SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Preacher Meadows Research Natural Area

Shasta-Trinity National Forests

Trinity County, California

The undersigned certify that all applicable land management planning and environmental analysis requirements have been met and that boundaries are clearly indentified 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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TITLE PAGE

Establishment Record for
Preacher Meadows Research Natural Area
within Shasta-Trinity National Forests
Trinity County, California.

Preacher Meadows Research Natural Area

MAPS

MAP 1: Preacher Meadows RNA Location and Boundaries

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MAP 3: Vegetation Types

A. Introduction

Preacher Meadows Research Natural Area (PMRNA) is located on the Weaverville Ranger District, Shasta-Trinity National Forests, in Trinity County, California. It is approximately 16 air miles (25.8 km) north of Weaverville and 6 air miles (9.7 km) west of Trinity Center.

Research Natural Areas are a national network of ecological areas designated in perpetuity for research and education, and to maintain biological diversity on the National Forest System lands. Primary selection of RNAs is based on the identification of 'target element(s)' which are representative examples of common, or widespread vegetation types found in each vegetation province. Additional selections are made to obtain representation of unusual or unique vegetation and, or geologic types. In California these target elements are mostly plant communities described in major ecological studies, such as Barbour and Major (1977), Eyre (1980), Kuchler (1966), and Holland (1986). Other unique ecosystems are selected on a case by case basis.

Preacher Meadows Research Natural Area was nominated by the Shasta-Trinity National Forests for establishment as a RNA in 1973 for its undisturbed Ultramafic Mixed Coniferous Forest (Holland type - 84180, Society of American Foresters [SAF] forest cover type 243 - Sierra Nevada Mixed Conifer [Eyre 1980]). On Nov. 11, 1977 a reconnaissance was conducted by Oliver and in July 1978 an Ecological Survey was completed by Sawyer, Palmer, and Cope. Preacher Meadows area was formally recommended by the Pacific Southwest Research Station (PSW)/Region 5 (R5) RNA Committee for establishment in July 1980.

The entire PMRNA is on land managed by the Shasta-Trinity National Forests and it is within the boundaries of the Trinity Alps Wilderness (Management Area #4). Areas surrounding the RNA are not entirely Wilderness. Approximately 1.5 miles (2.4 km) along the southeast boundary of the RNA is adjacent to land owned by Sierra Pacific Industries and 0.5 miles (0.8 km) of boundary on the east side of the RNA is adjacent to general forest (Weaverville/Lewiston, Management Area #7)(Appendix A1). All other adjacent lands are in the Trinity Alps Wilderness.

(1) Land Management Planning:

The recommendation for establishment of the PMRNA is included in the Shasta-Trinity National Forests Land and Resource Management Plan (FLRMP) (USDA Forest Service 1995a, Appendix A2). NEPA analysis for the land allocation of the area to PMRNA was conducted as part of the EIS for the FLRMP. Therefore, the decision allocating land to the RNA was made in the Record of Decision for the FLRMP and signed by the Regional Forester (1995). Preacher Meadows is one of thirteen RNAs currently listed under Special Area Management (Management Prescription X) in the FLRMP (Appendix A3).

B. Objectives

The primary objective for establishing PMRNA is to add to the National and Regional RNA systems an example of the ultramafic mixed coniferous forest and its associated vegetation types in the Klamath Physiographic Province. Undisturbed examples of this forest type are relatively rare and no other RNA in the Klamath Mountain province represents ultramafic mixed conifer forest. Using the relatively new concept of ecological subsections, the PMRNA will represent vegetation types in both the Upper Scott Mountains and Upper Klamath Mountains subsections.

The PMRNA also provides examples of Montane Chaparral, Montane Meadow and Darlingtonia Bog vegetation types (Holland types 37500, 45100, and 51120 respectively). The interrelationships between the target vegetation type and these communities is important in understanding ecological processes.

Establishment of the PMRNA fills the objective of the RNA Program to preserve genetic and biologic diversity. Sawyer et al. (1978) identified 164 pant species including California pitcher-plant (Darlingtonia californica[1]) and California lady's slipper (Cypripedium californicum). Both are plants with limited distribution and are included on the California Native Plant Society's (CNPS) watch list (List 4) (Skinner and Pavlik eds 1994). Sawyer et al. (1978) also found a great diversity of Ceanothus species and their hybrids.

C. Justification

Although the Mixed Coniferous Forest type is widespread in the Klamath Mountain province, undisturbed samples of adequate size are difficult to find. This area is unique in that it has been well preserved from logging, mining and other types of human disturbance. In the reconnaissance report, Oliver (1977) stated: "Upon the reconnaissance, no old mining activity, old roads, or timber cutting were observed. All human disturbances, mainly hiking, were recent."

In addition, vegetation in the PMRNA represents the typical regional vegetation type. Forests in the RNA are characteristic both in composition and quality to forests throughout much of the ultramafic terrain at mid-elevations of the eastern Klamath Province (Sawyer et al. 1978).

In the PMRNA, extensive portions of both the southwest and northeast slopes of Swift Creek are included, providing aspect and elevation variations through the featured Mixed Coniferous Forest type. As is commonly found with this forest type, species composition varies with these factors. For example, incense-cedar (Calocedrus decurrens) is dominant at lower elevations and on south facing slopes, white fir (Abies concolor) and Douglas-fir (Pseudotsuga menziesii) are dominant at higher elevations and on steep north facing slopes (Oliver 1977). These differences are valuable for the study of community ecology and ecological trends.

