
- Displacement of wildlife when their habitat is disturbed by vegetation management; road, trail or facility development; or recreation use.

Scenery

- Reduction in the unique scenic quality of the NRA as a result of vegetation spread.

Watershed

- Contamination of water sources due to increased human use of the NRA.
- Loss of soils from vegetated areas resulting from ORVs operating off of designated routes.

Cultural Resources

- Disruption of prehistoric or historic evidence of human occupancy on the NRA resulting from road, trail and facility development, habitat management and vegetation management.

Air Quality

- Short-term reduction in air quality from dust, smoke, and vehicle emissions resulting from construction of roads and facilities, recreation use and wildlife habitat management.

Fire Management

- Increase in fire hazard from increasing vegetation coupled with high levels of dispersed recreational use.

IRREVERSIBLE OR IRRETRIEVABLE RESOURCE COMMITMENTS

Irreversible resource commitments are actions which either deplete a non-renewable resource or disturb another resource to the point that it cannot be renewed within 100 years. Examples of irreversible commitments are the disturbance of cultural sites, the loss or destruction of a significant geologic feature, or the loss of critical habitats.

Irretrievable resource commitments are opportunities for resource use lost for a period of time because that resource is being used for some other, generally incompatible, purpose. Examples of irretrievable resource commitments are the loss of developed recreation opportunities in areas where wildlife management is the emphasis or, conversely, the loss of wildlife habitat opportunities in highly developed recreation areas. Irretrievable commitments may not extend forever, because they can be changed through changes in management direction.

Irreversible Resource Commitments

Standards and guidelines designed to protect resources that could be irreversibly affected are included in all the alternatives. Nevertheless, the potential for irreversible losses remains and the primary ones are noted below.

- Soil disturbing activities primarily related to recreation development and wildlife habitat management could result in irreversible losses of cultural resources (All Alternatives).

- Continued ORV riding at Tree Island #3 will cause soil erosion and undermine vegetation, which will eventually result in the irreversible loss of a unique geologic feature, a tree island (Alternatives A, C, G).

- Extracting minerals, such as high silica content sand, is an irreversible commitment since the minerals are no longer available for use (All Alternatives).

- The use of fossil fuels to manage the NRA and expended by recreationists getting to and at the NRA is an irreversible resource commitment. Alternatives encouraging higher levels visitation, management, and ORV riding would cause higher consumption of fossil fuels (Alternatives A, B, C, F(PA), G).

- Loss of soil resources resulting from ORVs operating off designated routes in vegetated areas is an irreversible condition (Alternatives A, B, C, D, F(PA), G).

- Contamination of surface and/or groundwater is an irreversible commitment that is more likely under alternatives that promote higher levels of recreation use, especially dispersed recreation use by ORVs (Alternatives A, C, F(PA), G).

Irretrievable Resource Commitments

All 8 alternatives contain irretrievable resource commitments. They are unavoidable because it is impossible to manage resources for any purpose without precluding the opportunity to use them for some other purpose. Some of the major irretrievable resources commitments included in the alternatives are listed below.

Recreation

- Managing areas of the NRA for recreation reduces opportunities to manage them for wildlife or plant habitat and for some types of research.
- Managing some portions of the NRA for developed recreation precludes opportunities to manage them for dispersed recreation.
- Managing some portions of the NRA for non-motorized forms of recreation precludes opportunities for ORV use of these areas.
- Increasing recreation access reduces opportunities for more quiet, remote, solitude-dependent types of recreation experiences.

Fish/Wildlife/Plant Habitat

- Managing certain areas primarily as habitat precludes opportunities for some forms of recreation and some types of research.
- Managing certain areas (i.e., meadows) as early seral stage habitats precludes opportunities for letting them evolve into later seral stage habitats.
- Managing fish habitats to benefit certain species reduces opportunities to benefit other species.

Wetlands

- Managing areas as wetland habitat precludes opportunities to manage them for some types of recreation, for species not adapted to wetlands, and for some types of research.

Research Natural Areas

- Managing areas primarily for research eliminates opportunities to manage them for some types of recreation (e.g., ORVs) and for some types of habitat.

Wild and Scenic Rivers

- Managing NRA streams as wild or scenic rivers would preclude opportunities for some types of recreational development; for some types of habitat management; and for expenditure of federal funds on activities outside the NRA that would detract from the values for which the stream was designated.

Minerals

- Allowing mineral entry in the NRA buffer in the Horsfall area could result in public lands claimed for mineral resources passing into private ownership and eliminate opportunities to manage them for public use.

Water

- Continued pumping from the Dunes Aquifer and the increase in vegetation could reduce or eliminate opportunities to manage surface water for scenic, recreational, and habitat purposes.

CONDITIONS UNCHANGED BY ALTERNATIVES

There are some conditions on the NRA which would not be affected by implementation of any alternative.

- The spread of vegetation will outstrip efforts to arrest it during this planning period in all alternatives.

- The decline in surface water levels in some portions of the NRA will continue in all alternatives.

- The potential for mineral entry in the NRA buffer (Horsfall area) and the potential for private land patents in accordance with provisions of the 1872 Mining Act will continue in all alternatives.

CONSISTENCY WITH OTHER PLANS AND POLICIES

Plans and policies of various federal, state, county and city agencies were reviewed for consistency with alternatives described in the Final Environmental Impact Statement (FEIS) for the Siuslaw National Forest Land and Resource Management Plan (USFS 1991). Alternatives described in this FEIS were also reviewed for consistency with other plans and policies. All alternatives were determined to be consistent with the 1980 Resource Planning Act, National Clean Air Act, the policies of Oregon Department of Forestry, and the policies of the Oregon Department of Environmental Quality (see USFS 1991 for detailed discussion).

The following plans and policies will be addressed more specifically.

Plant/Fish/ Wildlife Habitat

In general, no actions are proposed in the alternatives that would conflict with management plans of ODFW, the U.S. Fish and Wildlife Service, the Oregon Natural Heritage Program or the Siuslaw National Forest Land and Resource Management Plan. Existing populations of all proposed, endangered, threatened and sensitive plant species would not be jeopardized in compliance with Forest Service policy (FSM 2670).

