SIGNATURE PAGE for RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Adorni Research Natural Area
Six Rivers National Forest
Humboldt County, California

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly identified in accordance with FSM 4063.21, Mapping and Recordation and FSM 4063.41 5. e(3) in arriving at this recommendation.

Prepared by ________________________________ Date __________________
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Recommended by ________________________________ Date __________________
JON MARTIN, District Ranger, Orleans Ranger District

Recommended by ________________________________ Date __________________
GEORGE A. LOTTRITZ, Acting Forest Supervisor,
Six Rivers National Forest

Concurrence of ________________________________ Date __________________
HAL SALWASSER, Station Director, Pacific Southwest Research Station

Established by ________________________________ Date __________________
G. LYNN SPRAGUE, Regional Forester, Pacific Southwest Region
Establishment Record for
Adorni Research Natural Area
within Six Rivers National Forest
Humboldt County, California
Adorni Research Natural Area

MAPS

MAP 1: Location and Boundaries
MAP 2: Access
MAP 3: Vegetation Types
A. INTRODUCTION

The Research Natural Area (RNA) system is a national network of ecological areas designated in perpetuity for research and education, and to maintain biological diversity on the Forest Service and other public lands. Only non-manipulative research, observation, and study are allowed in the RNAs. RNAs include a representative array of widespread ecosystem types as well as unique ecosystems. There are more than 300 RNAs already established in the nation.

In California, the selection of candidate RNAs on National Forest lands is based on the identification of "target elements". These target elements include plant communities described in various ecological reference works (e.g., Kuchler 1966, Eyre 1980, Holland 1986), and unique ecosystems (such as aquatic and geologically unusual areas). The intention is to accurately reflect the natural diversity of vegetation types on Forest Service lands in California and lead to the long term study of each.

Most RNAs contain a far greater diversity of vegetation types than just the designated target elements and their representation within the RNA is of equal importance. For an overview of California's RNA, please refer to Keeler-Wolf (1990b), "Ecological Surveys of Forest Service Research Natural Areas in California" (U.S.D.A. Forest Service General Technical Report PSW-125).

The Adorni Research Natural Area (ARNA) is located on the Orleans Ranger District, Six Rivers National Forest in Humboldt County, California. It is approximately 3 air miles (4.8 km) north of Weitchpec, 9 air miles (14.5 km) southwest of Orleans.

ARNA was nominated by the Six Rivers National Forest in September 1977 for its representative Port-Orford-cedar (Chamaecyparis lawsoniana) in the Klamath Mountains Province. A reconnaissance was made in 1978 (Horton and Ward 1978) and an Ecological Survey of the area was completed three years later (Sawyer 1981). Keeler-Wolf prepared a draft Establishment Record in 1990. However, the establishment of ARNA was halted pending the finalized Six Rivers National Forest Land and Resource Management Plan (LRMP).

In 1965 a salvage logging operation was conducted in the western part of the RNA to remove windthrown trees (Horton and Ward 1978, Appendix A). Discussion of the presence of skid trails, slash piles, and other typical residual effects of logging operations were mentioned by Sawyer (1981) and Horton and Ward (1978). However, this area was surveyed in 1988 and no noticeable effects of the operation remained in the RNA as it is now defined (Keelr-Wolf 1990a). In the 1970's clear-cutting occurred in two blocks within one mile distance to the western boundary of the RNA (Appendix B).

The ARNA lies entirely on lands managed by the Six Rivers National Forest, which is the sole administrator of this RNA. Surrounding the ARNA are Forest Service lands except the area (Sections 35 and 36, T10N, R4E, Humboldt Base and Meridian [HBM]) south of the RNA (Map 1). Forest Service lands on the north, east and west are within Special Habitat Management Area. Management directions for these areas are included in Appendix C.
The Forest Service had no interest in or intent to acquire the private land abutting ARNA on the south. Border to the private land is approximately 1.15 miles (1.85 km) long. Another block of private land (Cooper Ranch) is located approximately 0.23 mile (0.38 km) to the north of the RNA. It doesn't share boundaries with the RNA (Map 2) and is currently under the Forest Plan's Land Adjustment Strategy Category 0-1 (acquire recreational access land and lands that facilitate resource management). However, there are no current proposals for acquiring any land in the area.

(1) Land Management Planning

The establishment of Adorni RNA is recommended and evaluated in the Six Rivers National Forest LRMP and the Final Environmental Impact Statement and Appendices for the LRMP (U.S.D.A. Forest Service 1995a-c) (Appendix C, D). The land allocation for the Adorni RNA (ARNA) was decided by the signing of the Record of Decision (ROD) for the LRMP by the Regional Forester (1995). The establishment of the RNA will be completed by the signing of this Establishment Record with concurrence of the Station Director. The ARNA is part of Management Area 5 which emphasizes the maintenance of values for which the RNA was established (Appendix C).

B. OBJECTIVES

The ARNA is established to represent the Port Orford-cedar type (Society of American Foresters [SAF] type 231, Eyre 1980) for the Klamath Mountains Province of the Pacific Southwest (PSW) Region (Appendix E).

In addition to the primary objective of establishing a reserve for the Port-Orford-cedar (POC) and associated vegetation types in the Klamath Mountains Province, many of the additional objectives of establishing RNAs outlined in FSM (Forest Service Manual) 4063.02 are met for this target element at ARNA. These include preserving genetic diversity of POC (as well as many other species), protecting against serious environmental disruptions, acting as a reference area for the study of succession, providing on site educational activities, acting as a baseline area for measuring long-term ecological changes, and acting as a control area for comparing results from manipulative research.