1Nomenclature for plants follows Munz (1959), except tree species which follow Little (1979).

Because this area has soils derived from ultramafic parent materials, it contains many interesting plants. Of note are the high number of Ceanothus species and hybrids in the Mixed Conifer and Montane Chaparral vegetation types (Ceanothus cordulatus, C. cuneatus, C. integerrimus, C. prostratus, C. pumilus, C. velutinus, C. prostratus x pumilus, C. velutinus x prostratus). The presence of several closely related Ceanothus species increases the value of this RNA particularly for botanical and genetic research. Also of interest are the presence of the carnivorous California pitcher-plants in bogs and the rare occurrence of California lady's slipper. Both of these species are of limited distribution and on the watch list (list 4) in the California Native Plant Society (Skinner and Pavlik 1994).

D. Principal distinguishing features

The dominant topographic characteristics of the area are the steep slopes and the two creeks that bisected them. Granite Creek flows into the RNA from the southwest side of section 17 and meets Swift creek in the northwest quarter of this same section. Swift Creek bisects the RNA and runs northwest to the southeast through section 17. At one location, Swift Creek has carved the bed rock into a 90 foot (27.4 m) deep gorge. Stream benches or flats exist along and above both banks of Swift Creek. Seeps and wet areas on these benches provide for a range of meadow types including dry meadow, moist meadow and Darlingtonia bogs (Sawyer et al. 1978). Darlingtonia californica and Cypripedium californicum are concentrated in these areas.

Moraines and other glacial deposits are found along the creek canyons and at higher elevations. Granitic erratics, along with peridotite rocks, are scattered throughout the region. Talus slopes of large boulders are also common.

Open, uneven-aged mixed conifer forest is a predominant feature in the mid and low elevation areas. Canopy cover averages 30-40 percent with Douglas-fir dominant in most of the area. A few of the higher sites have sugar pine (Pinus lambertiana) and white fir dominant with minor amounts of Shasta red fir (Abies magnifica var. shastensis) and western white pine (Pinus monticola).

Montane chaparral is the dominant vegetation at high elevations in the northern portion of the RNA. Tree density is variable in this type and may be absent.

At lower elevations and mesic sites, incense cedar co-dominates with Douglas-fir. Ponderosa pine (Pinus ponderosa) is also abundant at lower elevations, particularly on southwest facing aspects or flats. White fir is abundant in the understory which may be the result of past fire regimes favoring shade intolerant species. Fire scars were frequently encountered on larger trees. The shrub layer is well developed and strongly dominated by Quercus vaccinifolia.

E. Location

1) National Forest involved

The PMRNA is located on the Shasta-Trinity National Forests. No other Forest System lands are involved.

2) Latitude and Longitude

The approximate center of the RNA is at 40°58'N. latitude and 122°48'W. longitude.

3) Boundary description

PMRNA is on the Shasta-Trinity National Forests. It lies approximately 6 miles (10 km) west of Trinity Center and consists of the entire areas of secs. 8, 17, and 20, T36N, R8W, Mount Diablo Baseline and Meridian (MDBM), USGS Covington Mill and Ycatapom Peak quads (Map 1).

The boundaries of Preacher Meadows RNA follow the demarcations of sections 8, 17, and 20.

Beginning at the southeast corner of sec. 20 (Point a), said point being located exactly two miles (3.22 km) north (N2°E) from the found southeast section corner of sec. 32 (T36N, R8W), thence:

(a) due west, in a direct line, following the southern section line of sec. 20, for 1 mile (1.61 km) to the southwest corner of sec. 20 (Point b);

(b) thence, northwardly (N2°E), in a direct line, following the western section line of sec. 20, 17, and 8 for 3 miles (4.83 km), to the northwest corner of sec. 8 (Point c), said point being located at 1 mile (1.61 km) due east from the found northwest section corner sec. 7;

(c) thence, due east, in a direct line, following the northern section line of sec. 8 for 1 mile (1.61 km), to the northeast corner of sec. 8 (Point d);

(d) thence, southwardly (S5°W), in a direct line, following the eastern section line of sec. 8 for 1 mile (1.61 km) to the southeast corner of sec. 8 (Point e);

(e) thence, southwardly (S2°W), in a direct line, following the eastern section lines of sec. 17 and 20 for 2 miles (3.22 km) to the southeast corner of sec. 20 (Point a), the point of beginning.

4) Acreage

The total area of Preacher Meadows RNA is 1850 acres (749 ha).

5) Elevations

Elevations in the PMRNA range from 3,800 ft (1158 m) along Swift Creek in NE1/4 sec. 20 to 6,835 ft (2083 m) in NE1/4 sec. 8.

6) Access

The PMRNA can be reached from the town of Weaverville which is 48 road miles (77 km) west of Interstate 5 via Highway 299, and 102 miles (163 km) east of Highway 101 also via Highway 299 (Map 2). From Weaverville travel about 20 road miles (32 km) northeast via Route 3 to Trinity Center. From Trinity Center travel approximately 6 miles (10km) west via Road 36N25 which leads to the eastern edge of the RNA and the Swift Creek trailhead. This road does not require a 4-wheel drive vehicle. The Swift Creek Trail follows Swift Creek through the RNA's mid portion and connects with Granite Creek trail at the junction of Swift and Granite Creeks.