Oregon Department of Fish and Wildlife

Fish - ODFW recently completed a management plan for the Tenmile basin (Abrams et al. 1991), of which the Oregon Dunes NRA forms the most western portion. The Plan calls for cooperation between ODFW and the Oregon Dunes NRA to enhance fish habitat, post signs, determine access needs and angler use on Tenmile Creek, and consider a hatchery program for steelhead and coho salmon in Saunders Creek. The Plan also calls for protection of the Tenmile estuary.

None of the alternatives include the hatchery program on Saunders Creek, while only Alternatives D and F(PA) call for substantial developments to enhance angling in the Spinreel area along Tenmile Creek.

Wildlife - The goals of ODFW for wildlife habitat are expressed according to species. Only those species found on the Oregon Dunes NRA are discussed below.

Bald Eagle - ODFW requested that all important feeding areas be identified and protected. The estuaries of Siltcoos River and Tahkenitch and Tenmile creeks provide valuable foraging habitat for bald eagle. None of the alternatives would reduce the availability of this habitat although alternatives which are expected to increase recreation levels substantially (Alternatives A, B, G) may slightly reduce the suitability of estuary habitat for foraging eagles.

Snowy Plover - ODFW goals for snowy plover are to maintain and enhance habitat on the Oregon Dunes NRA and prevent disturbance to breeding plovers. All of the alternatives, except C, protect snowy plover habitat and reduce disturbance to nesting snowy plovers. Some disturbance would still occur in all alternatives; disturbance would be higher in alternatives which substantially increase use of the NRA (Alternatives A, B, G).

Black Bear - ODFW would like to maintain a huntable population of black bear. Coastal Oregon, and the Oregon Dunes NRA in particular, currently supports a high black bear population although exact numbers are not know. All alternatives are expected to maintain huntable bear populations. Alternatives which emphasize wildlife habitat management (Alternatives D, F(PA), H) would have more opportunity to manage specifically to increase bear populations.

Black-tailed Deer - ODFW specifies that they would like to maintain a black-tailed deer population of approximately 31,000. Numbers of deer residing on the NRA are not currently known and no surveys are planned. However, all alternatives are expected to at least maintain existing deer populations. Alternatives which emphasize wildlife habitat or wetlands management (Alternatives D, F(PA), H) would have more opportunity to specifically manage black-tailed deer populations.

Special Habitats - All alternatives would meet ODFW goals by maintaining special habitats. Special protection to these habitats would be provided in some alternatives through more restrictive standards and guidelines.

U.S. Fish and Wildlife Service Recovery Plans

Aleutian Canada Goose - All alternatives would meet recovery plan objectives for migratory and wintering habitat for the Aleutian Canada goose. Alternatives which emphasize wetlands management (Alternatives D, F(PA), H) would increase suitable habitat for this species.

Bald Eagle - All alternatives would meet recovery plan objectives of identifying and protecting important feeding areas. Alternatives which are expected to increase recreation levels substantially (Alternatives A, B, G) may slightly reduce the suitability of estuary habitat for foraging eagles.

California Brown Pelican - All alternatives would meet recovery plan objectives of identifying and protecting important roosting/resting areas. Many stretches of beach, sand spits, and estuaries on, or adjacent to the NRA provide fall roosting habitat for pelicans. Alternatives with few miles of "remote" beach may reduce the suitability of this habitat for pelicans.

Cultural Resources

All actions would comply with federal historic preservation law and regulations, including Executive Order 11593, Section 106 and 110 of the National Historic Preservation Act of 1966, the American Indian Religious Freedom Act, and the Archaeological Resources Protection Act of 1979, as amended.

Cultural resource inventory on the NRA would follow the procedures outlined in the Forest's programmatic agreement with the Oregon State Historic Preservation Office.

Recreation

The State Comprehensive Outdoor Recreation Plan (SCORP) is prepared every 5 years by the Oregon Department of Parks and Recreation. It reports current and projected demand for a variety of outdoor recreation activities and ROS settings within several regions comprising the entire state. It is the most comprehensive and reliable information dealing with future demand for recreation activities and settings at the NRA.

All alternatives in this FEIS provide varying amounts of 4 ROS classes for which SCORP has projected demand in the year 2000. These demand projections are not disaggregated beyond the National Forest level. On a proportional basis, the NRA would meet its share of the Siuslaw National Forest's projected demand in all alternatives except Alternative E.

Transportation - U.S. Highway 101

Oregon Department of Transportation (ODOT) is currently preparing a major plan for U.S. Highway 101. As the major transportation artery serving the NRA, future plans for the highway are very important to future visitation, resource conditions, and management at the NRA. Significant opportunities for coordination and cooperation to meet joint objectives exist between these 2 planning efforts. As concurrent planning progresses, the Forest Service will continue to monitor and remain involved in the Highway 101 planning effort in order to identify the opportunities and consequences for the NRA associated with this project.

Watershed

Protective measures for streams and soils within the NRA are generally more restrictive than required by the Oregon Forest Practices Act, or the Department of Environmental Quality. Estuaries at the mouth of the Siltcoos River, Tenmile Creek and Tahkenitch Creek are closed to motor vehicle use in accordance with Oregon Administrative Rules (OAR) 1414-84-020, 1414-84-030, and 1414-84-040 respectively.

City and County Plans

A complete discussion of how city and county plans are formulated to address Oregon law is presented in Chapter IV of the Forest Plan FEIS. County comprehensive plans must address 19 goals established by the Land Conservation and Development Commission (LCDC). The alternatives in this FEIS were compared to the LCDC-approved comprehensive plans for Lane, Douglas, and Coos counties, the counties in which NRA lands lie. The uses and activities proposed in the alternatives were consistent to the maximum extent practicable with the enforceable policies contained in the county comprehensive plans.

Some alternatives (B, D, E and H), including the preferred F(PA)were found to be not consistent with a Coos County advisory policy (included in the Coos County Comprehensive Plan) opposing "... new restrictions on the use of off-road vehicles on public lands in unincorporated Coos County unless the Board of Commissioners finds that such are necessary to protect the health, safety and welfare of its citizens." The Forest Service considered this advisory policy, but felt it appropriate and necessary to propose additional ORV restrictions in some alternatives (including the preferred) in order to more broadly address statewide planning goals 5, 17, and 18; provisions of the Endangered Species Act; and alternative recreation opportunities as identified in the State Comprehensive Outdoor Recreation Plan (SCORP).

