

# **cascade head**

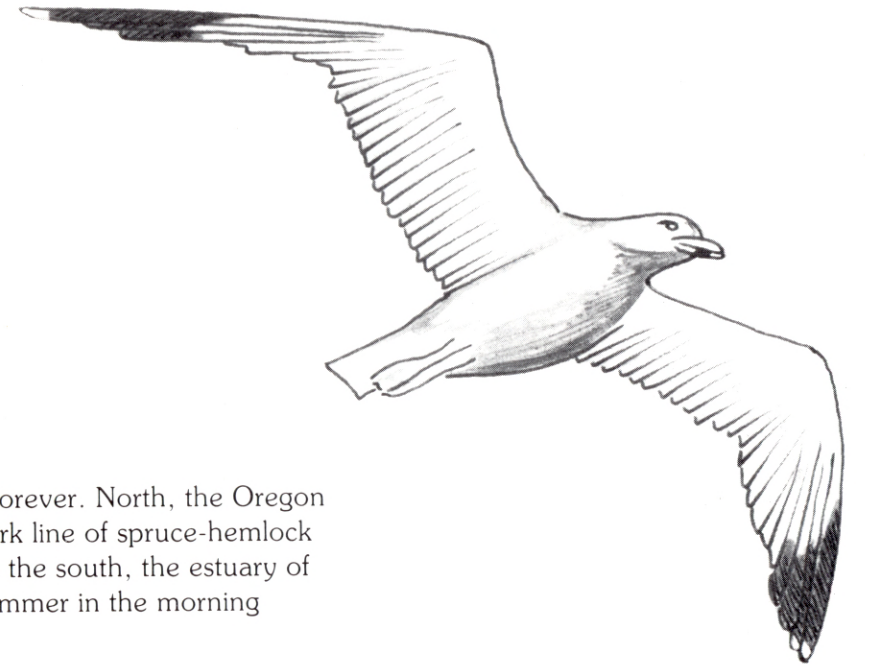
## **land for learning**



Forest Service • U.S. Department of Agriculture

. . . to promote a more sensitive relationship  
between man and his adjacent environment

from legislation establishing  
the cascade head scenic-research area  
on the central oregon coast  
december 22, 1974



From Cascade Head you can see forever. North, the Oregon coastline stretches in an endless dark line of spruce-hemlock forest, 1,800 miles into Alaska. To the south, the estuary of the Salmon River is a steel-gray glimmer in the morning sun.

Along the estuary the fog begins to lift. A sea gull raises its white wings against the winter wind, and a heron probes in the shallow tidal flat. There are a million things to see and learn.

Look about you, there is life here. Yours, and that of thousands of other living things—plants and animals. Your own heart is beating in time with the natural rhythms of this place. There is the motion of the wind and the waves and the rise and fall of the tides; the beginning and end of days and of seasons. There is death, the cycle of living and dying, of growing and becoming. All that nature is or will be is written on this landscape.

The clues to understanding are found in the rocks, and in the soils, waters, and plants and animals that make up the environment. They may be discovered as simply as dropping a pebble into the surf. Or it may be as difficult as knowing exactly why a tiny wildflower one day decides to open its petals and bloom.

Cascade Head is an important environment for learning. Here at the junction of land and sea, the lush and fast-growing Sitka spruce-hemlock forests have been studied by foresters and ecologists for many years. The estuary and the region's many plant and animal communities, including some 378 species of wildlife, offer many other opportunities for study.

In 1974, 9,670 acres of the headland and surrounding area were designated by Congress as the Cascade Head Scenic-Research Area. Under this unusual designation—the first of its type in the country—much of the area will be available for scientific and educational purposes. It is a fitting designation for an area that is unique in geographic and botanic diversity, animal life, and the activities of man.

The landscape at Cascade Head is made up of several environments: the estuary and its associated floodplain, the river system, and ocean edge; and the higher elevations which include the headland and forest. Each has a geology that is distinct with its own special plant and animal communities.



photo by byron ferris



## the estuary

In a very real sense, life begins in the estuary. At high tide, the incoming saltwater flows beneath the freshwater of the Salmon River, producing a mixture that is unique among the Oregon coastal estuaries. The waters are rich in nutrients dragged downstream from the mountains in the form of clay and silt, or in from the ocean as saltwater. The result is an environment teeming with life, from the tiniest of plants such as algae—the basic food source in all wetlands—to larger forms such as eel grass, rushes, sedges, pond weeds, and freshwater cattails. A myriad of animals also make their homes in and around the estuary, beginning with the microscopic plankton to invertebrates such as mussels, clams, shrimp, and crab.

