

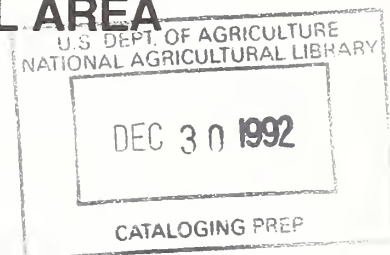
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THE BUTTE RESEARCH NATURAL AREA

Supplement 26¹

Sarah E. Greene and Larry R. Scofield²



The Research Natural Area described in this supplement is administered by the Bureau of Land Management, U.S. Department of the Interior. Bureau of Land Management Research Natural Areas are administered by District Offices that are organizational subdivisions of their State Offices. Scientists wishing to use these Research Natural Areas (RNA) in Oregon and Washington should contact the District Manager of the district in which the Research Natural Area is located.

The Butte Research Natural Area is part of a Federal system of such tracts established for research and educational purposes. Each RNA constitutes a site where natural features are preserved for scientific purposes and natural processes are allowed to dominate. Their main purposes are to provide:

1. Baseline areas against which effects of human activities can be measured;
2. Sites for study of natural processes in undisturbed ecosystems; and
3. Gene pool preserves for all types of organisms, especially rare and endangered types.

The Federal system is outlined in "A Directory of the Research Natural Areas on Federal Lands of the United States of America."³

¹Supplement No. 26 to "Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators," by Jerry F. Franklin, Frederick C. Hall, C.T. Dyrness, and Chris Maser (Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1972. 498 p.).

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³Federal Committee on Ecological Reserves. 1977. A directory of the Research Natural Areas on Federal lands of the United States of America. Washington, DC: U.S. Department of Agriculture, Forest Service.

Of the 105 Federal Research Natural Areas established in Oregon and Washington, 45 are described in "Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators" (see footnote 1). Supplements to the guidebook describe additions to the system.

The guiding principle in management of Research Natural Areas is to prevent unnatural encroachments or activities that directly or indirectly modify ecological processes. Logging and uncontrolled grazing are not allowed, for example, nor is public use that might impair scientific or educational values. Management practices necessary for maintenance of ecosystems may be allowed.

Federal Research Natural Areas provide a unique system of publicly owned and protected examples of undisturbed ecosystems where scientists can conduct research with minimal interference and reasonable assurance that investments in long-term studies will not be lost to logging, land development, or similar activities. In return, a scientist wishing to use a Research Natural Area is obligated to:

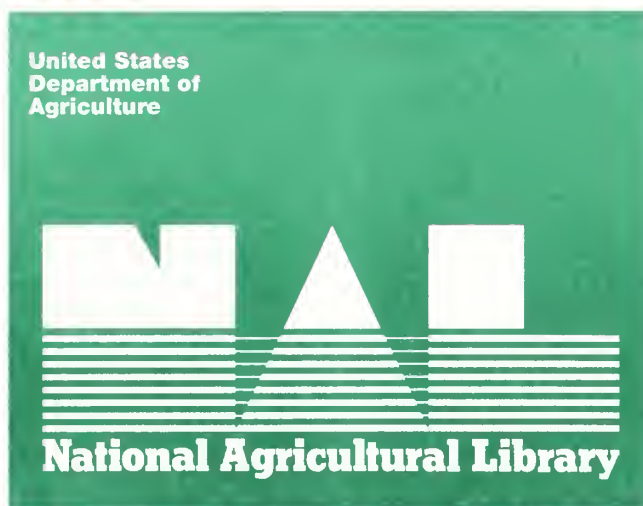
1. Obtain permission from the appropriate administering agency before using the area;⁴
2. Abide by the administering agency's regulations governing use, including specific limitations on the type of research, sampling methods, and other procedures; and
3. Inform the administering agency on progress of the research, published results, and disposition of collected materials.

⁴Seven agencies cooperate in this program in the Pacific Northwest: Army Corps of Engineers; U.S. Department of Agriculture—Forest Service; U.S. Department of the Interior—Bureau of Land Management; Fish and Wildlife Service; and National Park Service; U.S. Department of Energy; and U.S. Department of Defense.

The purpose of these limitations is to:

1. Ensure that the scientific and educational values of the tract are not impaired;
2. Accumulate a documented body of knowledge about the tract; and
3. Avoid conflict between studies.

Research must be essentially nondestructive; destructive analysis of vegetation is generally not allowed, nor are studies requiring extensive modification of the forest floor or extensive excavation of soil. Collection of plant and animal specimens should be restricted to the minimum necessary to provide voucher specimens and other research needs. Under no circumstances may collecting significantly reduce population levels of species. Collecting must also be carried out in accordance with applicable State and Federal agency regulations. Within these broad guidelines, appropriate uses of Research Natural Areas are determined by the administering agency.



THE BUTTE RESEARCH NATURAL AREA

A small, basalt ridge on the west edge of the Willamette Valley dominated by *Pseudotsuga menziesii*⁵ plant communities.