C. JUSTIFICATION STATEMENT

This is the second RNA recommended for establishment by the PSW Region for the target element of POC. The first (Cedar Basin on the Shasta-Trinity National Forests) represents a high elevation, interior form of the target element with substantially different associated vegetation and soil conditions (Keeler-Wolf 1982, 1989). Another candidate RNA on the Six Rivers National Forest, L.E. Horton, contains some POC, but is not being used to represent the target element and does not contain stands as extensive or diverse as in ARNA or Cedar Basin (Keeler-Wolf 1986, Martin 1990).
Two other candidate RNAs in the Klamath Mountains Province of the PSW Region have POC. These are Upper Goose Creek in Six Rivers National Forest and Rock Creek Butte in Klamath National Forest. The latter area has a very limited amount, but Upper Goose Creek has well-developed semi-riparian stands. Upper Goose Creek is not currently being considered as a POC target (U.S.D.A. Forest Service 1995b, Appendix D), and represents a different set of climatic and environmental conditions than does the ARNA.

The POC forest type occurs only in the Klamath and adjacent Coast Range Province of southern Oregon and California. It is naturally restricted to moist or wet sites (Zobel and Hawk 1980) and is severely threatened by an introduced plant pathogen, the root disease (Phytophthora lateralis). This non-native fungus has spread rapidly in the past 50 years and has infected many low-lying stands of POC in Oregon and California. It is especially insidious because it is water-borne, easily transported in mud on fenders of trucks and cars, and there is no known natural resistance in POC populations (C. Millar, PSW geneticist, pers. comm. 1990). Two of the POC RNAs established in the Pacific Northwest Region (Coquille Falls and Port Orford Cedar) have already been infected and have lost many trees.

POC is a valuable timber tree. Its wood is light, strong, rot resistant and shrinks and swells little when dried or soaked. It is used to make arrow shafts in the United States and is a top quality construction lumber with special spiritual values in Japan. A large POC can bring a higher price than any other conifer in the Pacific States (Norse 1990).

The northwestern portion of ARNA occupies a relatively undisturbed drainage with an exceptional representation of the target element. The south and east parts of the RNA contain large areas of POC stands, which are, however, vulnerable to the introduction of root disease, due to its proximity to private lands. Inclusion of these areas intends to protect the valuable POC stands and to provide buffer for the POC stands in the northwestern part of the RNA, even though challenges on the control of private accesses will be placed on the management of the RNA.

In addition to the target element the ARNA contains well developed Douglas-fir (Pseudotsuga menziesii)/hardwood forests with exceptionally large tanoak (Lithocarpus densiflorus) up to 4 ft (1.2 m) diameter at breast height (dbh) and 170 ft (52 m) tall. Also contained within the RNA are two species in the lily family listed by the California Native Plant Society (CNPS) as limited in distribution (List 4) (Skinner and Pavlik 1994). These are Erythronium citrinum and Lilium rubescens.

D. PRINCIPAL DISTINGUISHING FEATURES

The ARNA occupies a large portion of the Aikens Creek drainage, a second-order tributary of the Klamath River in the western Klamath Mountains Province. Slopes are primarily northeast facing and are steep and prone to slumping. The area is on the boundary between ultramafic (peridotite) and metasedimentary schistose rock, and contains both types. The entire RNA is forested, with no openings, save a few recent and rapidly colonizing slides.
The most distinctive feature of the area is its stands of POC. As is usual for the species it occurs as small stands in moist or mesic concavities and lines small stream courses. However, these small stands are densely packed, interspersed within a matrix of mesic Douglas-fir/hardwood forest. Port-Orford-cedar is estimated to cover about 209 acres (84.6 ha), or 30 percent of the RNA. Individual trees may attain dbhs of 5 ft (1.5 m) and heights of at least 160 ft (49 m).

The POC at ARNA occurs primarily on metasedimentary and not ultramafic parent material. A characteristic trait of the coastal populations of the tree in extreme northwestern California and southwestern Oregon is its occurrence on several varied soil types. Conversely, the inland populations as represented at the aforementioned Cedar Basin RNA, are strongly restricted to serpentinite and other ultramafics (Griffin and Critchfield 1976).

Within the ARNA vegetation varies over moisture and elevation gradients and also between ultramafic and metasedimentary parent materials. Upper slopes on eastward and southeast-facing slopes are covered with mixed evergreen forest dominated by Douglas-fir, tanoak, and Pacific madrone (Arbutus menziesii). The understory is relatively open. On ultramafic terrain the upper slope forests tend to be dominated by canyon live oak (Quercus chrysolepis) and tanoak with understories dominated by beargrass (Xerophyllum tenax). At lower elevations and on northeast exposures POC becomes common in slump areas and moist sites and the understory becomes choked with California huckleberry (Vaccinium ovatum), making for difficult travel. The most extensive and highest density POC stands occur on mid-elevation slopes with north-northeast exposures associated with slumps and streams.

No Federal, State, and Forest Service listed sensitive, threatened, or endangered plants are known from the ARNA. However, two species are considered by the CNPS (Skinner and Pavlik 1994) as plants of limited distribution (CNPS List 4). These species were found during the ecological survey (Sawyer 1981).

E. LOCATION

(1) National Forests Involved

The ARNA is located entirely on the Orleans Ranger District, Six Rivers National Forest. No other National Forest System lands are involved.

(2) Latitude and Longitude

The approximate mean latitude and longitude at the center of the area is 41°14'N, 123°40'W.

(3) Boundary Description (Map 1)
The ARNA is on land managed by the Six Rivers National Forest in Sections 25 and 26 T10N, R4E, HBM.