F. Area by cover types

Table 1: Area by cover types

Vegetation Type	Acres	Hectares	Percent
HOLLAND TYPES (Holland 1986):			
Ultramafic Mixed Coniferous Forest (84180)	1508	610	81.5
Montane Meadow (45100) & Darlingtonia Bog (51120)	15	6	0.8
Montane Chaparral (37500)	305	124	16.5
Rock	22	9	1.2
Total	1850	749	100.0
SAF TYPES (Eyre 1980):			
Sierra Nevada Mixed Conifer (SAF243)	1508	610	81.5
Unclassified	320	130	17.3
Rock	22	9	1.2
Total	1850	749	100.0
KUCHLER TYPES (Kuchler 1966):			
Mixed Conifer Forest (K5)	1508	610	81.5
Unclassified	320	130	17.3
Rock	22	9	1.2
Total	1850	749	100.0

G. Physical and climatic conditions

The topography of the area is moderate to steep (30-95%) northeast, east, and southwest-facing slopes. The area is underlain by ultrabasic intrusives (primarily peridotite) with moraines and other glacial deposits occurring along the canyons and at higher elevations. Talus slopes are common. Soils are shallow, and one slide area was observed by Sawyer et al. (1978).

The two nearest weather stations are Trinity River Hatchery and Weaverville Ranger Station. Trinity River Hatchery has 18 years of records and is located approximately 21 air miles (33.8 km) south of the RNA at an elevation of 1860 ft (567 m). Weaverville Ranger Station, at 2049 ft (624.5 m) is approximately 18 air miles (29 km) south of the RNA. It has 78 years of temperature records and 102 years of precipitation records. Both weather stations are at elevations considerably lower than the PMRNA. Usually temperature decreases (at the rate of -0.96^{o}C for 100 m rise in elevation) and precipitation increases with altitude. Therefore, in PMRNA, temperature should be about 9°F(5°C) (at lower elevations) to 24°F (13.5^{o}C) (at higher elevations) lower than the two weather stations and more precipitation would be expected.

Table 2: Weaverville Ranger Station Monthly Normals (1951-80)

	Temperature (^{o}F [^{o}C])			Precipitation
Month	Max.	Min.	Mean	Inches (mm)
Jan.	46.7 (8.2)	26.7 (-2.9)	36.7 (2.6)	8.41 (214)
Feb.	53.7 (12.1)	28.7 (-1.8)	41.2 (5.1)	5.67 (144)
Mar.	58.1 (14.5)	29.7 (-1.3)	44.0 (6.7)	4.12 (105)
Apr.	65.5 (18.6)	32.8 (0.4)	49.2 (9.6)	2.30 (59)
May	75.0 (23.9)	38.7 (3.7)	56.8 (13.8)	1.20 (31)
June	83.9 (28.8)	44.6 (7.0)	64.3 (17.9)	0.59 (15)
July	93.4 (34.1)	48.6 (9.2)	71.0 (21.7)	0.18 (5)
Aug.	91.4 (33.0)	47.3 (8.5)	69.4 (20.8)	0.48 (12)
Sep.	86.4 (30.2)	41.6 (5.3)	64.0 (17.8)	0.86 (22)
Oct.	74.0 (23.3)	34.8 (1.6)	54.4 (12.4)	2.42 (62)
Nov.	56.8 (13.8)	31.2 (-0.4)	44.0 (6.7)	5.64 (144)
Dec.	46.3 (7.9)	28.3 (-2.1)	37.3 (2.9)	7.32 (186)
Ann	69.3 (20.7)	36.1 (2.3)	52.7 (11.5)	39.19 (997)

from National Oceanic and Atmospheric Administration (1982)

Table 3: Trinity River Hatchery Monthly temperature and precipitation during the drought years 1986-90

	Temperature ^{o}F (^{o}C):					Precipitation Inches (mm):				
Month	86	87	88	89	90	86	87	88	89	90
Jan.	43.4	37.7	38.2	37.0	39.9	6.31	M3.87	6.55	2.36	6.30

	(6.3	.2	3.4	2.8	4.4)	(161	M98	167	60	160)
Feb.	45.1	41.6	45.9	38.8	39.5	12.38	3.73	0.14	0.80	2.30
	(7.3	5.3	7.7	3.8	4.2)	(315	95	4	20	59)
Mar.	51.1	45.5	48.5	45.0	48.8	5.10	M4.76	0.20	10.75	1.88
	(10.6	7.5	9.2	9.0	9.3)	(130	M121	5	274	48)
Apr.	52.6	55.9	M	55.9	57.7	0.58	0.53	M	1.67	0.75
	(11.4	13.3	M	13.3	14.3)	(14	13	M	42	19)
May	58.3	62.0	54.2	57.5	56.4	0.71	0.85	2.18	0.45	5.83
	(14.6	16.7	12.3	14.2	13.6)	(18	22	55	11	148)
June	69.2	68.2	64.0	66.9	64.1	0	0	1.70	0.08	0.17
	(20.7	20.1	17.8	19.4	17.8)	(0	0	43	2	4)
July	70.0	68.6	74.4	69.4	73.9	0	0	0.72	0	0.46
	(21.1	20.3	23.6	20.8	23.3)	(0	0	18	0	12)
Aug.	M	72.4	72.7	68.5	71.1	M	0	0	0.03	1.07
	(M	22.4	22.6	20.3	21.7)	(M	0	0	1	27)
Sep.	59.6	66.0	65.7	63.7	65.9	2.95	0	0	4.68	0.50
	(15.3	18.9	18.7	17.6	18.8)	(75	0	0	119	13)
Oct.	56.3	61.1	60.7	54.2	56.4	1.67	0.35	0.14	3.25	0.80
	(13.5	16.2	15.9	12.3	13.6)	(42	9	4	83	20)
Nov.	46.1	45.9	44.7	46.6	43.7	0.91	1.99	10.14	1.19	0.85
	(7.8	7.7	7.1	8.1	6.5)	(23	51	258	30	22)
Dec.	40.7	38.2	38.5	40.8	34.0	2.84	8.48	2.66	0.02	1.26
	(4.8	3.4	3.6	4.9	1.1)	(72	216	68	0.5	32)
Ann.	M	55.3	M	53.7	54.3	-	M24.56	-	25.28	22.17
	(M	12.9	M	12.1	12.4)	(M	M625	M	643	564)