The estuary is important for feeding and as a migration route for salmon heading upstream to spawn in freshwater tributaries. Migratory ducks and geese are attracted to these wetlands, as are other varieties of waterfowl including loons, grebes, cormorants, snipe, sandpipers, and sea gulls.

The ocean cliffs and offshore islands are used as nesting and roosting sites by at least six species of sea birds. More than 25,000 birds have been seen nesting on the cliffs and islands at one time. Sea lions and seals, including the harbor seal and elephant seal, frequent the ocean and offshore islands. Bald eagles and great blue herons have also been sighted.

It is a fragile environment, with each part tied to the others in a complex way. No plant or animal exists alone. Each contributes to the whole and is dependent on other parts of the environment. The estuary is the source of a food chain that begins with the smallest of plants and animals; which are in turn food sources for shellfish, fish and birds, and smaller mammals; and finally for man himself. Disturbances in the food chain here at its beginning can drastically affect higher forms of life. For example, our own food sources depend heavily on life from the sea and from the coastal shelves, including saltwater bays and estuaries.



## the rain forest

North of the estuary, the coastline is dominated by the 1,770-foot promontory of Cascade Head. The west side of the headland rises abruptly from the ocean's edge in a precipitous cliff. Near the top, this yields to open grassland and timber.

There is not much grassland, but it is a unique ecosystem with its own species of plants and animals. The grasslands were probably created by wildfire and have been maintained since by fire and grazing. If not maintained, the grasslands have a tendency to revert to forest.

The coastal forests are rain forests—lush, green, and underlain with a rich assortment of mosses, ferns, herbs, and shrubs. Moderate temperatures and frequent fogs create ideal growing conditions for the two major timber species—Sitka spruce and western hemlock. This forest type is representative of the coastal coniferous forests that extend along the Pacific Coast from northern California to Alaska, a distance of more than 1,800 miles.

The natural history of Cascade Head can be read in its forests. Wind, fire, and timber harvest have all made their mark. Most of the forests are about 130 years old, reflecting the history of fire in the area. The last major conflagration was about 1845. In the early days of settlement, it was common practice to burn the forests to clear the land for cultivation or pasture. When this was curtailed about 1910, nature responded by producing the present 50 to 60-year-old stands of mixed conifer and deciduous forests. Though the forests are young, they are fast growing, tall, straight, and beautiful to walk through.



Just as man has written his history into the forests, so has nature. In the Neskowin Crest Research Natural Area, there are older trees that are remnants of the stands that escaped the fires. Here the successional pattern can clearly be seen. Some large old Sitka spruce are more than 250 years old, 85 inches in diameter, and 240 feet high. As this forest falls into old age and the older spruce trees die or are downed by the wind, they are being naturally replaced by western hemlock.

In 1971 and 1972, biologists Chris and Rita Maser studied the small animals of the Cascade Head Experimental Forest and identified several species of salamanders, frogs, reptiles, birds, and mammals. Birds included many that commonly inhabit the forests of the Pacific Northwest: hummingbirds, woodpeckers, kingfishers, hawks, grouse, swallows, wrens, juncos, sparrows, cedar waxwings, and the great horned, pygmy, and screech owls.

Mammals are also numerous. The scientists noted the presence of bobcat, coyote, black-tailed deer, raccoon, weasel, skunk, otter, beaver; and many smaller mammals such as chipmunks, squirrels, mice, voles, flying squirrels, bats, and others.

A unique creature in the area is the Pacific giant salamander, which may be found in the riparian zone around streams where Pacific red alder grows. These salamanders sometimes reach lengths of 13½ inches and are the largest land salamander in the world.

## cultural history

Long before the arrival of the Europeans, Indians settled along the Salmon River in the area between the present-day communities of Lincoln City and Neskowin. They were of the Salish language group, calling themselves "Nechesney." The Indians built seven villages, mainly along the north bank of the river, where they took advantage of the abundant food source of the ocean and the estuary. In culture, they were similar to other Indians that lived along the North American coast from northern California to Alaska.

Salmon was important in their religion and a mainstay in the diet. The slender fillets were smoked and used during the long winter. Clams, shellfish, and fish were abundant and available for the taking. From the nearby forests, the Indians hunted deer and other wildlife and gathered timber to make dugout canoes and split-plank houses. Baskets of unusual quality were woven from cedar bark and grasses.

