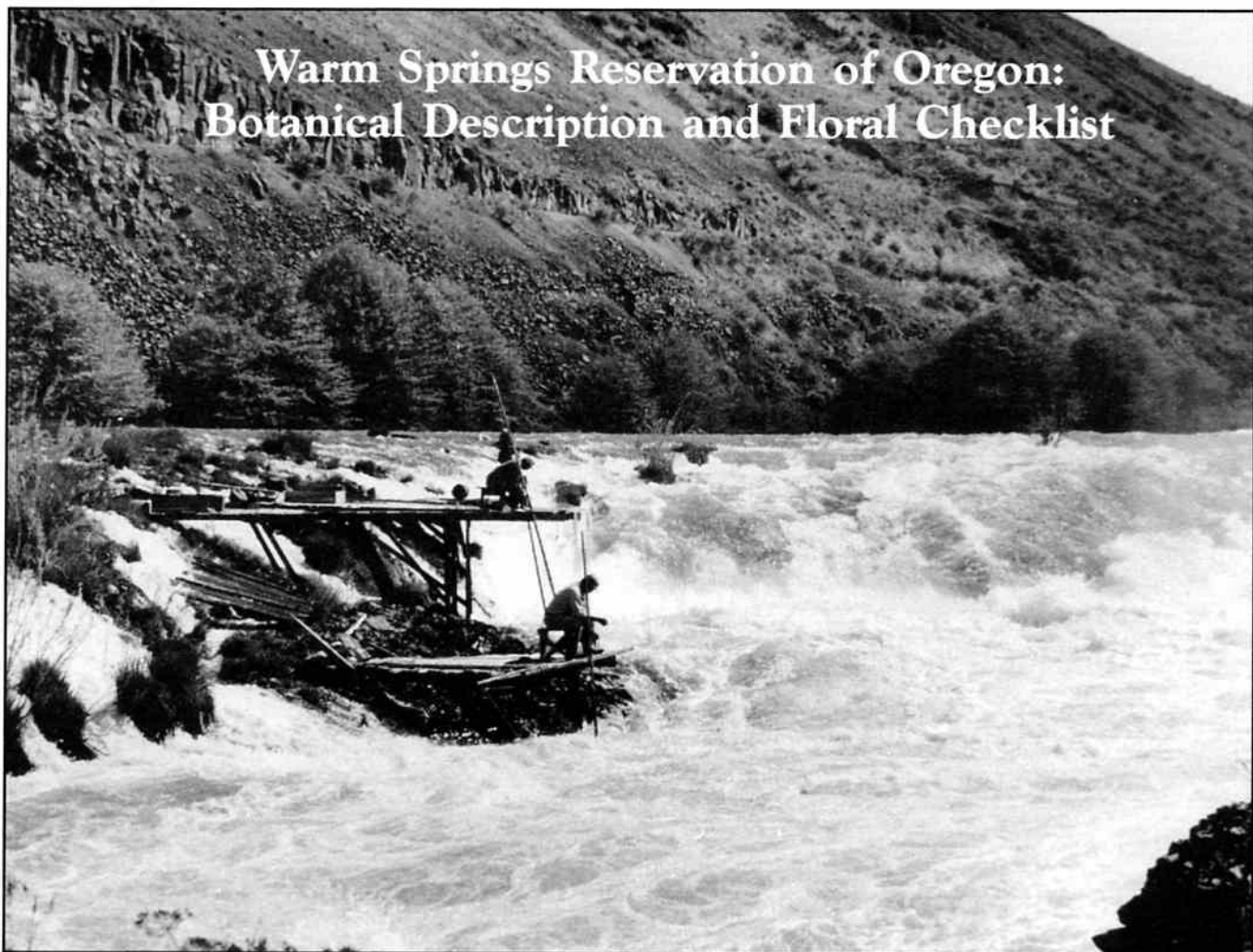


Warm Springs Reservation of Oregon: Botanical Description and Floral Checklist



OREGON STATE HIGHWAY PHOTO 7171, COURTESY DESCHUTES COUNTY HISTORICAL SOCIETY

Warm Springs Reservation, from the Deschutes River, ca. 1930s. Indians fishing near Maupin, OR. in Wasco County, in the traditional manner.

By **MARJORIE L. ETTINGER** and **SUSAN E. HARLESS**

Physiographic Description

The Warm Springs Reservation of Oregon blankets the eastern slope of the Cascade Divide from just south of Mt. Hood to the south shoulder of Mt. Jefferson. It reaches to the deep, basalt-rimmed canyons of the Deschutes and Metolius canyons on the east and south, and encompasses over 640,000 acres of snow-capped mountain, forest, high desert and river canyon country. The largest Reservation in Oregon, it is bigger than the entire state of Rhode Island. Its elevation ranges from 10,497 feet at the summit of Mt. Jefferson, to 1,000 feet along the Deschutes River Canyon at the northeastern corner of the Reservation. The major portion of the Reservation is located in Jefferson and Wasco counties, although fragments are in Clackamas (the headwaters of the Clackamas River) and Marion counties (Breitenbush Lake).