From National Oceanic and Atmospheric Administration (1986, 1987, 1988, 1989, 1990)
M--Insufficient or partial data.

H. Values

1) Flora

The forest in the PMRNA is classified as Ultramafic Mixed Coniferous Forest (Holland 84180, SAF 243, Kuchler 5). Non-forested areas are classified as Montane Chaparral, Montane Meadow and Darlingtonia Bog vegetation types (Holland 37500, 45100, and 51120 respectively).

Along the creeks are moraines and glacial deposits, which do not support a notable riparian community. Oliver (1977) found only a few Alnus on the north slope along the Swift Creek. Other riparian species occurring in the RNA are Corylus cornuta californica, Salix commutata and S. exigua. The separate riparian vegetation types were not classified or described in the Ecological Survey.

The Mixed Coniferous Forest is variously dominated by Pseudotsuga menziesii, Pinus lambertiana, Calocedrus decurrens, Abies concolor, and Pinus ponderosa. The Montane Chaparral is dominated by Quercus vaccinifolia and Ceanothus prostratus.

The following descriptions of each vegetation type are unless otherwise stated based on the Ecological Survey made by Sawyer, Palmer, and Cope (SPC) in 1978.

(1) Ultramafic Mixed Coniferous Forest (Holland 84180)
(SAF 243 - Sierra Nevada Mixed Conifer)
(Kuchler 5 - Mixed Conifer Forest)
(SPC - Pseudotsuga menziesii/Quercus vaccinifolia)

Most of the area is dominated by Douglas-fir with a typical canopy cover of about 30 to 40 percent. However, Douglas-fir disappears from the canopy at higher elevations while Pinus lambertiana and Abies concolor increase. Pinus monticola and Abies magnifica var. shastensis are only present at higher elevations. Pinus ponderosa is also abundant at these elevations, particularly on the southwest-facing slopes above Swift Creek. It is also a major component of the canopy on the high flat area in the northwest corner of sec. 17. At lower elevations and on more moist sites Pinus lambertiana becomes sparse and Calocedrus decurrens co-dominates with Douglas-fir.

The abundance of Abies concolor in the understory may indicate a trend for this area to become dominated by white fir if fire was eliminated as a disturbance factor. Fire scars were seen on many large tree trunks.

The shrub understory is extensive, typically 80 to 100 percent cover, though it occasionally will be as low as 30 percent. Often these areas of low shrub cover are boulder talus areas. Quercus vaccinifolia makes up 95 to 100 percent of the shrub cover on upland sites while Rhododendron occidentale constitutes 80 to 100 percent of the shrub cover along stream courses. Ribes roezlii, Rhamnus purshiana, and Spiraea densiflora are also present along Swift and Granite Creeks. On the driest sites Ceanothus prostratus is often found along with Q. vaccinifolia. An unusually large number of Ceanothus taxa (Appendix B) are found in this vegetation type.

Polygala cornuta is the most ubiquitous of the few species observed in the poorly developed herb layer. Cover values for this layer are around 5 percent. Herbs are all but lacking on south-facing slopes.

The average tree density is 127 trees per acre (313.8 trees per ha) and basal area is about 217.8 sq. ft per acre (50 sq. m per ha). One small area of large trees located on the bench in the northeast corner of section 17 (Sawyer et al. 1978, photo 5) has an average density of 117 trees per acre (289.1 trees per ha) and an average basal area of 435 sq. ft per acre (99.9 sq. m per ha).

(2) Montane Meadow and Darlingtonia Bog
(Holland 45100 and 51120)
(no SAF and Kuchler equivalents)

(SPC - Meadows)

Preacher Meadows are located on the bench above the southwest bank of Swift Creek in the southeastern portion of the RNA. Additional small meadows and seepage areas are found along the trail on the northeast side of Swift Creek in the upper portion of the RNA.

In the PMRNA three meadow phases are distinguished based on varying moisture conditions. Dry meadows are vernally wet, but dry later in the season. They were found to be dry on July 1, 1978 (Sawyer et al. 1978). They are characterized by Danthonia unispicata, Sisyrinchium bellum, Lotus purshianus, Dichelostemma multiflorum and Calochortys nudus. Moist meadows occur on sites which are wet throughout much of the season, but dry late. These meadows are characterized by Schoenolirion album, Deschampsia caespitosa, Helenium bigelovii, and Danthonia californica. They grade into the perennially wet meadows along the margins of small creeks and in seeps. Such sites are dominated by Darlingtonia californica (CNPS List 4) and often include Mimulus guttatus, Juncus spp., Narthecium californicum and occasionally Cypripedium californicum (CNPS List 4). The latter species occurs abundantly in section 21, which is outside the boundary of the RNA on private land.

