

**UTE LADIES' TRESSES (*SPIRANTHES DILUVIALIS*):
PRELIMINARY STATUS IN IDAHO**

by

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April 1997

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**Status Survey Report prepared for
Idaho Department of Parks and Recreation
through Section 6 funding from
U.S. Fish and Wildlife Service, Region 1**

ABSTRACT

Ute ladies' tresses (*Spiranthes diluvialis*) is a white-flowered orchid that occurs in low to mid-elevation wetlands and riparian zones of the Central Rockies and adjacent plains. It was listed as Threatened under the Endangered Species Act in 1992. Previously known from Colorado, Utah, Wyoming, and Montana, this plant was discovered in Idaho during 1996. Four populations are currently known from Idaho, occurring in floodplain habitats along 30 miles of the South Fork Snake River, between Heise and Swan Valley. In this report I discuss the preliminary status of Ute ladies' tresses in Idaho including the taxonomy and identification, documentation of the 1996 inventory, known distribution in Idaho in terms of geography and habitat, characterization of potential habitat, and synopsis of inventories planned for 1997.

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INTRODUCTION

Ute ladies' tresses (*Spiranthes diluvialis*) is a white-flowered orchid that occurs in low to mid-elevation wetlands and riparian zones of the Central Rockies and adjacent plains. The specific epithet, *diluvialis*, is Latin meaning "of the flood" (Sheviak 1984) which is descriptive of a majority of the species' habitat: alluvial substrates along perennial streams and rivers. Ute ladies' tresses was listed as Threatened under the Endangered Species Act (ESA) on January 17, 1992, because of its rarity, low population sizes, and threats of loss or modification of riparian habitats (England 1992). At the time of listing it was known from the Denver metropolitan area; Provo, Utah, area; and several tributaries of the Green River in eastern Utah. Several populations were known to have been extirpated. It has since been found to occur in eastern Wyoming and adjacent Nebraska, southwestern Montana, and most recently in eastern Idaho.

In 1995, the Section 7 (ESA) consultation guidelines for Ute ladies' tresses identified Priority Survey Areas for states containing populations, as well as adjacent states known to have potential habitat (U.S. Fish and Wildlife Service 1995). In Idaho, the Bear River and Snake River above American Falls Reservoir were identified as Category 3 watersheds, where surveys were encouraged, although populations were not known to occur (Table 1).

Table 1. Survey areas in Idaho identified in the Section 7 consultation guidelines. Watershed codes are from the 1974 USGS Hydrologic Unit Map of Idaho.

Hydrologic Unit	Subunit	Description of drainage
160101	02	upper Bear River in Idaho
160102	01	middle Bear River in Idaho
	02	lower Bear River in Idaho
	04	Malad River
170401	04	"South Fork" Snake River
	05	Salt River tributaries
170402	01	Snake River around Idaho Falls
	02	upper Henrys Fork
	03	lower Henrys Fork
	04	Teton River
	05	Willow Creek - Grays Lake Outlet
	06	Snake River around American Falls Reservoir
	07	Blackfoot River
	08	Portneuf River

Due to its potential occurrence in Idaho, the Idaho Department of Fish and Game's Conservation Data Center (CDC) was awarded a grant through Section 6 of the ESA to conduct extensive surveys in the watersheds of eastern Idaho identified in the consultation guidelines. This 1996 inventory was extensive in nature. It covered a wide area of eastern Idaho, including the Bear River, Blackfoot River, South Fork Snake River, Henrys Fork, and main Snake River drainages. The primary purpose was to determine if the species occurs in Idaho and elucidate its general distribution, if found. It was not meant to be intensive, that is, thoroughly searching all potential habitat within these drainages.

In late August, Mabel Jankovsky-Jones, Wetlands Ecologist at the CDC, discovered a *Spiranthes* while inventorying wetlands along the South Fork Snake River near Heise. She tentatively identified it as *S. diluvialis*. I later confirmed her identification on September 11, during a visit to the population. I discovered three additional populations along the South Fork during the next two weeks. All four populations occur on public land: three managed by the Bureau of Land Management and one by the Forest Service.