The Butte Research Natural Area (RNA) is a small, basalt ridge in the ecotone of the Willamette Valley and the Oregon Coast Range Physiographic Provinces. The top of the ridge supports a moist, lush herbaceous community with an overstory of *Pseudotsuga menziesii*. The east- and west-facing slopes are dominated by *P. menziesii*, *Abies grandis*, *Acer macrophyllum*, and *Polystichum munitum*. Ages of the stands are mixed. Though the RNA is not unique and is very small, it is one of the few remaining stands of relatively undisturbed (by logging) timber amidst primarily agricultural land. Ninety-four blown down trees were removed along the east edge of the RNA in 1967.

The 16-hectare area is in Yamhill County, Oregon, and is administered by the Yamhill Resource Area of the Salem District, Bureau of Land Management (BLM). The RNA comprises the NW1/4 of the SW1/4 sec. 19, T. 4 S., R. 5 W. of the Willamette Meridian (Lat. 45° 13' N.; long. 123° 18' W.).

Access and Accommodations

The Butte RNA is 8 air miles due west of McMinnville, OR, and lies between the North and South Forks of the Yamhill River (fig. 1). Permission to visit The Butte must be obtained from the owners of the S4 Ranch; contact the Salem BLM District Office for more information. At the intersection of route U.S. 99W and route 18 just south of McMinnville, turn west on Old Sheridan Road (old highway 18), travel 1.2 miles and turn north (right) on Peavine Road. Peavine Road remains paved for 7 miles where it turns to gravel; at this point drive 0.2 mile and turn left (south) on Bennette Road. Follow this road through the gate for the S4 Ranch; cross two cattle guards and park behind the green building at the end of the gravel road, about 0.7 mile from the S4 Ranch gate. Proceed on foot following an old country road for about 0.2 mile where you enter intact forest that is BLM land. The road continues through the

northwest corner of The Butte RNA. It is easiest to walk up the northwest edge, about 10 meters after crossing onto BLM land, to approach the ridgetop.

Environment

The Butte RNA lies on the east edge of the foothills of the Oregon Coast Range. Elevation ranges from 300 to 410 meters, considerably lower than most of the Coast Range, but well above the Willamette Valley floor (elevation of McMinnville is 48 m). The top of The Butte is broad and gently sloping. West- and east-facing slopes break off sharply, as much as 80 to 90 percent in some places. This is especially true toward the south end; slopes at the north end break off more gently. The east-facing slopes remain fairly steep until a wet toeslope is reached at the bottom. The west-facing slopes break steeply, but become more gentle within 10-15 m. At this break, the topography begins to level off, becoming rather broken and uneven.

There are two small areas of slope failure on the east side (fig. 2). Soil creep above these failures occurs as the slope breaks off from the ridge. Trees with pistol butts are evidence of this. The failures themselves are steep and dish-shaped. *Acer macrophyllum* is the only tree growing on these slumps; the understory is dominated by *Polystichum munitum*.

A modified marine climate dominates the area with large-scale air movement coming from the west. The influence of marine air tends to moderate temperatures and results in fairly similar average temperatures on the valley floor, in the foothills of the Coast Range, and in the central portion of the Coast Range in Yamhill County (table 2). This is not true of average annual rainfall, however. Rainfall increases significantly from the valley floor up into the Coast Range (table 2). In all three areas, 70 percent of the rain

⁵ Table 1 contains a partial list of plants found in The Butte Research Natural Area.