(3) Montane Chaparral (Holland 37500)
(no SAF and Kuchler equivalents)
(not surveyed by SPC)

Montane chaparral occupies the upper elevations of the RNA on south and southwest facing slopes. Typical species are Quercus vaccinifolia, Arctostaphylos nevadensis, A. patula, and Ceanothus prostratus var. laxus. Transition of this community to the forest is gradual. Except for the areas near the ridge, individual trees of Pinus monticola, Pinus jeffreyi, and Calocedrus may be scattered among the shrubs.

At least 164 plants occur in the PMRNA. They are listed in Appendix B. All plant nomenclature follows P. Munz (1959), except tree species which follow Little (1979).

2) Fauna

Formal field surveys for wildlife have not been conducted in the RNA. However, a nesting pair of the Federally listed threatened Northern spotted owl (Strix occidentalis caurina)[2] was observed within one mile of the RNA in 1992 (Dias 1994). Oliver, in his visit to the PMRNA on Nov. 10, 1977, observed American dipper, winter wren, golden-crowned kinglet, mountain chickadee, red-breasted nuthatch, and Steller's jay.

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[2]Nomenclature for fauna species follow Laudenslayer and Grenfell (1983), A list of amphibians, reptiles, birds and mammals of California.

A list of species possibly occurring in the PMRNA is available by using a Wildlife Habitat Relationship (WHR) model. The Modified WHR model for Shasta-Trinity National Forests (Crumpton and Dias 1994, Appendix C1) generated two species lists with different association levels. The 'strongly' associated list was generated by using a Habitat Index value of '1', and the 'moderately' associated list was created by using a Index value of '2'. Other parameters used to generate the species lists were WHR habitat types found in the PMRNA, elevation of the PMRNA, and the watershed containing PMRNA. A total of 78 species are strongly associated (Appendix C2) and 132 species are moderately associated (Appendix C3) with the RNA. The former list includes 3 species of special concern in California: Sharp-shinned Hawk, Cooper's Hawk, and Western Pond turtle, one species Federally listed as endangered, Peregrine Falcon, and one species listed as California threatened, Cliff swallow. The Western Pond Turtle is also a Category 2 species candidate for Federal listing. The Moderately associated species list includes Townsend's Big-eared Bat (Category 2, Federal listing), Northern Goshawk (California species of special concern), Golden Eagle (California fully protected species), and Northern Spotted Owl (California threatened species) (USDA Forest Service 1995c).

3) Geology

The PMRNA is located within the Klamath Mountains geologic province, one of the more complex provinces in North America. It is a west-facing arcuate-form region that extends from northwestern California into southwestern Oregon. It consists predominantly of marine arc-related volcanic and sedimentary rocks of Paleozoic and Mesozoic ages. Oceanic plate-related ultramafic and associated ophiolitic rocks are also important components. Granitic plutons intruded many parts of the province during Jurassic and early Cretaceous time. Structurally, the province consists of a series of north to northwest-trending slices of ancient crustal blocks that have collided to form an imbricate eastward-dipping sequence of volcanic, sedimentary and oceanic crustal rocks (Teixeira 1994a [Appendix D]).

The province has been subdivided into four major lithotectonic units that from east to west are called the Eastern Klamath belt, the Central Metamorphic belt, the Western Paleozoic and Triassic belt, and the Western Jurassic belt. The Preacher Meadows RNA lies within the Eastern Klamath belt. Hotz and others (1972), and Fraticelli and others (1987) mapped the rocks within the RNA as Ordovician. Trinity ultramafic rocks are composed of serpentinite, deformed peridotite with lesser gabbro and diabase dikes. A veneer of Pleistocene and Holocene glacial deposits covers most of the topographically lower portions of the RNA (Teixeira 1994a [Appendix D]).

Granitic erratics, along with peridotite rocks, are scattered throughout the region. Talus slopes of large boulders are common, especially on the slopes west of Swift Creek.

The ultramafic intrusive rock is responsible for the vegetation found in the PMRNA.

4) Soils

Soils in PMRNA are delineated into 11 map units (Fig. 1), 8 of them are mapped at the third Order and 2 are mapped at the fifth Order, in the Soil Survey of Shasta-Trinity Forest Area, California (USDA Forest Service et al. 1980). The Order 3 soil survey provides information about the soils, their capabilities and their limitations and delineations are as small as 10 acres for highly contrasting soils and 40 acres for non-contrasting soils. Order 5 soil data is not as detailed as Order 3 and is suited for very general land use planning. It was mapped by photo interpretation based on widely spaced observations. The southeastern half of the RNA was mapped at the third Order and the northwestern part was mapped at the fifth Order. Detail descriptions of these 11 map units can be found in Appendix E.

(1) Jayar family, 40 to 60 percent slopes (Map symbol 155)

This soil occurs on steep mountain side slopes in the mid eastern portion of the RNA. Vegetation on the soil is mixed coniferous forest. This soil lies on basic intrusive (ultra mafic) parent material.

The surface soil is 5 inches (12.7 cm) deep, light gray, and has a very gravelly (40% gravel and cobbles) sandy loam texture. The subsoil extends to 26 inches (66.2 cm), and has a very cobbly (42-55% cobbles and gravel), very fine sandy loam or loam texture.

