

FIELD INVESTIGATION OF EPIPACTIS GIGANTEA
(GIANT HELLEBORINE),
A REGION 4 SENSITIVE SPECIES,
ON THE PAYETTE NATIONAL FOREST

by

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ABSTRACT

A field investigation of Epipactis gigantea (giant helleborine) was conducted on the Payette National Forest by the Idaho Department of Fish and Game's Conservation Data Center (formerly the Idaho Natural Heritage Program). The investigation was a cooperative Challenge Cost-share project between the Department and the Payette NF. Giant helleborine is widely distributed throughout western North America, but is uncommon in much of its range, including Idaho. It is a Forest Service Region 4 sensitive species for the Payette NF.

Prior to 1991, 39 populations of giant helleborine were documented for Idaho, including one on the Payette NF at Barth Hot Springs. Updated information at this relatively inaccessible site was obtained from a BLM botanist who visited the population in July 1991. During our field investigation we discovered three new populations with two of these occurring on the Payette NF. In addition, a population previously documented for White Licks Hot Springs and located on private land within the Payette NF was revisited. No giant helleborine was found and this population is now believed to be extirpated. A number of populations throughout the state are at critically low numbers. At least one other population, besides at White Licks Hot Springs, has been extirpated due to anthropogenic causes.

In mountainous portions of its northern distribution, such as the Payette NF, giant helleborine is restricted to moist habitats associated with thermal waters. Many of these hot spring/seep habitats have been destroyed or greatly altered throughout the species range. This is also the case on the Payette NF, where all populations face current or potential threats to their long-term viability. Habitat degradation or alteration, associated mainly with recreational use of the hot springs, is the most serious of these threats.

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INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

Epipactis gigantea (giant helleborine) is an orchid that is widely distributed throughout much of western North America, from southern British Columbia and much of the western United States, south to central Mexico. Within much of this large range it is uncommon, however, and is a species of conservation concern in British Columbia and seven western states, including Idaho. Giant helleborine is a Forest Service Region 4 Sensitive Species on several Forests, including the Payette NF (Spahr et al. 1991; USDA Forest Service 1991b). A field investigation of this species was conducted on the Payette NF by the Idaho Department of Fish and Game's Conservation Data Center through the Cooperative Challenge Cost-share Program. Boise NF and private lands near the Payette NF were also searched to gain a more comprehensive view of the species' conservation status in west-central Idaho.

The primary objectives of this investigation were as follows:

- 1) Survey known population sites and search potential habitats for new occurrences of giant helleborine on the Payette NF.
- 2) Characterize habitat conditions for all populations found.
- 3) Assess population data on, and threats to existing populations and make management recommendations to the Payette NF based on these assessments.

RESULTS

In mountainous portions of its northern distribution, such as the Payette NF, giant helleborine is restricted to moist habitats associated with thermal waters. Because of this strict habitat specificity, potential sites where giant helleborine may occur on the Payette NF are limited and widely scattered. Prior to starting this field investigation, location information was assembled for all hot spring habitats on the Payette NF and adjacent areas. Sources included all pertinent U.S. Geological Survey maps, two Northwest area hot springs guide books (Litton 1990; Loam 1980), and interviews with knowledgeable personnel from the Council, McCall, New Meadows and Weiser Districts of the Payette NF.

From July 22-24, 1991, I surveyed each hot spring area on the Payette NF with the exception of Barth Hot Springs, the location of the only documented occurrence for giant helleborine on the Forest prior to 1991. Updated information for this relatively inaccessible site was obtained from a Bureau of Land Management botanist who visited the Barth Hot Spring population in July, 1991, during a boating trip (Rosentreter pers. comm.). I also surveyed a number of hot spring areas on nearby Boise NF and private lands, to gain a more comprehensive view of the distribution and conservation status for giant helleborine in west-central Idaho (see Appendix 3 for a list of areas searched during this survey).

