PRESERVE ANALYSIS: BLACKLOCK POINT

Prepared by

Robert C. Martin

Robert E. Frenkel

OREGON NATURAL AREA PRESERVES ADVISORY COMMITTEE

to the State Land Board

Salem, Oregon

July, 1978

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to the

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PREFACE

The purpose of this preserve analysis is to aid the Natural Area Preserves Advisory Committee in deciding whether to recommend dedication of the Blacklock Point Natural Area Preserve to the State Land Board and to the State Parks and Recreation Branch of the Highway Division (DOT). The preserve analysis considers principally the natural area values of the tract. Preserve management, agency agreements, and management planning are to be considered subsequently by the Division of State Lands.

The original suggestion for this preserve was by Dr. and Mrs. Hans Jenny (Professor Emeritus, University of California) who have documented and worked extensively with Blacklock Soils and their associated pygmy forests of cypress and pine south of Fort Bragg on the California Mendocino coast. Professor Jenny was especially interested in gaining positive protection for the type locality of Blacklock Soils which in California have become an ecological status symbol. Indeed, the more we have studied this Point, the more we realize that, as in California, the Blacklock Soils support a truly unique ecosystem worthy of protection.

Many individuals have helped in developing the documentation presented here. We wish to especially thank Dr. David V. McCorkle for his enthusiastic field work and for initiating the Blacklock Point project as a member of the Natural Area Preserves Advisory Committee. Glenn Juday and Bruce Nolf, both Committee members, also visited the site and contributed to the documentation. The first draft of this report was developed with the help of Bret Stafford. S. Reid Schuller worked on the computer analysis of vegetation and his assistance is greatly appreciated. Dr. Richard Janda (USGS, Menlo Park), who has worked along the southern Oregon Coast, aided in developing a geological sketch of the tract and the provision of his unpublished research is especially recognized. Chris Maser was kind enough to supply a list of vertebrate terrestrial animals. The Oregon State University Atmospheric Science Department provided climatological data. State Parks Branch staff have been of assistance throughout and we wish to thank Rod Polly, Val Jones, Dick McCosh and Pete Bond for their help.

The Natural Area Preserves Advisory Committee has spent 18 man-days of field time on the site in preparation of the analysis.

Robert C. Martin & Robert E. Frenkel
July 1978

SUMMARY

Blacklock Point, approximately 500 acres in Floras Lake State Park, northern Curry County is proposed as a Natural Area Preserve under the authority of ORS 273.562-273.597. The tract is located along the coast and south of Floras Lake and includes approximately 40 percent of the park area.

The preserve is proposed to protect a rare ecological complex for scientific and educational study and for public enjoyment. The candidate area is underlain by Blacklock soils which are highly infertile and acid. These soils have a white upper horizon and an iron hardpan at about 1 to 2 feet (30 to 60 cm) below the surface. Associated with these unusual soils are strips of dwarfed shore pine with rhododendron, laborador tea, and squaw grass in the understory. This counterpart of the California coastal pygmy forest of Mendocino County, is situated in depressions between low ridges where drainage is most impeded by the iron pan. The ridges are fossil sand dunes which occupy a marine terrace approximately 40,000 years old and which today are covered by a shorepine forest. Depressions, haveing the most impeded drainage, support a low heath with little coniferous growth and with shallow ponds which persist into late spring. The coastal edge of the area is forested by Sitka spruce growing in more sheltered areas and by wind-pruned shrub or in the most exposed areas, by headland prairie. Blacklock Point juts into the Pacific and shows signs of intense erosion associated with wave action, historical sandstone quarrying, and more recent grazing. North of Blacklock Point, a precipitous 120-feet sea cliff separates the wind-pruned shrub headland from a narrow, black sand beach. South of the Point, the coastline grades more gradually into the spruce forest.

The candidate preserve is entirely owned by the State Parks and Recreation Branch but is presently unplanned and undeveloped. Adjacent to the park, to the east, is the Cape Blanco Airport with an approach right-of-way which takes up about 46 acres (18 ha) of the Park. Vegetation is managed in this area to reduce hazard to aircraft. The major access to the proposed natural area is by the airport road which runs west from U.S. Highway 101 about 2.5 miles (4 km). This paved

road and a dirt road beside the landing strip are maintained by Curry County. A U.S. Coast Guard telephone right-of-way extends in a north-south direction from the airport to near Floras Lake.

A management concern is the existence of historical use of the preserve area for timber harvest, Christmas tree cutting, sheep grazing and depreciative recreation (ORV erosion and non-authorized camping). While the cutting and grazing have been stopped, continued damage by recreationists poses a management problem. Conflicts between the proposed natural area preserve and any future park developments have not been determined. Under proper controls, dispersed recreation use of the area should be entirely compatible with the protection of natural area values.

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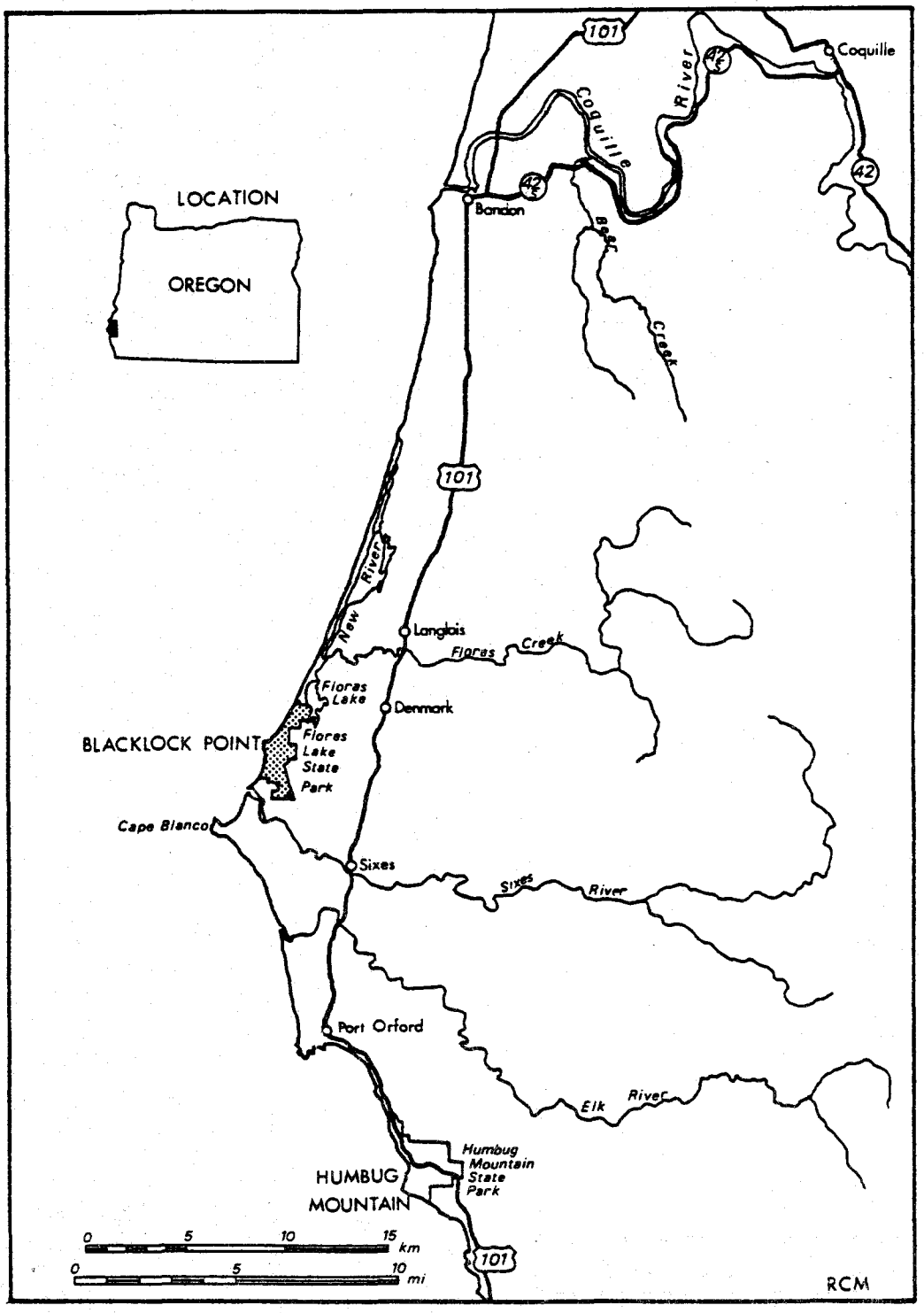


Figure 1. Location of Floras Lake State Park and Blacklock Point.

PRESERVE ANALYSIS: BLACKLOCK POINT

Proposed Name

Blacklock Point is proposed as the name for this natural area. The name "Blacklock" identifies the point itself and the soil series characteristic of the proposed tract. These highly podsolized soils developed on sandy substrate have led to stunted coniferous forest and also relate to the striking lineations in the topography corresponding to former dune and swale patterns. It is intended that this name will call to mind the area and its many features. Using the term "Point" as a geographic reference, calls attention to the area's important relationship with the ocean. Although the candidate natural area is within Floras Lake State Park, the name "Floras Lake" was rejected because the lake is not included within the proposed boundaries (Figures 1 and 2).

In earlier correspondence the Natural Area Preserves Advisory Committee identified this area as "Blacklock Point Pygmy Forest" or "Pygmy Forest". Although much of the forest is stunted, it does not compare in physiognomy to the pygmy forest near Mendocino, California also developed on soils closely related to Blacklock soils; for this reason the name "Pygmy Forest" was rejected.

Reasons for Preservation

The primary purpose of the proposed preserve is to protect and fill the research natural area need for a representative of the "pygmy lodgepole pine forest on Blacklock soil" as listed in Research Natural Area Needs in the Pacific Northwest (Dyrness *et al* 1975). The suggested location for this community is the "Blacklock Point" area in Floras Lake State Park. Protection of this community receives a high priority based on "how endangered areas of that type are believed to be, i.e., the danger that all examples of the type will be lost to other uses."

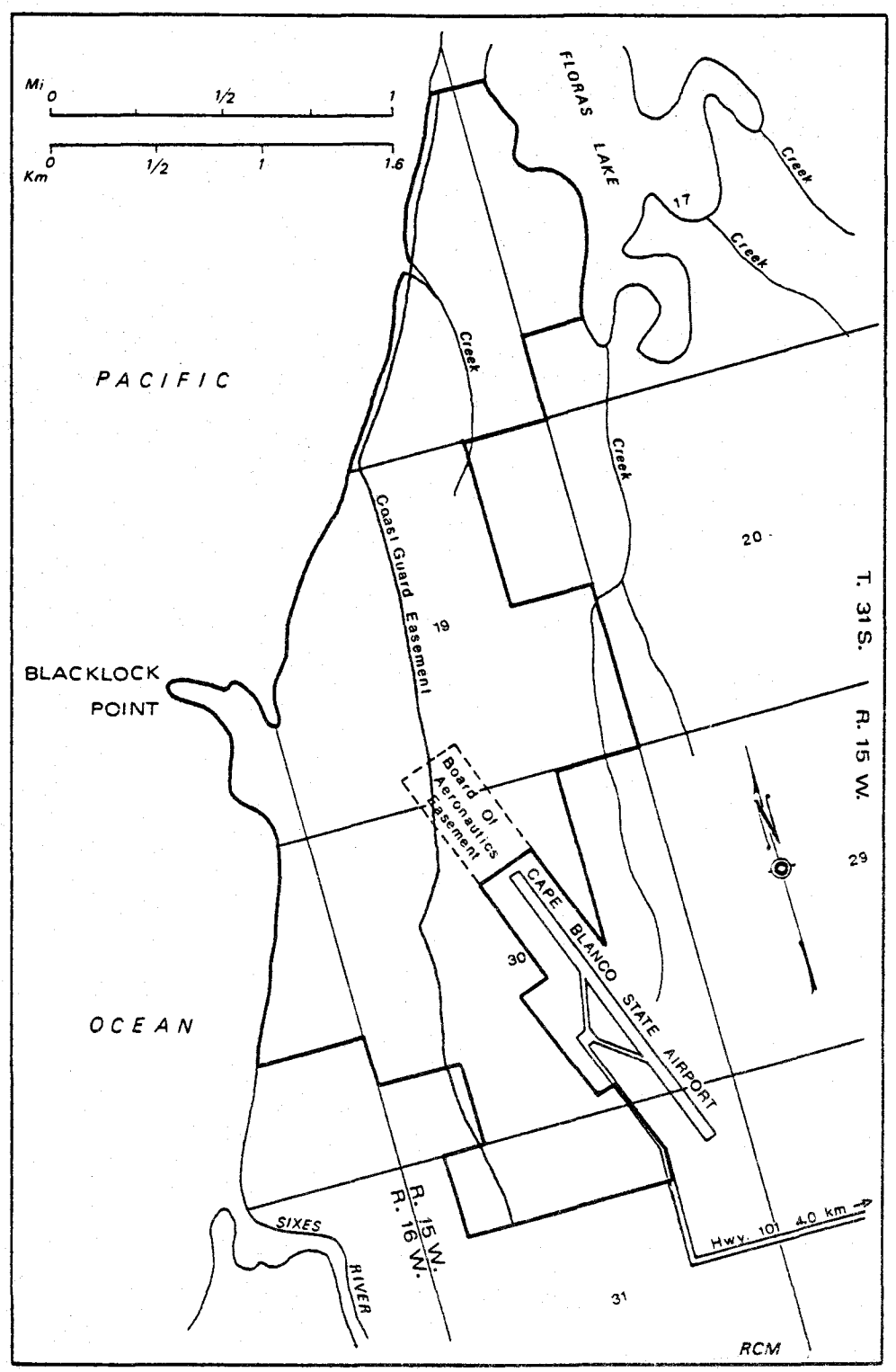


Figure 2. Boundary of Floras Lake State Park.

The proposed preserve will also partially fill the following research natural area and/or habitat protection needs (Dyrness et al 1975).

1) Typical vernal pond at low elevation. Suggested location--Blacklock Point area in community with pygmy lodgepole pine forest on Blacklock soil.

2) Ocean-front coniferous forest.

3) Ocean-front shrub lands.

4) Ocean-front herb lands.

5) Occurrence of Empetrum nigrum classified as "rare in Oregon" on the Provisional List of Rare, Threatened and Endangered Plants in Oregon, 1977.

6) Occurrence of Dudleya farinosa--on Provisional List of Rare, Threatened and Endangered Plants in Oregon, 1976.

7) Occurrence of Lilium occidentale listed as a "regional endemic" on the Provisional List of Rare, Threatened and Endangered Plants in Oregon, 1977 and as "endangered in Oregon and California" in "Endangered and Threatened Plant Species of the United States" (Federal Register, June 16, 1976).

8) Protect the type locality of Blacklock soils.

9) Protect typical south Oregon coastal intertidal communities associated with Blacklock Point.