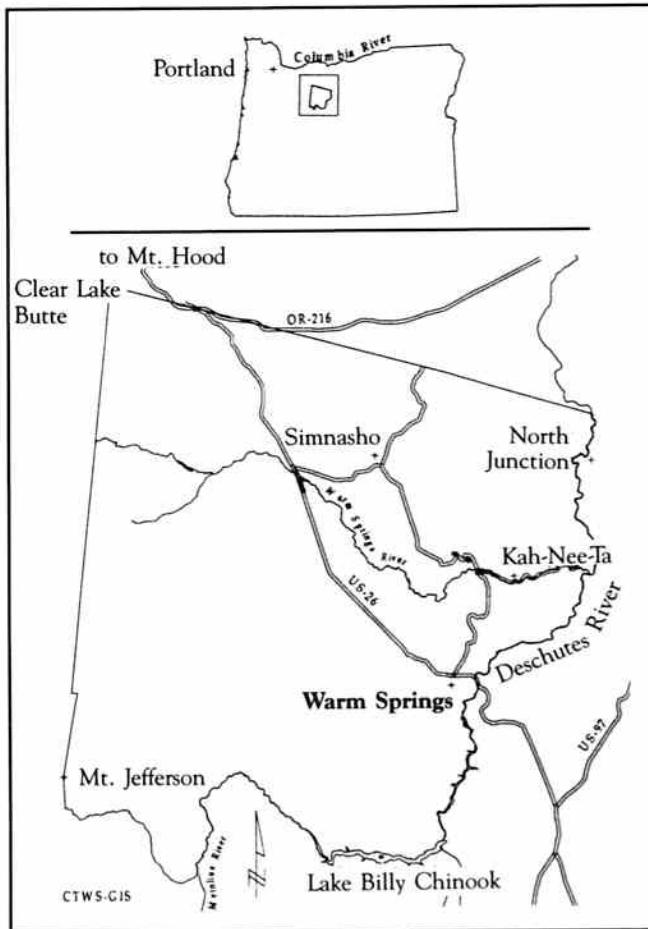
The Reservation has had only limited access for non-Indians since its creation by treaty with the Middle Oregon Indians in 1855. Two bands of inland Native cultures, the Warm Springs (Sahaptin) and the Wasco (Chinookan), were settled on the Reservation in 1859. A third band from eastern

Oregon, the Northern Paiute (a Great Basin culture), joined them in 1879. These three bands are now known collectively as the Confederated Tribes of the Warm Springs Reservation of Oregon.

In 1972, the Reservation's western and northern boundaries were greatly adjusted during a re-survey of the boundaries, correcting a significant deviation from the original treaty description of the lands. This reconfiguration now incorporates the lands known as the McQuinn Strip.

Reservation lands are accessible from only two highways; US Highway 26 (completed in 1948) transects the Reservation northwest to southeast to Madras, and State Highway 126 follows along its northern border to Maupin. A paved road from Highway 126 traverses the Reservation through Simnasho and the resort community of Kah-Nee-Tā to the settlement at Warm Springs.

The Reservation has been kept intact since the original treaty, and has remained largely undeveloped, with the exception of some logging and limited cattle and wheat ranching



Warm Springs Reservation of Oregon.

activities. The flora is therefore generally undisturbed by commerce, cattle or cars, and provides a unique glimpse into the evolution and natural history of a semi-arid region in the absence of culturally induced fires. It was this pristine botanical condition that interested the Ettingers.

Human Pre-History

During the historic period, no documented tribes or bands of Native Americans had permanent encampments on the Reservation lands. However, there were numerous sites of intermittent, semi-permanent seasonal usage of land and the botanical, riverine and faunal resources. The nearest known continuously occupied area was just to the north of the Reservation at Celilo Falls, near present-day The Dalles.

Archeological investigations undertaken in conjunction with construction on the Reservation have recently been conducted at several important sites that have been radiocarbon dated to more than 9,000 years b.p. (before present). Indications are that previous indigenous populations were also of Plateau Culture heritage with baskets, woven mats, and similar artifacts well represented. Subsistence was primarily dependent on seasonal rounds during which fish, roots, seeds and berries, all available in abundance on Reservation lands, were harvested in turn.

Reports from the earliest Euro-American explorations along

the Columbia River, the Lewis and Clark Expedition of 1804-06 which passed eighty miles to the north, describe The Dalles as an important trading center for all Western tribes and cultures. The primary access to The Dalles from the south and east was via an Indian trail along the Deschutes River canyon bordering the current eastern Reservation boundary.

Early Botanical Exploration of the Reservation

Records of the natural resources, specifically the botanical bounty of the Reservation lands, are scarce. The earliest botanical explorations of these lands were restricted by seasonal and access constraints.