The Oregon Coastal Management Program

The Federal Coastal Zone Management Act (CZMA) of 1972, as amended, established a program to encourage states to adopt coastal management programs which would meet national standards. A section of the CZMA requires that "Each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." [Subsection 307(c)(1)] Although Federal lands are excluded from the boundaries of the coastal zone, the "affecting activities" provision requires federal agencies to examine their actions for both direct, immediate impacts, cumulative impacts and indirect effects that may occur at a later time and at a distance from the action.

The LCDC has administered the Oregon Coastal Management Program (OCMP) since 1975. The federal government officially recognized and approved that program in 1977. The policies of the OCMP include the 19 statewide planning goals, all acknowledged city and county comprehensive plans and land use regulations and the statutory authorities of a variety of state agencies. These statutory authorities are included in the appendix of the OCMP document. Federal activities directly or indirectly affecting the coastal zone must be consistent "to the maximum extent practicable" with all applicable and mandatory OCMP policies, but advisory policies need only be considered. The term "to the maximum extent practicable" means that a federal agency's activities must be consistent with federally approved state coastal zone policies whenever the agency has discretion under federal law to abide with state policies. The CZMA does not, however, impose a higher duty on federal agencies than a state requires of its own agencies.

Oregon Revised Statues 197.180 requires state agencies to undertake their activities in compliance with the goals and in a manner compatible with acknowledged plans and land use regulations. So, if an examination of the activities included in the alternatives reveals compliance with the goals, compatibility with acknowledged city and county comprehensive plans and land use regulations, and conformance with the various state agency statutory authorities within the OCMP appendix, consistency with the OCMP would be demonstrated.

In summary, the CZMA requires that the stricter standards, either state or federal, be used to govern what activities may be allowed, but state standards are only applicable when a federal agency chooses to support or conduct an activity directly or indirectly affecting the coastal zone. The CZMA does not require federal agencies to initiate activities to be consistent with more permissive state policies.

Portions of Oregon's coastal zone in Douglas, Lane and Coos counties may be directly or indirectly affected by activities such as road construction, fish and wildlife habitat improvements, recreation development and land acquisition. These activities can affect water quality, water quantity, living resources of water, water aesthetics, and water surface area (page 17 of the Oregon Coastal Management Program). The alternatives would include all of the above activities and effects on the environment, which are discussed in earlier sections of this chapter. Specific affects in localized areas of the NRA will be identified and documented in project-level environmental assessments. All necessary permits and/or exceptions to OCMP goals will also be identified in these project-level documents. Required permits and goal exceptions will be obtained by the Forest Service before projects are implemented.

The comprehensive plans and land use regulations of the 3 counties have been acknowledged by the LCDC as meeting the requirements of the goals. These plans have been reviewed by the Forest Service. The effects predicted for the alternatives have been compared with the county comprehensive plans and have been found to be consistent to the maximum extent practicable at the programmatic level. Since the county plans have been found by LCDC to comply with the goals, consistency with the goals is assumed (to the extent LCDC required these plans to comply with the goals in the first place).

Figure IV-18. LCDC Goals and Discussion

LCDC STATE-WIDE GOAL	DISCUSSION
1. Citizen Involvement	Same as FEIS with amendments for NRA specifics.
5. Open Spaces, Scenic and Historic areas and resources (including federal Wild and Scenic, State Scenic Waterways, and designated state trails).	NRA FEIS alternatives are consistent to the maximum extent practicable (with exception as noted above in text)
6. Air, Water, and Land Resource Quality	Tiering to the Forest Plan, all NRA FEIS alternatives contain provisions for the protection or air, water and land.
8. Recreation Needs	Under all alternatives except E, the NRA would meet its proportional share of the demand projected for the Siuslaw N.F. by SCORP. All alternatives would provide a diverse mix of recreation opportunities.
9. Economy of the State	All alternatives would contribute to the economy of the State of Oregon. Alternatives A, B and G would contribute more than current management. Alternatives C, D, F(PA) and H would contribute amounts similar to current. Alternative E would contribute less than current amounts.
16. Estuarine Resources	All of the alternatives contain provisions for the protection of estuarine resources.
17. Coastal Shorelands	The alternatives would affect coastal shorelands by providing for varying levels of recreation, plant and wildlife habitat and other resource uses.
18. Beaches and Dunes	The alternatives would affect beaches and dunes by providing for varying levels of recreation, habitat and other resource uses.
19. Ocean Resources	None of the alternatives would have any significant effects on ocean resources.

The LCDC has left some provisions of the statewide planning goals to be administered by state agencies rather than local governments. These provisions are discussed below.

The Forest Practices Act administered by the Oregon Department of Forestry (Goals 5 and 17 and ORS 527.610 to 527.730)

All NRA practices used to implement the alternatives will meet or exceed the Forest Practices Act.

Fish and Wildlife policies administered by the Oregon Department of Fish and Wildlife (Goals 16, 17, and 18 and ORS 496.012 to 496.162 and ORS 506.105 to 506.201).

All alternatives contain provisions to provide for the habitat needs of species identified on the state of Oregon Threatened and Endangered Species list.

Air and Water Pollution Control statutes administered by the Oregon Department of Environmental Quality (Goal 6 and ORS 468.275 to 468.345 and ORS 468.700 to 468.775).

The Forest Service complies with these requirements by obtaining permits and providing data as needed. For example, any slash burning conducted as a part of implementing an alternative will be authorized by DEQ. Pollution control facilities will be operated according to DEQ standards and new facilities would be approved by DEQ before construction.

Regulations of Mining and Drilling administered by the Department of Geology and Mineral Industries (ORS Chapters 516, 517 and 520).

Forest Service permitted operations are required to obtain necessary permits before they commence. All necessary permits will be obtained.