In this report I discuss the preliminary status of Ute ladies' tresses in Idaho. I consider this preliminary because the CDC will be conducting comprehensive inventories of eastern and east-central Idaho during 1997. Topics discussed in this preliminary report include the taxonomy and identification of Ute ladies' tresses, documentation of the 1996 inventory, known distribution in Idaho in terms of geography and habitat, characterization of potential habitat, and synopsis of inventories planned for 1997.

TAXONOMY AND IDENTIFICATION

Ute ladies' tresses was formally described in 1984 (Sheviak 1984). Prior to that, populations of Ute ladies' tresses occurring at low elevations in Utah were thought to belong to *S. porrifolia* (e.g., Holmgren 1977; Welsh et al 1987), a species now known to occur only in California, Oregon, and Washington. Sheviak (1984) suggests that Ute ladies' tresses originated from the hybridization of *Spiranthes magnicamporum* (a Great Plains species) and *S. romanzoffiana* (a boreal and subalpine species) during a Pleistocene pluvial period when the region supported lush grasslands and the two parent species would have been sympatric. Under a cooler and wetter climate, *S. romanzoffiana* would have occurred at lower elevations. As the climate became drier, *S. romanzoffiana* retreated to higher elevations and *S. magnicamporum* retreated to the eastern Great Plains. Ute ladies' tresses persisted in warm wet situations, eventually becoming limited to scattered areas of permanent moisture.

Prior to the discovery of Ute ladies' tresses along the South Fork in 1996, the Idaho flora was thought to contain only one member of the genus *Spiranthes*, *S. romanzoffiana* (hooded ladies' tresses). Hooded ladies' tresses commonly occurs throughout northern and central Idaho in mid- to high-elevation fens (wetlands with stable, organic substrates). It is uncommon in eastern Idaho, where it is known from fens above 6,000 feet in the Teton Valley, Island Park, and near

Henry on Blackfoot Reservoir. The Teton Valley site is 25 air miles north of Ute ladies' tresses populations on the South Fork, while the Blackfoot Reservoir population is 35 miles to the south. Both of these hooded ladies' tresses populations are about 1,000 feet higher in elevation and occur in different ecological settings than Ute ladies' tresses. Nevertheless, it is the differentiation of these two species that is important when conducting inventories in Idaho.

Following are line drawings (Figure 1), a conspectus of diagnostic features (Table 2), and a key (Table 3) that will aid in identifying the two species of *Spiranthes* known to occur in Idaho. In general, Ute ladies' tresses is a more robust plant in every respect: taller, larger leaves, bigger flowers, etc (Figure 1B). This is not surprising given that Ute ladies' tresses is a polyploid, in part, derived from hooded ladies' tresses (Sheviak 1984); relative gigantism is one of the characteristics of a polyploid. Hooded ladies' tresses has a tight helix of inflated, ascending flowers around the spike (Figure 1B), fused sepals that are united with the petals to form a prominent hood above the lip (Figure 1A), and a violin-shaped (pandurate) lip (Figure 1A). In contrast, Ute ladies' tresses has flowers facing directly away from the stalk, neither ascending or nodding (Figure 1B), sepals that are free and a hood is rarely evident (Figure 1A), and a lip with a less prominent violin shape (Figure 1A). The flowers of hooded ladies' tresses tend to be more cream-colored, while Ute ladies' tresses are pure white.

Figure 1. Line drawings of Ute ladies' tresses (*Spiranthes diluvialis*) and hooded ladies' tresses (*S. romanzoffiana*); A. Flowers. B. Habit. (Artist: Carolyn Crawford)

Figure 1A

Figure 1B

Table 2. Comparison of diagnostic features of Ute ladies' tresses (*Spiranthes diluvialis*) and hooded ladies' tresses (*S. romanzoffiana*).