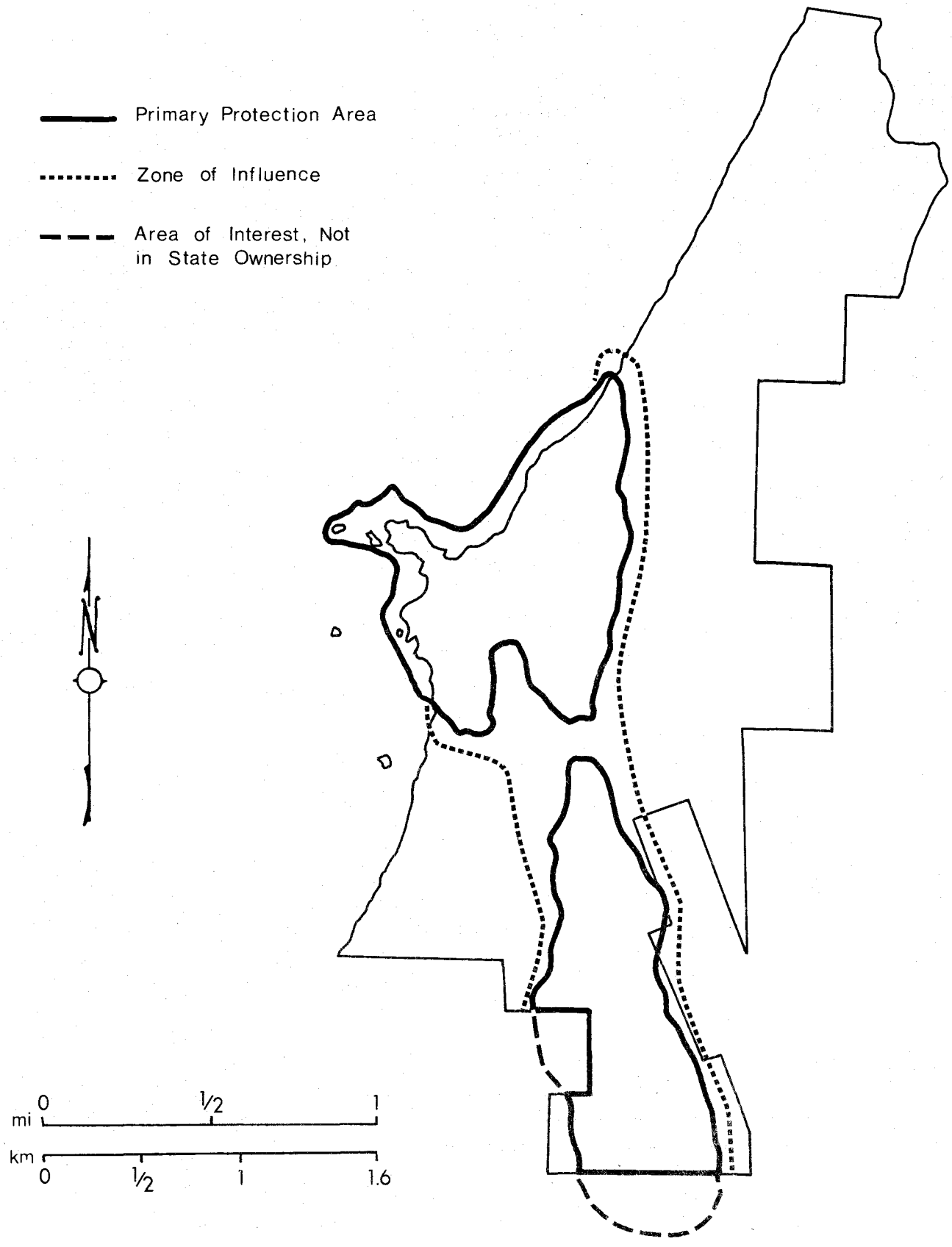


Figure 3. Protection Zone boundaries for proposed Blacklock Point Preserve.

Boundaries and Ownership

Boundary Selection

Protection zones for the proposed Blacklock Point Natural Area Preserve are shown in Figure 3. Boundaries were chosen so as to protect the significant natural area values of the Blacklock Point area, include a diversity of biotic systems in a single natural area, and diliniate areas which have important specific influences on the primary protection area.

The following general criteria are used in determining Primary Protection areas:

1. Natural Integrity. The area must substantially retain its natural character, or if disturbed, must exhibit evidence of recovery to pristine conditions.

2. Adequacy of Representation. The area must have adequate representation of ecological elements typical of their class in Oregon. An area may also qualify if it protects unique ecological elements.

3. Diversity. The area should include the maximum number of ecological elements feasible.

4. Defensibility. The area should be defensible in its ability to retain and/or develop its natural character.

5. Perpetuation. The area must be of sufficient size to perpetuate itself or its natural sequence of development.

The following general criteria are used to determine "influence zones" which have important relationships to the adjacent primary protection area.

1. Biological Influence. The zone contributes to nutrient flow or other biological aspects of the primary area.

2. Physical Influence. The zone constitutes a buffer between the primary area and physical forces such as erosion or damaging winds.

3. Human Influence. The zone, by its vegetation or topography, affects access to the primary area and/or presents a threat to the primary protection area due to the presence of damaging human activities such as eroding road cuts or intensive development.

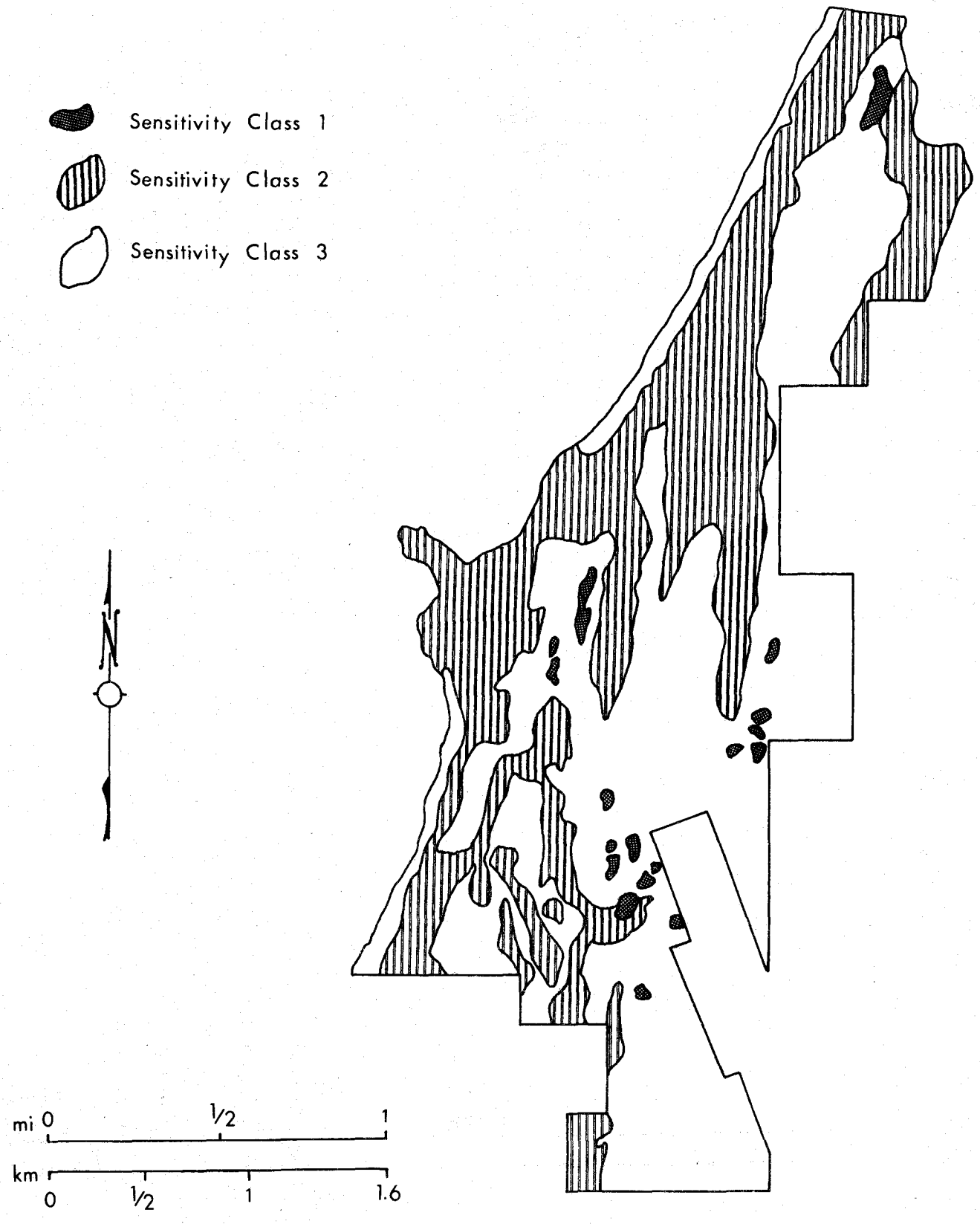


Figure 3a. Sensitivity Classes.

The proposed Blacklock Preserve will include at least eight ecological types (Figure 6), four of which are listed as cell needs in Dyrness et al. While it is felt that much of the proposed Blacklock Preserve substantially retains its natural character, several dinds of disturbances are recognized: (a) past grazing of Blacklock Point, (b) blowdown and salvage logging of Sitka spruce, (c) historic burning of much of the area's vegetation, (d) sandstone quarrying on Blacklock Point, and (e) localized impact by ORV's and Christmas tree cutting.

The following factor lead to the belief that these disturbances do not greatly impair the natural area values of the proposed preserve: (a) grazing has been eliminated, it is anticipated that a diverse headland prairie will re-establish itself on Blacklock Point, as was the case at Cape Blanco and other similar areas after the elimination of grazing; (b) the area of most intense blowdown and salvage logging has not been included in the primary protection area; (c) intentional burning was stopped in 1952, and recovery by natural succession is evident throughout the area; (d) sandstone quarrying in Blacklock Point has resulted in a scar of only localized impact; (e) impacts from ORV and Christmas tree trespass, while localized, will continue to be management problems in the area (see Management Considerations).

Ecological systems in the Blacklock Point area have been placed in three classes based on sensitivity to damage (Figure 3a). These systems are best seen on the vegetation map (Figure 6). Sensitivity Class I (the most sensitive systems) includes the ephemeral bogs. Sensitivity Class II (areas of intermediate sensitivity) includes: rock outcrop because of the fragility of crevice plants, prairie headland because of erosion potential, herb-rich wind-pruned headland because of easily damaged herbaceous vegetation, and Sitka spruce forest because of easily damaged understory vegetation. Sensitivity Class III (areas which are relatively robust) includes: beach sand, swale phase of shore pine forest, ridge phase of shore pine forest and Sitka spruce blowdown. This classification speaks only to the ability of the various systems to withstand disturbance, and is not intended to imply a greater or lesser contribution to

natural area values because of this relative sensitivity. It can, however, be used as a guide to enable the location of any unavoidable disturbance in areas most able to withstand it.

Ownership

The proposed preserve above mean high water (approximately equal to the beach zone line) is owned and managed by the State Parks Branch of the Highway Division of the Deparment of Transportation (Figure 2). A portion of this area is affected by a U.S. Coast Guard telephone line easement. The zone between the beach zone line and extreme low water is designated as a State Recreation Area with concurrent jurisdiction by the State Land Board and the Department of Transportation. The ocean bottom below extreme low water is public trust land of the State Land Board.

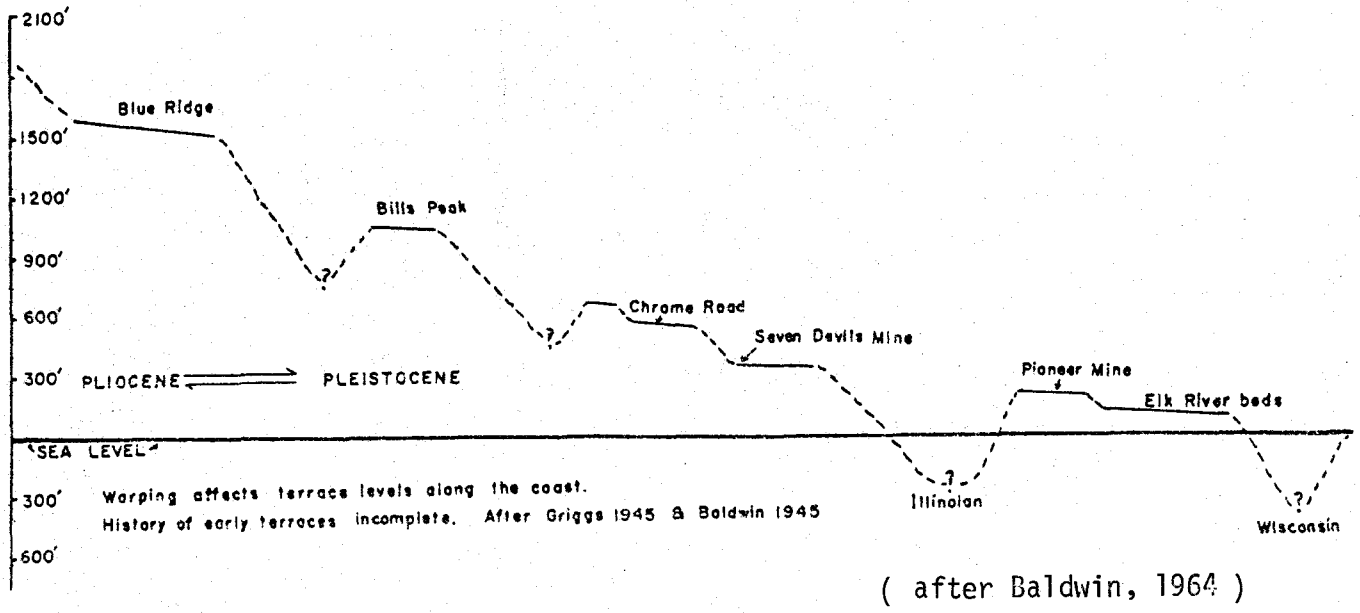
General Description

Floras Lake State Park is situated on a nearly level marine coastal terrace with nearly vertical cliffs of up to 30 to 40 meters rising from a narrow beach. The most striking geologic feature is Blacklock Point, a rocky headland topped by an herbaceous meadow. The area is generally forested except in scattered meadow areas and in the southwest corner where salvage logging has eliminated approximately 60 ha of tree cover. Of particular interest is the existence of tracts of stunted lodgepole pine (Pinus contorta) forest. Many of these trees are 80 years old and are only 2 to 3 meters high. This stunting results from the hardpan layer characteristic of the Blacklock Soils. Drainage is extremely poor in most of the park, causing standing water of 1 meter or more during periods of heavy precipitation (Appendix 1). The park is bounded on the north by the south shore Floras Lake. This lake is separated from the ocean by a narrow dune (berm) and drains toward the north. The east boundary adjoins private land, mostly in large tracts, and the state-owned Cape Blanco State Airport.