During the 1991 field investigation, two new populations of giant helleborine were discovered on the Payette NF, at (1) Laurel Hot Springs (Warm Creek), Council Ranger District, and (2) Holdover Creek Hot Springs, along the South Fork Salmon River, on the Krassel Ranger District. A population at Vulcan Hot Springs, on the Boise NF, was also discovered. The White Licks Hot Springs population, originally documented in 1930, could not be relocated. This site is on private land within the Payette NF and has been altered over the years. The White Licks population is now believed to be extirpated. In 1991, the three populations of giant helleborine on the Payette NF supported a total of approximately 125 stems and covered an area less than one acre.

The following is a detailed discussion of giant helleborine, including information on its taxonomy and identification, range and habitat, conservation status, and recommendations to the Regional Forester and the Payette NF, concerning its status in Idaho.

Epipactis gigantea Dougl. ex Hook.

CURRENT STATUS USFS - Region 4 Sensitive Species
USFWS - None
Idaho Native Plant Society - State Priority 2
Heritage Rank - G4/S3

TAXONOMY

Family: Orchidaceae (Orchid)

Common Name: Giant helleborine

Synonymy: Limodorum giganteum Kuntze, Rev. Gen. 2:672. 1891.
Peramium giganteum Coult., Contr. U.S. Nat. Herb.
2:424. 1894.
Serapias gigantea Eat., Proc. Biol. Soc. Wash. 21:67.
1908.
Helleborine gigantea Druce, Bull. Torrey Club 36:547.
1909.
Amesia gigantea Nels. & Macbr., Bot. Gaz. 56:472.
1913.

Citation: Fl. Bor. Am. 2:202. 1839.

Technical Description: Stems 1 to many from short rhizomes, mostly 3-7 (up to 12) dm tall; leaves numerous, sheathing, the lowest blades almost lacking, but gradually enlarged upward, almost glabrous to scabridulous-puberulent, broadly elliptic-lanceolate, mostly 7-14 (19) cm long and 1.5-5 cm broad; flowers 3-15, rather showy, the racemes usually secund, the bracts gradually reduced upward, but even the uppermost one usually exceeding the ovary; sepals coppery-green, lightly brownish-veined, 12-16 mm long; petals similar to the sepals, but thinner and (at least the venation) more brownish-purple; lip 15-20 mm long, the sac with prominent, raised purplish lines leading to the base, 3-lobed, the outer (basal) lobe prominent, the blade (central lobe) about as long as the basal lobes, somewhat curved downward, triangular-ovate, the tip flattened but with uprolled margins, greenish-yellow, the basal portion much thickened, yellow, the margins thickened and erect, with numerous linear callosities leading to the sac; column 6-9 mm long; anther 4-5 mm long; capsule reflexed, 2-3.5 cm long (Hitchcock 1969).

Nontechnical Description: Giant helleborine is a large perennial herb, with leafy stems, 1-3 feet tall from short rhizomes. The leaves are without petioles and up to 8 inches long. The herbage can be rough or mostly smooth to the touch. The numerous flowers are borne singly in a long, narrow, mostly one-sided, leafy-bracted inflorescence at the top of the stems. The brownish flowers have two upper petals that are shorter and broader than the sepals, the lower petal is sac-like (Moseley 1989). See

Appendix 1 for a line drawing of giant helleborine and Appendix 5 for slides of its habit and habitat.

Distinguishing Features and Similar Species: Its relatively large stature, many long leaves, and many brownish-colored flowers hanging on one side of a long raceme, combine to make giant helleborine a distinctive species when it is in flower. In a vegetative state, giant helleborine can be confused with some members of the orchid genus Habenaria or more likely with Smilacina stellata, in the lily family. These species can occur sympatrically with giant helleborine. The prominently clasping leaf bases and taller habit of giant helleborine distinguishes it from Smilacina, and its generally more numerous and larger leaves and taller habit from Habenaria.

DISTRIBUTION

Range: Giant helleborine occurs from central Mexico northward throughout the western United States and into southern British Columbia. Brunton (1986) notes that its range is entirely within cordilleran areas.