Character	<i>Spiranthes diluvialis</i>	<i>Spiranthes romanzoffiana</i>
Leaves	Several, mostly at base of stem, persistent	Often numerous, sometimes extending up the lower stem, persistent
Rachis	Sparsely to densely pubescent, the longest hairs ≥ 0.19 mm (often much longer), the glands obviously stalked	Glabrous or sparsely pubescent, the longest hairs < 0.18 mm long (usually much less), the glands often sessile or subsessile
Flowers	Ascending, rather long and slender, whitish to ivory-colored, ringent (gaping at the mouth); lip exposed in lateral view	Strongly ascending, short, broad at base, white to cream, with a well-developed hood open only at the apex (not ringent); lip hidden in lateral view except for reflexed tip
Sepals	Often connate at base for a short distance, sometimes free; variably appressed, spreading, or ascending; hood rarely evident	Fused for some length and united with the petals to form a prominent hood above the lip
Lip	Ovate to lanceolate or oblong in outline, with a marked median constriction, the base usually dilated; lacking a dense cushion of short hairs on upper surface near apex; membranous when moist; venation mostly parallel, typically with some branching, divaricating veins in lower half; often elongated	Strongly pandurate (violin-shaped with marked median constriction), the apex dilated; glabrous on upper surface; membranous when moist; prominently veined below the constriction with laterally diverging, branched veins
Chromosome No.	$2n = 74$	Commonly $2n = 44$
Flowering Period	Known populations in Idaho: late August through mid-September; rarely late September and early October	Populations in eastern Idaho (Teton Valley and Blackfoot Reservoir): July (and early August?); fruits dehiscent when <i>S. diluvialis</i> is in prime flower.

Table 3. Diagnostic key to the two species of *Spiranthes* in Idaho (from Welsh et al. 1993).

1. Petals free for (3.5) 4.5-6.5 mm; rachis of inflorescence with at least some hairs more than 0.2 mm long; plants of middle and lower elevations..... *S. diluvialis*
 - Petals free for 2-3.5 mm; rachis of inflorescence glabrous or with very short glandular hairs, mainly less than 0.1 mm long; plants of middle to upper elevations..... *S. romanzoffiana*
-
-

A similar species of orchid, *Habenaria dilatata* (white bog orchid), grows with Ute ladies' tresses along the South Fork Snake River, and probably occurs in potential habitat elsewhere in eastern and central Idaho. White bog orchid flowers much earlier than Ute ladies' tresses, probably in late June and July. The stem, leaves, and fruits of the bog orchid were dried and brown at the same time that the ladies' tresses was in full flower and early fruit (fruits still green). White bog orchid is two-to-three times larger in size (height, stem thickness, inflorescence, leaves, etc.), with more leaves occurring higher on the stem and many more flowers in the inflorescence. This species appears to be a good indicator of Ute ladies' tresses habitat along the South Fork, at least. Although possibly having a slightly wider ecological amplitude, it seems to be restricted to the moist, wetland-upland transition that is dominated by the grass, *Agrostis stolonifera* (redtop). It proved to be a useful indicator of potential habitat along the South Fork and may be useful elsewhere in Idaho.

1996 INVENTORIES IN IDAHO

Over the course of two months, from 30 July to 20 September 1996, three inventory forays were conducted for Ute ladies' tresses in eastern Idaho. As mentioned earlier, the 1996 inventory was extensive in nature, covering a wide area of eastern Idaho, to determine if the species occurs in the area and elucidate its general distribution. It was not meant to be intensive, thoroughly searching all potential habitat.

The first foray, from 30 July to 2 August, was conducted by Edna Rey-Vizgirdas, Boise U.S. Fish and Wildlife Service; Steve Popovich, Upper Snake River BLM; and myself. It started with a visit to populations in Utah with biologists from the U.S. Fish and Wildlife Service and Forest Service. We then conducted a reconnaissance of eastern Idaho from Bear Lake to the Teton Valley. Although we were probably early (i.e., prior to the peak flowering period) and found no populations, the trip proved useful in assessing the distribution of potential habitat. We also discovered two populations of hooded ladies' tresses in the area. Appendix 1 contains a list of the sites visited.