More specifically as follows:

(a) Beginning at the southeastern corner of Sec. 26 T10N, R4E (point a); thence westwardly in a direct line following the southern section line of section 26 for 0.5 mile (0.8 km) to the midpoint of the section line (point b; 41°13'19"N, 123°41'14"W);

(b) thence northwardly in a direct line for approximately 0.85 mile (1.37 km) to a point approximately 945 ft (288.2 m) south of the Sec. 26's northern section line (point c; 41°14'02"N, 123°41'16"W) (this point is also the approximate edge of a clearcut block logged in the mid-1970's);

(c) thence northeastwardly (N44°E) in a direct line, following said edge of the clearcut for approximately 1260 ft (384.3 m) to the point where Sec. 26's northern section line is met (point d; 41°14'11 1/2"N, 123°41'04 1/2"W);

(d) thence, eastwardly in a direct line, along said section line for approximately 1182 ft (360.3 m) to the crest of a small southeast-trending ridge (point e; 41°14'12"N, 123°40'49"W);

(e) thence southeastwardly (S41 1/2°E) in a direct line, which is kept 150 ft (45.7 m) away from the switchback of Road 13N01, for approximately 0.42 miles (0.68 km) to the creekbed of the main branch of Aikens Creek in NW 1/4 Sec. 25 T10N, R4E (point f; 41°14'00"N, 123°40'34 1/2"W);

(f) thence east-southeastwardly (S67°E) in a direct line, which is partially following the creekbed and is kept 150 ft (45.7 m) apart from the south side of the roadbed of Road 13N01, for approximately 1 mile (1.61 km) to a point where the eastern section line of Sec. 25 is met (point g; 41°13'38"N, 123°39'32"W); the point is also atop a minor ridge;

(g) thence southwestwardly (S44°W) in a direct line, ascending the crest of said ridge for approximately 0.56 miles (0.90 km) to a point near the top of a small knoll along the line dividing Secs. 25 and 36 (point h; 41°13'20"N, 123°39'50 1/2"W);

(h) thence westwardly along the said section line for approximately 0.65 miles (1.05 km) to the southeast corner of Sec. 26, the point of beginning.

An official boundary description made by licensed land surveyor is included in Appendix F.

(4) Acreage

The total acreage of the ARNA as described above is 700 (283.3 ha).
(5) Elevation

Elevations in the ARNA range from approximately 620 feet (189 m) at the easternmost point of the area to approximately 2580 feet (786 m) at the southwestern corner. This represents an elevation range of about 1960 feet (597 m).

(6) Access (Map 1 & 2)

Access to the ARNA is possible from State Route 96 (Klamath River Highway) via the following routes:

(a) Access to the eastern portion of the RNA:

From Orleans (Orleans Ranger Station) drive south on Highway 96 for approximately 11 miles (17.7 km) to the junction with Forest Road 13N01. Turn right on 13N01 and drive about 1 mile (1.6 km) to the Aikens Creek bridge where there is a small turn-out (enough space for two cars). The RNA is directly up hill from the road on the south side of this bridge. This route provides access to the lower elevation eastern portion of the RNA. Driving time from the Ranger Station to this site is about 20 minutes.

(b) Access to the western portion of the RNA:

Access to the upper elevations may be had by continuing on Forest Road 13N01 beyond the Aikens Creek bridge.

The northwestern corner of the RNA may be reached by following 13N01 approximately 4 miles (6.4 km) to the junction of Forest Road 10N41, thence following 10N41 for approximately one mile (1.6 km) to the logging spur 10N41A. This spur ends shortly in a clear-cut unit logged in the late 1970's at the edge of the RNA.

The western and southwestern portions of the RNA may be reached by continuing on 10N41 about 4 miles (6.4 km) to its end in an overgrown clear-cut in the SW1/4 Sec 26. From this point it is possible to descend along the periphery of the cut about 400 yards (366 m) to the edge of the RNA. Distance from Highway 96 to the end of 10N41 is approximately 10.5 miles (16.9 km) and travel time is about 40 minutes.

Travel within the RNA is difficult, particularly at the lower elevations, as a result of the steep terrain and the very dense understory of huckleberry and other shrubs. Travel within the eastern portion of Sec. 26 is easier than in most of Sec. 25. Travel in the area of best development of the target vegetation is often extremely difficult and much time is required to cover relatively short distances.

F. AREA BY COVER TYPES (with code numbers)
### VEGETATION TYPE

#### SAF TYPES (Eyre 1980):

<table>
<thead>
<tr>
<th>Type</th>
<th>Percent</th>
<th>Acres</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Orford-Cedar (231)</td>
<td>29.8</td>
<td>209</td>
<td>84.6</td>
</tr>
<tr>
<td>Douglas-fir-Tanoak-Pacific Madrone (234)</td>
<td>70.2</td>
<td>491</td>
<td>198.7</td>
</tr>
<tr>
<td>Unclassified</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>100.0</strong></td>
<td><strong>700</strong></td>
<td><strong>283.3</strong></td>
</tr>
</tbody>
</table>

#### KUCHLER TYPES (Kuchler 1966):

<table>
<thead>
<tr>
<th>Type</th>
<th>Percent</th>
<th>Acres</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spruce-Cedar-Hemlock (1)</td>
<td>29.8</td>
<td>209</td>
<td>84.6</td>
</tr>
<tr>
<td>California Mixed Evergreen (25)</td>
<td>70.2</td>
<td>491</td>
<td>198.7</td>
</tr>
<tr>
<td>Unclassified</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>100.0</strong></td>
<td><strong>700</strong></td>
<td><strong>283.3</strong></td>
</tr>
</tbody>
</table>