In December 1825, Peter Skeen Ogden, Finian McDonald and Thomas McKay, trappers from the Hudson's Bay Company out of Fort Vancouver, passed through the Reservation, making few notes on the botany of the area due to the winter season. Late in the fall of 1834, and once more in the winter of 1843, Nathaniel J. Wyeth traveled through the area. Again, no significant journal entries pertain to the botany of the area from his expeditions.

John Strong Newberry, M.D., a physician/botanist/geologist with the Pacific Railroad Survey party under the direction of Lts. R.S. Williamson and Henry L. Abbott came through the Deschutes and Metolius canyons in September and October 1855. Newberry was the only trained botanist to leave written records of his travels, but he did not cross Reservation lands, travelling only along the Indian trail that follows its eastern boundary. In the introduction to his "Botanical Report of the Route," he stated that his intention was to study the botany of the region "to discern those phenomena which have controlled the radiation of species from their original centers of creation." This statement was published four years before Darwin's *Origin of the Species*.

Other early European and American botanists such as David Douglas, Thomas Jefferson Howell, Thomas Nuttall, William Canby, Edward Greene, and William Cusick have left no reports of travels to or plants acquired from Reservation lands.

In 1949, Drs. David and Kathrine French, anthropologists and ethnobotanists from Reed College in Portland, kindled scientific interest in the natural resources of the Reservation. They spent two summers and multiple subsequent visits studying the cultural elements, linguistics, and ethnobotany of the tribes residing on the Reservation, focusing primarily on the Wascos. Their studies concentrated on the cultural plant areas of the Reservation, and did not extend into the remote areas. A significant private herbarium and an unpublished manuscript on the ethnobotanical and medicinal plants of the Reservation resulted. Several papers citing notable plants, range extensions, and cultural uses of plants were also published as a result of studies supervised by Dr. David French (see References).

In the mid-1980s further studies of the plant associations and ecological domains of the Reservation were undertaken by employees of the Bureau of Indian Affairs and the tribal Department of Forestry. These investigations resulted in a 600+

specimen vascular plant herbarium that was created by Frank Marsh, Richard Helliwell, Jean Rodgers and Rick Krause of the Warm Springs Department of Forestry.

Informal botanical studies and photography were begun in 1979 by Marjorie and Richard Ettinger and have continued intermittently until 1995. With annual letters of permission from the Tribal Council, the Ettingers have collected in many previously inaccessible remote and mountainous areas of the Reservation, often traveling by horseback, on foot, or by four-wheel drive vehicle.

Geology of the Reservation

A significant portion of north central Oregon has been labeled the Deschutes-Umatilla Plateau, and a large portion of these high lava plains created by the Columbia flood basalts, dating from 4-16 my (million years ago), comprise the surface geology of the Warm Springs Reservation.



Current photo of Deschutes River shows greatly increased vegetation, primarily juniper and sage, probably resulting from the decrease in fires on the Reservation in the past 140 years.

On the western shoulder of the Reservation is the spectacular barrier of the High Cascades, created within the past few million years. Along this portion of the Reservation, andesitic lava flows and associated ash flows overlay much older layers of lava which flooded this area during the Miocene epoch about 16 my. Heavily glaciated features are visible on these slopes.

The plateau of Columbia flood basalts is deeply dissected by several major rivers and many smaller tributaries: the Deschutes, the Metolius, Warm Springs, and White Water Rivers, and Mill and Boulder Creeks.

Outcrops of even older ash flows, called the John Day Formation (20-35 my) and the Clarno Formation (35-50 my), have also been identified. These often appear as deep layers of light-colored pumice or as orangish prominences of welded tuff, best observed in the eastern portion and Mutton Mountains of the Reservation.

The high lava cap, seen best when entering the Reservation from the south, originated from Tetherow and Round Buttes

north of Redmond about five million years ago. More recent events, such as the Newberry lava flows from the south or the floods from Glacial Lake Missoula to the north had little or no effect on the geology of Warm Springs.

Soils and Habitats

Rainfall on the Reservation varies widely. Along the Cascade crest, there is plentiful snow and water from permanent snowfields and glaciers of Mt. Jefferson and other Cascade slopes. Thirty-six miles to the east, along the banks of the Deschutes River, rainfall drops to an average of less than 10 inches annually. Not only are there severe climatic conditions related to rainfall, but the generally great elevation range (1,000 feet to over 10,000 feet) combines to create a variety of habitats.

There are several major habitats that accommodate a wide variety of plants. The major communities can be described as: rocky scabland with grasses and herbs dominating; sagebrush steppe, juniper (*Juniperus sp.*) forests, generally indicating deeper soils; pine (*Pinus sp.*) forests, indicating more rainfall; Douglas fir-mountain hemlock, (*Pseudotsuga menziesii* and *Tsuga mertensiana*) closer to the mountains and higher in elevation; subalpine fir (*Abies lasiocarpus*); whitebark pine (*Pinus albicaulis*); and alpine, generally above 6,000 feet in elevation. Several white oak groves (*Quercus garryana*) are scattered along the fringes of the Mutton Mountains in the northeastern portion of the Reservation. Richard Helliwell (1991) described the botanical associations in these forested areas.