In Idaho, giant helleborine has been documented at 43 sites, but is believed to be extirpated from at least two of these sites, including the White Licks Hot Spring population on private land within the Payette NF. All of these populations except two in the Panhandle region occur south of the Salmon River, with the majority found in the west-central part of the state. Prior to our 1991 field investigation, one population had been documented on the Payette NF, at Barth Hot Springs on the Salmon River in the Krassel Ranger District. Another population was documented in 1930 at White Licks Hot Spring on private land within the Council Ranger District.

The 1991 survey resulted in the discovery of two new populations on the Payette NF. In addition, a population at Vulcan Hot Springs on the Boise NF, approximately 13 miles south of the Payette NF, was also discovered during the survey. In the northern portion of its range, which includes Idaho, giant helleborine typically occurs along the margins of hot springs when found at higher elevations such as on the Payette NF. Because giant helleborine has such strict habitat requirements, it is unlikely additional populations occur on the Payette NF unless there are some hot spring habitats of which I was unaware.

Below is a summary of the three extant populations known from the Payette NF, plus the White Licks population from private land within the Forest (the number in parentheses refers to the occurrence number of this species in the Conservation Data Center data base). See Appendix 4 for the Idaho Conservation Data Center's element occurrence records for giant helleborine on the Payette NF. These records provide additional detail on location, ownership and population data, among other things.

Barth Hot Springs (013) - on the Salmon River, downstream from River mile 168, along the Salmon Wild and Scenic River corridor, Krassel Ranger District; elevation 2630 feet; granitic substrate; 15 depauperate stems with only one in flower counted in 1991 (Rosentreter 1991), this an increase from 5 stems counted in 1989, population believed to be much smaller than historical size; the population impacted by habitat degradation; not visited by the Conservation Data Center in 1991.

White Licks Hot Springs (020) - western side of the West Mountains; originally collected in 1930 at "hot springs on Middle Fork of Weiser River", which is presumed to be White Licks Hot Spring, this hot spring is on private land within the Payette NF; elevation 4800 feet; despite thorough searching, not relocated in 1991, and believed to be extirpated from site; area now with primitive bathhouses and adjacent campground.

Laurel Hot Springs (040) - western side of West Mountains, approximately six miles southeast of Council, one mile north of the Middle Fork Weiser River; elevation 4480 feet; approximately 100 stems in five main clusters counted in 1991; approximately 0.2 acre in size; potentially threatened by recreation use; first documented in 1991.

Holdover Creek Hot Springs (041) - on the South Fork Salmon River, just north of its confluence with Holdover Creek, near Mile Marker 16 on USFS Road #674; elevation 4160 feet; only 17 stems with one in flower counted in 1991; very small area, no more than 100 sq. feet; subject to several potential threats; first documented in 1991.

Habitat and Associated species: In general, giant helleborine occurs in moist areas along streambanks, lake margins, seeps and springs, especially near thermal waters (Hitchcock 1969). Like all mountain populations of giant helleborine in Idaho, those on the Payette NF are associated with the thermal waters of hot springs or seeps. The hot springs provide a constant flow and temperature of clean water. Such hot spring habitats are often localized along a larger watercourse, and associated with various types of riparian vegetation.

Plants at the Laurel Hot Springs population (040) are found on hummocks of other vegetation that are perennially moist from intimate contact with the warmed water rolling down the large rock outcrop. These hummocks occur on ledges and to a lesser extent on steeper portions of the rock outcrop. No giant helleborine plants were found away from the immediate hot spring area, including along adjacent portions of Warm Springs Creek. This population occurs at 4480 feet and has a generally southeast aspect. All plants are shaded for at least part of the day, with some receiving more shade than full sunlight. Associated species include Carex vesicaria, Carex spp., Juncus spp., Panicum

occidentale, Mimulus guttatus, Oenothera hookeri, Hypericum formosum, Epilobium watsonii, Solidago sp. Precipitated material covers much of the hot spring zone and I was uncertain of the immediate substrate. The substrate adjacent to the hot spring is basalt, however. The slopes around the hot spring support a forested mix of grand fir, Douglas fir and ponderosa pine.