#### HOLLAND TYPES (Holland 1986):

<table>
<thead>
<tr>
<th>Type</th>
<th>Percent</th>
<th>Acres</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Evergreen Forest (81100)</td>
<td>41.1</td>
<td>288</td>
<td>116.6</td>
</tr>
<tr>
<td>Tan-Oak Forest (81400)</td>
<td>29.1</td>
<td>203</td>
<td>82.1</td>
</tr>
<tr>
<td>Unclassified</td>
<td>29.8</td>
<td>209</td>
<td>84.6</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>100.0</strong></td>
<td><strong>700</strong></td>
<td><strong>283.3</strong></td>
</tr>
</tbody>
</table>

### G. PHYSICAL AND CLIMATIC CONDITIONS

Aikens Creek drains an area of a little over 3 square miles (7.8 km²) on the eastern side of Burrill Peak (4349 ft [1325.6 m]) just 3 miles (4.8 km) north of the junction of the Trinity and Klamath Rivers. The ARNA occupies a large portion of the middle of the Aikens Creek drainage. The upper (western) portion of the drainage is dominated by ultramafic rocks of the Josephine Peridotite sheet (Irwin 1981). The eastern portion of the drainage is underlain by Mesozoic metasediments of the Galice Formation. Within the RNA both types of rocks are present with the Galice Formation predominating.

The Galice Formation is prone to slumping (Scott et al. 1980) and numerous ancient and recent land slips are present in the ARNA. These vary in size from 50 feet (15.2 m) to several hundred feet across and are marked by a steep headwall and often a relatively flat bench which may have a spring or moist depression associated with it.

The relatively high precipitation in the area is estimated to average between 70 and 80 inches (1778-2032 mm) annually (Rantz 1972). Although no temperature or precipitation records exist for the RNA, the nearest recording stations (Orleans and Weitchpec) offer a reasonable approximation of the climate at ARNA. This is particularly true for Weitchpec where the recording station is only about 3 miles (4.8 km) south of the RNA and at a similar elevation. Data from these stations are summarized in the following table (based on information in Rocky et al. 1966).
Table 1: Climatic data from stations nearby the Adorni Research Natural Area.

<table>
<thead>
<tr>
<th></th>
<th>Orleans</th>
<th>Weitchpec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>403 ft (123 m)</td>
<td>1700 ft (518 m)</td>
</tr>
<tr>
<td>Temperature [°F (°C)]:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>highest</td>
<td>113.0 (45.0)</td>
<td>102.0 (38.9)</td>
</tr>
<tr>
<td>mean maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>94.0 (34.4)</td>
<td>83.5 (28.6)</td>
</tr>
<tr>
<td>January</td>
<td>49.9 (9.9)</td>
<td>45.0 (7.2)</td>
</tr>
<tr>
<td>year</td>
<td>71.1 (21.7)</td>
<td>64.5 (18.1)</td>
</tr>
<tr>
<td>mean temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>72.9 (22.7)</td>
<td>67.6 (19.8)</td>
</tr>
<tr>
<td>January</td>
<td>42.0 (5.6)</td>
<td>38.0 (3.3)</td>
</tr>
<tr>
<td>year</td>
<td>56.9 (13.8)</td>
<td>52.4 (11.3)</td>
</tr>
<tr>
<td>mean minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>51.8 (11.0)</td>
<td>51.7 (10.9)</td>
</tr>
<tr>
<td>January</td>
<td>34.1 (1.2)</td>
<td>30.9 (-0.6)</td>
</tr>
<tr>
<td>year</td>
<td>42.6 (5.9)</td>
<td>40.2 (4.6)</td>
</tr>
<tr>
<td>lowest</td>
<td>15.0 (-9.4)</td>
<td>16.0 (-8.9)</td>
</tr>
<tr>
<td>Precipitation [inches (mm)]:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>0.24 (6.1)</td>
<td>0.59 (14.9)</td>
</tr>
<tr>
<td>August</td>
<td>0.08 (2.0)</td>
<td>0.06 (1.5)</td>
</tr>
<tr>
<td>September</td>
<td>0.87 (22.1)</td>
<td>2.12 (53.9)</td>
</tr>
<tr>
<td>October</td>
<td>3.76 (95.5)</td>
<td>3.76 (95.5)</td>
</tr>
<tr>
<td>November</td>
<td>6.53 (165.8)</td>
<td>12.78 (324.6)</td>
</tr>
<tr>
<td>December</td>
<td>9.79 (248.7)</td>
<td>11.30 (287.0)</td>
</tr>
<tr>
<td>January</td>
<td>9.76 (247.9)</td>
<td>16.30 (414.0)</td>
</tr>
<tr>
<td>February</td>
<td>7.39 (187.7)</td>
<td>10.47 (265.9)</td>
</tr>
<tr>
<td>March</td>
<td>6.25 (158.8)</td>
<td>5.77 (146.6)</td>
</tr>
<tr>
<td>April</td>
<td>3.08 (78.2)</td>
<td>5.04 (128.0)</td>
</tr>
<tr>
<td>May</td>
<td>2.50 (63.5)</td>
<td>3.79 (96.3)</td>
</tr>
<tr>
<td>June</td>
<td>0.97 (24.6)</td>
<td>1.04 (26.4)</td>
</tr>
<tr>
<td>season</td>
<td>51.22 (1301.0)</td>
<td>73.38 (1863.9)</td>
</tr>
<tr>
<td>Mean annual snowfall [inches (cm)]:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.2 (15.7)</td>
<td>51.5 (130.8)</td>
</tr>
<tr>
<td>Dry Date*:</td>
<td>July 2</td>
<td>July 16</td>
</tr>
</tbody>
</table>

*the date when stored soil moisture has been depleted in a typical year

H. VALUES
The flora of the ARNA is not particularly diverse. Appendix G lists 133 taxa of vascular plants. The explanation for the relatively low diversity lies primarily in the dense, relatively uniform cover of forest vegetation with few herb dominated sunny and moist openings. Two species known from the area are CNPS List 4 species (plants of limited distribution): Erythronium citrinum and Lilium rubescens (Skinner and Pavlik 1994). No Federal, State, or Forest Service listed sensitive or endangered species are known to occur.