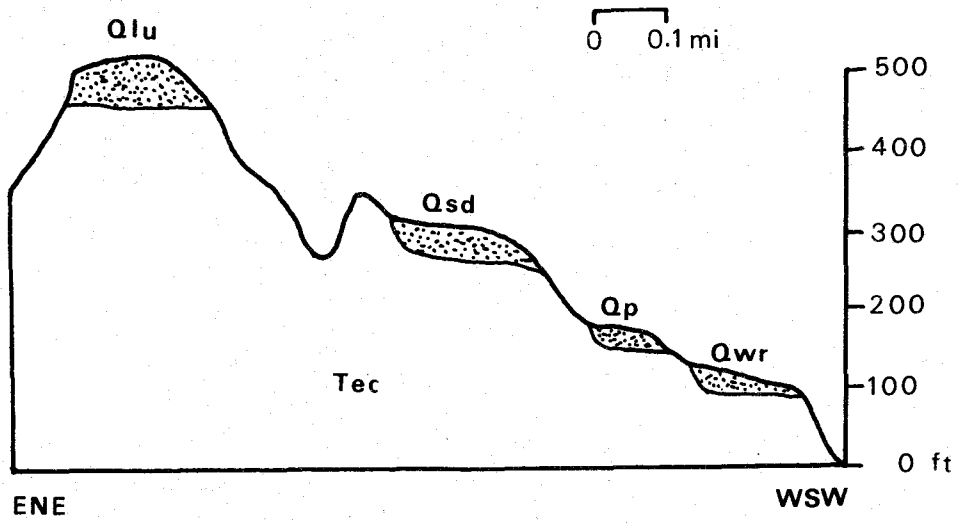
This airport was constructed on land included in the original Newburgh State Park. To the south lies more private land including some cranberry bogs and sheep ranches. This private land lies in a relatively narrow strip between the park and the north bank of the Sixes River.

Geology

Blacklock Point marks the northernmost extent of Mesozoic rocks along the Curry County coast (Lund 1975). The older exposed rocks of the Point representing the stratigraphy of the northern limb of the Cape Blanco anticline are overlain by a series of Miocene and Pliocene beds consisting of tuffaceous indurated sandstone which is collectively referred to as the "Empire Formation" and is seen in the precipitous light-colored cliffs north of Blacklock Point (Baldwin 1964). The rocks of those cliffs overlying the Hunters Cove Formation, are presently being eroded and the cliff's coastal edge is exceedingly hazardous. The compacted sandstone has historically been quarried from the



(after Baldwin, 1964)



Qwr	Whisky Run terrace	Qlu	Lower unamed terrace
Qp	Pioneer terrace	Tec	Eocene Coaledo Formation
Qsd	Seven Devils terrace	(after Janda, 1970)	

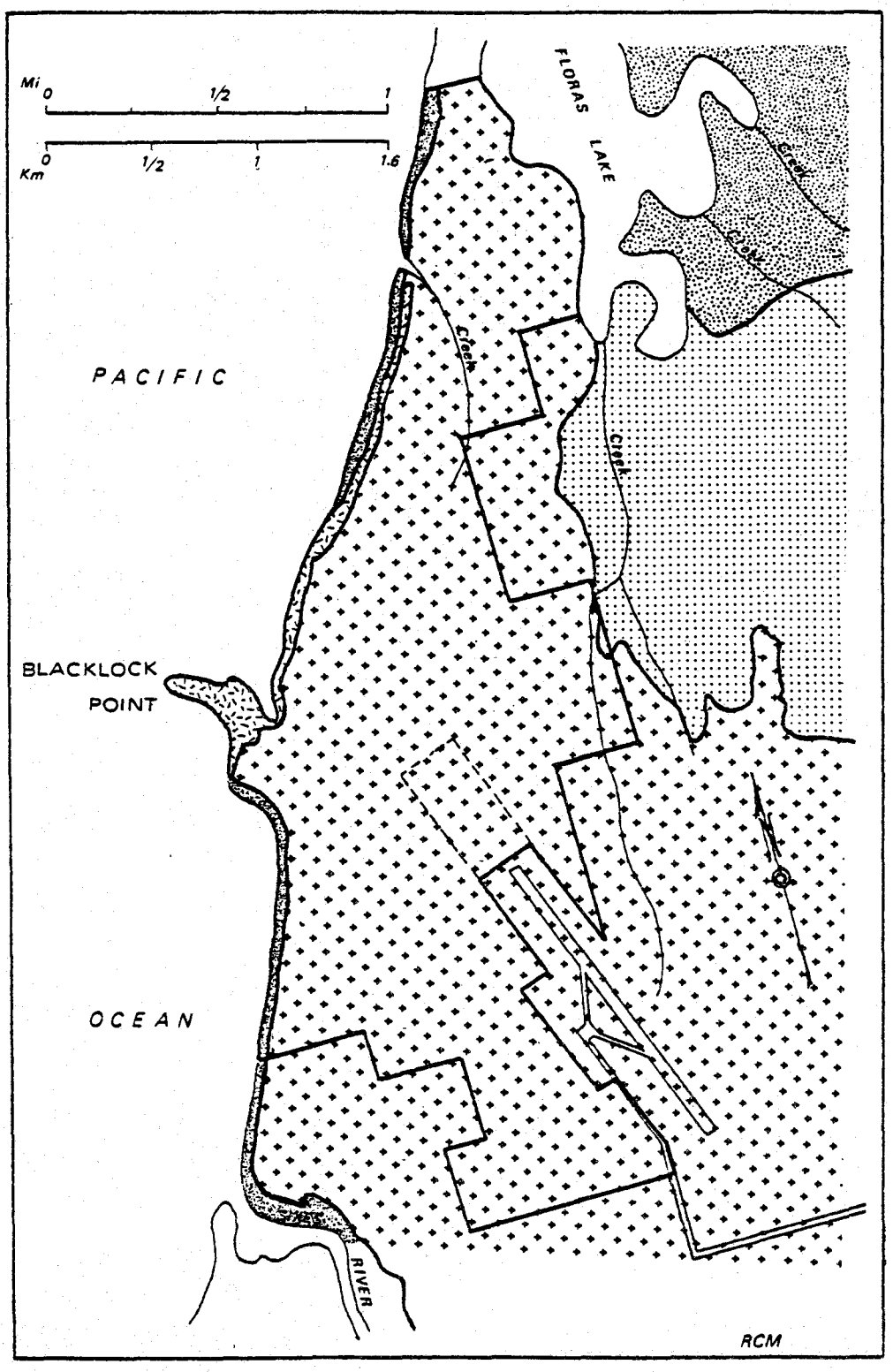
Figure 4. Generalized sequence of coastal terraces from Cape Arago to Cape Blanco.

area immediately north of Blacklock Point and shipped to San Francisco for construction purposes during the period 1885-1895. Remnants of the quarry operation and deep erosional gullies which have followed the mining are still visible.

A complex series of marine terraces of late-Pliocene and Pleistocene age is the prominent physiographic feature of today. This terrace system is the major component in the geologic control of biotic systems in the area. Described originally by Griggs (1945) and Baldwin (1945), these terraces provide evidence of sea level changes associated with world-wide glaciations and also local tectonic uplift (Figure 4). The marine stratigraphy and subsequent Plio-Pleistocene history of this section of the coast is under study by Dr. Richard Janda (USGS - Menlo Park). While the classic terrace sequence occurs at Cape Arago, the lower terraces (more recent) such as the Spruce Hollow terrace and Whisky Run terrace are below water. The well developed Pioneer terrace provides the relatively flat platform elevated at about 40 m above sea level upon which podsolic Blacklock soils have developed. Preliminary radiocarbon dating of wood and shell at the base of the Pioneer terrace is greater than 38,000 years B.P. (unpublished results prepared for the "Friends of the Pleistocene" Field Trip, 1970 by Dr. Richard Janda).

Professor Hans Jenny has referred to these terraces as vetusta (old) terraces and land surfaces which have been carved by the sea and slowly uplifted by geologic forces to their present position hundreds of feet above sea level. The terraces are covered by strongly leached soils and bear stands of stunted, dwarf vegetation. Appendix 2 presents a brief discussion of the terrace features and the rationale for their preservation.

The beach sands in the area are often called "black sands" but are dark-brown with brown and yellowish colors. Elsewhere these beach placer sands have been a source of gold, platinum, osmium and occasionally chromium. While mining of beach placers dates to the early 1850's there has been sporadic mining as recently as 1955 (Dougherty 1978). Some of the ancient elevated beach terraces also bear mineralized sands and



Rock outcrop

Active dune

Netarts sandy loam 0-12% slope

Knappa silty clay loam 2-7% slope

Blacklock fine sandy loam 0-7% slope

Figure 5. Soils of the Blacklock Point area (after Soil Conservation Service

have been exploited for mining, but none to our knowledge are located in the area of the proposed preserve (Libbey 1976).

The littoral has also played a geomorphic role in that a barrier beach has dammed a small bay and associated creek to form Floras Lake. Floras Lake, now the flooded lower end of Floras Creek, is connected to the Pacific by Floras Creek which flows northward about 11 km to the outlet of New River.

Soils

The featured environmental characteristic of the candidate preserve is the Blacklock soil. Indeed, the Point is the type locality of this soil which is beginning to achieve recognition as an ecological status symbol because of the well documented and very interesting soil vegetation relationships to a very closely related soil in California. The developmental sequence of this soil and its relationship to landforms and to vegetation is well described in Gardner (1967 and Jenny et al. (1969) and is discussed in the section of this report entitled "soil-vegetation relations".

Blacklock soils are classic ground-water podzols now referred to as a Sandy Mix Mesic Ortstein Typic Sideraquod subgroup of the Spodosol order. The soil has developed an impenetrable iron pan (ortstein) in the B2ir horizon which is encountered at a depth of from 30 to 76 cm and is 15 to 30 cm thick. The A1 horizon ranges from sandy loam to loam in texture and the parent material is loamy sand derived from fossil sand dunes and flats on Pleistocene terraces (Soil Conservation Service 1970). Appendix 3 describes a typical profile immediately adjacent to the candidate preserve. The Blacklock soil surface is quite acid (pH 5.0) but apparently not as acid as described in California (pH 2.8-3.9). The soil is low in available nitrogen and phosphorous as well as in exchangeable calcium, magnesium and potassium and its A horizons grade from a very dark gray to light gray to white to the reddish-brown B horizon where the cemented iron pan prevails. The presence of the pan leads to a perched water table which, during winter, floods the entire surface as discussed in Appendix 1 when observed by Robert Martin. Shallow depressions bear special vegetation and have summer-persistent ponds.

While Blacklock soil (BcB) is mapped as the dominant soil of the proposed area, active dune land (Ad) and rock outcrop mapping units are also identified within the area (Figure 5). The question as to the nature of the soil on the prairie headland is yet to be answered. The entire proposed preserve is within the Blacklock-Netarts-Active Dune Land soil association consisting of "nearly level to steep, moderately coarse textured and coarse textured soils that have coarse textured subsoil; on dunelike ridges and in intervening basins" (Soil Conservation Service 1970).

Biological Description

Vegetation and Flora

Situated within 3 km of the coast, the candidate area is clearly within the Picea sitchensis zone as evidenced by dominance of P. sitchensis and Pinus contorta. Although marked by conifer cover varying from tall mature P. sitchensis to stunted P. contorta, the proposed natural area also contains successional types, coastal headland prairie, coastal headland wind prostrated herb-shrub, and a seldom described ephemeral bog type. Littoral, coastal cliff, and intertidal situations, provide habitat for fragmental coastal communities, as well.

Reconaissance vegetation data collected from 20 plots distributed in most of the communities identified in the field, have been analyzed by the tabular technique of Braun Blanquet (Mueller-Dombois and Ellenberg 1974) and by ordination (Dick-Peddie and Moir 1970). Data were recorded from reconnaissance plots approximately 10 x 10 m in which species composition was determined and cover estimated in 6 Braun-Blanquet cover was also recorded. Additionally, diameters and age increment cores were determined for 33 trees and two soil pits dug.

Plant communities. The coniferous forest can best be separated into two rather indistinct types (they appear to grade into one another): a Picea sitchensis/Polysticum munitum community in which Vaccinium ovatum and Gaultheria shallon were dominant but not distinctive species, and a Pinus contorta/Rhododendron macrophyllum - Ledum glandulosum community also with the Vaccinium and Gautheria as prominent understory shrubs (Appendix 4). Patterns within the forest appeared to be related to light, with G. shallon dominating under higher light conditions. The Picea community tended toward a tall mature forest and typically grew on the most coastward ridges and on a prominent intermediate ridge to the west of the telephone right-of-way (Figure 2). Occupying possibly 30 percent of the proposed natural area, this taller forest was subject to intense blowdown, especially along the intermediate ridge segment. Examination of downed-trees revealed a shallow rooting system impeded by the iron pan characteristic of the Blacklock Soils. The Picea forest has also been salvage logged under State Park contract to remove blowdown, and is netted by tractor tracks southwest of the proposed preserve.

The Pinus community, more widespread than than the Picea, comprises about 50 percent of the proposed area and is prominently banded in a north-south orientation associated with a fossil sand dune system. The swales between dune ridges have strongly impeded drainage and bear stunted Pinus stands. The fossil sand dune ridges support more vigorous pine growth with a dense ericaceous understory (Figure 6). Some areas in the Pinus communities have been subject to Christmas tree trespass.