Along the rivers, streams and lakes at all altitudes are luxurious meadows and riparian habitats. The older John Day derived soils in the eastern portion of the Reservation degrade to heavy clay. There are also intermittent accumulations of glacial till and gravel and some clay stream banks. Otherwise the soil is a generally thin, sandy-pumice or sandy-loam volcanic tephra.

Reservation soils were surveyed by contract with Weyerhaeuser scientists in 1980, resulting in a privately published document describing the soil resources of the entire Reservation (Jenkins: 1981).

Paleobotany

(*Most fossil flora identifications from the Warm Springs area have been done by Melvin Ashwill of Madras, with assistance from Steven Manchester, paleobotanist from the University of Florida, and from Gaylord Brooks on fossil woods, from Boring, Oregon. Ted Fremd, vertebrate paleontologist from the John Day Fossil Beds National Monument, John Day, Oregon, identified fossil animal remains and assisted with dating some fossiliferous flora.)

The moist subtropical environment of the Eocene in this region gradually gave way to the harsher, semi-arid climate seen on the Reservation today. Due in part to global climatic conditions, this change also reflects the growing influence of the Cascade Range and its increasingly significant rain shadow over the last 25 million years.

The oldest known fossil floras on the Warm Springs Reservation date to the Oligocene, est. 32 my, from a climate that was moist, warm and temperate in nature. Exposed fossil beds in the Whitehorse Rapids Flora from the lower John Day Formation include pine (*Pinus sp.*), Chinese fir (*Cunninghamia sp.*), dawn redwood (*Metasequoia sp.*), chestnut (*Castanea sp.*), white oak (*Quercus sp.*), alder (*Alnus sp.*), sweet fern (*Comptonia sp.*), walnut (*Juglans sp.*), and willow (*Salix sp.*).

The Health Ranch Fossil flora are from the Upper John Day Formation and are estimated to be 22-23 my. They describe a more temperate climate. Significant additions to the paleobotanical list from this site include the oldest Reservation findings of maple (*Acer sp.*), Oregon grape (*Berberis sp.*), and huckleberry or rhododendron (*Ericaceae*). Maple (*Acer sp.*) and several unidentified leaves are also found at the nearby Horse Trap Flora from the Miocene, 18 my, in the uppermost John Day Formation.

The Foreman Point Flora from the Miocene era, 15 my, comes from the Simtustus Formation along the north flank of the Mutton Mountains and indicates a significantly drier, cooler condition. Such diverse specimens as horsetail (*Equisetum sp.*), maiden hair tree (*Ginkgo sp.*), as well as avocado genus (*Persea sp.*) and moonseed (*Cocculus sp.*) are found in addition to those previously listed.

The Dry Hollow Flora, from near the Deschutes River along the Jackson Trail, and the Kah-Nee-Ta Flora, from below the rimrocks above Kah-Nee-Ta Lodge, are from the Deschutes Formation and are about 6 my. These floras are from the Miocene and include pines (*Pinus sp.*), with associated cone impressions and log molds, cedar (*Thuja sp.*), and Oregon grape (*Mahonia sp.*).

The Deschutes Flora, located about a mile east of the Reservation on the Warm Springs grade, dates from 5.3 my, and includes willows (*Salix sp.*), cottonwoods (*Populus sp.*), and box elders (*Acer sp.*) in a condition nearing modern semiaridity. According to Ashwill, oak (*Quercus sp.*) is one of the most persistent fossil plants found on the Reservation.

Economic Botany

Traditionally, Native cultures have embraced the obligation to care for their natural resources. The Warm Springs tribes used the native roots, fish, berries and game for food, as well as plants for technological and medicinal uses without visible detrimental impact. Fire may have also been used selectively, especially to insure a plentiful huckleberry (*Vaccinium sp.*) harvest, and these fields were vigorously tended, burned and replanted. Horses grazed freely on native grasses.

Under an earlier Reservation protocol, agricultural crops and cattle ranching were encouraged. Agriculture agents from Oregon State University arrived on site to give the Indians advice and encouragement in these pursuits. A small canal was built to irrigate a suitable area and family gardens were promoted. Due to the small population, however, these practices never had much permanent impact on the overall natural habitat. However, cattle grazing did denude some slopes of the native flora, especially along the Deschutes River.

Today, these agricultural efforts have been mostly abandoned. The resulting effects have been the introduction of weedy species — cheatgrass (*Bromus tectorum*), mustards (*Cruciferae*), chenopods (*Chenopodiaceae*), and mullein (*Verbascum sp.*). There are also many introduced species, such as crested wheat (*Agropyron sp.*).