Fill and Removal administered by the Division of State Lands (Goals 16, 17 and 18 and ORS Chapters 274, 517, and 541)

All required DSL permits (or exceptions from OCMP goals) for fill and removal operations will be obtained by the NRA before project work is undertaken and projects will be modified accordingly to comply fully with statutory requirements.

Ocean Shore Regulations and Scenic Waterways administered by the Parks and Recreation Department (Goals 8,16,17, and 18 and ORS Chapter 390).

Any activities in the Ocean Shore zone or affecting State Scenic Waterways will be coordinated through discussions with the Oregon Department of Parks and Recreation. Any required permits (or exceptions from OCMP goals) will be obtained before commencing project work.

Regulation of water use administered by the Water Resources Department (WRD) (ORS Chapters 536 and 543)

Forest Service water use, such as for recreation facilities and wetland projects, will comply with applicable WRD water rights, permitting and reporting requirements.

Site specific actions may have to be examined in more detail before a final determination of consistency with the OCMP can be made. Project implementing actions will be examined to determine if they have the potential to directly or indirectly affect Oregon's Coastal Zone. If the affecting activity test is met, a site specific consistency determination will be made. This determination will address the goals, the acknowledged plans, and the statutory authorities. If exceptions to OCMP goals are required to achieve project objectives, the necessity will be demonstrated in project-level environmental documents and exceptions obtained in accordance with DLCD guidelines (OAR Ch. 660, Div. 4) This approach is consistent with the OCMP.

Glossary

GLOSSARY

A

Active Slip Face - Unvegetated, steeply-sloping, leeward surface of a sand dune.

Aggregate Material - Natural sands, gravels and stone used for mixing with cementing material in making mortars and concretes.

Alternative - One of several policies, plans or projects proposed for decision making.

Anadromous Salmonids - Species of salmon and trout that mature in the sea and migrate back to their native streams to spawn.

Aquatic Habitat - Stream channels, lakes or ponds.

Aquifer - Subsurface pervious zone that transports large quantities of water.

Avian Community - Community of birds.

B

Bank Erosion - Detachment and movement of soils in a stream bank by the force of water flowing in the stream.

Beach Strand - Area of land between the ocean and foredune.

Bedrock - Rock that lies below all loose or unconsolidated soil and organic materials, including other rocks not physically connected to the bedrock.

Best Management Practices (BMP) - A practice or combination of practices that is determined by a state (or designated area-wide planning agency) after problem assessment, examination of alternative practices and appropriate public participation, to be the most effective, practicable (including technological, economic and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (Federal Register, Volume 40, No. 230 dated 11/28/75).

Brackish Water - Salt water with saline content less than that of sea water.

Breaching - Removing a portion of the foredune, allowing sand to blow inland from the ocean.

Breeding Cover - Cover used by animals during the breeding season for activities including mating, incubation and rearing young.

Breeding Habitat - Habitat used by animals during the breeding season for activities including mating, incubation and rearing young.

Buffer - Zone between a sensitive area and disruptive management activities. Usually includes minimally disturbed, vegetation communities.

C

Candidate C2 Species - Comprises taxa for which information now in possession of USFWS indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support listing.

Canopy - More or less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

Cavity nester - Wildlife species that excavate and/or occupy cavities in trees and snags.

Clearcut - An area in which all of the trees have been harvested at one time for the purpose of creating a new, even-aged stand.

Climax Seral Stage - The final and most stable of a series of plant communities in a succession, remaining relatively unchanged as long as climatic and physiographic factors remain constant.

Coastal Dune Mosaic - Complex assembly of parabolic, transverse and oblique sand dunes that occupy the central coast area from mean high tide to the Coast Range foothills. The dunes range from unvegetated open sand to stabilized features covered with shrubs or trees. The mosaic is broken by intermittent to continuous wet lowlands called deflation plains.

Coastal Uplift - Continuous periodic rise of the bedrock that constitutes the Oregon Coast. The rise in the bedrock is due to deformation of the earth's crust by subduction of the Pacific Plate beneath the Continental Plate.

Code of Federal Regulations (CFR) - A codification of general and permanent rules published in the Federal Register by the Executive Department and agencies of the Federal Government.

Competing and Unwanted Vegetation - Unwanted plants which may reduce growth or vigor of desired plants, may be toxic to people or animals, pose a hazard to travel or safety, or pose a fire hazard.

Cost Efficiency - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs including environmental, economic, or social impacts are not assigned monetary values but are achieved at specified levels in the least-cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate. (36 CFR 219.3)

Commercial Thinning - Any type of tree thinning that produces merchantable material at least equal in value to the direct costs of harvesting.

Council on Environmental Quality (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies and advises the President on environmental matters. (Abstracted from the National Environmental Policy Act of 1969, as Amended.)

Cultural Resource - Remains of sites, structures or objects used by humans in the near (historical) or distant (archaeological) past.

Cumulative Impact (Effect) - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7)

D

Dead and Down Material - Dead, woody plant material, usually trunks and branches of dead trees, laying on or near the soil surface.

Decomposer - An organism which converts the bodies or excreta of other organisms into simpler substances such as bacteria, yeast, molds and other fungi.

Deflation Plain - Area east of the foredune which has been scoured down to wet sand. This area holds standing water during portions of the year.

Designated Route - Specially marked trails for ORVs to use for touring and travel in existing vegetated habitats. The routes reach the beach and other areas open to ORVs.

Desired Future Condition (DFC) - Collection of resource goals translated into descriptions of biological and physical conditions that are created, maintained or restored.

Developed Site - Recreation that requires facilities that, in turn, result in concentrated use of an area. An example of a developed recreation site is a campground; facilities might include roads, parking lots, picnic tables, toilets, drinking water and buildings.

Dispersed Setting - General term referring to recreation use outside developed recreation sites. This includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-country skiing and recreation in primitive environments.

Draft Environmental Impact Statement (DEIS) - The draft statement of environmental effects which is required for major federal actions under Section 102 of the National Environmental Policy Act and released to the public and other agencies for comment and review.

E

Ecosystem - Complete, interacting system of organisms considered together with their environment; for example a marsh, segment of stream or lake.

Ecozone - Transition zone between two ecosystems.