Most distinctive is the swale community that can best be described as an ephemeral bog. Dominated by Vaccinium uliginosum but with occasional patches of Sphagnum spp. and Deschampsia cespitosa, the ephemeral bog was identified as a Vaccinium uliginosum/Carex obnupta - Sanguisorba menziesii community (Appendix 4). At least 7 linear segments of this community exist, the longest, about 100 m long by 20 m across (Figure 6). In some of these bogs, circular ponds persist into late summer. Soils showed well-developed iron pans at about 30 cm. These small ephemeral bogs have not been described. Typical species composition includes:

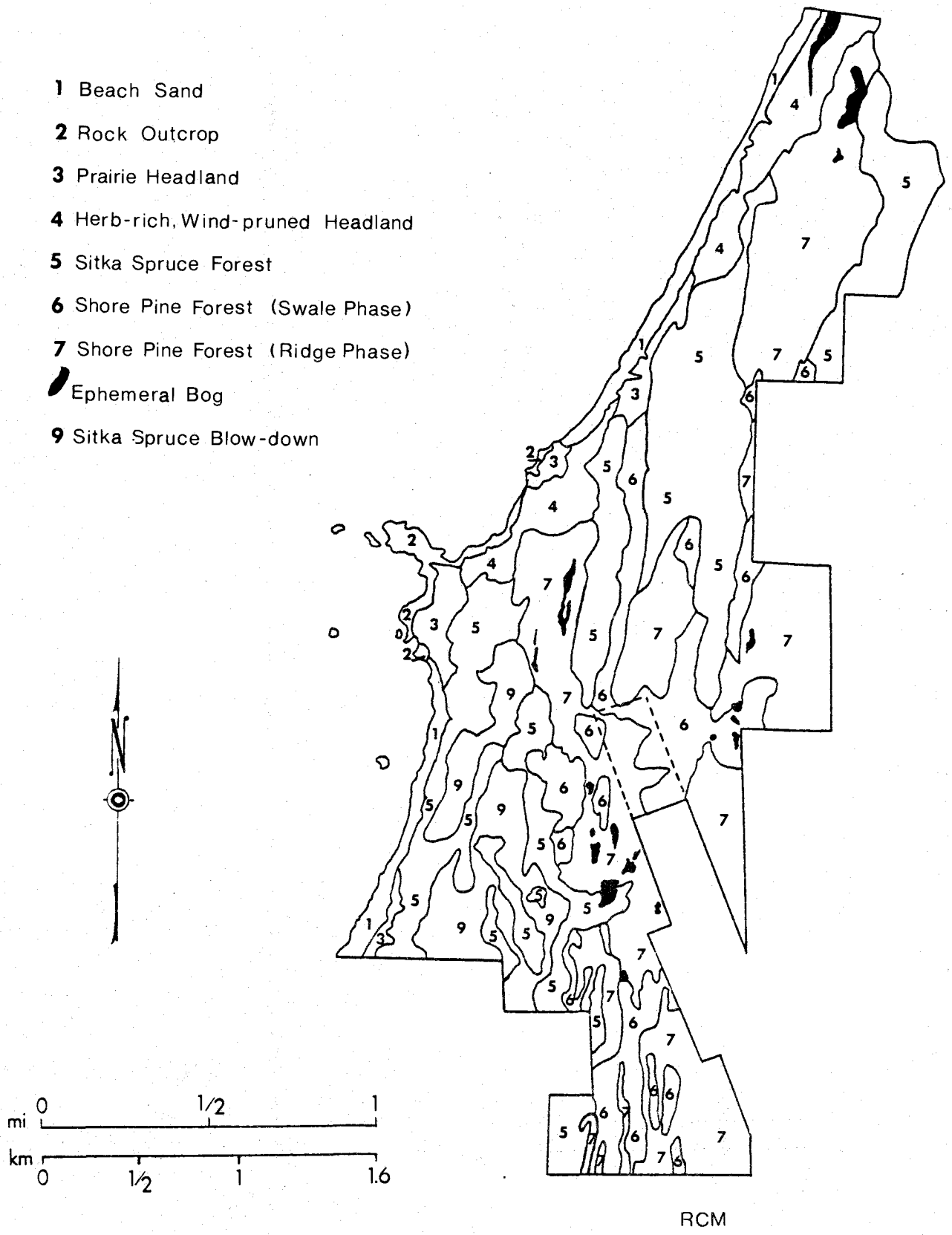


Figure 6. Vegetation, Blacklock Point area.

Vaccinium uliginosum	40% cover
Sanguisorba menziesii	2% cover
Carex obnupta	25% cover
Deschampsia cespitosa	25% cover
Agrostis spp.	2% cover

Two headland communities occur on Blacklock Point: to the south, a prairie headland, and to the north, a herb-rich wind-pruned headland. Neither has been adequately examined in Oregon (c.f., Franklin and Dyrness 1973:298). The prairie headland has been intensively grazed by sheep and contains many introduced species indicative of this disturbance. The following species list with cover indices (Mueller-Dombois and Ellenberg 1974) and introduced species noted by an asterisk (*) typifies the headland prairie:

Agrostis scabra	1	*Geranium spp.	+
*Aira caryophyllea v. californica	2	*Holcus lanatus	1
*Bellis perennis	+	*Hypochaeris radicata	3
*Bromus mollis	+	Iris douglasiana	2
*Cardionema ramosissima	+	Marah oreganus	+
Cirsium spp.	+	*Plantago lanceolata	1
*Cynosurus echinatus	+	*Plantago major	1
Distichlis spicata	+	Pteridium aquilinum	+
Erigeron glaucus	+	Poa spp.	1
*Erodium cicutarium	+	Ranunculus spp.	1
Festuca rubra	2	*Rumex acetosella	+
Fragaria chiloensis	1	*Sherardia arvensis	+
Gnaphalium spp.	1	Trifolium wormskjoldii	+
		Viola howellii	1

Comparison of this headland prairie with the five communities recognized by Davidson (1967) at Harts Cove, southern Tillamook County, shows little relation between the two. However, the species composition suggests a relation with the coastal prairie of California which is discontinuously distributed north of Santa Cruz (Heady et al. 1977). In particular, an interesting research project could be initiated during the summer of 1978 aimed at understanding the recovery of a heavily grazed headland. The largely naturally revegetated headland at Cape

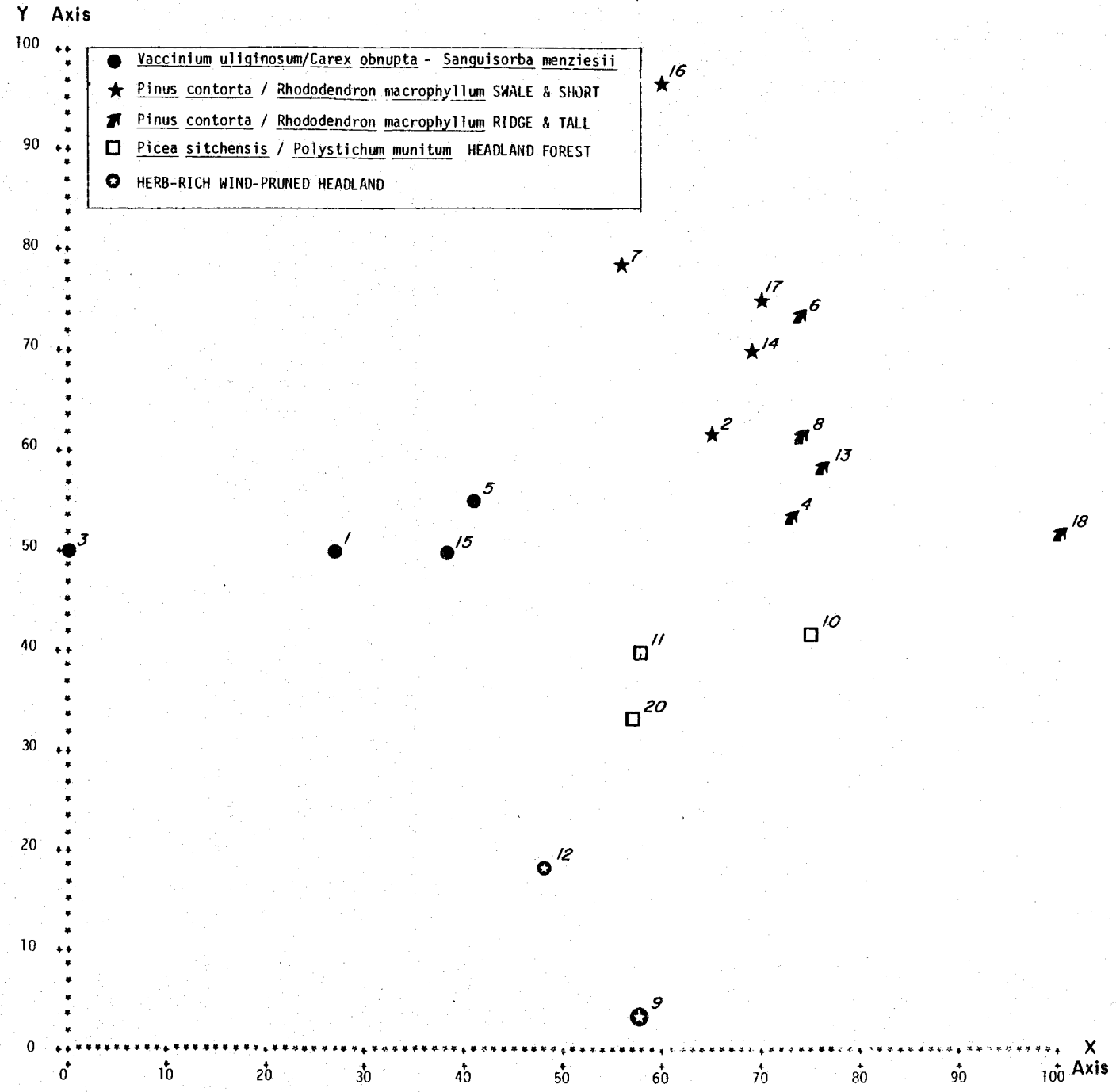


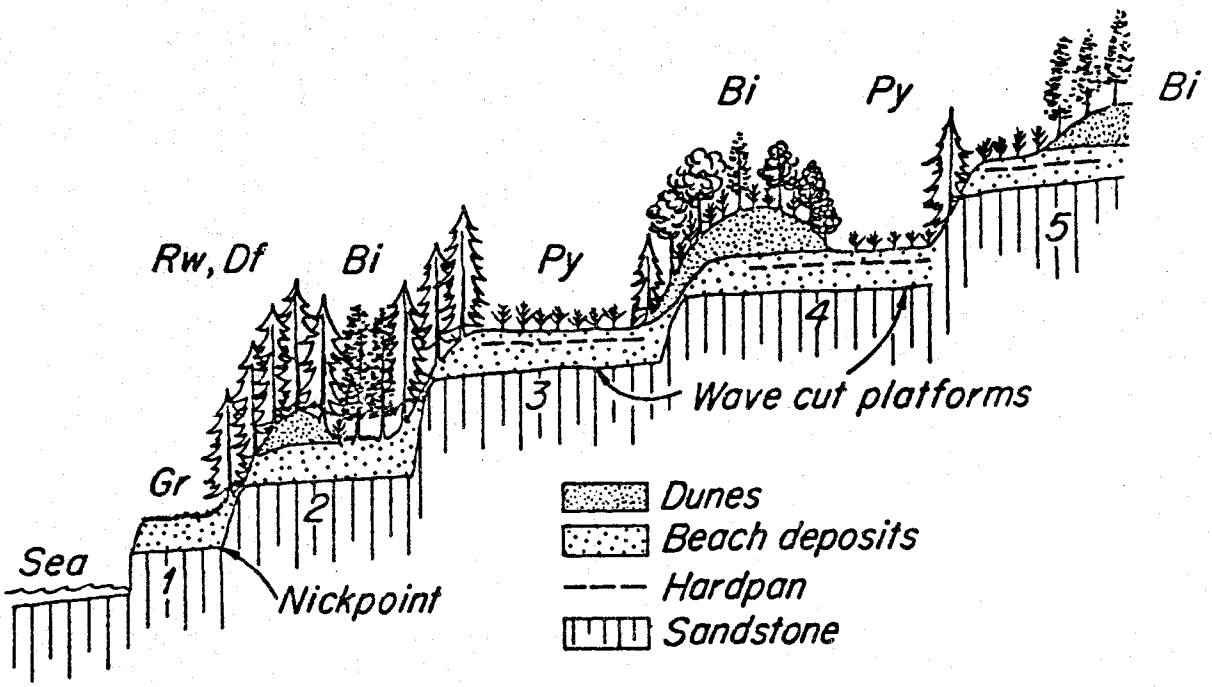
Figure 7. Ordination of 19 reconnaisance plots of vegetation in the Blacklock Point area.

Blanco could serve as control. The approach would be similar to that taken at Sea Ranch, Sonoma County, California (Heady et al. 1977).

Throughout the Blacklock Point area there is evidence of historic fire, with fire scarring, frequent chunks of charcoal, buried charcoal, and within many areas a remarkably uniform age structure (Table 1). Many of the interior areas appear to have trees which are about 25 years old, 35 years old and about 55 years old. Headland trees tend to be older. No analysis of the fire history of the tract has been made.

In order to display the relationships between vegetation samples taken in the Blacklock Point area, 19 samples were ordinated in Figure 7 using the program SIMORD developed by Dick-Peddie and Moir (1970). The algorithm selected, calculated sample similarity based on presence and absence using the Jaccard similarity coefficient. These similarities were plotted by computer in two-dimensional space such that the distance between samples reflects the dissimilarity based on species composition. Samples with identical species composition would be superimposed on each other. Samples 3, 18, 9, 16 were computer-selected endstands and are respectively most dissimilar to each other. Samples are identified by number and by plant community. Four groupings stand out: (1) the ephemeral bog community with Vaccinium uliginosum/Carex obnupta - Sanguisorba menziesii; (2) the herb-rich wind-pruned headland which was not named floristically because of too few samples; (3) the headland spruce forest, Picea sitchensis/Polystichum munitum; and (4) the Pinus contorta/Rhododendron macrophyllum - Ledum glandulosum community which separated into two phases--the swale phase with dwarfed trees and the adjacent ridge phase with tall trees. The headland prairie, represented by a single sample was left out of this analysis.

Indirect ordinations typically are used to either infer environmental gradients or to group samples into types. The ordination in Figure 7 displays 4 plant communities with two subgroups as discussed above. The ordination may also be interpreted as showing a headland-to-interior gradient along the Y-axis (salt spray, wind, temperature, etc.) and a soil moisture saturation gradient along the X-axis (soil moisture, iron pan development, cation exchange capacity, soil texture, microtopography, etc.). This provisional interpretation is extremely interesting and invites future research.



Looking north. Schematic illustration of Staircase, landforms and vegetation.
Gr - grassland, RW, DF - redwood-Douglas fir forest, Bi - bishop pine forest, Py - pygmy forest.
Horizontal distance is 3 miles, vertical distance 600 feet above sea level.

Figure 8. Arrangement of marine terraces and associated soils and vegetation on the Mendocino coast, California (after Jenny, 1973).

Additional summarization and analysis of the plant community data appears in the tabular plot in Appendix 4 based on a computer program PHYTO which simulates the early stages of a Braun-Blanquet analysis (Moore 1970). These same 4 communities are identified by columns in which "like" samples are grouped.

Soil-vegetation relations. The striking display of special plant assemblages on Blacklock soils near Mendocino, California suggests that similar relationships may prevail at Blacklock Point (Gardner and Bradshaw 1954; Jenny et al. 1969; Westman 1975; Westman and Whittaker 1975). While it is recognized that the California Blacklock Soils are presently being reevaluated as to their proper classification by Mr. Terry Cook of the Soil Conservation Survey, the general genesis of the California and Oregon soils appears similar. In California, the relationship of pygmy forest growth (Pinus contorta spp. bolanderi and Cupressus pygmaea) to the occurrence of highly podzolized soils has been well studied. A "staircase" arrangement of four Pleistocene marine terraces with fossil sand dunes and impeded drainage associated with the bleached white soils and pygmy forest is well developed (Figure 8). The dwarfed forest is associated with the highest (oldest) terraces where "during millenia vegetation and soil have evolved together (pygmy forest - podsol ecosystem)" (Jenny et al. 1969:73). The taller Pinus muricata and Sequoia sempervirens occur on the younger (lower) terraces and especially on dune ridges (Jenny et al. 1969; Westman 1975).