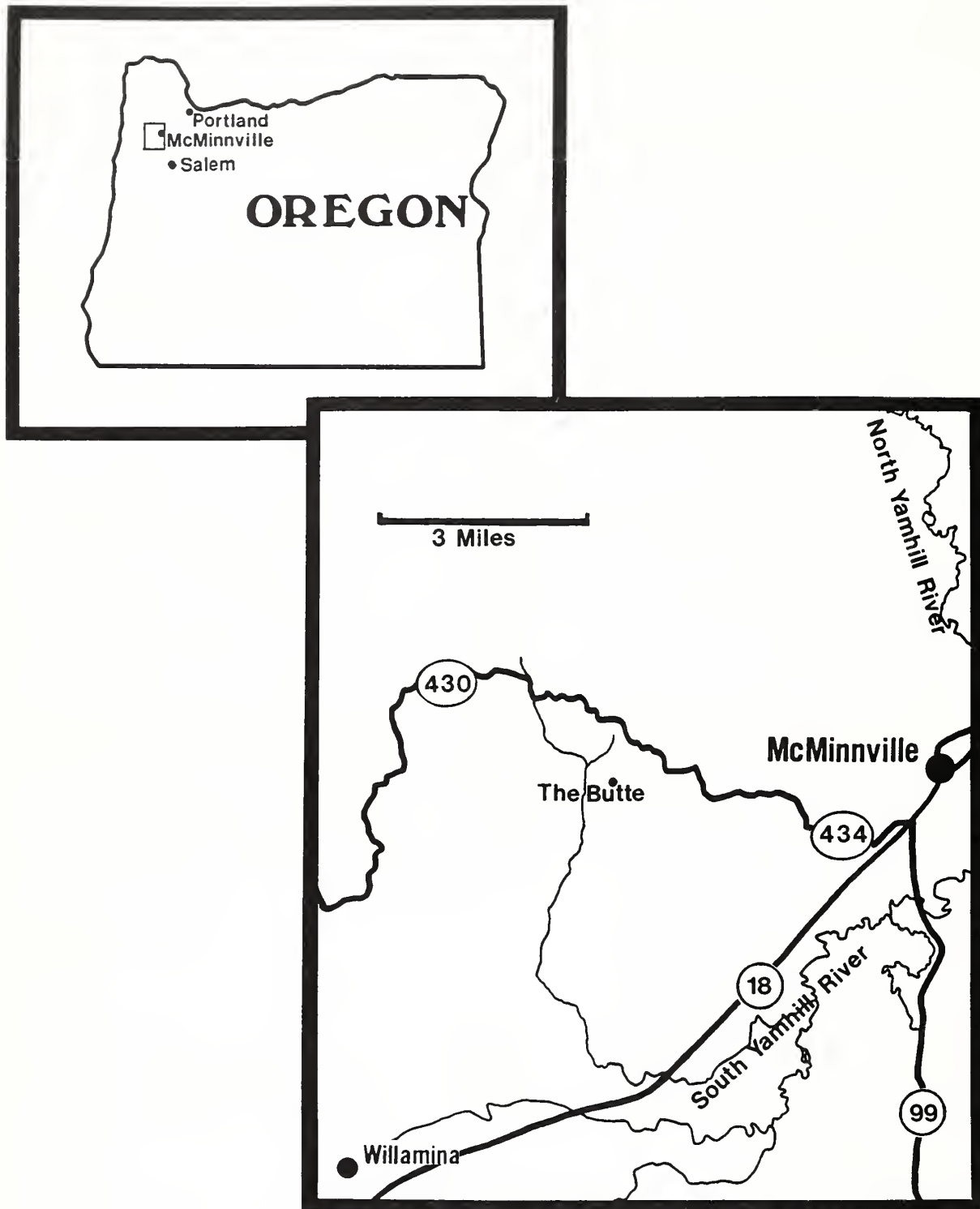


Figure 1—Location of The Butte Research Natural Area, in west-central Oregon.



Figure 2—East slope of The Butte Research Natural Area above a slope failure. Note pistol-butted trees.

occurs between November and March; 5 to 10 percent occurs from June through August.

The soils on the top of the ridge differ in depth over the fractured basalt. Soils deepen to as much as 40 centimeters as they extend away from the ridge noses on the north and south ends. The soils on the ridge noses are shallow, 1-10 cm, and were formed primarily from organic accumulation. Fractured basalt reaches the surface in these areas, thereby contributing to poor moisture-holding capacity. As the slopes break off to the west and east, the soils become nonskeletal (less than 35 percent rock by volume of soil) and deeper. The Butte soils mapped by the Soil Conservation Service include Melby, Olyic, and Jory soil series, which are generally deep, dry to moist, nonskeletal soils.

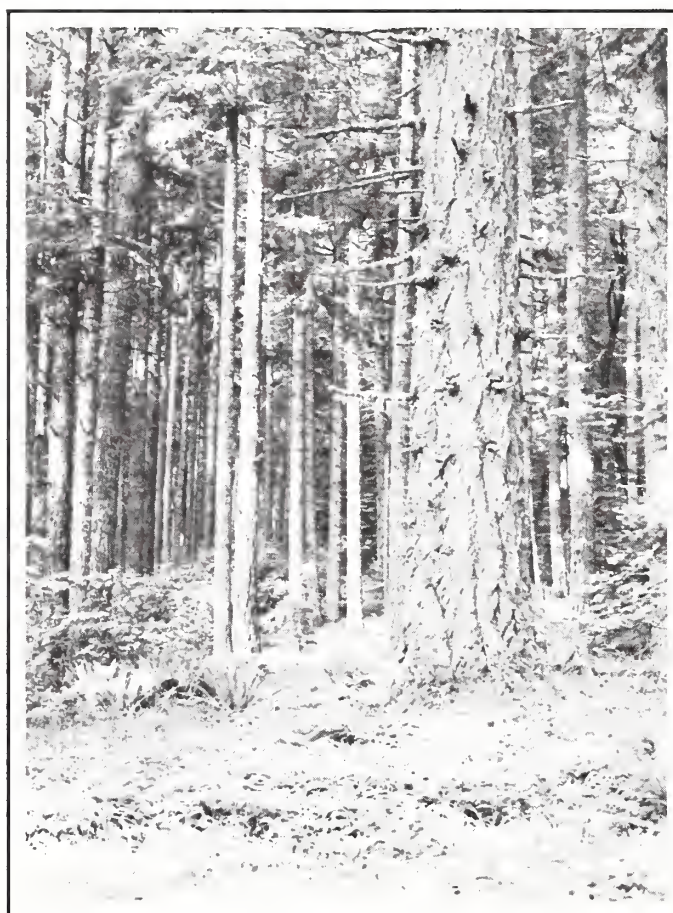
Vegetation

The north-south trending ridge on The Butte is narrower at the north end and broadens considerably, sloping upward very gently, toward the south. A small rock outcrop dominated by mosses (table 3) is on the north end. Tree cover on this end