The following is a brief account of the major vegetation types occurring at the ARNA. Descriptions are based upon those of Sawyer (1981). The corresponding Holland (1986), SAF (Eyre 1980), and Kuchler (1966) types are given for references.

(a) Port Orford-cedar
   SAF: 231, Port Orford-Cedar
   Kuchler: part of K1, Spruce-Cedar-Hemlock Forest
   no Holland equivalent

The target element, Port-Orford-cedar, is found in all areas of the RNA, and was not designated by Sawyer (1981) as a distinct vegetation type because of the overall dominance of Douglas-fir in most of his samples.

A different view of the vegetation based on moisture relations distinguishes a POC dominated forest of hollows, swales, and streamsides with species such as western azalea (Rhododendron occidentale) as major understory components (Keeler-Wolf 1990a). This concept is adopted in the vegetation map (Map 3) to indicate the approximate extent of the target element. However, caution should be used in interpreting the map, as the extent of POC dominated forest is based on a one day reconnaissance by Keeler-Wolf. The vegetation map (Map 3) employs the most accurate classification of the major types of vegetation in the area. Thus, the classification of Port-Orford-cedar is used for the target element, but the Holland units; mixed evergreen forest (81100), and tanoak forest (81400) are used for the remainder of the vegetation types. The area coverages of these types are noted in Section F.

(b) Douglas-fir/Goodyera oblongifolia
   SAF: 234, Douglas-fir-Tanoak-Pacific Madrone
   Holland: 81100, Mixed Evergreen Forest
   Kuchler: part of K25, California Mixed Evergreen Forest

This association is typical of the two-storied Douglas-fir-hardwood forest of the Klamath Mountains Province (Photo 1). A canopy of Douglas-fir (55 trees/acre [138 trees/ha]) and POC (44 trees/acre [109 trees/ha]) overlies a subcanopy of tanoak (80 trees/acre [198 trees/ha]), Pacific madrone (16 trees/acre [40 trees/ha]), and California bay (Umbellularia californica, 4 trees/acre [10 trees/ha]). Total basal area for this forest averages 649 ft²/acre (149 m²/ha) with Douglas-fir comprising 52%, POC 25%, and Pacific madrone 15% of the cover. All trees are reproducing in these uneven-aged stands. The dense understory is dominated by California huckleberry and patches of salal (Gaultheria shallon). Herbs include Goodyera oblongifolia,
Trillium ovatum, Oxalis oregana, Clintonia uniflora, and Hierochloe occidentalis. In all, 22 species of shrubs and 22 species of herbs are noted in the 30 relevés sampled by Sawyer.

The Douglas-fir/Goodyera oblongifolia forest has deeper and less rocky soils with steeper and more unstable slopes than the Tanoak/Rhamnus californica type. One perennially moist active slump is being colonized by white alder (Alnus rhombifolia), tanoak, Douglas-fir, and POC (Photo 2). Much of the sampled area was selectively logged in 1965. The disturbed area shows a heterogeneous mix of species depending on the degree of disturbance. Ceanothus velutinus and white alder are common with dense California huckleberry, and Douglas-fir, Pacific madrone, and tanoak reproduction. Western portion of this forest type was salvaged logged in 1965.

(c) Tanoak/Rhamnus californica

SAF: part of SAF234, Douglas-fir-Tanoak-Pacific Madrone
Holland: 81400, Tan-Oak Forest
Kuchler: part of K25, California Mixed Evergreen Forest

This is a more open forest differing primarily in structure from the previous type. Trees are in higher average density (273 trees/ac [674 trees/ha]), but in lower average basal area (283 ft²/ac [65 m²/ha]). Tanoak has the highest relative densities (35%) followed in order by Pacific madrone (22%), Douglas-fir (18%), sugar pine (Pinus lambertiana, 12%), POC (5%), and incense-cedar (Libocedrus decurrens, 5%). Douglas-fir has the highest relative cover (37%) followed by sugar pine (24%), tanoak (12%), madrone (12%), Port-Orford-cedar (10%), incense-cedar (4%), and canyon live oak (2%). This forest is less productive than the previous type with slower growing POC. The understory is more xeric than the other forest with Rhamnus californica, Arctostaphylos manzanita, Rhus diversiloba, and beargrass common (11 shrub and 18 herb species encountered on relevés) (Photo 3).

All forest types appear to be climax with compositional and structural differences related to soil depth, slope, and aspect.

(2) Fauna

The fauna of the ARNA is typical of heavily forested areas of the western Klamath Mountains Province. Large game animals such as black bear (Ursus americanus) and black-tailed deer (Odocoileus hemionus columbianus) are relatively common in the area. The Ecological Survey does not list species sighted in the area and the reconnaissance for this Establishment Record was conducted in late October, following the exodus of breeding birds. Consequently, little is known of the fauna of the area. Appendix H lists the 22 species of vertebrates detected in the RNA in late October 1988 (Keeler-Wolf 1990a). Four members of this list are indicator species in the Six Rivers National Forest LRMP, these include western gray squirrel (Sciurus griseus), Pileated woodpecker (Dryocopus pileatus), black bear, and black-tailed deer (U.S.D.A. Forest Service 1995c).
The northern spotted owl (Strix occidentalis caurina), a Federal listed threatened species, is a possible inhabitant due to the large tract of old growth forest in the lower part of the Aikens Creek drainage.