According to an interpretation by Dr. Richard Janda (USGS) and Professor Hans Jenny (pers. comm. August 23, 1974), the first terrace at Blacklock Point is under-water and the exposed Blacklock soils are actually on the second terrace (the late-Pleistocene, Pioneer terrace) now elevated about 40-60 m (130-200 ft) above sea level with a fine series of parallel fossil dunes with impeded drainage areas between (ephemeral bogs and stunted Pinus contorta forests). The Blacklock Point prairie headland might be an eroded remnant of the second terrace with weak podsolization because of increased oceanward drainage and strong salt spray effects. This could account for the grassland and also for the rim of tall Picea sitchensis forest occupying a fossil

sand dune on the headland. Local drainage systems running more or less parallel with the coast suggest this possibility.

The bulk of the proposed natural area consists of the ridge-swale system already discussed (Figure 6). Thirty-three trees were cored to determine the degree of stunting associated with podzolized soils. Table 1 presents diameters, ring counts, incremental growth ratios for 33 trees (22 Pinus contorta, 9 Picea sitchensis, 2 Tsuga heterophylla). Based on a very simple analysis, trees in swale communities showed striking stunting with a mean annual incremental growth of 0.37 cm/yr, while trees in adjacent ridge communities exhibited a mean annual incremental growth of 0.59 cm/yr. Headland trees grew fastest at a mean annual rate of 0.65 cm/yr. While the soils with impeded drainage have trees that are stunted somewhat, the dwarf nature of the Mendocino pygmy forest is not achieved in Oregon. Professor Jenny suggests that "the Oregon hardpan isn't quite as impenetrable (it is so on the higher privately owned terraces east of Bandon) and the Oregon sands are richer in non-quartz minerals, possibly providing better growth condition. It should be explored some day." (Pers. comm. August 23, 1974).

Flora. A species list appears in Appendix 5 as recorded in two field sessions early July and mid-September and by no means is the list complete. Several outstanding species are present in the area: Lilium occidentale, Empetrum nigrum, Dudleya farinosa all appear in various lists of rare, endangered or threatened species as already discussed.

Little floristic study has occurred in Oregon. Detling (1968) suggests an element of the Boreal Forest in Oregon has a historical relation to the southern Madro-Tertiary Geoflora having migrated in the Tertiary through California. This element is present in Blacklock Point where Arctostaphylos columbiana, Garrya elliptica, Myrica californica and Baccharis pilularis v. consanginea are all present. Dudleya confined to the rocky intertidal might also be added to this element. Barbour et al. (1976) analyzed the beach flora from Mexico to Washington using a clustering system by which five groups were identified. However, these did not correlate well with latitude. Both beaches near Blacklock Point (New River Beach and Bullards Beach) fell into Barbour's Group A dominated by Ammophila arenaria. The latitude of Blacklock Point is

near a decisive break in floristic composition--43° N latitude--leading to particular interest in the location of the candidate preserve.

Zoological

Besides the nine vegetation types discussed and mapped above, the intertidal environment provides a tenth distinct habitat for animals in the proposed preserve. Ideally, zoological data would key into these habitats but this habitat-related information is presently unavailable. Appendix 6 presents a tentative list of terrestrial mammals one could find in the Blacklock Point Area. Animals which are known to be there based on sighting or sign are marked in the list with an asterisk. Appendix 7 provides a list of birds believed to be in the area.

Dr. David V. McCorkle suggests that the coastal silverspot butterfly (Speyeria zerene behrensii), being considered by the Office of Endangered Species (USDI) for Threatened status, had been in the Blacklock Point area on coastal salt spray meadows (prairie headland) in association with its host plant, Viola adunca, prior to the grazing degradation of the headland vegetation. Dr. McCorkle has observed this rare butterfly on Cape Blanco where the prairie headland plant cover is more intact since natural revegetation subsequent to the cessation of grazing. With removal of grazing at Blacklock Point, it is expected that the butterfly will return.

The intertidal zone was surveyed by Dr. McCorkle at a -0.7 m (-2.5 ft) tide. The tide pools and rocky areas are rich in both algae and intertidal animals of the species one would expect in the south central Oregon coast. Especially interesting was the occurrence of numerous individuals of the sessile jellyfish (Haliclystus stejnegeri Kishinouye).

Although fragments of their endoskelton were present on the beach, no sea urchins were seen in the exposed intertidal zone. It is likely that the sea urchins occur subtidally or on the off-shore subtidal Mesozoic rocks. Mussel beds (Mytilus californianus Conrod) are present but are apparently heavily preyed upon by the starfish (Pisaster achraceus), a species present in large numbers.

Shell fragments of razor clams (Siliqua patula Dixon) that appeared to have died recently and which are found along the sandy beach to the south of Blacklock Point, as well as old shell remains in an Indian shell midden on the grassy south slope of the Point, attest to the presence of this species in the intertidal or perhaps subtidal sands at this location.

Although the intertidal habitats represented at Blacklock Point are not as varied as, for instance, those at Cape Arago to the north, it is an intertidal area typical of the south coast and worthy of protection.

Climate

The ocean is the single most important influence on the climate of this coastal area. Because of the general west-to-east flow of air in the mid-latitudes, most of the air masses reaching the Oregon coast have been influenced by up to several days of contact with the Pacific Ocean. This results in a great moderation of temperature. Temperatures in this area rarely exceed 38° C (100° F), and never drip below -18° C (0° F). January, the coldest month, has a mean temperature of 7° C (45° F). This is only 8° C (15° F) colder than the 15° C (60° F) mean for July, the warmest month.

Table 2. Mean maximum and minimum temperatures, Port Orford, Oregon, 1931 to 1952.

Month	Mean Maximum °C	Mean Maximum °F	Mean Minimum °C	Mean Minimum °F
January	11-12	(52-54)	2-4	(36-40)
July	19-20	(66-68)	10-11	(50-52)

Precipitation is also greatly influenced by proximity to the ocean. Abundant rainfall occurs on the coast and most of western Oregon. The Cape Blanco area receives a mean annual precipitation of 190 cm (74.8 in), most of which occurs during late fall and winter (Table 3).

Wind is another climatic factor strongly influenced by the proximity of Floras Lake Park to the ocean. Ocean influences cause yearly cyclic variation in wind direction as well as velocity. Strongest winds

are encountered during winter months and are associated with the storms which bring most of the annual precipitation. These storms generally come onshore from the southwest, and often generate winds in excess of hurricane force (120 kmph and over). The average wind speed for the entire period of December, January, and February is 32 kmph at Cape Blanco (Table 2). A slight reduction in this value can be expected at Floras Lake Park due to the sheltering affect of Cape Blanco.

The general wind direction shifts to the northwest in the spring and continues from that direction until late fall when it moves back to the southwest. The average wind speed from March through November is 24.2 kmph. There is no sheltering effect on winds from the northwest.

Winds in excess of 16 kmph are sufficient to cause some modification of vegetative growth. The degree of modification increases with increasing velocity and duration of exposure. Vegetation in unsheltered areas of Floras Lake Park is exposed to winds in excess of 16 kmph for 75 percent of the year.

Table 3. Climate data at Cape Blanco.

Month	Temperature* °C	(°F)	Precipitation* cm	(inch)	Wind Speed# kmph	(mph)
J	8	(46)	36.1	(14.2)	29.6	(18.5)
F	8	(46)	31.5	(12.4)	31.8	(19.9)
M	7	(45)	29.0	(11.4)	27.7	(17.3)
A	8	(46)	14.2	(5.6)	24.8	(15.5)
M	10	(50)	5.3	(2.1)	26.2	(16.4)
J	10	(51)	2.8	(1.1)	22.7	(14.2)
J	13	(55)	4.3	(1.7)	24.3	(15.2)
A	13	(55)	8.9	(3.5)	20.6	(12.9)
S	12	(54)	2.0	(.8)	22.0	(13.8)
O	11	(52)	14.5	(5.7)	23.8	(14.9)
N	10	(51)	21.1	(8.3)	25.3	(15.8)
D	9	(48)	24.1	(9.5)	34.8	(21.8)
YEARLY AVERAGE	10	(50)	190.0	(74.8)	26.1	(16.3)

* 3 year averages - Dept. of Commerce, NOAA

\# 2 year averages - OSU Atmospheric Science Dept.

Educational and Scientific Values

An area as biologically and physiographically striking as the proposed preserve is ripe with possibilities for developing a better understanding of natural processes.

The obvious prime feature of the area is the Blacklock soil. Much is yet to be learned about the development and composition of these unusually podsolized hardpan soils.

The interactions between these soils and the vegetation is another important research area. The extreme characteristics of the hardpan layer, poor drainage, and high acidity result in little understood effects on vegetation. One such effect, stunting of tree growth, produces the pygmy type forests which are the main feature of biological interest in the area. The proposed preserve contains both stunted and normal trees in close proximity, allowing valuable comparisons. Research into these processes can be conducted in the proposed preserve and the few remaining comparable areas, most of which are in California.

The proposed preserve is located on an old (vetusta) ocean terrace which is part of a system of such terrace areas scattered from the central California coast to Washington. Each of these areas is marked by particular soil and biotic features but all are related through are and the relative stability of the nearly level land forms. The proposed preserve would aid in understanding these terraces and the processes associated with them. A study of this kind develops over many years and requires input from many individuals and disciplines. It can only be undertaken when the integrity of study areas is assured.

Vegetation in parts of the proposed preserve is also stunted by salt spray and wind. This is a different process than the stunting associated with the Blacklock soils, and provides different research and educational opportunities. The utility of studying wind stunted vegetation is demonstrated by the research program now being carried out by Oregon State University's Atmospheric Science Department with funding by Portland General Electric. An anemometer and recorder have been located at Cape Blanco State Airport adjacent to Floras Lake State Park as part of this study.

The opportunity also exists for studies of succession in the areas of the proposed preserve which have been grazed for many years. As grazing is eliminated on these areas, studies can be initiated to monitor the reclamation by natural species of areas now supporting up to 90 percent introduced species. Such studies would have obvious implications for aiding in restoration of damaged natural areas.

Resource Base

Historical Use

The aboriginal history of the Floras Lake area begins with a late migration of Athabascan speaking peoples of the Quatomah band which settled in the Port Orford area between 1100 and 1300 A.D. The group most closely associated with the proposed preserve was called the Kwatami or Sixes. "This group occupied territory on the coast from about six kilometers (four miles) south of Bandon to Humbug Mountain and claimed the drainage basins of the streams in this region to the summit of the Coast Range." Their chief is said to have lived on the Sixes River (Berreman 1937).

These people were skillful hunters and gatherers, being especially adept at construction of wiers for capture of salmon. They also utilized large shellfish colonies in tidal areas along the coast. A number of shellfish middens are still visible on the southwest-facing slope of Blacklock Point.

Subsequent to the decimation of these people through epidemic, wars, and the placement of the few survivors on the reservation at Siletz in 1855, the government took possession of the land. In keeping with land disposal policies of the time, proceedings were begun to place the area in private ownership. William Blacklock and Associates Sandstone Company of San Francisco began acquisition in the area in 1875 on a parcel-by-parcel basis. Ownership of the 566 ha (1,398 ac) comprising the old Newburgh State Park was completed by the company in 1886. The company's interest in the area was the sandstone of Blacklock Point. Quarrying operations on the Point produced sandstone blocks

which were transferred to ships for delivery to San Francisco as construction material.

After a couple of years the quarrying operations were halted, but Blacklock Company retained ownership until 1943 (Boardman 1952). In 1936 the State Of Oregon contacted the company regarding the possibility of acquisition of company property. The deed to 565 ha (1,398 ac) was acquired by the State on February 26, 1943 for $3,641 or $6.37 per ha ($2.60 per ac).

That same month, proceedings were initiated which resulted in construction of what is now Cape Blanco State Airport. The airport was a cooperative venture of the Navy, Army Corps of Engineers, the Civil Aeronautics Administration, and Curry County. Federal interest in the plan was to provide a base for military aircraft should defense of our Pacific Coast become necessary. County interest involved air transport of locally grown Easter lilies to eastern markets (Boardman 1952). A lease for approximately 41 ha (102 ac) of state land was issued to Curry County for construction of the facility. An additional 19 ha (46 ac) adjacent to the NW end of the airstrip lease was covered under an easement allowing tree cutting for maintenance of a 20:1 approach surface (see Leases & Easements for current status of both of these agreements).

Ready access to the park area was first gained as a 4 kilometer (2.5 mile) road was built from Highway 101 to the construction site. This access surely contributed to increased use of park land for both appreciative and destructive purposes. One local rancher, in particular set fire to areas of the park to promote growth of forage for his sheep. This was done at irregular intervals for several years prior to 1952 (letter by McCosh & Dougherty). Park trees were cut commercially for timber and as Christmas trees starting in about 1954. Timber trespass has continued with regularity up to and including the winter season of 1976 (see Contemporary Use). Hunting was another technically illegal activity conducted with regularity on State Park land. In general, excepting the arson to promote grazing which prompted some state response, the land use problems were not ones of deliberate violation of laws, but ones of no laws being enforced. Discussion with Dan Dougherty, a long

time local resident and now Park Planner for the State Parks Branch, revealed that the local citizenry was largely unaware that the property was in fact a state park. Being undeveloped, unstaffed, and unmarked, the area appeared to be just another piece of public land to be used to anyones' advantage. The State did little to alter this situation until very recently (see Management Considerations).

Contemporary Use

Floras Lake State Park is currently classified as an undeveloped park. There are no services or facilities provided by the State Parks and Recreation Branch. Though no visitation figures are kept, visitation is assumed to be low due to limited access and lack of facilities. The appreciative public visitation which does occur is likely to be attracted by the headland of Blacklock Point and by the striking cliffs to the north. The beach between Floras Lake and the ocean is another likely point of interest. There is evidence of unauthorized overnight use in the forest near the Point which has resulted in trampling and tree removal for fire wood.

While appreciative visitation is relatively low, utilization of Park lands and resources for extractive and depreciative pursuits continues at a level quite destructive to both natural area and state park values. One such negative use is domestic sheep grazing. There are no grazing leases on the land, but the practice continues. Sheep apparently move from south of the park to graze on the grassy slopes and terrace level of Blacklock Point.

The destructive effects of sheep grazing in this area are many. Comparable headlands at Cape Blanco which have been grazed in the past but have been free of grazing for many years support vegetation cover 7 to 20 cm in height, and are extremely rich in native species with few introduced weedy species. Blacklock Point, in striking contrast, supports a cover of 1 to 2 cm with as much as 90 percent introduced weedy species. Trampling is heavy on the north and south slopes and on the terrace level, but it is most intense on the north slope. Slopes in excess of 20° exhibit gullies, slumping and erosional scarps. All of these effects are aggravated by sheep trampling. The north slope of

the point is particularly heavily laced with stock trails. There is a high density of sheep droppings in several areas of the headland, giving evidence of sheep grazing as recently as 1977.