is comprised of *Cornus nuttallii*, *Acer macrophyllum*, and *Quercus garryana*. *Symphoricarpus albus*, *Holodiscus discolor*, and *Corylus cornuta* var. *californica* grow on the north end of the ridge and along the edges of the ridge where the slope begins to steepen. The rest of this broad ridge is dominated by a lush, herbaceous understory of *Circaea alpina*, *Montia sibirica*, *Viola glabella*, *Galium aparine*, *Vancouveria hexandra*, *Thalictrum* sp., *Adenocaulon bicolor*, *Smilacina stellata*, and a grass, probably a *Melica* (fig. 3). The canopy is closed in most places and dominated by two size classes of *Pseudotsuga menziesii* (fig. 4). There are some very large, 1-2 meters in diameter at breast height (d.b.h.), open-grown *P. menziesii* on the north end, along the southeast side of the ridge, and on the upper slopes of the west side of the ridge. Many trees on the north end show evidence of past fires. Toward the south edge of the ridge are a few live and dead *Quercus garryana*. Regeneration of trees on the ridge is practically nonexistent, save for a few scattered *Abies grandis*. The southern boundary opens onto a south-facing slope that was cut in the last 20 years.



Figure 3—Herb-dominated ridge, with shrubs on The Butte Research Natural Area.



*Figure 4—Ridgetop in The Butte Research Natural Area with two age classes of *Pseudotsuga menziesii*.*



Figure 5—West slope in The Butte Research Natural Area is dominated by shrubs and *Polystichum munitum*.

The east-facing slopes break off sharply except at the extreme south end of The Butte. Shrubs dominate the breaks and appear in a few of the canopy openings. *Rosa gymnocarpa* is evident in the southeast corner. *Polystichum munitum* covers most of the east-facing slopes and often grows up to 1.5 meters tall (See fig. 2). The tree canopy is closed and composed primarily of *Pseudotsuga menziesii* with some large and small *Acer macrophyllum* scattered about in openings; *Cornus nuttallii* is found nearer the top of these slopes. Regeneration of coniferous tree species appears to be absent. Franklin and Dyrness (1973) describe a *P. menziesii* / *Acer circinatum* / *Polystichum munitum* community on north-facing slopes of the foothills of the Willamette Valley. This may be an east-slope variation of that community. The toeslope of the east side of The Butte is the most mesic part of the RNA. This area is dominated by *Rubus spectabilis*, *Athyrium felix-femina*, and *Equisetum* sp.

Holodiscus discolor and *Corylus cornuta* var. *californica* inhabit the west-facing slope edges but occur only as scattered individuals on the slopes. Small patches of *Gaultheria shallon* grow on the upper, steep slopes. *Polystichum munitum*

is the most dominant understory species, though it shares dominance with *Berberis nervosa* in some areas on the lower, more gentle slopes. Other dominant herbs are *Vancouveria hexandra*, *Adenocaulon bicolor*, and *Achlys triphylla*. Both *H. discolor* and *C. cornuta* var. *californica* increase as the slope levels out (fig. 5).

Large, seemingly old, *Pseudotsuga menziesii* form a somewhat open canopy on the steeper west slopes that is broken intermittently by large *Acer macrophyllum*. As the slope becomes gentler, the large, open-grown trees are mixed with smaller *P. menziesii*, 10-25 centimeters d.b.h. *Abies grandis* is regenerating successfully, though patchily, along the entire west side; diameters range from 10 to 50 centimeters. It is interesting that *P. menziesii* are regenerating in some areas along the southwest slopes, primarily under the larger *P. menziesii*. At the toeslope is a small area where the canopy opens, the large *P. menziesii* are less dense, and a few younger *P. menziesii* and numerous *A. macrophyllum* appear. This opening may be a small slope failure, though pistol-butted trees are not evident.

The lower southwest corner has been cut in the last 30-40 years. Stumps, with diameters ranging

from 0.5 to 2 meters, are scattered among young *P. menziesii*, *Abies grandis*, and *Acer macrophyllum*. *Acer macrophyllum* range in size from small saplings to trees 50 centimeters in d.b.h. Because of canopy closure, the understory is depauperate except for a few scattered *Polystichum munitum*.

The occurrence of *Berberis nervosa* and *Gaultheria shallon* on the west side indicates that the plant association here is different from that on the east side. Anderson (1967) describes two subtypes of a *Pseudotsuga menziesii*-*Abies grandis*/*Corylus cornuta* var. *californica*-*Holidiscus discolor* community in his classification of some *Acer circinatum* communities around Mary's Peak in the Oregon Coast Range. One subtype is dominated by *A. circinatum*, *C. cornuta*, *H. discolor*, and *Rosa gymnocarpa*. With the exception of the *A. circinatum*, this subtype might fit the upper slopes on the west side. The second subtype includes *Berberis nervosa*, *Polystichum munitum*, several herbaceous species, and *Gaultheria shallon*. It is questionable whether this is the type that exists on the lower slopes, as the *G. shallon* is diagnostic in Anderson's type, and is really restricted to the upper slopes on the west side of The Butte. It is interesting that both plant communities used to describe the west and east sides include *Acer circinatum*, but that species is found sporadically only on the west side of The Butte.