(2) Xerofluvents-Riverwash association, 0 to 20 percent slope
(Map symbol 351)

This soil is on river floodplains, alluvial terraces, and fans along Swift Creek and Granite Creek. Vegetation on the Xerofluvents of the alluvial terraces and fans is mixed coniferous forest. Soils of the Riverwash association are subject to continuous or frequent flooding, therefore little or no permanent vascular plant life establishes.

The surface soil of Xerofluvents is medium to pale brown in color, 11 inches deep (28 cm), and has a gravelly (20-30% gravel) sandy loam texture. The subsoil is difficult to separate from the substratum, which extends to 45 inches (114.5 cm), is brown to yellowish brown, and has a very gravelly (35-45% gravel) sandy loam texture.

Figure 1. Soils in Preacher Meadows RNA
(from Soil Survey of Shasta-Trinity Forest Area, California)

(3) Weitchpec family-Rock outcrop association, 40-60 percent slopes
(Map symbol 349)

This soil unit is on steep mountain sideslopes and ridge tops southeast from the confluence of Granite and Swift Creeks. The Weitchpec family soil is moderately deep, well drained and formed in material weathered from ultramafic rock. The Ca/Mg ratio in this soil is imbalanced. Vegetation found on the soil is open mixed coniferous forest; scattered Jeffrey pine and incense ceder over dense shrubs, mainly Quercus vaccinifolia.

The surface soil is 5 inches (12.7 cm) deep, light gray, gravelly (30% gravel) loam textured, with moderate fine and medium granular structure. The subsoil extends to 25 inches (63.6 cm), and is a very gravelly (35-45% gravel) loam.

(4) Dunsmuir-Ishi Pishi, deep families, complex, 20 to 40 percent slopes
(Map symbol 53)

These well drained soils are on gentle to moderately steep linear and broken mountain sideslopes and benches south of Swift Creek. The Dunsmuir family has a substratum of paralithic contact with highly weathered ultramafic rocks. The substratum of Ishi Pishi family is moderately weathered ultramafic rock, thus, both soils are Ca/Mg imbalanced. Vegetation on both soil families is mixed coniferous forest.

The Dunsmuir Family surface soil is 7 inches (17.8 cm) deep, reddish brown, and has a gravelly (20-35% gravel) light sandy clay loam texture. The subsoil extends to 53 inches (134.8 cm), and ranges in texture from reddish brown, gravelly (20-55% gravely and cobbles) clay loam and gravelly clay to yellowish red very cobbly clay loam.

The Ishi Pishi, deep family surface soil, is 3 inches (7.6 cm) deep, brown, and has a heavy gravelly (30% gravel) loam texture. The subsoil extends to 48 inches (122.1 cm), and ranges in texture from heavy yellowish red very gravelly (35-55% gravel and cobbles) clay loam to heavy yellowish brown very cobbly clay.

(5) Olete family, 40 to 60 percent slopes (Map symbol 232)

This Ca/Mg imbalanced soil occurs on steep, smooth mountain sideslopes in the southern portion of the RNA. It is a well drained soil formed in material weathered from ultramafic rocks. In the RNA, mixed coniferous forest is found on this soil type.

The surface soil is 6" (15.3 cm) deep, pale brown and the texture is gravelly (30% gravel) loam. The subsoil extends to 35 inches (89 cm), and ranges from light yellowish brown, very gravelly loam to brownish yellow very cobbly heavy loam, with 35-55% gravel and cobbles.

(6) Olete-Konocti families associations, 50 to 80 percent slopes

(Map symbol 235)

This soil is distributed on the southeastern border of the PMRNA. Mixed coniferous forest is found on this soil type. The soil lies on a substratum of highly fractured and weathered ultramafic rock and it has an imbalanced Ca/Mg ratio.

Olete family has a gravelly (30% gravel) loam surface soil 6 inches (15.3 cm) deep that is pale brown in color. The subsoil extends to 35 inches (89 cm), and is light yellowish brown, very gravelly loam to brownish yellow very cobbly heavy loam, with 35-55% gravel and cobbles.

Konocti family surface soil is very shallow, only 3 inches (7.6 cm) deep, brown, and has a gravelly (30% gravel) loam texture. The subsoil extends to 22 inches (60 cm), and has yellowish red, very gravelly loam to dark yellowish brown very stony clay loam textures, with 35-45% gravel and cobbles.

(7) Parks family-Rubble land complex, 50 to 80 percent slopes
(Map symbol 241)

This soil occurs on steep to very steep, dissected linear slopes in the southern portions of the RNA. The Parks family consists of moderately deep, Ca/Mg imbalanced, well drained soils that formed in material weathered from ultramafic rocks. Vegetation on this soil is mixed coniferous forest. The Rubble land portion of this complex is topically barren and forms 30 percent of the association.

The surface soil of the Parks family soil is 13 inches (33 cm) deep, yellowish red in color, and has a gravelly and very gravelly (40-50% gravel and cobbles) sandy clay loam texture. The subsoil extends to 24 inches (61 cm), is strong brown, and has a very gravelly (40% gravel and cobbles) sandy clay loam texture.

(8) Rock outcrop-Lithic Cryochrepts-Deadfall family complex, 20 to 70
percent slopes (Map symbol 263)

This soil unit occurs on a ridge top in the southwest corner of the RNA. The parent material is ultramafic rocks, with Deadfall family having large amounts of serpentinitic minerals. The Mixed Conifer forest vegetation type is found on these Ca/Mg imbalanced soils. Rock outcrop makes up 40 percent of the complex.