From 13 - 23 August, I conducted inventories along the major tributaries of the South Fork Snake River, Stump Creek, Bear River, and Thomas Fork (Appendix 1). Concurrent with this, Mabel Jankovsky-Jones was conducting wetland and riparian inventories along the main corridor of the South Fork, as part of another project. It was while conducting these inventories that she discovered the first population of Ute ladies' tresses near Heise.

The last foray took place between 11 - 20 September, when I conducted inventories along the South Fork, lower Henrys Fork, main Snake River to Ferry Butte, and the Blackfoot River below Blackfoot Reservoir (Appendix 1). It was during this trip that I confirmed the identification of the Heise population and found three additional populations upstream.

CURRENT DISTRIBUTION IN IDAHO

Geography

Four populations of Ute ladies' tresses were discovered in Idaho during 1996. They constitute the known distribution of the species in the state. All four occur along about 30 river miles of the South Fork Snake River between Heise and Swan Valley. Table 4 presents a summary of the location and the estimated population sizes and areas in 1996. Appendix 2 contains more detailed occurrence records from the CDC data base for the four populations. Figure 2 shows the general location of Ute ladies' tresses in Idaho. Appendix 3 contains more precisely mapped locations.

Table 4. Location and estimated size and area of the Ute ladies' tresses populations in Idaho. Refer to Appendix 2 and 3 for more details.

Site Name	CDC Occurrence Number	River Mile	Estimated Population Size	Estimated Population Area
Kelly's Island	001	853	12	1 acre
Rattlesnake Point	002	863.5	15	60 m ²
Warm Springs Bottom	003	866*	173	1 acre
Papoose Creek Bottom	004	882*	1	1 m ²

* = remeasured river miles. There is a discrepancy in numbering on the USGS quads above river mile 863. The actual remeasured values are from Hydrology and Hydraulics Committee (1976).

Figure 2. General location of Ute ladies' tresses in Idaho.

Habitat

Ute ladies' tresses is currently known from two types of communities in Idaho (Jankovsky-Jones 1997): (1) *Eleocharis rostellata* (wandering spike-rush) and (2) *Elaeagnus commutata* (silverberry). Floodplain vegetation adjacent to these communities include cattail (*Typha latifolia*) marsh, narrowleaf cottonwood (*Populus angustifolia*), and water birch (*Betula occidentalis*) types. Vegetation of slopes bordering the South Fork is dominated by Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*), Douglas-fir (*Pseudotsuga menziesii*), bigtooth maple (*Acer grandidentatum*), and Rocky Mountain juniper (*Juniperus scopulorum*).

The Kelly's Island (001) population is the only one in the wandering spike-rush community type. This community is widely scattered in eastern Idaho, with at least one occurrence containing hooded ladies' tresses (a fen near Blackfoot Reservoir). In central Idaho, the wandering spike-rush community is uncommon, most often found in wetland habitats influenced by geothermal waters (Moseley 1995). Wandering spike-rush occurs in nearly monotypic stands in this community type and overall species diversity is low. At Kelly's Island, this community occurs in an old river channel that no longer floods. The habitat is subirrigated and has soils that remain moist at the surface the entire season. Ute ladies' tresses does not, however, occur in areas of standing water.

The other three populations occur in nearly identical habitats, but are very different from Kelly's Island. All occur in mesic habitats on the edge of active channels that were at or below high water during the spring of 1996, when river flows peaked at 23,000 cfs. The silverberry community type occurs as a narrow band in the transition between sedge (*Carex*)-dominated areas in the center of the channels and the higher terraces dominated by old narrowleaf cottonwood stands. Sedge-dominated areas have standing water and are too wet, while the higher terraces, which usually have an understory of Kentucky bluegrass (*Poa pratensis*), are too dry. Ute ladies' tresses habitat is characterized by a dense sward of the rhizomatous grass, *Agrostis stolonifera* (redtop), covering the ground, with an overstory of widely scattered silverberry and coyote willow (*Salix exigua*). Canopy cover of the shrubs averages less than 10%. The substrate is fine to coarse alluvium, with minimal soil development. The soil remains moist at the surface throughout the growing season, fed by capillary fringe from the water table.