Timber harvesting has increased in the last fifty years, with heavy cutting during the 1980's. Heavily logged areas are small and scattered, and today they support the greatest diversity of herbaceous growth. An increasingly sophisticated forest management program now concentrates on eradicating unnecessary timber harvesting roads to allow for greater growth potential.

Lightening and human caused fires periodically sweep quickly through portions of the Reservation, destroying mostly grasses, junipers, and sagebrush. A huge fire in 1994 ravaged over one-third of the eastern portion of the Reservation, finally stopping on the western bank of the Deschutes River.

The Forestry Department, under the auspices of the Bureau of Indian Affairs on the Reservation, has been systematically mapping the Reservation's natural resources, including both its economic and cultural botany, through the Geographical Information System (GIS).

Ethnobotany

Columbia River and Plateau peoples have used the Reservation lands for millennia, resulting in intensification of plant growth in some cultural plant areas. The most significant cultural plants are used for food, ceremonies, medicines and utilitarian items.



RICHARD ETTINGER

Lomatium cous. Known as "kous" by the Indians, it is one of the first roots to be harvested, and is honored annually at the Root Festival ceremony when thanks is offered for abundant food.

Eugene Hunn notes at least twenty-five species that are frequently dug for food. Edible underground plant parts include various tubers, corms, bulbs, roots, and underground sprouts. Root food species are primarily biscuitroot (*Lomatium sp.*), bitterroot (*Lewisia rediviva*), camas (*Camassia sp.*), balsamroot (primarily as an emergency food) (*Balsamorhiza sp.*), and Indian carrot or yampah (*Perideridia gairdneri*). Not all are found in harvestable quantities on the Reservation.

Plants picked for food include currant (*Ribes sp.*), huckleberries and blueberries (*Vaccinium sp.*), chokecherries (*Prunus*

virginiana), salal (*Gaultheria sp.*) and serviceberries (*Amelanchier alnifolia*). Lichens (*Alectoria fremontii*) were gathered, particularly from the Mutton Mountains, and pit-baked as a delicacy or "Indian pudding." Acorns were gathered from the Garry Oak (*Quercus garryana*). Most roots, seeds, and fruits were gathered and eaten in season. Any excess was dried for use throughout the year or saved for times of drought or need. Despite centuries of use, these resources have apparently not declined in availability.



RICHARD ETTINGER

Camassia quamash. Favored root food of Plateau Indians.

Indian hemp (*Apocynum cannabinis*), tule or bullrush (*Scirpus acutus*), willow (*Salix sp.*), and cattail (*Typha latifolia*) were important for household items, basketry and mats. Juniper (*Juniperus sp.*) was used for weaponry, and mountain mahogany (*Cercocarpus ledifolius*) was heat-treated and hardened for use as root digging sticks. Other important utilitarian plants include lichens (*Letharia vulpina*) for tanning and coloring hides, fir branches (*Abies sp.*) for sweat houses and wild roses (*Rosa sp.*) for purification and cleansing.

Kathrine French states that medicinal plants were primarily used according to individual family recipes passed down through oral tradition, in contrast to having a cultural pharmacopeia, in which medicines would be generally used throughout the cultures by many people for the same ailments.

Medicinal, ceremonial, sacred and spiritual uses for plants are not frequently discussed by the Native Americans on the Reservation. For more information regarding plants generally used by Chinookan and Sahaptin peoples for these purposes, see Eugene Hunn (1990).

Botany of the Reservation

A botanical checklist of over 1000 identified varieties has been compiled from all the known collections of Warm Springs plants. The list reflects a varied and stable habitat, with wide diversity due to the broad range of geographical and climatic conditions. It also includes many plants introduced by farming and grazing conditions that are found only in disturbed areas. The following discussion will be only of the plants deemed most interesting and important. All other plants found were considered typical of the eastern Cascade habitats.

Sensitive Species

Eighteen plants found on the Reservation are listed on Oregon's Rare, Threatened or Endangered list published in 1989. Without regard to special status, these plants are: Douglas' onion (*Allium douglassii* var. *nevii*), rock onion (*Allium macrum*), Cascade rockcress (*Arabis furcata*), Gorman's aster (*Aster gormanii*), long-bearded sego lily (*Calochortus longebarbatus* var. *longebarbatus*), pond sedge (*Carex microptera* [*C. limnophila*]), John Day chaenactis (*Chaenactis nevii*), alpine collomia (*Collomia larseni* [*C. debilis*]), mountain lady-slipper (*Cypripedium montanum*), Cascade daisy (*Erigeron cascadenis*), gnome-plant (*Hemitomes congestum*), Baker's linanthus (*Linanthus bolanderi* [*L. bakeri*]), Hamblen's Coeur d'Alene lomatium (*Lomatium farinosum* var. *hambleniae*), French's lomatium (*Lomatium frenchii* [*L. watsonii*]), clubmoss (*Lycopodium annotinum*), Peck's penstemon (*Penstemon peckii*), Klamath gooseberry (*Ribes inerme* var. *klamathense* [*R. kalamathense*]), and scapose silene (*Silene scaposa* var. *scaposa*).

