UTE LADIES TRESSES (*SPIRANTHES DILUVIALIS*) IN IDAHO:

1998 STATUS REPORT

by

Robert K. Moseley
Conservation Data Center

November 1998

Idaho Department of Fish and Game
Natural Resource Policy Bureau
600 South Walnut, P.O. Box 25
Boise, Idaho 83707
Stephen P. Mealey, Director

Status Survey Report prepared for:
Idaho Department of Parks and Recreation
through Section 6 funding from
U.S. Fish and Wildlife Service, Region 1
and
Upper Snake River District, Bureau of Land Management

SUMMARY

This 1998 status report for Ute ladies tresses is meant to compliment the 1997 report (Moseley 1998a) and only contains new or updated information about the species in Idaho. I follow the same format in this update as I did in the 1997 report, which should be consulted for information not covered here. The big news is that not much changed in 1998, so the Taxonomy, Legal Status, Description and Identification, Assessing Potential Habitat, Flood Plain Dynamics, and Assessment and Recommendations sections are little changed from last year's report. I have updated the Distribution section with information about the new occurrence found along the Snake River. Substantive new data on the composition and structure of communities occupied by Ute ladies tresses appear in the Habitat section. The Population Biology section contains our 1998 observations on population levels, phenology, land use, and a new section reviewing sampling for genetic studies. Finally, I outline the Ute ladies tresses conservation work being planned for the Snake River populations in 1999, which will focus on population and habitat monitoring, continued habitat characterization, and the relationship of primary succession in ladies tresses habitat to fluvial processes.

ACKNOWLEDGMENTS

Funding was provided to the Conservation Data Center (CDC) for its 1998 Ute ladies tresses work by the Upper Snake River District of the Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (USFWS). Considerable field work was conducted by Karen Rice and Susan Murdock of the BLM, and Rose Lehman of the Targhee National Forest, who contributed their information and knowledge to this report. Chris Murphy of the CDC also helped with field sampling and inventory. Thanks also to Karen Rice, Rose Lehman, Edna Rey-Vizgirdis, Mike Merigliano, and Terry Vernholm for reviewing a draft version.

TABLE OF CONTENTS

SUMMARY i
ACKNOWLEDGMENTS i
TABLE OF CONTENTS ii
LIST OF FIGURES iii
LIST OF TABLES iii
LIST OF APPENDICES iii

TAXONOMY 1

LEGAL OR OTHER FORMAL STATUS 1

DESCRIPTION AND IDENTIFICATION 1

DISTRIBUTION
- Rangewide distribution 1
- Idaho distribution 1
- Precise occurrences in Idaho 1
- Extent of surveys in Idaho 3

HABITAT 3
- Review of plant communities 3
- Methods for 1998 data collection 4
- Results 6

ASSESSING POTENTIAL HABITAT 11

FLOOD PLAIN DYNAMICS IN RELATION TO UTE LADIES TRESSES HABITAT
- 1997 flood observations 12
- Merigliano floodplain and vegetation dynamics research 12

POPULATION BIOLOGY 12
- Phenology 13
- Population size and condition 13
- Population genetics 13
- Reproductive biology 15
- Competition 15
- Herbivory 15
- Land ownership and management responsibility 15
- Land use and possible threats 16

ASSESSMENT AND RECOMMENDATIONS
General assessment of vigor, trends, and status 18
Recommendation to the U.S. Fish and Wildlife Service 18
Recommendations to the other federal agencies 18
Recommendation to the Heritage Network 18
Recommendations regarding present or anticipated activities 19

REQUEST TO BOTANISTS AND SURVEYORS! 19

CONSERVATION WORK FOR 1999 19

REFERENCES 21

LIST OF FIGURES

Figure 1. Canopy cover of non-native species in plots from Ute ladies tresses habitat along the Snake River, Idaho. 10

LIST OF TABLES

Table 1. 1998 Ute ladies tresses occurrences in Idaho, arranged by river mile along the Snake River from downstream to upstream 2

Table 2. Summary of species cover and constancy data for Ute ladies tresses habitat arranged by community type 7

Table 3. Number of plants observed at *Spiranthes diluvialis* occurrences in Idaho, 1996-1998 14

Table 4. Known activities and impacts observed in 1998 at *Spiranthes diluvialis* occurrences in Idaho 17

LIST OF APPENDICES

Appendix 1. *Spiranthes diluvialis* habitat plot data.

TAXONOMY

No change from 1997 status report (Moseley 1998a).

LEGAL OR OTHER FORMAL STATUS

No change from 1997 status report.

DESCRIPTION AND IDENTIFICATION

No change from 1997 status report.

DISTRIBUTION

Rangewide distribution: No change from 1997 status survey report (Moseley 1998a).

Idaho distribution: The distribution of Ute ladies tresses in Idaho at the end of the 1998 field season is virtually the same as it was in 1997. Only one new occurrence was discovered this year and several new populations were found at previously delineated occurrences. In Idaho, it is still only known from the Snake River flood plain in the far eastern part of the state, in Jefferson, Madison, and Bonneville counties. Populations are scattered along 49 river miles from near the confluence of the Henry's Fork, upstream to Swan Valley, nine river miles below Palisades Dam. In Idaho, this stretch of river is known as the "South Fork," while on USGS maps and in Wyoming the same waterway is known simply as the Snake River.