Throughout the range of Ute ladies' tresses, redtop appears to be one of the most reliable indicators of suitable habitat. It indicates a mesic habitat that is dryer than sedge-dominated sites and wetter than habitats supporting Kentucky bluegrass. Redtop is a densely rhizomatous grass that is native to Europe and has been widely introduced into North America. The composition and structure of Ute ladies' tresses habitats prior to invasion by redtop is unknown. Redtop commonly has high cover in many shrub and forested riparian community types in eastern and central Idaho.

For land managers in central and eastern Idaho, consider this statement when assessing whether or not you administer suitable habitat or are preparing for field inventories of project areas:

The habitat of Ute ladies' tresses is pretty generic stuff, with the rhizomatous grass, redtop (*Agrostis stolonifera*), being the best indicator species of potential habitat along dynamic streams and rivers. Nothing odd or peculiar about this. It also can occur in fairly stable communities dominated by wandering spike-rush (*Eleocharis rostellata*) in Idaho and Utah. This is an odd habitat in Idaho. It's only known from around hot springs or alkaline wetlands in central Idaho (Moseley 1995), although it is widely scattered in eastern Idaho in non-thermal fens. The riparian areas where it's found in Utah and Idaho are most concisely characterized as medium to large streams and rivers of moderate gradient (not slow and meandering), generally as they near the edge of the mountains or somewhat out onto the plains, but before they start to slow down. It does not occur in dense shrub patches, although it can occur in small grassy openings within the stands. Soil must be moist to the surface throughout the growing season. This moisture level is usually maintained by capillary fringe from the water table. Populations can be flooded in the spring. It starts flowering in August and is pretty much through flowering by late September.

1997 INVENTORIES PLANNED IN IDAHO

Soon after the discovery of this listed Threatened species, the U.S. Fish and Wildlife Service added Ute ladies' tresses to the list of species requiring Section 7 consultation by federal land managers in eastern and east-central Idaho. This elicited a great deal of interest in conducting inventories to better elucidate the distribution of the plant in the state. Below is a summary of the inventory projects to be conducted or coordinated by the CDC in 1997:

Section 6 ESA - Extensive inventory of eastern Idaho, including watersheds listed in Table 1, plus the Camas Creek (hydrologic unit 17040214) and Medicine Lodge Creek (hydrologic unit 17040215) drainages.

Upper Snake River District BLM - Intensive inventory of all potential habitat along the main Snake River corridor from Palisades Dam, downstream to American Falls Reservoir. This area contains the known populations in Idaho.

Idaho Transportation Department - Intensive survey of road projects near Soda Springs and Montpelier.

EPA Wetlands Conservation Planning - Extensive inventory of low-elevation wetlands and riparian areas of east-central Idaho, including East Fork Salmon, Pahsimeroi, Big Lost, Little Lost, Birch Creek, and Lemhi drainages, as well as the main Salmon between Clayton and North Fork.

Salmon-Challis National Forests - Extensive inventory of higher-elevation wetlands and riparian areas of east-central Idaho on the Challis-Salmon National Forest, including at least the upper Big Lost, upper Little Lost, and major tributaries of other rivers.

Information gathered during these inventories will be combined and summarized into a status survey report for Idaho, following the format of Henifin et al. (1981). Smaller, project-specific reports may also be produced for some of the intensive inventories.

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Appendix 1

Sites inventoried for Ute ladies' tresses in Idaho during 1996.