In addition to the large timber removal, there has historically been Christmas tree cutting on park land. As recently as 1976, 750 freshly cut small tree stumps were observed between December 1 and Christmas as reported in a conversation in October 1977 with Rod Polly former manager of Floras Lake State Park. He also stated that these trees were removed almost exclusively by a single individual for sale as Christmas trees.

The Natural Area Preserves Advisory Committee contacted the Parks and Recreation Branch concerning both Christmas trees and grazing trespass problems. Dave Talbot, State Parks Superintendent, replied that the problems were being acted upon (see Management Considerations).

Uncontrolled uses of the are by all-terrain vehicles constitutes yet another threat to the resource base. The road system discussed in greater detail in the section on access allows vehicles entry to a large percentage of park land including Blacklock Point. The main access routes to park land is the dirt road beginning at the hanger area of the airport and running parallel to the landing strip. This road is on airport property and is graded at irregular intervals by Curry County. The last known maintenance was in September 1976. Tom Robertson, Airport Maintenance Supervisor for the Aeronautics Division, stated that a gate was placed across this road in 1975. The gate remained intact for about one day. He has observed 30 or more vehicles, both passenger cars and ATV's, entering park property via this road in one day.

Without supervision, the ATV trail system has increased especially in the eastern side of the park just north of the airport. It appears that a network of trails has been created in this area by repeatedly driving vehicles over the vegetation.

A contemporary use closely associated with the park is Cape Blanco State Airport. This is a General Aviation Strip 1,500 m (5,000 ft) long and 15 m (50 ft) wide with landing lights. There is also a taxiway with hangars for 4 small private aircraft. There are currently plans to construct up to 4 more hangar slots. The length and quality of the landing strip enables it to accommodate medium size commercial jets.

Management Considerations

The entire area proposed as a Natural Area Preserve is managed by the State Parks Recreation Branch of the Oregon Department of Transportation. It is presently classified as an undeveloped State Park. As such, no facilities are provided for either public visitation or management activities other than a fire control road constructed in the late 1960's. The present management efforts are described in a letter from Dave Talbot, Director of State Parks, to Bob Frenkel on 11/10/77. The letter states that, in response to continued grazing and timber trespass, patrol of the area will be increased, known violators will be contacted concerning possible prosecution for further violations, and that the feasibility of fencing sections of the park perimeter is under study.

The plan for future development of the park is scheduled to begin in 1978. The State Park planning section has requested close coordination with the Natural Area Preserves program to insure adequate considerations of the needs of both programs (letter--McCosh, Dougherty).

Following is a list of topics requiring consideration as the management plan is developed for Floras Lake State Park.

1. The relationship of the proposed preserve to planned development areas and activity centers within the park.
2. The problems of grazing and timber trespass should present preventative measures prove inadequate.
3. Unrestricted and damaging use of off-road vehicles.
4. Unauthorized overnight use.
5. Visitor protection in the cliff area north of Blacklock Point.
6. Protection of archaeologic resources.

7. Impact of potential low density residential development on property such as the "Old Kronenberg Estate" directly east of the State Park.

8. Threat to area--extension of county airport, or any road or campground or construction activity of any kind that would change drainage patterns.

Access

Access to Floras Lake Park is limited. Lack of an access road in the 1930's was a stumbling block to acquisition of the land by the State (Boardman 1952). A road was provided when the airport was constructed in 1943. It runs from Highway 101, 4 km to Cape Blanco Airport. While the access road to the airport is gated at the hangar area near the middle of the landing strip, a two track dirt fire control road passable by passenger car during dry seasons begins at that point. This road parallels the landing field, and then turns north past the end of the field. It then parallels the Coast Guard telephone line almost to Floras Lake. A system of somewhat less developed dirt track roads intersects this main route.

One such road goes due west almost to the meadow on Blacklock Point. Another dirt track provides access to an area in the northeast section of the park which suffers from unauthorized and destructive off-road vehicle use. One can also drive to the southwest section of the park.

There is also limited access to the park from the private land to the south. It is believed that much of the grazing and timber trespass has gained access via these southern routes.

Entry to the park by hikers must come from the airport, or along the beach from either north or south. Due to the dense vegetation of the area it is doubtful that anyone would gain entry by going cross country.

Leases and Easements

Of the leases and easements affecting Floras Lake State Park, the largest was granted to Curry County in 1943 for construction of Curry County Airport. The lease was issued to the county to circumvent legal

restrictions prohibiting the Federal government, the principal pary, from directly leasing state land. The original lease was for 25 years with a revocation clause should the county fail to fulfill the stated objective of the lease (Boardman 1952). The lease was transfered to the State Board of Aeronautics (now the Aeronautics Division of DOT) in the form of a Deed on April 28, 1971 (Appendix 8). The facility is now called Cape Blanco State Airport and is operated as a general aviation strip by the Airports Branch of the Aeronautics Division, DOT.

The Aeronautics Division of DOT now holds an easement on a 320 m by 640 m (1,000 foot by 2,000 foot) parcel (approximately 18 ha) directly adjacent to the northwest boundary of Cape Blanco State Airport. This easement was executed to clear and maintain free airspace above a given glide angle plane to allow unobstructed approach to the landing strip. The agreement specifies that the State Highway Commission shall "not hereafter erect, or permit the erection of any structure or other object extending into or above said glide angle plane, and...shall include the continuing right in Grantee [Board of Aeronautics] to clear and keep clear the above-described easement area of any and all obstructions, including trees, which infringe upon or extend into above said glide angle plane" (Appendix 8). "The present easement is for a 20:1 approach surface." In the future, if the use of the airport increases, the Aeronautics Division could request lowering of the approach surface to 50:1 (letter from Tom Robertson 11/8/77).

A third easement was issued to the U.S. Coast Guard in October 1945 for construction of a telephone line (Appendix 9). This pole line runs the entire north-south length of Floras Lake State Park (Figure 2). One provision of the agreement stipulates "It is strictly forbidden to cut or trim trees or shrubs growing on the highway right of way unless and until written permission and instructions to do so have been obtained from the State Highway Engineer or his authorized representative."

On the land this line appears as a row of poles approximately 4 meters high with a pair of wires mounted on crossbars. Vegetation along this line is kept below approximately 1.5 meters for about 2 meters on either side of the center line.

There are no other known leases or easements in force on Floras Lake State Park.

Economic Value

It is not possible to place a dollar value on the indirect recreational services presently provided by Floras Lake State Park as there is no established delivery system or even a reliable estimate of visitation. The park appears to be of some importance to local dispersed recreation interests.

Chronic timber and grazing trespassers could be said to have economic interest in the park. This obvious negative impact to the state is prohibited under State Park statute, and the economic value of the damage has not been evaluated.

There is no discernable negative impact on the present economic value of Floras Lake State Park. There is potential negative impact on the future value of the park to the extent that management for natural area values would curtail development of park facilities in the designated area. This conflict, however, is unlikely since management for natural area values and state park values will be integrated. Conflict is also unlikely since Floras Lake, the assumed focus for state park development, is in the north end of the park, and the proposal area is the central and southern sections.

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APPENDIX 1

Field Reconnaissance of Floras Lake State Park
With Attention to Drainage Patterns During Heavy Rains

The following is a report of a field reconnaissance conducted on November 25, 1977 from 1:00 to 4:00 p.m. at Floras Lake State Park for the Natural Area Preserves Advisory Committee. This report is being entered because of the time of year and the weather conditions at the time of the visit. A major coastal storm had dropped 4 inches of rain in the area by the afternoon of the visit. Medium to heavy rain and strong winds were encountered throughout the trip. There was moderate flooding of several coastal streams due to this storm.

Travel in the park was strictly by foot due to flooding of the unsurfaced roads. The road following the telephone line north appeared much like a small stream flowing at the rate of an average walk until it reached periodic depressions in the road. From these depressions the water would flow off into the forest on either side.

Upon arrival at the cliffs I turned south following the cliffs toward Blacklock Point. At the large point of land directly north of Blacklock Point itself there was a waterfall fed by a stream of water about 4 feet wide and 10 inches deep. This stream flowed out of the adjacent forest and fell directly into the ocean. This water had the brown staining which was characteristic of all standing or flowing water in the area. Moving to Blacklock Point I noted the heavy impact of sheep in the area. The north facing slope of the Point was heavily laced with sheep trails from top to bottom. This slope and the level top of the headland exhibited many thistles among the ground cover which was pruned to as little as ½ inch in most areas.

Turning inland from the Point, I passed two forest campsites. One site was rather small, but the other was about 40 feet in diameter with heavy trampling and removal of up to 8 inch diameter trees for firewood. Progress was greatly slowed from this point on by large amounts of water flowing both on the roads and through the forest, and reaching depths of 4 feet in depressions. Several of these forest depressions were 40 to 50 feet wide and ran generally north-south with water collecting in them from several directions. Trees in these areas were submerged to a third of their height. Upon reconnection with the road north-west of the airport, I found it submerged to a noticeably greater degree than when I had passed 3 hours earlier. The road and adjacent forest was now submerged to two feet deep for 60-100 linear feet at a time with streams flowing from one depression to the next moving generally northward.

Recorded November 27, 1977
by Bob Martin
NAPAC Research Assistant

APPENDIX 2

Vegetation-Soil Research Areas along the Pacific Coast, especially in Oregon and California [1]

Introduction

Coastal landscape evolution and concommitant soil and vegetation development are being studied intensively by geologists, geographers, pedologists (soil scientists), botanists, zoologists, ecologists, foresters and many others. The hope is that research on a broad front will unravel the causes of distribution of soils and biota, why grassy-terraces near cliffs persist at high rainfall, why Sitka spruce ends south of Caspar Creek, California, why bishop pine does not enter Oregon and why tall redwoods and Douglas firs and puny pygmy forests occur side by side. Understanding of the origin of forests will contribute to their rational management.

The vetusta terraces

Along the coasts, sea-carved terraces are being slowly uplifted by geologic forces. The resultant vetusta (old) terraces and land surfaces extend a few miles inland, are hundreds of feet above sea level and are estimated to be up to a million years old. They are covered by leached soils and stunted, dwarf-type vegetation.

These ancient landscapes are found in California in Mendocino, Monterey, and San Diego counties and in a few sites between. Probably

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[1] The above material prepared by Professor Hans Jenny about 1974 or 1975.

they occur in Central and South America. They are abundant and well developed in Oregon and possibly extend farther north. Each geographic area has its own unique pattern of biota and soils but all relate to each other because of old age and nearly level land forms of great stability. They are believed to figure prominently in species evolution.

The Pygmy Forest Ecological Staircase in California

To cite an example, on the vetusta terraces along the Mendocino coast the old, highly weathered sand dunes (Noyo soils) are mantled by bishop pines whereas the level platforms with old beach material carry but dwarfed pygmy forest of pines and cypresses and endemic species. It is underlain by Blacklock soil, an extremely acid podsol or spodsol with white, bleached A2-horizon and an indurated hardpan B-horizon that opposes root penetration. It is the result of soil genesis in that iron leached out of the A2-horizon during millennia cemented the sand grains below into a rock-like B-horizon. It creates severe waterlogging in winter and gives rise to sphagnum bogs.

In contrast, on the youngest, lowest terrace the soils are grasslands on rich, black prairie soils (Mollisols). Within hundreds of feet from the shore line wind and salt spray are so intense that planted, native trees will not grow. Farther inland, on slightly weathered dunes and in protected canyons, redwood, Douglas firs and hemlocks grow luxuriously. Along Jug Handle Creek there are five well preserved elevated terraces aligned like a staircase with progressive changes in vegetation, from grass to commercial forests to pine forest and to pygmy forest.

This Pygmy Forest Ecological Staircase has become known nationally and internationally (with articles written in a Russian journal) and it is visited annually on conducted tours by several thousand nature lovers, high school and college students and teachers. Research teams from Cornell University and the University of California, supported by the National Science Foundation, have been and still are conducting research.

Elevated terraces in Oregon

As said, ancient terraces are widespread in Oregon, and the United States Geological Survey is actively exploring their extent (R. Janda), but the soil-vegetation patterns have not yet been studied in detail. Joint field trips with representatives of the Soils Department of Oregon State University at Corvallis, of the Oregon Soil Conservation Service, and of the Soils and Plant Nutrition Department of the University of California at Berkeley were undertaken in 1968 and promising leads developed. As in Mendocino, on terraces east and south of Bandon the bleached Blacklock soils with hardpan are also common and they are also waterlogged in winter, but they are less extreme, perhaps because of base-richer sands. The vegetation likewise consists of acid-tolerant species and though they are less severely stunted, the soils cannot produce commercial timber.

Well preserved, ancient terraces extend along Seven Devils Road south of Coos Bay at 500-600 feet altitude. The soils also have bleached

A2-horizons and a cemented iron hardpan (B-horizon). They are more silty and are called the Depoe soil series. Again they fail to grow commercial timber. On lower terraces Blacklock soils are mapped.

Specifically, the soils occur in T26S, Range 14WWM, Sections 27, 33 and 34 and north into Section 28. On the enclosed map "Portion of Empire Quadrangle, Oregon Coos County", the area is outlined in black. In Sections 27, 33 and 34 all of the plateau above 500 feet has been included, while in Section 28 only land above 600 feet has been considered.

Preservation Activities

By necessity, the soil-vegetation or ecosystem research will extend over a period of years depending on funding and available manpower, including graduate students. Hence, suitable areas must be set aside and protected from exploitation and development. Moreover, as knowledge accumulates public demands for teaching and educational tours rises.

a.) Situation in California

Preservation of the Pygmy Forest Ecological Staircase is developing in several directions. Pygmy forest proper has been purchased by the University as a research area and in Jackson State Forest it has been declared a "Registered National Landmark" by the Department of Interior, Washington, D.C. Action is under way to accord it status as an Ecological National Monument in the National Park Service. The State of California has taken an active lead and has placed the entire Staircase as Park acquisition on a State Bond Act to be voted on by Californians in June 1974.

b.) Situation in Oregon

The type locality of the now famous Blacklock soils is at Blacklock Point, Curry County, Oregon. It is near Curry County Airport and is included in Floras Lake State Park (see enclosed map). The administration of the Park has been contacted and urged to protect selected areas of soil and natural vegetation from excessive use which might destroy the area for scientific purposes. Regular checking inquiries should be made because of the administrative turnover of park personnel. The spectacular higher terraces east of Bandon have been cut up by developments to such an extent that no suitable area seems to remain, but search for them should be continued.

In the highlands along Seven Devils Road, with the exception of 120 acres owned by Coos Head Timber Company, and 40 acres owned by the United States, administered by the Bureau of Land Management, the entire area is in the hands of the Georgia Pacific Corporation, as seen by the ownership map enclosed.