It is important to consider the relation of the vegetation, especially the tree component, at The Butte to presettlement and postsettlement vegetation. Before the mid-1850s, burning by Native Americans had a profound influence on the Willamette Valley and the surrounding foothills. It is well documented that Native Americans burned much of the valley annually (Boyd 1986, Cole 1977, Johannessen 1971, Sprague and Hansen 1946, Thilenius 1968). Lightning periodically started large crown fires (Morris 1934), but burning by Native Americans can generally be described as annual underburning with fires occasionally escaping and burning far up into the Cascade or Coast Ranges. David Douglas described the vegetation along the foothills as open forest or rolling oak hills, interspersed by large *Pinus ponderosa*, grading into dark fir-

covered mountains (Johannessen 1971). Written accounts of hills around the Yamhill River describe "Brown rolling oak hills rising into the dark green fir mountains..." (Johannessen 1971). Cole (1977) surmises that Fox Hollow Research Natural Area at 215-305 meters in elevation, southwest of Eugene, was dominated before 1850 by *P. ponderosa* with *Quercus garryana* in dry areas and *Abies grandis* in more mesic areas. Surveyors in 1854 wrote about oak and fir openings with the crest of the hills heavy to timber, usually fir (Johannessen 1971).

Burning by Indians ceased and fire suppression began with the coming of settlers in the mid-1800's. Profound changes in the vegetation began to occur. The oak openings around the margins of the valley and the lower hills became dense oak woods. These areas began to be invaded by *Pseudotsuga menziesii* that overtopped the oaks in less than 50 years (Johannessen 1971). Cole (1977) speculates that between 1850 and 1950 *Libocedrus decurrens* replaced *Pinus ponderosa* with a concurrent increase in hardwood species like *Quercus kelloggii*, *Acer macrophyllum*, *Alnus rubra*, *Cornus nuttalli*, and *Castanopsis chrysophylla*. *Pseudotsuga menziesii* and *Abies grandis* became much more abundant, and after 1950, *A. grandis* began to replace *P. menziesii* as the major reproducing species, particularly in more mesic areas.

One can only speculate about the vegetation at The Butte, as a comprehensive fire analysis has never been done. Because The Butte is on the valley margin, it was probably burned often, though not annually. Notes (with no cited references or tree ages) at the Salem BLM office state that trees on the northwest slopes were established about 1800 with timber on the remaining area established around 1900. The literature does not mention a fire around 1800. Morris (1934) provides detailed discussion of destructive fires that occurred throughout the margins, foothills, and mountains surrounding the Willamette Valley in 1902. He does not provide any specific evidence for fire at The Butte, though he does describe a fire that burned north of Willamina toward Hebo. There were so many fires that summer that many may not have been reported in the newspapers.

A student at Linfield College in McMinnville

took increment cores from trees throughout The Butte but chose only those trees less than 70 centimeters d.b.h. (Reynolds 1984). She counted numerous cores that predated and postdated 1902, but no trees older than 126 years. Because there are many trees along the ridge and on the west slopes of The Butte that are much larger than 70 centimeters d.b.h., her age data are limited. Many of the larger trees have fire scars. Whether these scars represent a 1902 fire, previous fires, or Indian burning is unclear. Reynolds' data clearly show *P. menziesii* was on The Butte in 1858.

We speculate that *P. menziesii* have always been present at The Butte, though they shared the canopy with *Quercus garryana*. The hardwoods on the east and west slopes probably became more abundant after fire suppression, as has the *Abies grandis*, which appear to be quite young. The larger *P. menziesii* are concentrated on the ridge top and on the west slope. This probably indicates that the east slope forest is younger and may have been burned during the 1902 fires. The east slopes have no *Q. garryana*, whereas the west side has some dead and barely living individuals still standing.

It is hard to speculate on the understory. There is little in the literature on the understory of the hillsides. On the "rolling oak hills" (Johannessen 1971), the understory was most likely dominated by grasses. If the slopes of The Butte were once rolling oak hills, *P. menziesii* may have been codominant because of the higher elevations and the moist climate around The Butte. It is also possible that the slopes have become moister since the suppression of fire and the canopy closure by *P. menziesii*. There are few grasses at The Butte and those are predominantly on the ridgetop. The dominance of *Polystichum munitum* is probably a result of fire suppression and canopy closure.

Fauna

The Butte RNA is a small area, not particularly diverse, and is surrounded primarily by agricultural land. Any large mammals using the area probably only pass through, with the one exception of deer. Deer trails are prevalent throughout The Butte, and because deer tend to use agricultural areas, The Butte may provide much

needed cover. A list of mammals believed to use the RNA is found in table 4. Birds in the RNA are listed in table 5, and reptiles and amphibians in table 6.

Research

No research studies are known to be in progress on the RNA. An in-depth age analysis of the RNA would yield much about vegetative succession since the arrival of the settlers. Because the area has been relatively undisturbed by activities like logging, agriculture, or grazing, there is clearly something to be learned about the development of these communities under fire suppression.

Maps and Aerial Photographs

The maps applicable to The Butte RNA are **Topographic**—Muddy Valley, Oregon, quadrangle, scale 1:24,000, issued by the U.S. Geological Survey in 1979; and **Geologic**—Geologic Map of Oregon West of the 121st Meridian, scale 1:500,000 (Peck 1961). The Bureau of Land Management, Salem District Office, can supply information on the most recent aerial photos and forest type maps for the area.