Of these, three species found are well outside of their normal range: Coeur d'Alene lomatium is found in eastern Washington and neighboring Idaho. Scapose silene normally inhabits the Blue Mountains of eastern Oregon. John Day chaenactis has long been considered an endemic of the John Day area over fifty miles to the east.



RICHARD ETTINGER

Lomatium frenchii

Four sensitive species are considered to be range extensions beyond that listed in Hitchcock and Cronquist: Douglas' onion is found south of its described range, rock onion is found west, Cascade daisy is normally found in the western Cascades, and Peck's penstemon is found north of its listed range.

Unusual Plants

Two plants on the Warm Springs Reservation are of ongoing taxonomic interest. *Lomatium frenchii* is found in a concentrated area of desert scabland, geographically isolated from *Lomatium watsonii* populations in northern Wasco county. This plant was previously described by Mathias and Lincoln Constance in 1959. Hitchcock and Cronquist declined the new species name; however, descriptively this plant continues to be significantly different from *L. watsonii*. Molecular and taxonomic studies of these two species are being pursued at Washington State University.

¹Bracketed names are found in Hitchcock and Cronquist.



RICHARD EITTINGER

Penstemon fruticosus (potential new variety)

A flourishing population of *Penstemon fruticosus* with small serrated leaves and large corollas is also of continuing interest. This isolated variety flourishes in an unusual desert rock outcropping near Kah-Nee-Ta resort. It also is undergoing molecular and taxonomic studies at WSU and Ohio State University.

The following is a listing of plants from the Reservation considered to be significantly out of range, or notable range extensions.

Out of Range Plants	Normal Range
<i>Allium pleianthum</i> (many-flowered onion)	Wheeler County
<i>Angelica canbyi</i> (Canby's angelica)	Ochoco Mountains
<i>Aster adscendens</i> (long-leaved aster)	Blue Mountains
<i>Camassia leichtlinii</i> (Leichtlin's camas)	Willamette Valley
<i>Cardamine pulcherrima</i> var. <i>pulcherrima</i> (slender toothwort)	Olympic peninsula
<i>Corallorhiza trifida</i> (early coralroot)	Wallowa County
<i>Downingia yina</i> (spreading downingia)	Lake County
<i>Eriophyllum lanatum</i> var. <i>achillioides</i> (woolly sunflower)	Willamette Valley
<i>Eryngium alismifolium</i> (coyote thistle)	Harney County
<i>Frageria virginiana</i> var. <i>glauca</i> (wild strawberry)	Rocky Mountains

Out of Range Plants

<i>Grindelia nana</i> var. <i>nana</i> (low gumweed)	Idaho
<i>Lomatium nevadense</i> (Nevada desert parsley)	Great Basin
<i>Lomatium utriculatum</i> (common lomatium)	West Cascades
<i>Lupinus polyphyllus</i> var. <i>pallidipes</i> (bigleaf lupine)	Willamette Valley
<i>Madia sativa</i> (coast tarweed)	West Cascades
<i>Microseris borealis</i> (apargidium)	Pacific coast
<i>Rubus idaeus</i> (red raspberry)	Idaho
<i>Rubus nigerrimus</i> (northwest raspberry)	Snake River
<i>Senecio macounii</i> (Puget butterweed)	West Cascades
<i>Vancouveria hexandra</i> (inside-out flower)	West Cascades

Range Extensions

	Extended to the:
<i>Allium tolmiei</i> (Tolmie's onion)	north and west
<i>Ancistrocarphus filagineus</i> (northern stylocline)	west
<i>Angelica genuiflexa</i> (kneeling angelica)	east
<i>Artemisia douglasiana</i> (Douglas sagebrush)	south