The surface soil of Lithic Cryochrepts is 7 inches (17.8 cm) deep, very pale brown, and has a gravelly (40% gravel) sandy clay loam texture. The subsoil extends to 17 inches (43.2 cm), is pale brown, and has a very gravelly (50% gravel) sandy clay loam texture.

The Deadfall family soil has a 14 inch (35.6 cm) deep surface soil, that is pale brown or yellowish brown, and has a very gravelly (35-45%) sandy loam texture. The subsoil extends to

24 inches (61 cm), is yellowish brown, and has an extremely gravelly (75% gravel and cobbles) sandy loam texture.

(9) Rock outcrop, ultramafic-Rubble land association, 60 to 80 percent slopes (Map symbol 276)

This rocky area is found on the ridge in the northeastern corner of the RNA. It is considered a barren area and no vegetation plots were taken in the mapping unit.

The next two map units were described in an Order 5 soil survey.

(10) Rock Outcrop-Lithic Xerochrepts, Typic Xerochrepts Association, Gently Slopping to Steep (Map symbol FU2, Order 5)

This soil, formed on ultramafic parent material, occurs on gentle to steep mountain sideslopes in the northern one third of the RNA. Typical vegetation is Montane Chaparral sparsely forested with white fir, Jeffrey pine, incense cedar, and western white pine.

Lithic Xerochrept soils are loamy, skeletal, and less than 20" (50.9 cm) deep. Typic Xerochrept soils are loamy, skeletal, and less than 40" (101.8 cm) deep. Rock outcrops comprise 35 percent, Lithic Xerochrepts 35 percent, and Typic Xerochrepts 30 percent of the association.

(11) Ultic Haploxeralfs-Typic Xerochrepts Association, Gently Sloping to Moderately Steep (Map symbol FU3, Order 5)

This soil occurs on gentle to moderately steep mountain sideslopes in the mid portions of the RNA, up-stream area of Swift Creek. It lies on ultramafic bedrock and supports mixed coniferous forest.

Ultic Haploxeralf soils are deep to moderately deep, fine loamy soils that make up 50 percent of the association. Typic Xerochrept is a skeletal, deep to moderately deep, fine loamy to loamy soil also making up 50 percent of the association.

5) Lands

All lands are controlled by Shasta-Trinity National Forests. No private inholdings are involved.

6) Cultural sites

No formal archaeological field survey was conducted in this area. There are some Native American placenames recorded within a few miles from the PMRNA, but none within the

boundaries of PMRNA. Prehistorically and historically, this area was probably visited seasonally for short periods of time (Henn 1995).

I. Impacts/Conflicts

1) Mineral resources

The Preacher Meadows area does not have a history of significant mining related activity. Some early day mining probably occurred in the area, but no established mines are present. The PMRNA has a low potential for hosting mineral deposits (Teixeira 1994a). Since it is within the boundary of designated Wilderness Areas, the PMRNA is already withdrawn from mineral entry (Teixeira 1994b). A Geology Report prepared by Teixeira is included in Appendix D. Establishment of RNA will not have an impact on the mineral resources of the area.

2) Grazing

The meadows were used historically for grazing, as were most of the meadows in the Trinity Alps. Currently, there is no livestock grazing in the PMRNA. The PMRNA is not in an allotment and there are none nearby (Nelson 1994). Establishing the PMRNA will not be in conflict with grazing on the forest.

3) Timber

PMRNA supports no "suitable timber" land (USDA Forest Service 1995b) because it is within the Trinity Alps Wilderness Area, which is withdrawn from timber production. Therefore, establishment of RNA will have no effect on timber production in the area.

4) Watershed values

Swift Creek drains into Trinity Lake, which is used for fish habitat, recreation, hydroelectric power production, and extensive downstream agricultural irrigation. Trinity Lake, along with Shasta Lake, also provides domestic water to several communities and resorts. Establishment of the PMRNA will maintain ground cover and protect the soil surface, facilitating the protection of water quality through the prevention of additional sedimentation in Trinity Lake.

Seeps and benches associated with the Swift and Granite creeks create the most productive, sensitive, and diverse sites in the PMRNA. These areas contain a variety of moisture conditions and support three types of meadow communities. As mentioned in the Flora Section, two CNPS List 4 plants are found in these areas. Because of the favorable conditions on the benches, they also support the largest trees in the RNA. Establishment of the PMRNA will preserve these features though the development of management strategies that include a fire prescription necessary to ensure the perpetuity of the meadows and old growth characteristics.

The aquatic system and the associated unique plant communities provide important habitats for wildlife. 31 of the 78 wildlife species strongly associated with the PMRNA are dependent upon these habitats (Appendix C2). Many of these species are either California species of special concern or federally listed as category 2 species. Establishing PMRNA will secure the watershed values for wildlife of the area. However, if fire is kept out of the RNA, wildlife values will change.

5) Recreation values

The most significant impact of establishing PMRNA is on recreation. Most recreational users are entering the Trinity Alps Wilderness from the trailhead at the end of the Swift Creek Road and traveling upstream to higher elevation sites in the wilderness area. There is one small camp site along the Swift Creek in the central portion of section 17. However, most of the traffic is passing through, and due to the steep nature of the land, visitors predominantly stay on the trails.