Efforts should be made now to encourage the owners to set aside the areas for an indefinite period of years. Already university teachers and students are frequenting the area. To assure continuity of interest and action a volunteer group would be desirable either within an organization like The Nature Conservancy or among concerned laymen, naturalists and researchers.

APPENDIX 3

Description of the Blacklock Soil Series

From Soil Conservation Service, 1970

Blacklock Series

The Blacklock series consists of nearly level to gently sloping, dark-colored soils that are poorly drained. These soils formed in moderately coarse textured sediment laid down by wind and water. They occupy concave slopes on flats and in depressions on marine terraces. The natural vegetation is shore pine, Sitka spruce, Port-Orford-cedar, hemlock, huckleberry, salal, rhododendron, azalea, swordfern, spirea, and sedges and rushes.

In a typical profile (fig. 3) the surface layer is fine sandy loam to a depth of about 18 inches. It is very dark gray in the upper part and gray below. It overlies a dark reddish-brown to yellowish-brown subsoil that is cemented in the upper part. Pale-yellow loamy fine sand is at a depth of about 48 inches.

Blacklock soils are important for producing forest greens for the floral trade and shore pine for Christmas trees. A few small areas are used intensively for cranberries or are seeded to pasture.

Blacklock fine sandy loam, 0 to 7 percent slopes (BcB).—This is the only Blacklock soil mapped in the survey area. It occupies small basins on marine terraces. Nearly all of it is in the northwestern part of the Area in tracts that extend from north of Port Orford to Langlois.

Typical profile in a wooded area (1.8 miles west of U.S. Highway 101 on Airport Road then 30 feet north of the road; sec. 32, T. 31 S., R. 15 W.):

O2—3 inches to 0 of very strongly acid litter consisting of leaves, needles, and grass.

A1—0 to 8 inches, very dark gray (10YR 3/1) fine sandy loam, dark gray (10YR 4/1) when dry; moderate, fine, subangular blocky structure that breaks to moderate, fine, granular; very friable when moist, soft when dry, nonsticky and nonplastic when wet; many irregular pores; many roots; very strongly acid (pH 5.0); gradual, wavy boundary. 4 to 10 inches thick.

A2—8 to 18 inches, gray (N 5/0 to 6/0) fine sandy loam, white (N 8/0) when dry; massive; slightly hard when dry, friable when moist; nonsticky and nonplastic when wet; a few fine pores; many roots; strongly acid (pH 5.2); abrupt, wavy boundary. 6 to 10 inches thick.

B21h—18 to 22 inches, dark reddish-brown (5YR 2/2) loam, dark reddish gray (5YR 4/2) when dry; weak, medium, subangular blocky structure to massive; some cementation; very friable to firm and very firm when moist, soft when dry; many fine pores; many roots; very strongly acid (pH 5.0); abrupt, wavy boundary. 2 to 4 inches thick.

B22ir—22 to 32 inches, yellowish-brown (10YR 5/4 and 5/6) and dark reddish-brown (5YR 3/4) loamy sand; massive; very firm when moist, very hard when dry; common, medium and coarse, dark reddish-brown (5YR 3/4) mottles; a few fine pores; a few roots; strongly acid (pH 5.4); clear, wavy boundary. 6 to 12 inches thick.

B3—32 to 48 inches, yellowish-brown (10YR 5/4) loamy fine sand; massive; firm when moist, slightly hard when dry; many fine pores; a few, medium, distinct, strong-brown (7.5YR 5/6) mottles and a few, fine, prominent, dark reddish-brown (5YR 3/4) mottles; medium acid (pH 5.6); gradual, wavy boundary. 10 to 20 inches thick.

C—48 to 60 inches +, pale-yellow (2.5Y 8/4) loamy fine sand; massive to single grain; loose when moist, slightly hard when dry; reddish-brown concretions and yellowish-brown mottles; many fine pores; medium acid (pH 6.0).

The A1 horizon ranges from fine sandy loam to loam in texture, but it is dominantly fine sandy loam. Depth to the strongly cemented hardpan in the B2 horizon ranges from 12 to 30 inches. This restrictive layer is 6 to 12 inches thick.

Runoff is very slow on the soil, and the hazard of erosion is slight. Permeability of the subsoil is very slow. Available water holding capacity is low, effective root penetration is moderately shallow to moderately deep, and fertility is low. Workability is good.

Included with this soil in mapping are small areas of well-drained Ferrelo loam, 0 to 7 percent slopes, on knolls or ridges that are 100 to 200 feet long and are slightly higher than this Blacklock soil. Also included are small areas of very deep, well-drained, silty Knappa soils that are near the shoreline side of the marine terraces. Other included small areas consist of gently sloping to moderately sloping, well-drained, sandy Netarts soils.

This Blacklock soil is poorly suited to most crops adapted to the survey area. Cranberries and a few other specialty crops can be grown, however, under special management. Most areas have a cover of shore pine, spruce, cedar, and various kinds of shrubs. A few shore pine are harvested annually for Christmas trees. From time to time forest greens are cut and shipped to florists in metropolitan areas. Pastures have been established in some areas by installing surface drains, adding large amounts of lime and commercial fertilizer, and seeding shallow-rooted grasses and legumes that tolerate wetness. Capability unit VIw-1; woodland group 1.

PRESENCE	CODE	SERIAL NUMBER	COMMUNITY ●	✪	□	↗	★
		SAMPLE NUMBER	3 1 15 5	9 11 12 10	20 8 13 18	4	7 14 16 17 6 2
			1 2 3 4	5 6 7 8 9	10 11 12	13	1 2 3 4 5 6 7 8 9
5	1	VACCINIUM ULIGINOSUM	4241				2
5	2	SANGUISORBA MENZIESII	2111				+
4	4	CAREX OBNUPTA	1223				
4	5	DESCHAMPSIA CESPITOSA	252				1
2	36	SPHAGNUM SPP.	? 5				
2	25	AGROSTIS SCABRA	1 1				
8	12	RHODODENDRON MACROPHYLLUM				21	21+222
6	17	XEROPHYLLUM TENAX					211113
9	10	LEDUM GLANDULOSUM	1	+		2	322213
5	22	CORNUS CANADENSIS					++ +++
4	38	ARCTOSTAPHYLOS COLUMBIANA					+1+ +
15	11	GAULTHERIA SHALLON		232	4+5	2	3211213
15	9	VACCINIUM OVATUM		112	2233		3222222
14	14	PTERIDIUM AQUILINUM	1	++	++11	+	2124141
13	6	PINUS CONTORTA	+	+	+ 133	1	2222?2
12	8	MYRICA CALIFORNICA	+		1 +311		11+++1
11	7	PICEA SITCHENSIS		?	+35341	?	+ +
8	37	PHALARIS ARUNDINACE	+ +		4		++1++
7	13	ALNUS RUBRA			++	+	+++ +1
5	29	TSUGA HETEROPHYLLA			11+3		+
4	24	AGROSTIS ALBA VAR.	+2		+		+
6	31	POLYSTICHUM MUNITUM			1+2+	+1	
5	40	IRIS DOUGLASIANA			++++1		
4	23	MAIANTHEMUM DILATATUM			++ +		+
3	45	AMMOPHILA ARENARIA			21 1		
4	43	CIRSIUM SPP.			++ +		+
4	47	BERBERIS AQUILIFOLIUM			+++ +		
4	52	HYPOCHAERIS RADICATA			+++ +		
3	46	ANGELICA LUCIDA			+1 +		
3	20	EMPETRUM NIGRUM			51		2
4	33	VIOLA SEMPERVIRENS			+ +	+	+
3	30	RUBUS SPECTABLIS			+ +	+	
4	34	CAREX 9			+	+	++
3	15	LILIUM OCCIDENTALE					+ + +
3	19	PANICUM OCCIDENTALE					++ +
2	18	TRIENTALIS LATIFOLIA					++
2	21	RUBUS URSINUS					++
2	32	BLECHNUM SPICANT			+	+	
2	42	JUNIPERUS COMMUNIS		2			+
2	49	AMBROSIA CHAMISSONIS		++			
2	50	ASTER FOLIACEOUS		++			
2	51	CASTILLEJA LITTORALIS		++			
2	53	LUZULA CAMPESTRIS		++			
2	54	HOLCUS LANATUS		+	3		
2	60	RUBUS SPP.		+	1		
2	26	VIOLA ADUNCA	+	+			
2	39	GENTIANA SCEPTRUM					++
1	5	VERONICA SCUTELLATA	+				
1	27	POLYGONUM PARONYCHIA	+				
1	28	CALAMAGROSTIS NUTKANA	+				
1	35	JUNCUS EFFUSUS VAR	4				
1	41	ARMERIA MARITIMA		+			
1	44	LILIUM SPP.		+			
1	48	SACCHARIS PILULARIS VAR.		+			
1	55	SENECIO JACOBAEA		+			
1	56	CAREX SITCHENSIS		+			
1	57	LATHYRUS SPP.		+			
1	58	FESTUCA RUBRA		+			
1	59	ACHILLEA MILLEFOLIUM		+			
1	61	GNAPHALIUM PURPUREUM		+			
1	62	PSEUDO TSUGA MENZIESII			2		
1	67	SATUREJA DOUGLASII			1		
1	68	GALIUM TRIFLORUM			+		
1	69	POLYPODIUM GLYCERRHIZA			+		
1	63	LYCOPODIUM CLAVATUM					+
1	64	CONIOSELINUM PACIFICUM					+
1	66	BERBERIS NERVOSA				+	
1	16	LOTUS CRASSIFOLIUS					+
			1 2 3 4	5 6 7 8 9	10 11 12	13	1 2 3 4 5 6 7 8 9

APPENDIX 4

Plant Community Tabular Analysis

Floristic data were taken from 19, 10 x 10 m samples representing vegetation types tentatively recognized in the field; species "total estimate" being recorded in 6 cover classes according to the system of Braun-Blanquet (Mueller-Dombois and Ellenberg 1974). Data were processed by J. J. Moore's (1970) PHYTO program developed at University College, Dublin by which the first stages of a Braun-Blanquet tabular rearrangement are achieved by program-selection of the two "best" pairs of opposing "differential" species. Original sample numbers are printed above the serial numbers with symbols corresponding with those used in the ordination.

Computer output is displayed on the facing page showing three groups of samples. Group I corresponds to the Vaccinium uliginosum/Carex obnupta - Sanguisorba menziesii community (●). Group II includes three plant communities: the herb-rich, wind-pruned headland community (✪) represented by samples 9 and 12 with some wind-dwarfed Picea and a large complement of species; the Picea sitchensis/Polystichum munitum community (□) closely related to the foregoing adjacent headland scrub but with a much sparser flora attributed, in part, to dense shade; and a Pinus contorta/Rhododendron macrophyllum community (ridge phase) (◢) where Myrica californica, Picea sitchensis and Tsuga heterophylla are important tree components. Group III corresponds to the Pinus contorta/Rhododendron macrophyllum - Ledum glandulosum community (★) marked by Xerophyllum tenax, as well, and found in swale situations with a strongly developed iron pan leading to impeded drainage and dwarfed trees. A single sample taken in the prairie headland community is not shown in this tabular arrangement.

APPENDIX 5

Tentative List of Vascular Plants in the Proposed Blacklock Point Natural Area Preserve

This list was prepared from collected and observed plant species during two field visits to the parcel. The field visits were made July 3-4, 1974 and September 16-17, 1975. A more complete seasonal sampling would provide a more comprehensive list. Nomenclature follows Hitchcock (1973) and Munz (1959, 1968).

Scientific Name	Common Name
Achillea millefolium L.	yarrow
Agrostis alba L.	redtop
Agrostis scabra Willd.	rough hairgrass
Aira caryophyllea L.	silver hairgrass
Aira praecox L.	early hairgrass
Alnus rubra Bong.	red alder
Ambrosia chamissonis (Less.) Greene	ragweed
Ammophila arenaria (L.) Link	European beachgrass
Anaphalis margaritacea (L.) B. & H.	pearly everlasting
Angelica spp.	angelica
Arctostaphylos columbiana Piper	hairy manzanita
Arctostaphylos uva-ursi (L.) Spreng.	kinnikinnick
Armeria maritima (Mill.) Willd. var californica (Boiss.) Lawrence	thrift
Aster foliaceus Lindl.	showy aster
Baccharis pilularis DC.	chapparal broom
Bellis perennis L.	English daisy
Berberis aquifolium Pursh	tall Oregongrape
Berberis nervosa Pursh	Oregongrape
Blechnum spicant (L.) With.	deerfern
Bromus mollis L.	soft brome
Calamagrostis spp.	reedgrass
Cardionema ramosissima (Weinm.) Nels. & Macbr.	sandmat
Carex spp. "B"	sedge "B"
Carex obnupta L.H.Bailey	slough sedge
Carex sitchensis Prescott	Sitka sedge
Castilleja litoralis Pennell	Oregon coast paintbrush
Chamaecyparis lawsoniana (A.Murr.) Parl.	Port-Orford-cedar
Cirsium spp.	thistle
Conioselinum pacificum (Wats.) Coult. & Rose	Pacific hemlock-parsley
Cornus canadensis L.	bunchberry dogwood
Cynosurus echinatus L.	hedgehog dogtail
Deschampsia caespitosa (L.) Beauv.	tufted hairgrass
Distichlis spicata (L.) Greene	seashore saltgrass
Dudleya farinosa (Lindl.) Britt. & Rose	powdery dudleya
Empetrum nigrum L.	black crowberry
Equisetum telmateia Ehrh. var braunii Milde	giant horsetail
Erigeron glaucus Ker.	seaside fleabane

Scientific Name	Common Name
Erodium cicutarium (L.) L'Her.	filaree
Festuca rubra L.	red fescue
Fragaria chiloensis (L.) Duchesne	coast strawberry
Galium triflorum Michx.	sweetscented bedstraw
Garrya elliptica Dougl.	silk tassel bush
Gaultheria shallon Pursh	salal
Gentiana sceptrum Griseb.	staff gentian
Geranium spp.	geranium
Gnaphalium spp.	cudweed
Gnaphalium purpureum L.	purple cudweed
Holcus lanatus L.	common velvetgrass
Hypericum anagalloides C. & S.	bog St. Johnswort
Hypochaeris radicata L.	spotted catsear
Iris douglasiana Herb.	Douglas' iris
Juncus effusus L.	common rush
Juniperus communis L.	common juniper
Lathyrus spp.	peavine
Ledum glandulosum Nutt.	mountain Labrador tea
Lilium spp.	lily
Lilium occidentale Purdy	western lily
Lotus crassifolius (Benth.) Greene	thick-leaved lotus
Luzula campestris (L.) DC.	field woodrush
Lycopodium clavatum L.	elk-moss
Lysichitum americanum Hult. & St. John	skunkcabbage
Maianthemum dilatatum (Wood) Nels. & Macbr.	false lily-of-the-valley
Marah oreganus (T. & G.) How.	Oregon wild cucumber
Myrica californica Cham.	waxmyrtle
Panicum occidentale Scribn.	western witchgrass
Phalaris arundinacea L.	reed canarygrass
Picea sitchensis (Bong.) Carr.	Sitka spruce
Pinus contorta Dougl. ex Loud.	lodgepole pine
Plantago lanceolata L.	English plantain
Plantago major L.	common plantain
Plantago maritima L. spp. juncoides (Lam.) Hult.	seaside plantain
Poa annua L.	annual bluegrass
Poa pratensis L.	Kentucky bluegrass
Polygonum paronychia Cham. & Schlect.	nailwort knotweed
Polypodium scouleri Hook. & Grev.	Scouler's polypody
Polysticum munitum (Kaulf.) Presl	swordfern
Pseudotsuga menziesii (Mirb.) Franco	Douglas-fir
Pteridium aquilinum (L.) Kuhn	bracken fern
Ranunculus spp.	buttercup
Ranunculus acris L.	meadow buttercup
Ranunculus californicus Benth.	California buttercup
Ranunculus flammula L.	smaller creeping buttercup
Rhododendron macrophyllum G.Don	Pacific rhododendron
Rubus spp.	blackberry
Rubus parviflorus Nutt.	thimbleberry
Rubus spectabilis Pursh	salmonberry
Rubus ursinus Cham. & Schlect.	trailing blackberry
Rumex acetosella L.	sheep sorrel