30 July to 2 August (Bob Moseley, Edna Rey-Vizgirdas, Steve Popovich)

- 30 July - Utah: American Fork, Powell Slough (near Provo), and Spanish Fork drainage
- 31 July - vicinity of Bear Lake Hot Springs
- east side of Bear Lake National Wildlife Refuge
- west side of Bear Lake National Wildlife Refuge (along Powerline Road)
- mouth of Little Creek near St Charles (on Bear Lake)
- 1 August - cottonwood stands near Dingle along the Bear River.
- fen at Henry Stampede Parks Springs site along Blackfoot Reservoir (found *Spiranthes romanzoffiana*)
- lower Tin Cup Creek on east side of Star Valley
- Rainey Creek, South Fork Snake River tributary
- 2 August - Woods Creek Fen, outside of Driggs in Teton Valley (found *S. romanzoffiana*)

13 - 23 August (Bob Moseley, Mabel Jankovsky-Jones)

- 13 August - McCoy Creek in Caribou Basin
- 17 August - Rainey Creek on Targhee NF (along road)
- lower Big Elk Creek (around campground)
- lower Palisades Creek (campground to mouth)
- Fall Creek (Gibson Creek to mouth)
- 18 August - Palisades Creek (Lower Palisades Lake to campground)
- 22 August - Bear Creek, South Fork Snake (Palisades Reservoir) tributary
- Stump Creek drainage
- 23 August - cottonwood stands near Dingle along the Bear River.
- lower Thomas Fork (new addition to Bear Lake NWR)

11 - 20 September (Bob Moseley)

- 11 Sept - Kelly's Island (*Spiranthes diluvialis* occurrence 001)
- 12 Sept - Heise Hot Spring area
- Warm Springs bottom (*Spiranthes diluvialis* occurrence 003)
- Wood Creek Fen (to check phenology of *S. romanzoffiana*)

- 14 Sept - lower Henrys Fork access points:
 Trestle Bridge
 Red Road Bridge
 Hibbard Bridge (west and east side)
- 15 Sept - lower Henrys Fork access points:
 fishing ponds in Rexburg
 Egin Lakes
 Warm Slough
 Cartier Slough WMA
 Menan Bridge
 - South Fork Snake River:
 Lorenzo Bridge
 Twin Bridges
 Heise Bridge
 Gormer Canyon #5 island (across from Lufkin Bottom)
 terrace upstream from Black Canyon
 Warm Spring bottom (*Spiranthes diluvialis* occurrence 003)
- 16 Sept - near Rattlesnake Point, South Fork (*Spiranthes diluvialis* occurrence 002)
 - Mineral Springs area, Fall Creek
 - Fall Creek Campground (*Spiranthes diluvialis* occurrence 004)
- 17 Sept - South Fork Snake River:
 Warm Spring bottom (*Spiranthes diluvialis* occurrence 003)
 Rattlesnake Point (*Spiranthes diluvialis* occurrence 002)
 - main Snake River:
 Roberts Bridge
 Woodville to Firth
 Firth Nature Park
 Rose/Blackfoot to Ferry Butte Bridge
 Riverton Access Site
 - lower Blackfoot River (below canyon)
- 18 Sept - Blackfoot River:
 The Cove
 The Cove to Trail Creek Bridge
 Trail Creek Bridge Exclosure
 Morgan Bridge Exclosure
 Grave Creek Campground area
 Negro Creek Exclosure
 Travertine Park RNA/ACEC
- 20 Sept - McCoy Creek/Caribou Basin
 21 Sept - Little Elk Creek, South Fork Snake River

Appendix 2

CDC occurrence records for Ute ladies' tresses in Idaho.

OMITTED FROM INTERNET VERSION

Appendix 3

Maps of Ute ladies' tresses populations in Idaho.

Map 1. Kelly's Island 001. Portions of the 1979 Heise and Poplar USGS 7.5' quadrangles.

Map 2. Rattlesnake Point 002 and Warm Springs Bottom 003. Portion of the 1966 Wheaton Mtn. USGS 7.5' quadrangle.

Map 3. Papoose Creek Bottom 003. Portion of the 1966 Swan Valley USGS 7.5' quadrangle.