The Nechesney gathered only what they needed to live and to trade with other tribes. Their moderate needs in no way threatened the resource, and the land and its waters repaid them with plenty year after year. They lived at Cascade Head, in harmony with the environment, for about 20,000 years.

To the Indians, Cascade Head was a vigil site. They climbed the lonely mountaintop to fast, dance, and dream, as children on spirit quests or as adults seeking power or vision. Today visitors may hike the 1,770 feet to the top of the headland for the same inspiring view.

In 1855, the Cascade Head area became part of the Siletz Indian Reservation. Later, settlers took squatters rights along the Salmon River and, under the Dawes Act of 1887, the land eventually passed into private ownership or the public domain.





## research at cascade head

More is probably known about the forests than any other part of the natural environment at Cascade Head. An experimental forest was established there in 1934 by the Forest Service in an effort to learn more about how to manage the coastal spruce-hemlock forest type. About half of the 11,890-acre Cascade Head Experimental Forest, the western portion, is now in the scenic-research area. In 1941, the 700-acre Neskowin Crest Research Natural Area was established within the experimental forest. As are other research natural areas, it is preserved in its natural state for ecological study and educational purposes.

Over the years, scientists have built up an important body of knowledge about the biology and ecology of the forests at Cascade Head. Each new piece of information, added to the old, increases the value of the area for research purposes. The importance with which scientists view this area is indicated by a third special designation, a biosphere reserve, which was established in 1975 by the United Nations Education, Scientific and Cultural Organization. Along with the Olympic National Park in Washington, it represents the Pacific coastal forests in this important worldwide system of reserves.

Weather records have been kept since 1936 and help explain the unusual productivity of the coastal forests. The climate is generally moderate with winters that are mild, cloudy, and wet. Summers are cool, clear, and dry with morning fog. It rains more than half of the days of the year, or about 97 inches a year. Winter storms can be severe, with fronts coming in from north or south along the coast. Hurricane-force winds are not uncommon.

One of the first studies in the experimental forest was begun in 1935 to learn more about the rate of tree growth. Permanent plots were established and the trees measured each year. At 80 years of age, the trees were adding wood at the average rate of more than 250 cubic feet per acre a year, or about one-quarter of a house. Takeo Fujimori, a Japanese forest scientist, in his studies of "biomass" (total vegetation production) found the forests to be among the most productive in the world.

Over the years, many other valuable lessons have been learned at Cascade Head. Studies of the light requirements of the various tree species have helped determine the role each plays in forest succession. For example, in the deep hemlock-spruce forest, where only 10 percent of the sunlight reaches the forest floor, most of the seedlings are hemlock. Spruce is found in areas that have somewhat more light. Still more sun encourages Douglas-fir and red alder. This information has helped determine the best timber harvest systems for each species; for example, whether to use an even-aged system such as clearcutting or shelterwood harvest, or a system such as selection cutting which produces a forest stand of several age classes.

Experimental cuttings were begun in 1948 to learn more about the silvicultural system known as clearcutting. In this system, all of the trees in a given area, usually about 40 acres, are removed and the area planted again. The resulting new forest is even-aged or all of one age class. From this research and other studies in the Cascade Range in Oregon came early guidelines for timber harvest in the Pacific Northwest. Much work has also been done at Cascade Head to develop guidelines for controlling brush and hardwoods that compete with conifers and slow down reforestation efforts.





Scientists have identified the important role of red alder in fixing nitrogen in the soil. Douglas-fir trees and red alder often grow on the same sites, but alder is frequently considered a “weed” species. In fact, alder is nitrogen fixing, meaning its roots have nodules that “capture” nitrogen from the air and transform it into nitrogenous compounds that plants can absorb from the soil. The appearance of this leafy hardwood in forests following fire, or on old logging roads, may be especially significant. Scientists now believe that alder adds nitrogen to the soil, thereby enriching the site and maintaining its fertility. Conifers cannot fix nitrogen and are therefore dependent on nitrogen added to the soil by other plants. Nitrogen concentrations in soils under red alder have been measured at three times that found under an adjacent conifer forest at Cascade Head.

Since nitrogen fertilizer is one of the factors that limits tree growth, it may be possible to increase the yield of Douglas-fir by planting it along with red alder. Abundant nitrogen in the soil may also reduce the incidence of *Phellinus weirii*, a severe root disease of Douglas-fir.

Because of the frequent high winds during winter storms, tree damage from windthrow is common along the Oregon coast. Trees respond to the stress of strong onshore winds by producing heavier trunks and bigger roots on the lee side. But even this is not enough protection from gale-force winds. After a severe storm in December 1951, researchers found that certain sites, such as the northeast side of ridges, suffered the heaviest damage. As a result, they were able to recommend timber harvest prescriptions that minimize wind damage.