The Holdover Creek Hot Springs population (041) is perched on one of a series of small ledges below the very local source of hot water. It is situated near the bottom of a very steep, cliff-like slope just above the South Fork Salmon River, but below USFS Road #674. At an elevation of 4160 feet, this moist microsite has a west aspect on a near vertical slope of granitic rock. Associated species are few and include Epilobium watsonii, Prunella vulgaris and an unidentified grass. No other giant helleborine plants were found in the area.

Giant helleborine plants at the Barth Hot Springs population (013) are now restricted to clumps of vegetation on steep areas not readily impacted by recreational users or wildlife (Rosentreter 1991). They are associated with Carex species and Mimulus guttatus. This population occurs at 2630 feet on granitic rock.

The White Licks Hot Spring site (020) is a mosaic of near monoculture Scirpus acutus, low-growing sedge/rush-forb, and dense, fairly diverse, graminoid dominated communities. Weedy species are prevalent in some places too. Although much of the hot springs hydrology has been altered, a few small areas supported suitable-appearing habitat, but no giant helleborine was found.

CONSERVATION STATUS

Conservation Status - Idaho: Giant helleborine as a conservation concern in Idaho was first recognized in the mid-1960's when it was included on a list of protected plants in the state wildflower protection act (Idaho Code, Chapter 18-3911). In his treatment of giant helleborine for the Idaho rare plant project of the Idaho Natural Areas Council, Henderson (1981) recommended a status of State Threatened, due to numerous and varied threats to its habitat. Giant helleborine is currently a Forest Service Region 4 Sensitive Species for several National Forests, including the Payette NF (Spahr et al. 1991; USDA Forest Service 1991b). It is also a Region 1 Sensitive Species, although no populations have been verified from Idaho Forests in the Region (USDA Forest Service 1991a).

The Idaho Native Plant Society considers giant helleborine a Priority 2 species (Moseley and Groves 1990). The Priority 2 category of the Idaho Native Plant Society refers to taxa "that are likely to be classified as Priority 1 within the foreseeable future in Idaho, if factors contributing to its decline or habitat

degradation or loss continue".

The Idaho Conservation Data Center currently ranks giant helleborine as G4/S3 [G4 = apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery, S3 = either very rare and local throughout Idaho, or found locally in a restricted range or because of other factors making it vulnerable to extinction (Moseley and Groves 1990)].

Conservation Status - Elsewhere:

BRITISH COLUMBIA - S1 = taxa in British Columbia that are imperiled because of rarity (6 to 20 occurrences) (Argus and Pryer 1990). Brunton (1986) states that most British Columbia occurrences are known from single records and only four have been recently seen. In addition, the largest known occurrence has declined in recent years and is vulnerable to further disturbance.

MONTANA - The Montana Heritage Program ranks giant helleborine as S1 (Lesica and Shelly 1991). This category lists taxa that are critically imperiled in Montana because of extreme rarity, or because of some factor of its biology making it especially vulnerable to extirpation from the state. It is also a Forest Service Region 1 Sensitive Species known from several Montana Forests (USDA Forest Service 1991a).

WASHINGTON - State Sensitive = taxa that are vulnerable or declining, and could become endangered or threatened in the state without active management or removal of threats (Washington Natural Heritage Program 1990).

WYOMING - The Wyoming Natural Diversity Data Base (1991) ranks giant helleborine S1. This category lists taxa that are critically imperiled in Wyoming because of extreme rarity, or because of some factor of its biology making it especially vulnerable to extirpation.

Argus and Pryer (1990) also list Colorado, Oklahoma and South Dakota as states ranking giant helleborine a conservation concern.

Ownership: Idaho populations occur on private, state and federal land (several agencies). Three populations occur on the Payette NF; the Laurel Hot Springs population on the Council District and both the Barth Hot Springs and Holdover Creek Hot Springs populations on the Krassel Ranger District.

Threats: Throughout its range, giant helleborine is subject to various current or potential threats. In Idaho, habitat at almost all known sites has been altered, and several populations are known to be extirpated or at critically low numbers. All occurrences on the Payette NF face ongoing or potential threats as

well. Many of the Idaho populations, including those at Laurel Hot Springs and Holdover Creek occur at locations covered in two popular hot springs guides (Litton 1990; Loam 1980). Such advertisement can only add to the recreational use of these areas and increase the potential for habitat disturbances.