(3) Geology

The majority of the area is underlain by metamorphosed sedimentary rocks of the Upper Galice Formation, a part of the Western Jurassic Plate of the Klamath Mountains (Irwin 1981). Rocks are phyllites and schists with outcroppings of sheared black slate. The western side of the RNA has scattered outcrops and weathered soil derived from peridotite of the Josephine Peridotite sheet. Jennings et al. (1977) shows the entire RNA as part of this ultramafic complex. However, from field inspection it appears that less than half of the RNA is actually underlain by ultramafics, most of which outcrop in Sec 26. These ultramafics are largely dark greenish and massive with occasional lighter greenish-gray outcrops of serpentinized rock.

The most recent interpretation of the two major rock types in the RNA is that the Josephine Peridotite is a slice of the upper mantle or oceanic crust whose tectonic emplacement is closely related in time to the deposition of the Galice Formation in the lower or middle Jurassic, about 150 m.y. (Irwin 1981). Theories vary about which unit predates the other and their type of contact.

(4) Soils

Soils in the ARNA are considered part of three mapping units (U.S.D.A. Forest Service, Six Rivers National Forest 1982) (Fig. 1). The most extensive is the Clallam family, moderately deep, unstable, 50-70% slopes (mapping unit 215). This unit occupies unstable mountain sideslopes and is derived from sheared metasedimentary rocks and schist. This unit is the most prone to slides and slumping in the area.

The next most extensive unit is the Hugo family, moderately deep 30-40% slopes (mapping unit 271). It shares many characteristics with the previous mapping unit, but is not as excessively drained, with more gentle slopes.
Legend:
215...Clallam family, moderately deep, unstable, 50-70% slopes
271...Hugo family, moderately deep, 30-40% slopes
404...Orleans family-Weitchpec family, moderately deep-Lithic
    Haploxeralfs, ultramafic complex, 50-70% slopes

Fig. 1: Soils of Adorni Research Natural Area
(from U.S.D.A. Forest Service, Six Rivers National Forest, 1982)
The final unit mapped for the ARNA is the Orleans family-Weitchpec family, moderately deep-Lithic Haploxeralfs, ultramafic complex, 50-70% slopes (mapping unit 404). This unit is derived from serpentinized ultramafics, is shallower than the previous two units and occupies very steep mountain sideslopes. According to the soils map the unit is prevalent on the southeastern part of the RNA. However, field work for this report indicated its presence in the eastern portion of the area as well.

(5) Lands

All land within the boundaries of the ARNA is under the management of the Six Rivers National Forest. There are no private inholdings, acquisitions, or reserved lands.

Lands surrounding the RNA are not all Forest Service land. Abutting ARNA on the south is a large tract of private land. The borderline to the private land is approximately 1.15 miles (1.85 km) long. Other areas surrounding the RNA are Forest Service lands within Management Area 8 - Special Habitat (Late-Successional Reserve).

(6) Cultural

There are no known cultural or archaeological sites in the ARNA according to Forest archaeologist Tom Keter (pers. comm. October 1988). Both Yurok and Karok tribes may have occasionally used the area for hunting and gathering (Bright 1978, Pilling 1978).

I. IMPACTS/CONFLICTS

(1) Mineral Resources

The mineral development potential in the area has been classified as moderate (Appendix C); that means this RNA is included in the 242,840 acres (98276 ha) of Forest lands on at least a portion of which mineral development is expected to occur during the 50-year planning horizon.

There are no existing mining claims within the ARNA. Bureau of Land Management (BLM) microfiche geographic index shows no claims have been located in the area since claim holders were first required to send copies of location notices to BLM by the Federal Land Policy and Management Act of 1976 (Meredith Smith, Realty Specialist, Six Rivers National Forest, pers. comm. 1994, Appendix I).

Thus the impact on the mineral resource will be minimal if the ARNA is established and withdrawn from mineral entry.

(2) Grazing
The ARNA is not within any active grazing allotment. The dense forest and steep slopes preclude any grazing use. Therefore, establishment of ARNA won't have any impact on the grazing use of the Forest.

(3) Timber

In Six Rivers National Forest LRMP (1995), about 91 percent (872,217 ac [352,981 ha]) of the land is allocated to uses that exclude most land disturbance and timber management activities. Due to the small size of the ARNA, the impact of RNA establishment on the value of timber resource is minimal.

(4) Watershed Values

The unstable slopes underlain by Clallam family soils are sensitive to loss of vegetative cover. Several small perennial branches of Aikens Creek within the RNA show evidence of downcutting and slides. As an RNA, the undisturbed forest in the area will provide protection from erosion for the watershed of Aikens Creek. Although some erosion is present in the clear-cuts immediately upslope from the RNA (gullying), there is no evidence of carry-over into the RNA at the present time. However, additional logging upstream may affect the erosion rates along streams in the RNA. Any proposed timber sales within the drainage should be carefully considered not only for the effects of erosion on the RNA, but also for the threat of introducing root disease.

In 1983 a proposal was made to develop a small hydroelectric scheme on the lower part of Aikens Creek, just up-stream from the bridge in the SE 1/4 Sec. 25. This proposal is no longer being considered.

Establishment of the RNA will provide protection for the watershed and the associated plant and wildlife communities.

(5) Recreation Values

The ARNA receives very light recreational use because of the difficulty of traversing its densely vegetated, steep slopes. No evidence of any kind of recreational use was seen in the interior of the RNA. A poorly marked trail ascends the ridge along the southeastern boundary, but no regular routes occur in other parts of the RNA. Hunters may occasionally enter the area, but their impacts are minimal.