Many other studies have been conducted and their results have added to our understanding of the coastal hemlock-spruce forests. Results of this research are available in government publications, as well as in professional and trade journals. More than 60 research reports have been published as a result of research in the Cascade Head Experimental Forest. A bibliography is available on request.



## **educational opportunities**

In the past, research at Cascade Head has focused on the forest environment. Under the scenic-research designation, there will be opportunities for research in many other sciences: geology, ecology, zoology, marine biology, and others. One of the first priorities is to gather information that relates to management of the area. Scientists may learn more about the effect of dikes on the hydrology of the estuary and about the pattern of succession from prairie to forest on the headland. They may want to study the movement of soil on steep slopes of the headland, and the effect of rainfall and logging on soil movement. Other studies may be done to learn more about the effects of recreation use and residential construction on the sensitive forest and estuarine environments.

Visitor information and educational programs will play an increasingly important role as more people come to Cascade Head to enjoy the beaches, the hiking trails, and the special camps oriented to outdoor education, ecology, and the arts.

More baseline information is also needed about the estuary, the forests, their related environments, and how the various parts of the ecosystem function and work together. For the student of nature, whether scientist, educator, or undergraduate, Cascade Head is an increasingly important place for learning—for learning about and learning from.

Perhaps in future years, through research such as that conducted here and by more sensitive resource management, we can learn to do as the early Indians did at Cascade Head—to live in harmony with our natural environment.

## administration

Considerable planning will be required in order to draw the various uses of the area into a unified whole. Almost 5,000 acres are in private ownership and subject to development. Uses of the forest, such as timber harvesting, will be allowed only for research purposes or to control forest insect or disease outbreaks. Other land uses must be carefully planned in keeping with the steep and fragile nature of the topography and with its scenic values.

Future decisions about resource management will be based on the prescriptions outlined in the management plan for Cascade Head, a document prepared by the Cascade Head Planning Team. The plan is based on inventories of the resources, the natural ability of the land to withstand various types of use, and the expressions of interest from many citizens.

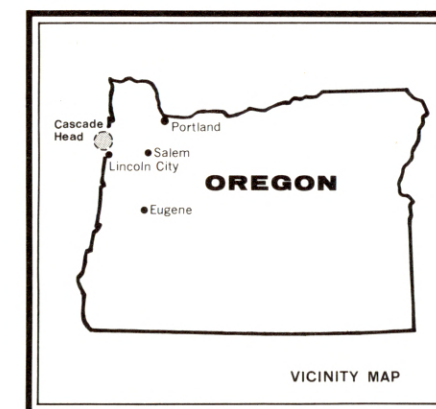
The Cascade Head Scenic-Research Area is administered by the Siuslaw National Forest. Additional information may be obtained from the District Ranger, Hebo Ranger District, Hebo, Oregon 97122, phone 503/392-2162 (FTS 423-4111). For information about research in the area or approval to conduct studies, contact the Forestry Sciences Laboratory, 3200 Jefferson Way, Corvallis, Oregon 97331, phone 503/757-4362 (FTS 420-4362).

## visitors are welcome

All of the federal lands in the area are open to the public. You are encouraged to explore the roads and trails, enjoy the scenery, and learn more about the natural environment. Much of the land is privately owned, however, and not open to the public. A map accompanying this brochure shows the boundary between private and federal ownerships. To avoid disrupting ongoing experiments, please:

- pick nothing
- leave signs, markers, and instruments undisturbed
- stay on trails
- leave no litter

## cascade head map



# Administration

...be required in order to draw the various uses of  
 ...e. Almost 5,000 acres are in private ownership  
 ...t. Uses of the forest, such as timber harvesting,  
 ...research purposes or to control forest insect or  
 ...uses must be carefully planned in keeping with  
 ...e of the topography and with its scenic values.

...out resource management will be based on the  
 ...in the management plan for Cascade Head, a  
 ...ascade Head Planning Team. The plan is based  
 ...ces, the natural ability of the land to withstand  
 ...the expressions of interest from many citizens.

...-Research Area is administered by the Siuslaw  
 ...information may be obtained from the District  
 ...Hebo, Oregon 97122, phone 503/392-2162  
 ...ation about research in the area or approval to  
 ...Forestry Sciences Laboratory, 3200 Jefferson  
 ...7331, phone 503/757-4362 (FTS 420-4362).

...e welcome