Edge - Where plant communities meet or where successional stages of vegetative conditions within plant communities come together.

Edge effect - Increased richness of flora and fauna resulting from mixing of two communities where they join, such as at the edge of a meadow.

Effluent - Outflow or discharge of an undesired by-product.

Emergent Plant - An aquatic plant which extends partially above the water surface.

Encroaching Vegetation - Plants that are gradually advancing into open, unvegetated sand.

Endangered Species - Species of animal or plant that is in danger of extinction throughout all or a significant portion of its range, and identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

Endemic Plant Species - A plant species that is confined to a particular geographical area.

Environmental Consequence - Projected effect of a federal action or actions on the social and biological environment.

Eradicate - To remove from the area.

Escape Cover - Hiding cover used by animals to hide from predators and/or provide a sense of security.

Estuary - Downstream portion of a river system that widens under the influence of tidal action. Also known as a transition zone between fresh and salt waters. Especially important because sensitive young stages of fish, shellfish and other aquatic organisms often concentrate there.

Exotic Plant Species - An introduced plant species, one that is not naturally found in the geographic area in which it is located.

F

Fertilized Pond - Pond which has had fertilizer added to it to increase production.

Final Environmental Impact Statement (FEIS) - Final version of the statement of environmental effects required for major federal actions under section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement to include public and agency responses.

Flank - Lateral edge of a sand dune.

Flood Plain - Area of land associated with river outlets and estuaries subject to tidal fluctuations or seasonal flooding. Represents deposits left by changing streamcourse or reduced streamflow velocity.

Flotsam - Objects floating on a body of water.

Fog Drip - Moisture that forms as condensation on vegetation during periods of dense fog. Condensation continues until droplets form and fall to earth. Fog drip effectively increases the total precipitation over the amount that comes only as rain.

Forage - To feed; or the material on which animals feed.

Forb - Herbaceous plant species other than those in the Gramineae (grass), Cyperaceae (sedge) and Juncaceae (rush) families; fleshy-leaved plants.

Foredune - Large, continuous, stabilized sand ridge above the beach high tide line. The foredune is formed from sand that accumulates in beach grass.

G

Globally Significant Plant Community - A plant community that is imperiled globally because of rarity (less than 20 occurrences) or because of some factor(s) making it especially vulnerable to extinction throughout its range.

Gravel Bed - Continuous layer of rock fragments deposited by fast moving water. Fragments are generally smaller than three inches in diameter.

Ground-Disturbing Activity - Human activity that disturbs the soil's surface.

Groundwater - Water beneath the earth's surface that accumulates as a result of seepage through pervious rock or gravel layers and serves as the source of springs and wells.

H

Habitat - The place where a plant or animal naturally or normally lives and grows.

Habitat Improvement/Habitat Manipulation - Changing the physical or biological structure of a particular habitat to achieve predetermined objectives for improving fish, wildlife, or plant habitat.

Headland - High, steep-faced promontory extending into the sea. Also known as a head.

Heavy Metal - One of a number of elemental metals including lead, iron, copper, zinc, mercury and magnesium which have toxic effects on wildlife.

Herbaceous - Adjective describing seed-producing plants that do not develop persistent woody tissue but die down to ground level at the end of the growing season.

Hiding Cover - Cover used by animals to hide from predators and/or provide a sense of security.

High Salt Marsh - Marsh which is only occasionally under tidal influence.

Host Species - Plant or animal which provides food or lodging for another plant or animal.

Hummock - Mounds of sand piled in and around vegetation, one to several meters in height. Generally unstable, eventually eroding away.

Hydrologic - Adjective pertaining to quantity, quality and timing of water yield.

I

IMPLAN - Computer model which simulates economic interdependence among firms, industries and government in a local economy.

Indicator - Qualitative measure of ability to respond to an ICO. It includes outputs, uses or conditions that can be measured and described to judge how well the various alternatives resolve issues.

Indirect Effects - Effects on the environment that were triggered by changes in the environment directly caused by some action. Indirect effects, compared to direct effects, are later in time or farther removed in distance but are still reasonably foreseeable.

Inland Dune Sheet - Dunes that occur on the inland side of the foredune.

Interdunal Swale - Long, narrow depressions between dune ridges which may hold standing water and support water-loving plants.

Interpretive Sign - Thematically-designed sign covering various topics used at viewpoints, near special features, in kiosks, along trails and at roadside pullouts. Visible to all.

Invertebrate - Member of the animal kingdom which does not have a backbone.

Irretrievable - Term that applies to losses of production, harvest or use of renewable natural resources. For example, where production is lost, the action is irretrievable, but not irreversible.

Irreversible - Term that applies primarily to use of nonrenewable resources, such as minerals or cultural resources, or to factors such as soil productivity that are renewable only over long time periods. Also includes loss of future options.

J

Japanese Current - System of fast moving, warm ocean currents that originate in Asia and connect with North Pacific currents.

Juxtaposition - Arrangement of habitats in space.

L

Landform - Naturally occurring land structures that have a characteristic shape and are formed by specific processes. Examples include foredune, deflation plain, hummocks and oblique dunes.

Landscape Diversity - How plant and animal communities function and interact within a large network of watersheds and regional scale areas.

Layering or Vertical Structure - Arrangement of vegetation heights within a forest stand which may include overstory canopy, subcanopy, shrub layer and herbaceous layer.

Litter Layer - Accumulation of organic material on top of the soil surface.

Loafing Habitat - Resting habitat which is used between active periods, primarily for resting.

Loam Soil - Soil that contains sands, silts, clays and organic material in proportions that result in light (sand) and heavy (clay) properties that are approximately equal.

Locatable Mineral - Mineral that can be found and extracted through understanding of processes or properties that resulted in its formation.

Low Salt Marsh - Salt marsh which is regularly under tidal influence.

M

Macrophyte - Submerged and/or floating aquatic vascular plant (as opposed to algae and phytoplankton).

Management Area - Area composed of aggregate pieces of land to which a given management objective and prescription are applied.

Marine Sand - Sand particles that originated in or were transported from the ocean.

Mean High Tide - Tidal datum derived from the arithmetic mean of daily high tide over a specific 19-year metonic cycle.