English Equivalents

- 1 centimeter (cm) = 0.4 inch
- 1 meter (m) = 3.3 feet
- 1 kilometer (km) = 0.6 mile
- 1 hectare (ha) = 2.5 acres
- $9/5\text{ }^{\circ}\text{C} + 32 = \text{ }^{\circ}\text{F}$

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Table 1—Partial list of plants found in The Butte Research Natural Area^a

Plant	Scientific name	Common name
Trees	<i>Abies grandis</i> (Dougl.) Forbes	Grand fir
	<i>Acer macrophyllum</i> Pursh	Big-leaf maple
	<i>Alnus rubra</i> Bong.	Red alder
	<i>Cornus nuttallii</i> Aud.	Pacific dogwood
	<i>Pseudotsuga menziesii</i> (Mirbel) Franco	Douglas fir
	<i>Quercus garryana</i> Dougl.	Oregon white oak
Shrubs	<i>Acer circinatum</i> Pursh	Vine maple
	<i>Berberis aquifolium</i> Pursh	Shining Oregongrape
	<i>Berberis nervosa</i> Pursh	Dull Oregongrape
	<i>Corylus cornuta</i> Marsh. var. <i>californica</i>	Hazelnut
	<i>Holodiscus discolor</i> (Pursh Maxim.)	Creambush ocean-spray
	<i>Prunus emarginata</i> (Dougl.) Walp.	Plum
	<i>Rhus diversiloba</i> T. & G.	Poison oak
	<i>Ribes lacustre</i> (Pers.) Poir.	Swamp gooseberry
	<i>Rosa gymnocarpa</i> Nutt.	Baldhip rose
	<i>Rubus parviflorus</i> Nutt.	Thimbleberry
	<i>Rubus spectabilis</i> Pursh	Salmonberry
	<i>Rubus ursinus</i> Cham. & Schlecht.	Douglasberry
	<i>Symphoricarpos albus</i> (L.) Blake	Common snowberry
	<i>Vaccinium parvifolium</i> Smith	Red bilberry
	Herbs	<i>Achlys triphylla</i> (Smith) DC.
<i>Adenocaulon bicolor</i> Hook.		Trail-plant
<i>Anemone deltoidea</i> Hook.		Threel-leaf anemone
<i>Aquilegia formosa</i> Fisch.		Red columbine
<i>Arenaria macrophylla</i> Hook.		Bigleaf sandwort
<i>Asarum caudatum</i> Lindl.		Wild ginger
<i>Athyrium filix-femina</i> (L.) Roth.		Lady-fern
<i>Calypto bulbosa</i> (L.) Oakes.		Fairy-slipper
<i>Campanula scouleri</i> Hook.		Scouler's harebell
<i>Cardamine</i> L. spp.		Bittercress
<i>Chrysosplenium glechomaefolium</i> Nutt.		Western golden-carpet
<i>Circaea alpina</i> L.		Enchanter's nightshade
<i>Cirsium</i> Mill spp.		Thistle
<i>Corallorhiza</i> Chat. spp.		Coral-root
<i>Cystopteris fragilis</i> (L.) Bernh.		Brittle bladder-fern
<i>Dicentra formosa</i> (Andr.) Walp.		Pacific bleedingheart
<i>Disporum hookeri</i> (Torr.) Nicholson		Hooker fairy-bell
<i>Equisetum</i> L. spp.		Horsetail
<i>Erythronium oregonum</i> Applegate		Giant fawn-lily
<i>Fragaria vesca</i> L.		Strawberry
<i>Galium aparine</i> L.		Bedstraw
<i>Galium triflorum</i> Michx.		Sweetscented bedstraw
<i>Geranium oregonum</i> Howell		Western geranium
<i>Goodyera oblongifolia</i> Raf.		Western rattlesnake-plantain

Table 1—Partial list of plants found in The Butte Research Natural Area^a

Plant	Scientific name	Common name
	<i>Hieracium albiflorum</i> Hook.	White-flowered hawkweed
	<i>Hydrophyllum tenuipes</i>	Slender-stem waterleaf
	<i>Iris tenax</i> Dougl.	Oregon iris
	<i>Lactuca</i> L. spp.	Lettuce
	<i>Ligusticum apiifolium</i> (Nutt.) Gray	Celery-leaved lovage
	<i>Linnaea borealis</i> L.	Twinflower
	<i>Lithophragma parviflora</i> (Hook.) Nutt.	Smallflowered fringecup
	<i>Melica</i> L. spp.	Melic
	<i>Monotropa uniflora</i> L.	Indian-pipe
	<i>Montia perfoliata</i> (Donn) Howell	Miner's lettuce
	<i>Montia sibirica</i> (L.) Howell	Western spring beauty
	<i>Nemophila parviflora</i> Dougl.	Small-flowered nemophila
	<i>Osmorhiza chilensis</i> H. & A.	Mountain sweet-root
	<i>Poa</i> L. spp.	Bluegrass
	<i>Polystichum munitum</i> (Kaulf.) Presl	Sword-fern
	<i>Pteridium aquilinum</i> (L.) Kuhn.	Bracken
	<i>Ranunculus uncinatus</i> D. Don	Little buttercup
	<i>Rumex acetosella</i> L.	Sheep sorrel
	<i>Smilacina racemosa</i> (L.) Desf.	False spikenard
	<i>Smilacina stellata</i> (L.) Desf.	Starry solomon-plume
	<i>Stachys</i> L. spp.	Hedge-nettle
	<i>Tellima grandiflora</i> (Pursh) Dougl.	Fringecup
	<i>Thalictrum</i> L. spp.	Meadowrue
	<i>Trientalis latifolia</i> Hook.	Western starflower
	<i>Trillium ovatum</i> Pursh	White trillium
	<i>Urtica dioica</i> var. <i>lyallii</i> (Wats.) Hitchc.	Stinging nettle
	<i>Vancouveria hexandra</i> (Hook.) Morr. & Dec.	White inside-out-flower
	<i>Vicia</i> L. spp.	Vetch
	<i>Viola glabella</i> Nutt.	Stream violet
	<i>Viola nuttallii</i> var. <i>praemorsa</i> (Dougl.) Wats.	Canary violet