Allium pleianthum

Range Extensions

<i>Atriplex confertifolia</i> (sheepfat)	west
<i>Betula glandulosa</i> (bog birch)	east
<i>Carex lasiocarpa</i> var. <i>americana</i> (slender sedge)	south
<i>Castilleja pruinosa</i> (frosted paintbrush)	northeast
<i>Cercocarpus ledifolius</i> var. <i>intercedens</i> (mountain mahogany)	west
<i>Comandra umbellata</i> var. <i>californica</i> (bastard toadflax)	south
<i>Cymopterus terebinthinus</i> var. <i>foeniculaceus</i> (cymopterus)	west
<i>Cynoglossum occidentale</i> (western houndstooth)	north
<i>Delphinium menziesii</i> var. <i>pyramidale</i> (Menzies' larkspur)	east
<i>Gaultheria shallon</i> (salal)	east
<i>Gentiana sceptrum</i> (king's gentian)	east
<i>Geranium bicknellii</i> (Bicknell's geranium)	south
<i>Geum triflorum</i> var. <i>triflorum</i> (old man's whiskers)	west
<i>Hackelia californica</i> (California stickseed)	north
<i>Hackelia diffusa</i> (diffuse stickseed)	south
<i>Hydrophyllum capitatum</i> var. <i>alpinum</i> (wool-breeches)	north
<i>Lathyrus rigidus</i> (rigid peavine)	west
<i>Lomatium leptocarpum</i> (bicolor biscuitroot)	west
<i>Lupinus bicolor</i> (two-colored lupine)	south
<i>Lupinus lepidus</i> var. <i>lepidus</i> (prairie lupine)	west
<i>Micropus californicus</i> (slender cottonweed)	north
<i>Petasites frigidus</i> var. <i>palmatus</i> (sweet coltsfoot)	east
<i>Phacelia thermalis</i> (hotspring phacelia)	west
<i>Physocarpus capitatus</i> (Pacific ninebark)	east
<i>Pinus lambertiana</i> (sugar pine)	north
<i>Plagiobothrys nothofulvus</i> (rusty plagiobothrys)	east and south
<i>Pyrrocoma carthamoides</i> (Puget butterweed)	south and west
<i>Quercus garryana</i> (Oregon white oak)	south
<i>Ribes sanguineum</i> (red currant)	east
<i>Sagittaria latifolia</i> (wapato)	east

Extended to the:

<i>Satureja douglasii</i> (yerba buena)	east
<i>Senecio macounii</i> (biennial stanleya)	north
<i>Stephanomeria lactucina</i> (large-flowered wirelettuce)	north
<i>Valeriana occidentalis</i> (western valerian)	west
<i>Whipplea modesta</i> (Yerba de Selva)	east



Collinsia grandiflora

RICHARD ETTINGER

Conclusion

This study started serendipitously when an opportunity for access onto the Reservation was granted by the Tribal Council. The many trips we made over the years were always interesting; some were very exciting. We formed many lasting friendships with the Indians and are honored by the recognition and respect they have shown us.

We feel this study has added significantly to the floral knowledge in Oregon, which is an objective endorsed by the Tribal Council. As there are no immediate threats to the floral populations on the Reservation, we believe it will maintain its stable native flora indefinitely.

Our intent has always been to give the information we acquired back to the Tribes. Hence, we have arranged to have the herbarium, photographs, and collection notes deposited at the Museum at Warm Springs. After David French's death in 1994, Kathrine French trusted us to mount his private

herbarium which, along with his notes, will also be deposited at the Museum. A complete collated floral checklist of the Plants of the Warm Springs Reservation of Oregon can be obtained from the authors.

Without exception, permission to travel onto Reservation lands for botanical studies must be obtained by application to the Tribal Council, Warm Springs Reservation, Warm Springs, Oregon.



RICHARD ETTINGER

Viola sheltonii

Acknowledgements

Judge Owen Panner provided the first stimulus for this research, providing support to approach the Tribal Council in 1979 for permission to study on the Reservation. Other important contributors and collaborators have been: Melvin Ashwill, Eric Brandt, Drs. David and Kathrine French, Dr. Michael Hammond, Richard Helliwell, George Schneider, Scott Stuemke, Dr. David Wagner and his graduate students, Harvey Waldron, and valued members of the Warm Springs Reservation of Oregon Tribal Council throughout the years. A special thank you goes to tribal member, Prunie Williams.

References

Ashwill, Melvin. 1983. "Seven Fossil Floras in the Rain Shadow of the Cascade Mountains, Oregon." *Oregon Geology* 45(10).

---, n.d. "Central Oregon Fossil Leaves: Their implications about paleoclimate and the growth of the central portion of the Oregon High Cascade mountains." Manuscript.

Berreman, Joel V. 1937. "Tribal Distribution in Oregon." *Memoirs of the American Anthropological Association*. Number 47, Menasha, WI.

Bishop, Ellen Morris. 1990. "A field guide to the geology of Cove Palisades State Park and the Deschutes Basin in central Oregon." *Oregon Geology* 52(1).

Bureau of Indian Affairs. 1984. "Warm Springs Indian Reservation plant list." Warm Springs, Oregon: Unpublished.

Cliff, Thelma Drake. 1942. "A History of the Warm Springs Reservation, 1855-1900." M.S. Thesis, Department of History, University of Oregon, Eugene, OR.

Confederated Tribes of the Warm Springs Reservation of Oregon. 1984. *The People of Warm Springs*. Warm Springs, OR.

Eastman, Donald C. 1990. *Rare and Endangered Plants of Oregon*. Wilsonville, OR: Beautiful American Publishing Co.