Microclimate - Uniform local climate of a small area or habitat.

Migratory Corridor - Normal path followed by animals during regular, seasonal travel.

Mitigation - Practices intended to reduce adverse effects of certain management activities. Mitigation includes: (a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments. (40 CFR Part 1508.20)

Mudflat - Intertidal area, usually within coastal estuaries, that is composed of very thick accumulations of muds and silts.

Municipal Watershed - A watershed which provides water for human consumption, where Forest service management could have a significant effect on the quality of water at the intake point, and that provides water utilized by a community or any other water system that regularly serves: 1) at least 25 people on at least 60 days in a year, or 2) at least 15 service connections. In addition to cities, this includes campgrounds, residental developments, and restaurants.

Mycorrhizal Fungi - Fungus that forms an association with roots of higher plants for the benefit of both. The fungus gets carbohydrates from the roots and the higher plants benefit from extension of their root hairs by the fungal filaments which extend great distances through the soil.

N

National Environmental Policy Act (NEPA) of 1969 - Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, promote

efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, enrich the understanding of the ecological systems and natural resources important to the Nation, and establish a Council on Environmental Quality. (The Principal Laws Relating to Forest Service Activities, Agriculture Handbook No. 453, USDA, Forest Service, 359 pp.)

National Forest Management Act (NFMA) - Law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring preparation of Regional Guides and Forest Plans and regulations to guide them.

Natural Dunal Processes - Changes in geomorphology taking place without human intervention on the Oregon Dunes.

Native Species - Species found naturally living in a particular geographical area.

Native Vegetation - Plant or community of plants naturally found in a particular habitat or area.

Net Public Benefit (NPB) - Value to the nation of all benefits less all associated costs. Includes both priced and nonpriced benefits.

No-Action Alternative - Alternative C, which reflects management direction in the current Oregon Dunes NRA Plan.

Non-Native Vegetation - Plants which are not found naturally growing in a particular geographic area.

Non-Priced Benefit - Benefits for which there is no available market transaction data and no reasonable way to estimate a dollar value similar to market values associated with priced benefits. Examples include scenic views, threatened and endangered species, natural and scientific areas, historical and archeological sites, and clean air and water.

Nongame Wildlife - Wild animals which are not hunted, fished or trapped during any part of their life cycle.

O

Oblique Dune - Long, sinuous, symmetric ridges running perpendicular to the shoreline.

Off-road Vehicle (ORV) - Vehicle capable of cross-country travel or travel on low-standard roads and trails, for example, motorbike, all-terrain and four-wheel drive vehicles.

Open Sand Dunes - Small, undulating dunes with crests 6-8 feet high to large dunes up to 300 feet high and 5,000 feet long.

Open Water Habitat - Aquatic habitat.

Opportunity Costs - Economic and resource values that are foregone in order to meet an objective.

Optimal Cover - Cover condition most preferred by deer and elk. It has the following characteristics:

- four vegetation layers--overstory canopy, sub-canopy, shrubs, and a herbaceous layer;
- an overstory canopy which can intercept and hold a substantial amount of snow yet has dispersed, small (less than 1/8 acre) openings. This cover type provides hiding and thermal cover characteristics as well as supplemental forage during adverse weather. This condition generally occurs when trees reach about 120 years of age, dominant trees are greater than 21 inches diameter at breast height, and crown closure exceeds 70%.

Oregon Wilderness Act (1984) - Act that determined which areas were worthy of wilderness designation and that additional areas need not be considered for wilderness in the Forest Planning Process.

Outstanding Remarkable (OR) Value - The value of a river-related characteristic of a stream which is either unique (or very rare) or is one of the best examples of a characteristic which is common to many rivers. It is determined by comparing a characteristic of the river being studied with the same characteristic of other rivers in the region. At least one OR value must be present in order for a river to be eligibile for inclusion in the National Wild and Scenic Rivers System.

P

Pathogen - Disease-causing organism.

Parabola Dune - Asymmetric U- or V-shaped sand ridge.

Perennial Stream - Stream which flows throughout the year.

People at One Time (PAOT) - Term for measuring recreation capacity that indicates the number of people who can use a facility or area at one time.

Pest - Animal or plant that, during some portion of its life cycle, inhibits growth of some other species favored by humans.

Piscivorous Species - Fish-eating species.

Plankton - Small plants and animals suspended in the water.

Planning Period - Length of time that a planning document is intended to be in effect; in this case, 10 to 15 years.

Plant Communities - Association of plants in a given area or region in which various species are more or less interdependent upon each other, as in a pond community.

Post-Glacial - Event that occurred since the last period of continental glaciation.

Preferred Alternative (PA) - Alternative F, which has the greatest Net Public Benefit (NPB).

Present Net Value (PNV) - Value that represents the dollar difference between the discounted value of all outputs to which monetary values are assigned and the discounted costs of managing the Forest for the next 150 years.

Priced Benefit - Benefit received from greenery permits, commercial fishing and developed recreation which can be given dollar values determined by either actual market transactions or estimation methods that produce prices approximating market transactions.

Public Issue - Subject or question of widespread public interest relating to management of the National Forest System (36 CFR 219.3).

R

Rearing Area - River or stream areas where juvenile salmonids must find food and shelter to survive for a period of time.

Recreation Capacity - Number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing quality of the recreation experience or biophysical resources.

Recreation Opportunity Spectrum (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

- **Primitive** - Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.

- **Semiprimitive Nonmotorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

- **Semiprimitive Motorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted.

- **Roaded Natural** - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.

- **Rural** - Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

- **Urban** - Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans are predominant on site. Large numbers of users can be expected both on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transmit often available to carry people throughout the site.

Recreation Setting - Combination of physical and social environmental factors that determines what activities people engage in and the nature of their recreation experience.

Recreation Visitor Days (RVDs) - Twelve visitor hours, which may be aggregated continuously, intermittently or simultaneously by one or more persons.

Remote Beach - Beach which is closed to off-road vehicles and is greater than one mile from the nearest access point.

Research Natural Area (RNA) - Area set aside by a public or private agency specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes. In the Forest Service, RNAs are designated to ensure representative samples of as many of the major naturally occurring plant communities as possible.