Establishment of the RNA will have no impact on the recreational use of the area.

(6) Wildlife and Plant Values
By far the most significant potential impact to the RNA's plant values is the infection of the target POC stands by the lethal root disease. Precautions have been taken to reduce the threat of introduction of the fungus in the Aikens Creek drainage. Additionally, all projects within watersheds containing POC stands will undergo a risk analysis to determine the possibility of spreading infection.

Barring infection by root disease the ARNA should continue to provide favorable conditions for the maintenance of all wildlife and plant values including the habitat for the two species of restricted plants and the several indicator species of vertebrates known from the area.

(7) Special Management Area Values

The ARNA is not within any special management or congressionally designated area. Establishment of ARNA will have no conflict with current land management.

(8) Transportation Plans

There is a propose to re-route the lower portion of Road 13N01, which runs along the border on the northeastern side of the RNA and through the Cooper Ranch (Fig. 2). Establishment of ARNA will have no impact on this plan. ARNA will benefit from this re-routing, which eliminates impacts associated with the road.

The logging spur (10N41A) which abuts the northwestern corner of the RNA is not scheduled for maintenance and is already impassible where it enters the area.

J. MANAGEMENT PRESCRIPTION

Appendix C contains management direction for the ARNA as stated in the Six Rivers National Forest LRMP (U.S.D.A. Forest Service 1995a). Within it standards and guidelines are provided.

Management of areas surrounding the ARNA should also follow the management directions for pest management (Appendix C) to prevent the spreading of Port-Orford-cedar root disease. Severe restrictions should be made to access and use of the Forest Service lands of the Upper Aikens Creek Drainage to prevent the root disease infection of the Port-Orford-cedar stands in the RNA. These include the gating and closure of all roads into the drainage upstream from the RNA during wet months when the threat of root disease spread is greatest.

Already gates were installed at the intersections of 13N01 and 10N41, 13N01 and Highway 96, which block all access roads from NFS lands adjacent to the ARNA. Remaining threat is via access from private lands on the north and south. To control access from private, Fig. 2 indicates the locations proposed for additional gating. However, approvals from private land owners, who should be advised of the root disease threat and of the RNA boundaries, are necessary prior to the installation.
Logging operations up slope from the RNA should also be strictly monitored to insure that machinery and trucks have been thoroughly cleaned if they were formerly in an infected area.

1) RNA Management Strategy

The Six Rivers National Forest will develop a specific management strategy to maintain the target element and other resource values in the best possible condition after the establishment of ARNA.

K. ADMINISTRATION RECORDS AND PROTECTION

The official responsibility for administration and protection of the ARNA is with the District Ranger, Orleans/Ukonon Ranger District, Drawer 410, Orleans, CA 95556. Attention will be given to the protection of the Port-Orford-cedar stands from root disease infestation.

The research coordinator is the Director, Pacific Southwest Research Station, 800 Buchanan Street, Albany, California 94710. This person is responsible for approving and coordinating observational or non-manipulative applied research, and maintaining a research data file.

L. ARCHIVING

The Station Director shall establish and maintain a system for archiving data and reports from Research Natural Areas in a manner that will facilitate the exchange and transfer of information among Stations, Forests, and scientists.
Ex.- Existing gate, Pro.- Proposed gate

Fig. 2: Transportation plan nearby the Adroni RNA and proposed access control to prevent the spread of Port Orford-cedar root disease
M. REFERENCES


APPENDICES

A. Map excerpted from Field Reconnaissance Report (Horton and Ward 1978)

B. Map indicating the 1975 clearcut (from correspondence on file at PSW Research Station, Berkeley)


E. Display of Target Elements and gaps for Pacific Southwest Region

F. Official boundary description for Adorni RNA.

G. Vascular plants known from Adorni Research Natural Area

H. List of Vertebrates detected in the Adorni Research Natural Area

I. Lands and Mineral Status and Uses of Adorni Research Natural Area (Smith 1994, per. comm. on file at PSW Research Station, Berkeley)
Appendix A. Map excerpted from Field Reconnaissance Report (Horton and Ward 1978)
Appendix B. Map indicating the 1975 clearcut (from correspondence on file at PSW Research Station, Berkeley)
Appendix E. Display of Target Elements and gaps for Pacific Southwest Region
Appendix F. Official boundary description for Adorni RNA
Appendix G: Vascular plants known from Adorni Research Natural Area

The following list makes up all taxa of vascular plants known from the ARNA. All but three species (identified by Keeler-Wolf [1990]) were identified in the ecological survey (Sawyer 1981). The authorities for these plants are Munz (1968) and Smith and Sawyer (1978). The list includes 133 taxa.