^a Nomenclature follows Hitchcock and Cronquist (1976).

Table 2—Temperatures and precipitation for the valley floor, foothills of the Coast Range, and the Coast Range, Yamhill County, OR.^a

Item	Valley floor	Foothills Coast Range	Coast Range
January maximum temperature	7 °C (45 °F)	6 °C (44 °F)	7 °C (45 °F)
January minimum temperature	-0.5 °C (31 °)	-0.5 °C (31 °F)	-0.5 °C (31 °F)
July maximum temperature	28 °C (83 °F)	26 °C (79 °F)	25 °C (77 °F)
July maximum temperature	9 °C (49 °F)	10 °C (50 °F)	7 °C (46 °F)
Average annual precipitation	109 cm (43 in)	158 m (62.1 in)	323 cm (127.2 in)

^aSternes, Gilbert L. 1964. The climate of Yamhill County. Weather Bureau State Climatologist, 310 Post Office Building, 511 NW Broadway, Portland, OR 97209. 26 p.

Table 3—Cryptograms collected in The Butte Research Natural Area.^a

Class	Family	Genus and species
Hepaticae (liverworts) ^b	Porelleaceae	<i>Porella navicularis</i>
	Lophocoleaceae	<i>Chiloscyphus polyanthus</i>
Lichenae (lichens) ^c	Strictaceae	<i>Lobaria oregana</i>
	Peltigeraceae	<i>Peltigera polydactyla</i>
	Parmeliaceae	<i>Parmelia sulcata</i>
	Sphaerophoraceae	<i>Sphaerophorus globosus</i>
	Lecanoraceae	<i>Ochrolechia pallescens</i>
Musci (mosses) ^d	Dicranaceae	<i>Dicranus fuscescens</i>
		<i>Dicranus tauricum</i>
	Grimmiaceae	<i>Rhacomitrium heterostichum</i>
		<i>Rhacomitrium varium</i>
		<i>Dendroalsia abietina</i>
	Cryphaeaceae Brachytheciaceae	<i>Isothecium stoloniferum</i>
		<i>Brachythecium frigidum</i>
		<i>Homalothecium fulgenscens</i>
Hypnaceae Rhytidiaceae	<i>Hypnum subimponens</i>	
	<i>Rhytidiadelphus triquetrus</i>	

^aIdentification of cryptograms by Glenn Walthall, Portland Audobon Society.

^bNomenclature follows Stotler and Crandall-Stotler (1977).

^cNomenclature follows Hale and Culberson (1975).

^dNomenclature follows Lawton (1971).

Table 4—Mammals in The Butte Research Natural Area.^a

Order	Scientific name	Common name
Insectivora	<i>Neurotrichus gibbsi</i>	Shrew-mole
	<i>Scapanus orarius</i>	Pacific mole
	<i>Sorex pacificus</i>	Pacific shrew
	<i>Sorex trowbridgei</i>	Trowbridge shrew
	<i>Sorex vagrans</i>	Vagrant shrew
Chiroptera	<i>Eptesicus fuscus</i>	Big brown bat
	<i>Myotis lucifugus</i>	Little brown myotis
Lagomorpha	<i>Sylvilagus bachmani</i>	Brush rabbit
Rodentia	<i>Aplodontia rufa</i>	Mountain beaver
	<i>Clethrionomys occidentalis</i>	California redbacked vole
	<i>Erethizon dorsatum</i>	Porcupine
	<i>Eutamias townsendi</i>	Townsend's chipmunk
	<i>Glaucomys sabrinus</i>	Northern flying squirrel
	<i>Microtus longicaudus</i>	Longtail vole
	<i>Microtus oregoni</i>	Oregon vole
	<i>Microtus townsendi</i>	Townsend vole
	<i>Neotoma cinerea</i>	Bushytail woodrat
	<i>Peromyscus maniculatus</i>	Deer mouse
	<i>Phenacomys longicaudus</i>	Tree phenacomys
	<i>Sciurus griseus</i>	Western gray squirrel
	<i>Tamiasciurus douglasi</i>	Chickaree
	<i>Thomomys mazama</i>	Mazama pocket gopher
<i>Zapus trinotatus</i>	Pacific jumping mouse	
Carnivora	<i>Canis latrans</i>	Coyote
	<i>Lynx rufus</i>	Bobcat
	<i>Mephitis mephitis</i>	Striped skunk
	<i>Spilogale putorius</i>	Spotted skunk
	<i>Urocyon cinereoargenteus</i>	Gray fox
	<i>Ursus americanus</i>	Black bear
Artiodactyla	<i>Odocoileus hemionus</i>	Blacktail deer

^aNomenclature follows Burt and Grossenheider (1976). Mammals listed are believed to use the area at some time of year. Information supplied by Wayne Logan, wildlife biologist, U.S. Department of the Interior, Bureau of Land Management, Salem, Oregon.