Resource Output - Amount of resource produced under a given alternative.

Rhizomes - Rootstock, a rootlike stem which grows on or under the ground producing stems and roots.

Riprap - A collection of rock erected in water or on banks to prevent or reduce erosion.

Riparian Area - Terrestrial areas less than 100 feet wide where the vegetation and microclimate are influenced by perennial or intermittent water or both, associated high water tables and soils which exhibit some wetness characteristics. This habitat is transitional between true bottom land wetlands and upland terrestrial habitats and, while associated with water courses, may extend inland for considerable distance.

Roadless Area - Parcel of land usually 2,500 acres or more in size that does not contain roads.

Rock Outcroppings - Exposed stratum of rock that is covered by little or no soil or plants.

Rush - Wetland indicator plant belonging to the family Juncaceae, typically exhibiting a round, hollow stem.

S

Salmonid - Member of the fish family Salmonidae. Includes salmon and trout.

Salt Meadow - High salt marsh; salt marsh which is only occasionally under tidal influence.

Salt-Dependent Species - Plant species which can only survive in habitats which are under tidal influence.

Salt-Tolerant Species - Plant species that can survive in habitats which are occasionally to frequently under tidal influence.

Sand Compaction - Packing together of sand particles by forces exerted at the soil surface, resulting in increased soil density.

Sand Spit - Small point of land consisting of sand which terminates in the water. Usually forms as a result of interaction of ocean currents and river outflow.

Sand Stabilizer - Material or activity that stabilizes unvegetated, blowing sand.

Scavenger - Animal which devours dead animals or feeds on dead organic material.

Scoping - Process by which the Forest Service determines how inclusive and detailed an analysis is necessary to make an informed decision on a proposed action.

Secondary Gravel - Sand roads

Second Growth - Forest that has grown up naturally after some drastic interference (for example, wholesale cutting, serious fire, or insect attack) with the previous forest.

Sedge - Wetland indicator plant belonging to the family Cyperaceae usually characterized by edged or winged leaves.

Sediment Delivery - Process of transporting eroded soil materials by moving water to a stable location.

Sensitive Species - Species that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists.

Seral - Term for a biotic community that is a developmental, transitory stage in an ecological succession.

Shrub - Bush or low-growing, perennial plant, usually with several main stems arising near the ground.

Site Avoidance - Mitigation method used in cultural resource management where the project is redesigned or relocated to avoid causing adverse damage to the site.

Site-Specific Environmental Analysis - Analysis of alternative actions and their predictable short and long-term environmental effects, incorporating physical, biological, economic, social and environmental design arts and their interactions.

Snag - Standing dead tree.

Special Habitat - Area that is unusual, unique or limited such as tree islands, wetlands, meadows and breeding sites.

Stable Slope - Slope that has internal strength characteristics sufficient to prevent failure by landslide.

Stable Soil - Soil that effectively resists detachment of individual particles by wind or water, or movement of larger coherent blocks through mass wasting.

Stand - Aggregation of trees occupying a specific area and sufficiently uniform in composition, age and condition so as to be distinguishable from the forest in adjoining areas.

Standard and Guideline (S&G) - Practice needed to achieve desired conditions or levels of environmental quality.

Standing Water - Water that collects at the surface of a saturated soil.

Submergent Plant - Plant which normally grows underwater.

Substrate - Material below the soil.

Succession - Progressive development of vegetation toward its highest ecological expression, the climax community by replacing one plant community with another.

Suitable Breeding Habitat - An environment with all the attributes necessary for a wildife species to breed.

T

Thermal Cover - Cover used by animals to lessen effects of weather.

Threatened Species - Plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future.

Touring - Riding an ORV in a leisurely manner while enjoying the scenery and traveling to a selected destination.

Tradeoff - Reduction or limitation of one or more resource benefits in favor of increasing or improving some other benefits. Some amount of tradeoff is necessary when resource benefits are not totally compatible.

Transition Forest - Seral stage of coastal forest, typically dominated by relatively small shorepine with scattered Sitka spruce, western hemlock, Douglas-fir and western redcedar.

Transpiration - Emission of water vapor from the surface of an organism.

Transverse Dune - Long, sinuous, asymmetric sand dune ridges.

Travel Corridor - Strip of land, usually vegetated, used by animals traveling between two or more habitats.

Tree Island - Small isolated pockets of coastal forests completely encircled by sand, usually five to 10 acres in size.

Tributary Stream - Stream that contributes to and flows into a larger stream system.

U

Uncommon Variety Minerals - Minerals such as gold and silver valued for their scarcity.

Understory - Trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Undeveloped Setting - A recreation environment where visitors can engage in activities not dependent on facilities, have few other people around, and experience a moderate level of sel reliance and risk.

Unvegetated - An area with no plants, large or small, growing there. Also refered to as "open sand."

Upland - Higher area; typically refers to habitats not riparian, wetland or aquatic.

V

Visual Quality Objectives (VQOs) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

- **Preservation** - Human activities do not change the natural appearance.
- **Retention** - Human activities are not evident to the casual forest visitor.
- **Partial Retention** - Human activity may be evident, but must remain subordinate to the characteristic landscape.
- **Modification** - Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.
- **Maximum Modification** - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.
- **Enhancement** - A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.

W

Waterbody - An area of open water with definable boundaries.

Watershed - Portion of the land in which all surface water drains to a common point. Size of watersheds can range from tens of acres that contain a small intermittent stream to thousands of acres for a river that drains hundreds of connected intermittent and perennial streams.

Water Regime - Water cycle.

Water Salinity - Relative scale of salt content in water.

Water Table - Level of groundwater relative to the land surface.

Water Turnover Rate - Rate at which water is replaced in a groundwater system.

Wetland - Area that is inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetative or aquatic life that requires saturated soil conditions for growth and reproduction (Executive Order 11990).

Wild and Scenic Rivers - Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

- **Wild River Areas** - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

- **Scenic River Areas** - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

- **Recreational River Areas** - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines and that may have undergone some impoundment or diversion in the past.