Ettinger, Marjorie. 1979-95. "Warm Springs Reservation Floral Checklist and Collection Notes." Central Oregon Community College Herbarium, Bend, OR: Unpublished. (Available at the Museum at Warm Springs in 1996.)

Franklin, Jerry F. and C.T. Dyrness. 1988. *Natural Vegetation of Oregon and Washington*. Corvallis, OR: Oregon State University.

French, David H. 1952-58. Warm Springs Reservation Research Collection Notes. Portland, OR: Unpublished. (Available at the Museum at Warm Springs, 1996.)

---, 1966. "Ethnobotany of the Pacific Northwest Indians." *Economic Botany* 19:378-382.

---, 1981. "Neglected Aspects of North American Ethnobotany." *Canad. J. Botany*, 59:2326-2330.

Garrett, Stuart and Berta Youtie, 1992. "The Painted Hills: Thirty Million Years of Phytogeography." *Kalmiopsis* 2:21-31.

Helliwell, Richard. 1987. *Forest Plants of the Warm Springs Indian Reservation*. Warm Springs, OR: USDI Bureau of Indian Affairs.

---, 1988. "Rare, Threatened and Endangered Plants of the Warm Springs Reservation." Warm Springs, OR: Unpublished.

---, 1994. "Vascular Plant List of Warm Springs Indian Reservation." Warm Springs, OR: Unpublished.

Hitchcock, C. Leo, Arthur Cronquist, Marion Ownbey, and J.W. Thompson. 1977. *Vascular Plants of the Pacific Northwest*. 4 Volumes. Seattle: University of Washington Press.

Hunn, Eugene. 1990. *Nchi'Wana "The Big River" Mid-Columbia Indians and Their Land*. Seattle: University of Wash. Press.

Jenkins, David and Eugene Steinbrenner. 1981. *Soil Survey of the Warm Springs Indian Reservation*. Weyerhaeuser Company, Centralia, WA. Restricted publication.

Krause, Rick. 1982. "Plant Directory for the Warm Springs Indian Reservation." Department of Forestry, Warm Springs, OR: Unpublished.

Logan Richard. 1981. *Historical Perspectives: The Warm Springs Forest Through 1980*. Forest Management Plan. Privately published.

MacNab, Gordon. 1972. *A History of the McQuinn Strip*. Warm Springs, OR: Tribal Council, Confederated Tribes of the Warm Springs Indian Reservation.

Mahar, James Michael. 1953. Ethnobotany of the Oregon Paiutes of the Warm Springs Indian Reservation. B.A. Thesis, Reed College, Portland, OR.

Marsh, F., R. Helliwell, and J. Rodgers. 1987. *Plant Association Guide for the Commercial Forest of the Warm Springs Indian Reservation*. Warm Springs, OR: USDI Bureau of Indian Affairs.

Mathias, Mildred E. and Lincoln Constance. 1959. "New North American Umbelliferae-III." *Bulletin of the Torrey Botanical Club* 86(6):374-382.

McKelvey, Susan Delano. 1955. *Botanical Exploration of the*

Trans-Mississippi West, 1870-1950. Cambridge, MA: Arnold Arboretum, Harvard University.

Newberry, John Strong. 1857. "Report Upon the Botany of the Route," In *Reports of Explorations and Surveys... for a Railroad*. Vol. VI. Washington: House of Representatives, 33rd Congress, 2nd Session, Ex. Doc. No. 91.

Ornduff, Robert. 1953. *Some Aspects of the Flora and Ecology of the Warm Springs Indian Reservation Area*. B.A. Thesis, Reed College, Portland, OR.

Ornduff, Robert and David H. French. 1958. "Notable Plants of the Warm Springs Indian Reservation, Oregon." *Leaflets of Western Botany* VII(9):217-220.

---, 1960. "Distributional Notes on Plants of the Warm Springs Area, Oregon." *Madrano* 15(8):225-231.

Orr, Elizabeth L., William N. Orr, and Ewart M. Baldwin. 1992. *Geology of Oregon*. 4th Ed. Kendall/Hart Pub. Co.

Smith, Gary A. 1991. "A field guide to depositional processes and facies geometry of Neogene continental volcanoclastic rocks, Deschutes basin, central Oregon." *Oregon Geology* 53(1).

Strodt, Catherine E. 1965. *An Analysis of the Non-Use of Edible Plants by Two Plateau Indian Tribes*. B.A. Thesis, Reed College, Portland, OR.

Mark your calendar now for these special events!

Wildflower Festival & Plant Sale
Sunday, May 19, 1996


Fall Plant Sale
Late September, date to be announced.

Mushroom Festival
Sunday, October 27, 1996

The Mount Pisgah Arboretum

The Arboretum is located off I-5, exit 189, just south of downtown Eugene. For info and directions call (541) 747-3817 or e-mail us at mtpisgah@efn.org

Botanical illustrations



•
pen-and-ink
graphite
watercolor
•

Andrew Sudkamp
(541) 479-1287