Acer circinatum
Acer macrophyllum
Achlys triphylla
Adiantum pedatum
Agrostis aurantiaca
Agrostis hallii
Aira praecox
Allotropa virgata
Alnus rhombifolia
Amelanchier alnifolia
Anaphalis margaretacea
Apocynum androsaemifolium
Aquilegia formosa
Aralia californica
Arbutus menziesii
Arctostaphylos columbiana
Arctostaphylos manzanita
Arctostaphylos nevadensis
Arctostaphylos viscida
Arnica cordifolia
Arnica discoidea
Aruncus vulgaris
Asarum caudatum
Aspidotus densa
Athyrium filix-femina var. californicum
Baccharis pilularis ssp. consanguinea
Boschniakia strobilacea
Bromus diandrus
Calocedrus (Libocedrus) decurrens
Calypso bulbosa ssp. occidentalis
Carex sp.
Ceanothus cuneatus
Ceanothus integerrimus
Ceanothus thyrsiflorus
Ceanothus velutinus
Centaurium venustum
Chamaecyparis lawsoniana
Chimaphila menziesii
Chimaphila umbellata var. occidentalis
Chrysolepis chrysophylla
Clintonia uniflora
Cornus nuttallii
Cornus sessilis
Cornus stolonifera
Corylus cornuta var. californica
Crataegus douglasii
Deschampsia elongata
Disporum hookeri var. trachyandrum
Elymus glaucus
Epilobium minutum
Equisetum arvense
Equisetum hymale var. robustum
Erigeron foliosus var. hartwegii
Eriophyllum lanatum
Erythronium citrinum
Festuca idahoensis
Festuca occidentalis
Fraxinus latifolia
Galium triflorum
Gaultheria shallon
Glyceria elata
Goodyera oblongifolia
Heteromeles arbutifolia
Heuchera micrantha
Hieracium albiflorum
Hierochloe occidentalis
Holcus lanatus
Holodiscus discolor
Hypericum perforatum
Hypochoeris radicata
Iris tenax
Lilium rubescens
Ligusticum apiifolium
Lithocarpus densiflorus
Lolium multiflorum
Lonicera hispidula var. vacillans
Lotus purshianus
Luzula subsessilis
Mahonia nervosa
Melica bulbosa
Microsteris gracilis
Mimulus moschatus
Montia siberica
Oxalis oregana
Petasites frigidus var. palmatus
Phacelia bolanderi
Pinus lambertiana
Piperia unalascensis
Pityrogramma triangularis
Polygala californica
Polygala cornuta
Polypodium californicum
Polystichum imbricans
Polystichum munitum
Pseudotsuga menziesii
Pteridium aquilinum var. pubescens
Pterospora andromedea
Pyrola picta
Pyrola picta forma aphylla
Quercus chrysolepis
Quercus vaccinifolia
Rhamnus californica
Rhododendron macrophyllum
Rhododendron occidentale
Rhus diversiloba
Ribes roezlili var. cruentum
Ribes sanguineum var. sanguineum
Rosa gymnocarpa
Rubus lacinatus
Rubus leucoderminis
Rubus parviflorus
Rubus procerus
Rubus vitifolius
Salix scouleriina
Silene californica
Smilacina racemosa var. amplexicaulis
Stachys rigida
Taeniatherum asperum
Taraxacum officinale
Taxus brevifolia
Tellima grandiflora
Torilis arvensis
Tridentes latifolia
Trillium ovatum
Umbellularia californica
Vaccinium ovatum
Vaccinium parviflorum
Vancouveria planipetala
Veronica americana
Viola sempervirens
Whipplea modesta
Woodwardia fimbriata
Xerophyllum tenax
Appendix H: List of vertebrates detected in the Adorni Research Natural Area

This list includes all species noted by either visual sighting or sign during the reconnaissance for the draft Establishment Record, October 30, 1988, by Todd Keelr-Wolf.

Amphibians:
Foothill Yellow-legged frog (Rana boylei)

Birds:
Band-tailed pigeon (Columba fasciata)
Red-breasted sapsucker (Sphyrapicus ruber)
Pileated woodpecker (Dryocopus pileatus)
Common flicker (Colaptes auratus)
Stellers jay (Cyanocitta stelleri)
Common raven (Corvus corax)
Chestnut-backed chickadee (Parus rufescens)
Wrentit (Chamaea fasciata)
Red-breasted nuthatch (Sitta canadensis)
Winter wren (Troglodytes troglodytes)
Robin (Turdus migratorius)
Varied thrush (Ixoreus naevius)
Golden-crowned kinglet (Regulus satrapa)
Ruby-crowned kinglet (Regulus calendula)
Hutton's vireo (Vireo huttoni)
Evening grosbeak (Coccothraustes vespertinus)
Dark-eyed junco (Junco hyemalis)
Fox sparrow (Passerella iliacea)

Mammals:
Douglas squirrel (Tamiasciurus douglasii)
Western gray squirrel (Sciurus griseus)
Black bear (Ursus americanus)
Columbian black-tailed deer (Odocoileus hemionus columbianus)
Appendix I. Lands and Mineral Status and Uses of Adorni Research Natural Area
(Smith 1994, per. comm. on file at PSW Research Station, Berkeley)
INSTRUCTIONS: Submit to Washington Office in quadruplicate. Permanent numbers will be assigned and the forms will be distributed as follows. (1) Washington Office, (2) RO or Station, (3) Forest or Center and (4) Photographer.

PHOTOGRAPH NUMBER|           |         |              |                                       NEGATIVE
|PERMANENT|LOCATION|CONCISE DESCRIPTION|of VIEW
|TEMP.| Select- |(State,Forest,|black and
|ed for | Exposition|County) |white or C
|the WO)|(To be fil- |District and|for color)
|Library |led in by| | All:
|       | Photo | | Adorni RNA
|       |       | | California
|       |       | | Six Rivers NF
|       |       | | Orleans RD
|       |       | | Humboldt Co.,
|       |       | | California
|       |       | | All:
|       | 10/30/88 | | Photo 1. General Structure of Douglas-fir/Goodyera oblongifolia forest type 35mm C neg.
|       |       | | Photo 2. Recent slump with Alnus rhombifolia reproduction
|       |       | | Photo 3. Mature Chamaecyparis lawsoniana and Pseudotsuga menziesii in the Tanaok/Rhamnus Californica forest type
|       |       | | All:

GPO 888-0 22 1600-1 (8/67)
Photo 1. General Structure of Douglas-fir/Goodyera oblongifolia forest type
Photo 2. Recent slump with Alnus rhombifolia reproduction
Photo 3. Mature Chamaecyparis lawsoniana and Pseudotsuga menziesii in the Tanoak/Rhamnus californica forest type