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List of FEIS Recipients

PLANNING DOCUMENT RECIPIENTS

Copies of the full Final Environmental Impact Statement (FEIS) were sent to the following agencies, organizations and persons. An additional 4,613 people received the Summary for the FEIS along with the Record of Decision and a map.

FEDERAL AGENCIES

Agencies

US Advisory Council Historic Preservation
- Office of Program Review & Education
- Western Office of Review

US Assist. US Attorney
- Attn: Jack Collins

US Dept of Agriculture
- Gen. Counsel, Owen L. Schmidt
- National Agriculture Library
- Office of Equal Opportunity
- OPA Publication Stockroom
- Rural Electrification Admin.
- Soil Conservation Service

US Dept of Commerce
- Nat. Marine Fisheries Service
- NOAA Ecology & Conservation Div.

US Dept of Defense
- Corps of Engineers
- Naval Oceanography Division
- Office of Chief of Navy Opr.
- US Army Engineers Division

US Dept of Energy
- Bonneville Power Administration
- NW Power Planning Council
- Office of Environmental Compliance

US Dept of Interior
- Bureau of Indian Affairs
- Fish & Wildlife Service
- Office of Environmental Affairs

US Dept of Interior, BLM
- State Director, Portland
- Coos Bay District Office
- Eugene District Office
- Roseburg District Office
- Salem District Office

US Dept of Transportation
- Asst Sec. Pol. & Inter. Affairs
- FAA, Northwest Region
- Region 10, Regional Admin., FHA
- US Coast Guard Station
- USCG Environmental Impact Branch

US EPA
- Corvallis Office
- EIS Review Coordinator, Seattle
- Office of Environmental Review

US Fed. Energy Reg. Comm
- Advisor on Envir. Quality

US Fed. Railroad Admin.
- Office of Policy
- Office of Transp. & Reg. Affairs
- Research & Special Program Admin.

US Gen. Services Admin.
- Environmental Staff
- Office of Planning & Analysis

US Gov. Printing Office
- Consigned Stock
- Depository

US Govt. Accounting Off.
- Attn: Joyce Peters

US Health & Human Servs.
- Office of Special Progs. Coord.

US Housing & Urban Devel.
- Director, Office Envir. & Energy
- Environmental Officer

US ICC
- Chief, Sect. of Energy & Envir.

US Office of Economic Opportunity
- EEO Commission, Pers. Mgmt Serv.

US Small Business Admin.
USDA - APHIS
USDA Forest Service
- Colville National Forest
- Deschutes National Forest
- Director, Envir. Coordination
- FS-INFO-NW, AQ-15
- Fort Rock Ranger District
- Fremont National Forest
- Gifford Pinchot N. F.
- Lowell Ranger District
- Malheur National Forest
- Mt. Baker-Snoqualmie N.F.
- Mt. Hood National Forest
- Ochoco National Forest
- Okanogan National Forest
- Animal & Plant Inspection Serv.

USDA Forest Service
- Olympic National Forest
- Pacific NW Region, Envir. Coord.
- Rocky Mtn For. Exper. Station
- Rogue River National Forest
- Siskiyou National Forest
- Umatilla National Forest
- Umpqua National Forest
- Wallowa-Whitman National Forest
- Washington Office, LMP
- Wenatchee National Forest
- Willamette National Forest
- Winema National Forest

FEDERALLY RECOGNIZED INDIAN TRIBES

Confederated Tribes of
- Coos, Lower Umpqua and Siuslaw

STATE AGENCIES

State of Oregon
- Dept. of Fish & Wildlife
- Dept. of Forestry

State of Oregon
- Oregon State Marine Board
- State Recreation Planner

OTHER STATES

State of California
- Dept. of Parks & Recreation

LOCAL OFFICIALS AND AGENCIES

City of Lakeside
Coos Bay-North Bend Water Board
Florence City Planner

Josephine County Board of Comm.
Lakeside Water District
- Attn: Bill Paetz, Dist. Sup.

LIBRARIES

Albany City Library
Albina Branch Library
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Lewis and Clark College
Banks Community Library
Beaverton City Library
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Branford Millar Library
Portland State University
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West Slope Comm. Library
Westfornet, Berkeley Lib.
PSW Science Lit Service
Wilson W. Clark Library
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ORGANIZATIONS AND BUSINESSES

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Attn: Eric Lundquist
Bay Area Yamaha
Attn: Crystal Rose
Black Butte Ranch
Attn: W. Gaskin
Blue Ribbon Coalition, Inc.
Attn: Joani Dufourd
Cascade Innovations
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Source Point Habitats
Attn: Bob Garner
Starker Forests, Inc.
Attn: Gary Blanchard
The Research Group
Attn: Shannen W. Davis
Woahink Lake RV Resort
Woodsman Native Nursery

INDIVIDUALS

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Kevin Bausch
Greg/Jude Berry
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ACRONYMS

BMP	Best management practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DEIS	Draft environmental impact statement
DSL	Department of State Lands
DFC	Desired future condition
EIS	Environmental impact statement
FEIS	Final environmental impact statement
FSM	Forest service manual
ICO	Issues, concerns and opportunities
IDT	Interdisciplinary team
IMPLAN	Impact planning model
IP	International Paper Company
MA	Management area
MGD	Million gallons per day
N/A	Not applicable
NEPA	National Environmental Policy Act of 1969
NFMA	National Forest Management Act
NFS	National Forest system
NMFS	National Marine Fisheries Service
NPB	Net public benefit
NRA	National Recreation Area
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
ORV	Off-road vehicle
(PA)	Preferred alternative
PAOT	People at one time
PETS	Proposed, endangered, threatened and sensitive species
PNV	Present net value
R	Rural (ROS category)
RN	Roaded Natural (ROS category)
RNA	Research Natural Area
ROD	Record of decision
ROS	Recreation Opportunity Spectrum
RVD	Recreation visitor day
SCORP	State Comprehensive Outdoor Recreation Plan
SPM	Semiprimitive Motorized (ROS category)
SPNM	Semiprimitive Nonmotorized (ROS category)
S&G	Standard and guideline
T&E	Threatened and endangered
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VQO	Visual quality objective
W&S	Wild and Scenic

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