Scientific Name	Common Name
Sanguisorba menziesii Rydb.	Menzies' burnet
Satureja douglasii (Benth.) Briq.	yerba buena
Senecio jacobaea L.	tansy ragwort
Sherardia arvensis L.	bluefield madder
Sisyrinchium californicum (Ker-Gawl.) Dryand.	golden-eyed grass
Sphagnum	
Trientalis latifolia Hook.	starflower
Trifolium wormskjoldii Lehm.	springbank clover
Tsuga heterophylla (Raf.) Sarg.	western hemlock
Vaccinium ovatum Pursh	evergreen huckleberry
Vaccinium uliginosum L.	bog huckleberry
Veronica scutellata L.	marsh speedwell
Viola adunca Smith	western long-spurred violet
Viola howellii Gray	Howell's violet
Viola sempervirens Greene	evergreen violet
Xerophyllum tenax (Pursh) Nutt.	common beargrass

APPENDIX 6

Tentative List of Terrestrial Animals in the Proposed

Blacklock Point Natural Area Preserve

This list together with footnotes was prepared by Chris Maser based on field examination and knowledge of the fauna of the area.

Order	Scientific Name	Common Name
	CLASS MAMMALIA	
Insectivora	Neurotrichus gibbsii*	Shrew-mole
	Scapanus orarius *	Coast mole
	Sorex pacificus	Pacific shrew
	Sorex trowbridgii *	Trowbridge shrew
	Sorex vagrans	Wandering shrew
Chiroptera	Eptesicus fuscus	Big brown bat
	Lasionycteris noctivagans	Silver-haired bat
	Lasiurus cinereus	Hoary bat
	Myotis californicus *	California myotis
	Myotis evotis	Long-eared myotis
	Myotis lucifugus *	Little brown myotis
	Myotis thysanodes	Fringed myotis
	Myotis volans *	Long-legged myotis
	Myotis yumanensis	Yuma myotis
	Plecotus townsendi	Townsend big-eared bat
Lagomorpha	Sylvilagus bachmani *	Brush rabbit
Rodentia	Clethrionomys californicus	California red-backed vole
	Erethizon dorsatum	Porcupine
	Eutamias townsendi *	Townsend chipmunk
	Microtus oregoni	Oregon vole
	Microtus townsendi	Townsend vole
	Peromyscus maniculatus *	Deer mouse
	Spermophilus beecheyi	California ground squirrel
	Tamiasciurus douglasii *	Chickaree
	Zapus trinotatus	Pacific jumping mouse
Carnivora	Lynx rufus	Bobcat
	Mephitis mephitis	Striped skunk
	Mustela erminea	Short-tailed weasel
	Mustela frenata	Long-tailed weasel
	Procyon lotor	Raccoon
	Spilogale putorius	Spotted skunk
	Urocyon cinereoargenteus	Gray fox
Artiodactyla	Odocoileus hemionus columbianus *	Black-tailed deer
	CLASS AMPHIBIA	
Salientia	Hyla regilla	Pacific treefrog

Caudata	Aneides ferreus	Clouded salamander
	Ensatina eschscholtzii	Oregon salamander
	Taricha granulosa	Rough-skinned newt
	CLASS REPTILIA	
Squamata	Gerrhonotus coeruleus	Northern alligator lizard
Serpentes	Thamnophis ordinoides	Northwestern garter snake

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* Known to be in the Blacklock Point NAP candidate

APPENDIX 7

Tentative List of Birds in the Proposed Blacklock Point Natural Area Preserve

This list was prepared by Chris Maser.

Order	Scientific Name	Common Name
Falconiformes	Accipter cooperi	Cooper's hawk
	Buteo jamaicensis	Red-tailed hawk
	Cathartes aura	Turkey vulture
Strigiformes	Aegolius acadicus	Saw-whet owl
	Bubo virginianus	Great horned owl
Apodiformes	Selasphorus rufus	Rufous hummingbird
Piciformes	Colaptes cafer	Red-shafter flicker
	Dendrocopos pubescens	Downy woodpecker
	Dendrocopos villosus	Hairy woodpecker
	Dryocopus pileatus	Pileated woodpecker
Passeriformes	Certhia familiaris	Brown creeper
	Chamaea fasciata	Wrentit
	Chordeiles minor	Common nighthawk
	Cyanocitta stelleri	Steller's jay
	Hylocichla guttata	Hermit thrush
	Hylocichla ustulata	Swainson's thrush
	Ixoreus naevius	Varied thrush
	Junco oregonus	Oregon junco
	Melospiza melodia	Song sparrow
	Nuttallornis borealis	Olive-sided flycatcher
	Parus rufescens	Chestnut-backed chickadee
	Sitta canadensis	Red-breasted nuthatch
	Tachycineta thalassina	Violet-green swallow
	Troglodytes troglodytes	Winter wren
	Turdus migratorius	Robin

APPENDIX 8

Deed to Board of Aeronautics Easement

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ORIGINAL

File 10688

DEED

KNOW ALL MEN BY THESE PRESENTS, That the STATE OF OREGON, by and through its STATE HIGHWAY COMMISSION, hereinafter called "Grantor", for and in consideration of public benefits to be derived, hereby conveys unto STATE OF OREGON, by and through its BOARD OF AERONAUTICS, hereinafter called "Grantee", its title to and rights in the following described property, only so long as used for public airport purposes, to wit:

PARCEL 1

A parcel of land lying in Sections 30 and 31, Township 31 South, Range 15 West, W.M., Curry County, Oregon; the said parcel being described as follows:

Beginning at a point West 414.63 feet from the Southeast corner of said Section 30; thence North 21° West 4540.93 feet; thence South 69° West 1000 feet; thence South 21° East 1750 feet; thence South 69° West 500 feet; thence South 21° East 1950 feet; thence North 69° East 366 feet, more or less, to the East right of way line of the airport access road (County Road No. 160); thence Southerly along said East right of way line of the airport access road 1750 feet, more or less, to the South line of the N½NE¼ of said Section 31; thence East along said South line to the Southeast corner of the NE¼NE¼ of said Section 31; thence North 0° 10' East along the East line of said Section 31, a distance of 320 feet, more or less, to a point South 21° East of the point of beginning; thence North 21° West 1060 feet, more or less, to the point of beginning.

EXCEPT therefrom that portion lying within the E½SE¼ of said Section 30 and within the NE¼NE¼ of said Section 31, leaving a net area of 102 acres, more or less.

Grantor does hereby further grant unto Grantee a permanent and assignable easement for the free and unobstructed passage of aircraft in, through and across the airspace above the hereinafter defined glide angle plane, over the following described property, to wit:

PARCEL 2

A parcel of land lying in the S½ of Section 19 and in the W½NE¼ and the NW¼ of Section 30, Township 31 South, Range 15 West, W.M., Curry County, Oregon; the said parcel being described as follows:

Beginning at the Southeast corner of said Section 30; thence West along the South line of said Section 30, a distance of 414.63 feet; thence North 21° West 4540.93 feet to the true point of beginning; thence continuing North 21° West 2000 feet; thence South 69° West 1000 feet; thence South 21° East 2000 feet; thence North 69° East 1000 feet to the true point of beginning, containing 45.91 acres.

Grantor, for its successors and assigns, does hereby covenant and agree with Grantee, that, for the benefit of the public in its use of the Curry County Airport, it will not hereafter erect, or permit the erection of any structure or other object extending into or above said glide angle plane, and the easement rights hereby granted shall include the continuing right in Grantee to clear and keep clear the above-described easement area of any and all obstructions, including trees, which infringe upon or extend into or above said glide angle plane.

Said glide angle plane is defined as that airspace directly above said easement area and above the following elevation: Beginning at the Southerly boundary of said

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File 10688

easement area and at an elevation equal to the elevation of the end of the established airport runway; thence Northerly a distance of 200 feet at a 0.0% grade; thence rising at a 20:1 slope for a distance of 1800 feet to the Northerly boundary of said easement area.

This conveyance is made, executed and delivered upon the grounds and for the reason that the real property hereinabove described is no longer needed, required or useful for state highway, scenic or park purposes.

Dated this 26th day of April, 1971.

ATTEST:

Secretary

APPROVED:

Assistant State Highway Engineer

APPROVED AS TO FORM:

Chief Counsel

Parks Superintendent

STATE OF OREGON, by and through its STATE HIGHWAY COMMISSION

By
Chairman

By
Commissioner

By
Commissioner

STATE OF OREGON, County of Marion

On this 26th day of April, 1971, before me personally appeared Glenn L. Jackson, Chairman of the Oregon State Highway Commission, Fred W. Hill and ~~Thaddeus B. Brumo~~, Oregon State Highway Commissioners, who each being duly sworn, stated that this instrument was voluntarily signed and sealed on behalf of the State of Oregon by said Commission.

Notary Public for Oregon

My Commission expires 11-5-74

tk/kz

INDEXED IN DEEDS

State of Oregon } ss.
County of Curry }

I hereby certify that the within instrument was filed for record April 26, 1971 at 9:15 o'clock A M. and recorded in Book of Records Vol. 19 Page 332-333

BERNARD L MATHER, County Clerk

Deputy

Fee Rec'd.

Return To: State Hwy. Comm.
Rm 114, St Hwy Bldg.
Salem, Ore. 97310

APPENDIX 9

Coast Guard Telephone Line Easement

E 13—2M—3-45

10/20/45

Permit No. .....

Oregon State Highway Commission

PERMIT Not in National Forest

To Construct a Telephone Pole Line Upon a State ~~Highway~~ PARK

WHEREAS, the U. S. Coast Guard of Port Angeles, ~~Washington~~ Oregon has made application under the provisions of section 6005, Oregon Laws, as amended by chapter 102, General Laws of Oregon 1923, for a designation by the Oregon State Highway Commission of a location for the construction, operation and maintenance of ~~poles~~ telephone poles and fixtures of said U. S. Coast Guard upon and ~~across~~ the Humbug State ~~/~~ Park in ~~sided the~~ ~~Highway~~ northern Curry County, Oregon, ~~between~~ and located near the Pacific Coast line north of Sixes River and south of ~~and~~ Floras Lake in Sections 18, 19, 30 and 31, T. 31 S., R. 15 W., W.M. and more particularly described as being ~~between Mile Post No.~~ (engineer's sta. ~~and Mile Post No.~~ (engineer's sta. ~~)~~ as shown on the blueprint map which is attached hereto and is hereby made a part hereof; and

WHEREAS, the said application having been duly considered by the State Highway Commission, the said U. S. Coast Guard is hereby directed to locate, install and place its said pole line on the said Humbug State Park in accordance with the ~~/~~ ~~Highway~~ following:

~~Said~~ pole line shall be constructed across said Humbug State Park within the confines of a strip forty (40) feet in width whose center line (as indicated on the attached map) is described as follows:

Beginning on the north line of lot 3, Section 18, approximately 1000 feet west of the east line of Section 18; thence southwesterly 4200 feet more or less parallel to the coast line of U. S. Coast Guard telephone line station 0+00, 150 feet north of the south line of Section 18 and approximately 2900 feet west of the east line of said Section 18; thence 3735 feet in a southerly direction through a point on the north boundary of the Curry County airport, 666 feet east of the northwest corner of said airport, thence southwesterly 3044 feet to a point on the west boundary of said airport, approximately 1405 feet south of the north line of Section 30, thence approximately 5555 feet in a southerly direction to station 135+94 on the south boundary of the State Park 1405 feet east of the west line of Section 31.

This permit is granted to cover only such sections of the above described pole line as lie within the confines of the said State Park and shall not be interpreted as including any installations on private property.

Only round poles of substantial character shall be used and the line shall be well graded and constructed in a neat and workmanlike manner to the satisfaction of the State Highway Engineer or his authorized representative.

It is strictly forbidden to cut or trim trees or shrubs growing on the highway right of ~~way~~ unless and until written permission and instructions to do so have first been obtained from the State Highway Engineer or his authorized representative.

(Continued on reverse side)

APPENDIX 10

Correspondence Concerning Board of Aeronautics Easement

ROBERT W. STRAUB
GOVERNOR

State of Oregon Aeronautics Division

3040 25th STREET S.E., SALEM, OREGON 97310 PHONE 378-4880

November 8, 1977

Mr. Bob Martin
Natural Area Preserve Advisory Committee
Wilkinson Hall
Oregon State University
Corvallis, OR 97330

Dear Mr. Martin:

In reference to your phone conversation of November 2, 1977, I am enclosing a copy of the deed and clear zone easement from the Oregon State Highway Commission to the Board of Aeronautics.

The present easement is for a 20:1 approach surface. In the future, if the use of the airport increases, the Aeronautics Division could request lowering of the approach surface to 50:1.

If we can be of further assistance, please contact us.

Sincerely,

PAUL E. BURKET,
Aeronautics Administrator

Thomas W. Robertson,
Airports Maintenance Supervisor

sh

NATURAL AREA PRESERVES ADVISORY COMMITTEE

GOALS

1. Cooperate in developing a coordinated program of preserving representative samples of Oregon's typical and unique ecosystem types or natural features by dedicating natural area preserves on public lands.

2. Provide educational and research opportunities in Oregon through access to natural area preserves as basic resources.

3. Compile and periodically update a comprehensive list of natural area locations in Oregon, and maintain a list of natural area preserves needs.

4. Assure perpetual protection to dedicated natural area preserves and maintain preserves in as nearly a natural condition as possible.

5. Encourage the establishment of natural area preserves on qualified areas that appropriate local governments, resource agencies or citizens recommend to the State Land Board and advisory committee.

6. Recommend natural area preserves in suitable locations throughout the state, including those within and near Oregon's population centers.

7. Publish and disseminate appropriate information about natural area preserves.