Precise occurrences in Idaho: I consider the populations along the Snake River to be one large metapopulation, although 21 occurrences have been delineated in the CDC data base based on management and geographic considerations. I distributed the precise occurrence records and maps for Idaho populations in October 1998 (Moseley 1998b), so only a summary is presented here (Table 1). Refer to the occurrence records for detailed location data on individual Idaho occurrences.

During the 1998 inventory season, one new occurrence was discovered. Rose Lehman, Targhee National Forest, found a small population (occurrence 021) along the Snake River, less than a mile upstream from a previously-known site. Our 1998 surveys added new populations to several previously-known occurrences. These results are discussed in the Population Biology section.

Table 1. 1998 Ute ladies tresses occurrences in Idaho, arranged by river mile along the Snake River from downstream to upstream.

Occurrence Name	Occurrence No.	River Mile[1]	Land Ownership
Annis Island	006	835	BLM
Lorenzo Levee	008	836.5	Private
Archer Powerline	015	844	Private
Twin Bridges Island	007	846	BLM, Madison County
Railroad Island	005	847	BLM
Kelly's Island	001	853	BLM
Mud Creek Bar	009	862	BLM
Rattlesnake Point	002	863.5	BLM
TNC Island	010	863.5	BLM
Warm Springs Bottom	003	866*	BLM
Lufkin Bottom	011	867*	BLM
Gormer Canyon #5	012	867.8*	Targhee NF
Gormer Canyon #4	013	868.5*	Targhee NF
Gormer Canyon #3	021	869*	Targhee NF
Pine Creek #5	014	873.5*	BLM
Pine Creek #3 & #4	016	874.5*	BLM
Lower Conant Valley	017	876.3*	BLM
Upper Conant Valley	018	878*	BLM
Lower Swan Valley	019	881.8*	BLM
Falls Campground	004	882*	Targhee NF
Squaw Creek Islands	020	884*	BLM, Targhee NF,Private

[1]In some cases the river miles reported on the USGS quads are incorrect. I use the remeasured river mile index of the Hydrology and Hydraulics Committee (1976) as the reference for this table and subsequent discussions. Cases where the remeasurement disagrees with the quad are marked with an asterisk (*).

Extent of surveys in Idaho: Systematic surveys for Ute ladies tresses began in Idaho in a modest way during 1996 (CDC 1998; Moseley 1997a; 1997b). These surveys resulted in its discovery in Idaho. The 1997 Section 7 consultation area included 24 counties in eastern and east-central Idaho. Based on these guidelines, nearly 600 miles of rivers and creeks were surveyed by a small army of botanists during 1997. Refer to CDC (1998) and Moseley (1998a) for summaries of the 1997 survey work. When a Ute ladies tresses population was discovered in Washington in late 1997, the USFWS issued new Section 7 guidelines that expanded the consultation area to include the entire state (U.S. Fish and Wildlife Service 1998). Needless to say, during the 1998 field season the botanical army searching for *Spiranthes* expanded substantially. As I did last year, I will attempt to compile and map all the 1998 survey information for the state (see Request to Botanists and Surveyors! section, below).

HABITAT

In last year's status report (Moseley 1998a) I discussed rangewide and Idaho-specific habitat characteristics for Ute ladies tresses at three scales: macro-, meso-, and micro-scales. I have nothing new to report for the macro- and micro-scales, at either rangewide or statewide levels. There is new information for meso-scale characteristics in Idaho. Remember that meso-scale characteristics included geologic and flood plain features, soils, landscape setting, plant communities, and broad hydrologic gradients. This year we collected quantitative data on the composition and structure of plant communities supporting Ute ladies tresses. In the 1997 report they were only discussed in general terms.

Review of Plant Communities

Last year I described Ute ladies tresses as occurring in four types of communities or cover types: *Eleocharis rostellata, Elaeagnus commutata, Salix exigua/Agrostis stolonifera*, and *Equisetum variegatum*. This pattern held true again in 1998, although I'm now adding *Agrostis stolonifera* to the name of the *Elaeagnus commutata* type (i.e., *E. commutata/A. stolonifera*). Below is a brief description of each community.

<u>*Eleocharis rostellata* (wandering spike-rush)</u>: This is the odd ball for Idaho Ute ladies tresses occurrences. Only a portion of the Kelly's Island occurrence (001) occurs in this community. Wandering spike-rush occurs in nearly monotypic stands and overall species diversity is low. At Kelly's Island this community occurs in an old river channel at the center of the island that no longer floods regularly. Kelly's Island is the only place this community is known to occur in the Snake River corridor from American Falls to the Wyoming border. There are, however, extensive stands at travertine springs along Fall Creek, ca. two miles upstream from the Snake River, south of Swan Valley.