An estimated 1,200 visitor days of recreational use will be moderately affected after the establishment of RNA (USDA Forest Service 1995b). Signs posted at the trailhead and boundary of the RNA will discourage camping within the RNA. An unknown increased risk of fire is associated with the recreational use of this area.

One structure exists in the RNA, a wooden footbridge on the Swift Creek Trail. This structure allows hikers to cross the creek while minimizing damage to the stream banks and channel. The value of protecting the creek from foot traffic exceeds the loss to RNA values. No other structures will be installed in the RNA except as in compliance with FSM 4060-3, RNA regulations.

6) Wildlife & plant values

High fire frequency in the forested area was indicated by forest composition and fire scars on mature trees (Sawyer et al. 1978). In general, occurrence of fire in the Mixed Coniferous type favors ponderosa pine, sugar pine, and Douglas-fir; while no disturbance favors white fir and incense cedar. After fire, herbs and shrubs, such as Ceanothus, Arctostaphylos, and Quercus vaccinifolia, quickly become established. A linear model of succession concludes that without disturbance, white fir will become the dominant tree species. If the PMRNA is established and a management strategy is followed, the fire prescription developed in the strategy will ensure the maintenance of a mosaic of forest types.

The Montane Chaparral in the upper elevations is thought to be edaphicaly controlled and is therefore relatively stable.

Wet meadows areas are sensitive to grazing and recreation related human disturbance, and to fire. Grazing is not allowed in the RNA and camping will be discouraged. However, fire plays an important role in reducing encroachment on dry meadow sites and affects the amount of

ground water recharge in an area. The development of a management strategy with fire prescriptions will help to maintain the meadow systems.

Fire and fuel management on the areas to the southeast (private land) and east (Management Area #7) of the RNA may change the natural fire regime of the PMRNA, and therefore, have an impact on the wildlife and plant values.

7) Special management area

The entire RNA lies within the Congressionally designated Trinity Alps Wilderness management Area. The primary conflict between these management prescriptions is recreational use of the RNA.

8) Transportation plans

Establishment of the Preacher Meadows RNA will have no effect on current transportation systems. There are no transportation plan proposed near this area. The RNA is in a designated primitive non-motorized use area.

J. Management prescription

In Shasta-Trinity National Forests Land and Resource Management Plan (USDA Forest Service 1995a), PMRNA is under Management Prescription X (Appendix A3), which provides standards and guidelines for the management of RNAs.

1) RNA Management Plan

The Shasta-Trinity National Forests will prepare a Management Strategy for the PMRNA in consultation with the Pacific Southwest Research Station. The plan will specify project prescriptions, practices, uses, and monitoring conducive to the objectives for establishment of the PMRNA.

K. Administration records and protection

The official responsibility for administration and protection of the Preacher Meadow RNA is with the Wilderness and Dispersed Recreation Director, Star Route 1, Box 10, Big Bar, CA 96010 (Tel: 916-623-6106). Attention should be given to the recreational use of the PMRNA.

The research coordinator is the Director of the Pacific Southwest Forest and Range Experiment Station, 800 Buchanan Street, Albany, CA 94710. This person is responsible for coordinating observational or nonmanipulative applied research in the area, and maintaining research data files.

Because the PMRNA is within a congressionally designated area, authority for approval of activities within the RNA is the Regional Forester's. Concurrence of the Station Director is required.

L. Archives

The Station Director shall establish and maintain a system for archiving data and reports from RNAs in a manner that will facilitate the exchange and transfer of information among scientists, Forests, and Stations.

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Appendices

A: Excerpts from Shasta-Trinity National Forests Land and Resource Management Plan

A1. Map of Management Areas

A2. Management direction for Management Area #4

A3. Management prescription for Special Area Management

B: Plant list of Preacher Meadows area (from Sawyer, Palmer and Cope 1978)

C: List of animal species may occur in the Preacher Meadows RNA, generated from Modified Wildlife Habitat Relationship Model for Shasta-Trinity National Forests by Crumpton and Dias

C1. Modified Wildlife Habitat Relationship Model for Shasta-Trinity National Forests (Crumpton and Dias 1994)

C2. Strongly associated list

C3. Moderately associated list

D: Preacher Meadows Geology Report (Teixeira 1994)

E: Descriptions of soil types (from Soil Survey of Shasta-Trinity Forest Area, California)

Appendix A: Excerpts from Shasta-Trinity National Forests Land and Resource Management Plan

A1. Map of Management Areas

A2. Management direction for Management Area #4

A3. Management prescription for Special Area Management

Appendix A1. Map of Management Areas

Appendix A2. Management direction for Management Area #4

Appendix A3. Management prescription for Special Area Management

Appendix B: Plant list of Preacher Meadows area
(from Sawyer, Palmer and Cope 1978)

Appendix C: List of animal species may occur in the Preacher Meadows RNA, generated from Modified Wildlife Habitat Relationship Model for Shasta-Trinity National Forests by Crumpton and Dias

C1. Modified Wildlife Habitat Relationship Model for Shasta-Trinity National Forests (Crumpton and Dias 1994)

C2. Strongly associated list

C3. Moderately associated list

Appendix C1. Modified Wildlife Habitat Relationship Model for Shasta-Trinity National Forests (Crumpton and Dias 1994)

Appendix C2. Strongly associated list

Appendix C3. Moderately associated list

Appendix D: Preacher Meadows Geology Report (Teixeira 1994)

Appendix E: Descriptions of soil types (from Soil Survey of Shasta-Trinity Forest Area, California)