The habitat at the Laurel Hot Springs population (040) on Warm Creek is in good condition with only minimal disturbances at this time. Several threats to this relatively high quality site do exist, however. The most serious threat is from increased recreational use. Currently, recreational use appears relatively benign and poses only a minor threat, this mainly from people potentially picking plants, or from more ambitious people exploring and inadvertently trampling or even dislodging the hummocks of vegetation supporting giant helleborine. While not a problem at this time, any alteration of the spring's flow, such as diverting hot water for soaking pools, could have a serious adverse impact and should not be allowed. Livestock use the area around the hot spring, but the slippery, steep nature of most of the spring discourages livestock use except for around the perimeter. The hot spring is surrounded by forest. Logging in the proximity of the population is another potential threat to the integrity of the hot spring habitat, either from altering the site's hydrology or from problems associated with erosion.

The Holdover Hot Spring population (041) is extremely localized and also faces several threats. Much of the water at this hot spring is diverted via a pipe to fill a pool used by soakers. It is possible this population was once somewhat larger before the pipe diverting much of the hot water was installed. Further alterations to this spring may adversely affect this small population. The area around the hot springs has been invaded by several exotic species, especially Canada thistle. The thistle is not yet found on the ledge supporting giant helleborine. USFS Road #674 (South Fork Salmon River Road) passes above this population. Road alteration or maintenance projects that may cause problems with erosion have the potential to impact this population.

Associated with the ongoing habitat degradation at the Barth Hot Springs population is a presumed substantial decrease in the abundance of giant helleborine from historical levels. Roger Rosentreter (1991) of the Bureau of Land Management has visited the Barth Hot Springs site a number of times over the years while on boating trips. He has done some basic surveying for giant helleborine at the site and notes that much of the hot spring habitat is degraded from recreational use and that the remaining plants all appear very depauperate compared to what is typical for the species. Furthermore, only one stem was in flower during his 1991 visit. Although the number of stems observed by Dr. Rosentreter in 1991 was slightly more than in 1989, this population will remain in jeopardy and without hope of recovery until degradation to its habitat ceases and the restorative

process begun. Rosentreter also speculates that wildlife eating the plants early in the season may, at least in part, be responsible for the depauperate nature of the giant helleborine plants.

Management Implications: The three populations of giant helleborine on the Payette NF all occur in hot spring areas impacted by recreational use. Management objectives at these hot springs should recognize that preserving the integrity of the hot springs habitat is crucial to maintaining the giant helleborine populations present.

Diverting, or in any way altering the natural flow of the hot springs at the Laurel Hot Springs on Warm Creek should not be allowed. Safeguards protecting the integrity of Laurel Hot Springs should be included early on if any logging projects should occur in that area. Any further diverting of water at the Holdover Creek Hot Spring population also should not be allowed. There are presently no signs or parking areas advertising the Holdover Hot Springs. With the objective of limiting recreation-related impacts, this policy of relative anonymity should remain. If improvements to USFS Road #674 are initiated, special care not to disturb the Holdover Creek Hot Spring population should be taken. The Barth Hot Springs population site is heavily used by recreationalists. If initiated, protection efforts could potentially conflict with some of this use.

ASSESSMENT AND RECOMMENDATIONS

Summary: In Idaho, giant helleborine has been documented from 43 sites, with numerous and varied threats occurring at many of them. It is believed to be extirpated from at least two of these sites, including the White Licks Hot Spring population on private land within the Payette NF. Critically low population levels are known for several other populations throughout the state. Three populations are known from the Payette NF, two of these discovered during the 1991 field investigation.

In the mountainous regions of Idaho, giant helleborine is apparently restricted to thermal water areas. This is the same pattern found in Montana (Schassberger 1988) and other parts of its northern distribution. All three populations on the Payette NF face current or potential threats, mainly from impacts associated with recreational use of their hot springs habitats.

Recommendations to the Regional Forester - Region 4: Based on information discussed in this report, giant helleborine still meets Sensitive Species criteria and should remain on the Regional List for the Payette NF.