Table 5—Birds in The Butte Research Natural Area.*

Order	Scientific name	Common name
Falconiformes	<i>Accipiter cooperii</i>	Cooper's hawk
	<i>Accipiter striatus</i>	Sharp-shinned hawk
	<i>Buteo jamaicensis</i>	Red-tailed hawk
	<i>Cathartes aura</i>	Turkey vulture
Galliformes	<i>bonasa umbellus</i>	Ruffed grouse
	<i>Callipepla californica</i>	California quail
Columbiformes	<i>Columba fasciata</i>	Band-tailed pigeon
	<i>Zenaida macroura</i>	Mourning dove
Strigiformes	<i>Aegolius acadicus</i>	Northern saw-whet owl
	<i>Bubo virginianus</i>	Great horned owl
	<i>Glaucidium gnoma</i>	Northern pygmy-owl
	<i>Otus kennicottii</i>	Western screech-owl
	<i>Tyto alba</i>	Barn owl
Apodiformes	<i>Selasphorus rufus</i>	Rufous hummingbird
Piciformes	<i>Colaptes auratus</i>	Common flicker
	<i>Dryocopus pileatus</i>	Pileated woodpecker
	<i>Picoides pubescens</i>	Downy woodpecker
	<i>Picoides villosus</i>	Hairy woodpecker
	<i>Sphyrapicus varius</i>	Yellow-bellied sapsucker
Passeriformes	<i>Aphelocoma coerulescens</i>	Scrub jay
	<i>Carduelis pinus</i>	Pine siskin
	<i>Carpodacus cassinii</i>	Cassin's finch
	<i>Catharus guttatus</i>	Hermit thrush
	<i>Catharus ustulatus</i>	Swainson thrush
	<i>Certhia americana</i>	Brown creeper
	<i>Coccothraustes vespertinus</i>	Evening grosbeak
	<i>Contopus borealis</i>	Olive-sided flycatcher
	<i>Contopus sordidulus</i>	Western wood-pewee
	<i>Corvus branchyrhynchos</i>	American crow
	<i>Corvus corax</i>	Common raven
	<i>Cyanocitta stelleri</i>	Steller's jay
	<i>Dendroica coronata</i>	Yellow-rumped warbler
	<i>Dendroica occidentalis</i>	Hermit warbler
	<i>Empidonax hammondi</i>	Hammond's flycatcher
	<i>Ixoreus naevius</i>	Varied thrush
	<i>Junco hyemalis</i>	Dark-eyed junco
	<i>Melospiza Melodia</i>	Song sparrow
<i>Myadestes townsendi</i>	Townsend's solitaire	
<i>Parus gambeli</i>	Mountain chickadee	
<i>Parus rufescens</i>	Chestnut-backed chickadee	

Table 5—Birds in The Butte Research Natural Area.^a

Order	Scientific name	Common name
	<i>Regulus calendula</i>	Ruby-crowned kinglet
	<i>Regulus satrapa</i>	Golden-crowned kinglet
	<i>Sialia mexicana</i>	Western bluebird
	<i>Sitta canadensis</i>	Red-breasted nuthatch
	<i>Troglodytes troglodytes</i>	Winter wren
	<i>Turdus migratorius</i>	American robin
	<i>Vireo huttoni</i>	Hutton's vireo

^aNomenclature follows Chandler and others (1983). Birds listed are believed to use the area at some time of year. Information supplied by Wayne Logan, wildlife biologist, U.S. Department of the Interior, Bureau of Land Management, Salem, Oregon.

Table 6—Reptiles and amphibians in The Butte Research Natural Area.^a

Order	Scientific name	Common name
Anura	<i>Bufo boreas</i>	Western toad
	<i>Hyla regilla</i>	Pacific treefrog
	<i>Rana boylei</i>	Foothill yellow-legged frog
Caudata	<i>Ambystoma gracile</i>	Northwestern salamander
	<i>Plethodon dunni</i>	Dunn's salamander
	<i>Rhyacotriton olympicus</i>	Olympic salamander
	<i>Taricha granulosa</i>	Rough-skinned newt
Squamata	<i>Charina bottae</i>	Rubber boa
	<i>Gerrhonotus coeruleus</i>	Northern alligator lizard
	<i>Pituophis melanoleucus</i>	Gopher snake
	<i>Thamnophi elegans</i>	Western terrestrial garter snake
	<i>Thamnophis sirtalis</i>	Common garter snake

^a Nomenclature follows Stebbins (1966). Reptiles and amphibians listed are believed to use the area at some time of year. Information supplied by Wayne Logan, wildlife biologist, U.S. Department of the Interior, Bureau of Land Management, Salem, Oregon.



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