Recommendations to the Payette National Forest: All populations on the Payette NF are subject to current or potential threats. The most serious situation is at Barth Hot Springs where heavy recreational use possibly compounded by wildlife impacts, has resulted in a situation where only a small, remnant population currently persists. Educating recreational users on the conservation problems facing giant helleborine is probably the most important step that can be taken to protect the Barth Hot Spring population from further jeopardy. An on-site interpretive sign using giant helleborine as a case-in-point can outline the uniqueness and fragility of hot spring habitats and their accompanying diversity, including rare plants. This would be one way to reach the audience having the most direct consequence on the species at Barth Hot Springs. Education material for rafting outfitters and other boaters on their impacts and steps to minimize these impacts should be produced and made available at all permit stations. A special effort to inform outfitters of the problem should be made because they, in turn, can help educate and influence a larger number of river users.

Although the area's isolation and limited accessibility present special logistical problems, a monitoring program quantifying population trend should be established at Barth Hot Springs as soon as possible. Ideally, the monitoring design should also attempt to quantify and qualify changes in the hot spring habitat due to anthropogenic causes.

The Laurel Hot Springs should be periodically checked to insure that the natural hot springs flow does not become diverted or anyway altered by recreational users. While probably not a likely scenario, further diversion of hot water at the Holdover Creek Hot Springs by recreational users should not be allowed.

Projects such as road improvements along USFS Road #674, near Holdover Creek Hot Springs, or logging in the area of Laurel Hot Springs on Warm Creek, should be conducted in a manner that protects the hot springs habitats. A rare plant clearance for giant helleborine should be conducted for all projects in hot springs areas.

Land managers and field personnel on the Payette NF should be informed of the occurrence of this species in their area. Possible sightings of giant helleborine should be documented by specimens (only if the size of the population warrants collecting), and should be sent to the University of Idaho Herbarium (Department of Biological Sciences, University of Idaho, Moscow, Idaho 83843) for verification of their identity. Confirmed sightings of this species should be reported to the Idaho Conservation Data Center, using Region 4 TES Plant Forms, for entry into its permanent data base on sensitive species.

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Appendix 1

Line drawing of Epipactis gigantea.
(From Hitchcock et al. 1969)

Appendix 2

Locations of Epipactis gigantea on the Payette National Forest.

- Map 1. Overview of distribution on the Payette NF. The map is from page I-4, Payette NF Environmental Impact Statement, Chapters I-V, VII, Index (no date).
- Map 2. Barth Hot Springs population (013). Portion of Sheep Hill 7.5' USGS quadrangle.
- Map 3. White Licks Hot Springs population - extirpated (020). Portion of Lone Tree 7.5' USGS quadrangle.
- Map 4. Laurel Hot Springs population (040). Portion of Council Mountain 7.5' USGS quadrangle.
- Map 5. Holdover Creek Hot Spring population (041). Portion of White Rock Peak 7.5' USGS quadrangle.

Appendix 3

List of areas searched unsuccessfully for
Epipactis gigantea on the Payette NF and adjacent lands
during the 1991 field investigation.

Payette National Forest

1. Goose Creek (Ceilann) Hot Springs.

Boise National Forest

1. Molly's Hot Springs.
2. Molly's Tubs Hot Springs.
3. Penny Hot Springs.

Private Land

1. White Licks Hot Spring (occurrence 020 now believed to be extirpated).
2. Burgdorf Hot Springs.
3. Gold Fork Hot Springs.
4. Starkey Hot Springs.
5. Zim's Hot Springs.

Note: Names for hot springs are those given in Loam (1980) and Litton (1990). A limited amount of location and description information for these hot springs can be found in these two references.

Appendix 4

Element occurrence records for
Epipactis gigantea
on the Payette National Forest.

Appendix 5

Slides of Epipactis gigantea and its habitat.

1. Close-up; note brownish color of the flowers.
2. Habitat and habit; note large leafy nature of plants and numerous flowers in the inflorescence.
3. Habitat at Laurel Hot Springs; plants occur on some of the vegetation clumps within the stream of thermal water.