Elaeagnus commutata/Agrostis stolonifera (silverberry/redtop): The silverberry/redtop community occurs as a narrow, often linear band in the transition zone between sedge-dominated areas or open water in the center of the channels and the higher bars dominated by narrowleaf cottonwood stands. Sedge-dominated areas have standing water and are too wet, while the higher bars are too dry. Ute ladies tresses habitat is characterized by a dense ground cover of redtop, a rhizomatous grass, with an overstory of widely scattered silverberry. This is the most common habitat for Ute ladies tresses along the Snake River.

Salix exigua (sandbar willow)/*Agrostis stolonifera*: This is essentially the same in composition, structure, and its position on the hydrologic gradient as the silverberry/redtop community described above, except silverberry is absent. Sandbar willow is the dominant shrub, albeit in relatively low cover, and redtop forms a dense sward in the understory. This is a common habitat for Ute ladies tresses along the Snake.

Equisetum variegatum (variegated scouring rush): This community occurs in small stands, usually adjacent to the silverberry or sandbar willow types. The low-growing, rhizomatous *Equisetum variegatum* dominates the ground cover. Redtop and other associates occur in only minor amounts. Shrubs are virtually absent. This is a relatively common habitat for Ute ladies tresses in the Snake River corridor, although it has low aerial coverage.

Methods for 1998 Data Collection

We collected composition and structure data in the silverberry/redtop, sandbar willow/redtop, and variegated scouring rush communities. We did not collect data in the wandering spike-rush community because of its single occurrence and its simple composition and structure; it is essentially a monotypic stand of wandering spike-rush. The sampling methods follow standards set up by the Natural Heritage/Conservation Data Center network in western North America (Bourgeron et al. 1992). The salient features of the methodology applied to sampling Ute ladies tresses habitat along the Snake River are as follows:

1. Plots were subjectively placed in Ute ladies tresses populations to assure the best habitat characterization in these small, isolated sites. Random placement of plots would have been impractical in this situation. Please note that in the data presented below, Ute ladies tresses does not appear in every plot; however, it was present in every stand sampled except for Plot 003C (explained below).

2. We used microplots to sample herbaceous species (graminoids and forbs) and a line-intercept procedure to sample woody species, as follows:

Herbaceous species: A 10 meter-long transect was used for the microplot layout. We used a transect instead of a rectangular arrangement, because of the linear nature of Ute ladies tresses habitat. Ten 20 x 50 cm (0.1 m^2) microplots were placed at 1 m intervals along the transect. Percent foliar cover was estimated for every graminoid and forb (including pteridophyte)

species in the microplot, using the following classes:

Code	Cover Class	Midpoint
1	<1%	0.5%
3	1% to 4.9%	3%
10	5% to 14.9%	10%
20	15% to 24.9%	20%
30	25% to 34.9%	30%
40	35% to 44.9%	40%
50	45% to 54.9%	50%
60	55% to 64.9%	60%
70	65% to 74.9%	70%
80	75% to 84.9%	80%
90	85% to 94.9%	90%
98	95% to 100%	97.5%

The class midpoint was used to calculate percent cover in all analyses that follow.

Woody species: For woody plants we measured the amount of canopy of each species intercepted by the 10 m-long transect tape. This value was converted to percent cover. Narrowleaf cottonwood was the only tree species in the plots. It is lumped with the shrubs in the life-form analyses because it only occurred as low, scrawny sprouts that were shrub-like.

3. Location of the plot was documented and the general site described. The following environmental features were noted for each transect: dominant life form, parent material, landform, plot position, slope shape, aspect, slope, elevation, erosion potential, erosion type, valley width, ground cover disturbance, animal use, and disturbance history. Ground cover was estimated, using the same cover classes defined above, for the following categories: bare soil (particles < 1/16 in. diam.); gravel (particles 1/16 to 3 in. diam.); rock (particles > 3 in. diam.); litter and duff; wood (downed fragments > 0.25 in. dia.); moss; and basal vegetation (area occupied by root crowns and stems, excluding moss).

4. I treat Plot 003C somewhat differently in the results that follow. This plot is from the upper end of the Warm Springs Bottom occurrence (003) from a stand where Ute ladies tresses was last observed in 1996. It was subsequently buried by deep sands in the June 1997 flood. In other

words, this plot is in habitat where Ute ladies tresses appears to have been extirpated. See Moseley (1998a) and the Flood Plain Dynamics in Relation to Ute Ladies Tresses Habitat section, below, for further discussion of this situation.

Results

Fourteen plots were sampled from throughout the 49-mile-long Ute ladies tresses metapopulation in the Snake River corridor. Summarized canopy cover and constancy data for species, life form, and ground cover appear in Table 2. Cover data for all plots appear in Appendix 1; original plot forms are archived in the files of the CDC. A total of 55 species (not counting unidentifiable forbs) occurred in all the plots, with 7 being woody species, 18 graminoids, and 30 forbs. Expect for Plot 003C, the average number of species/plot is about the same for each community, varying from 15.6 to 17.4.

Equisetum variegatum clearly dominates one community, while *Salix exigua* and *Elaeagnus commutata* are mutually exclusive in the two communities where they dominate the shrub layer. *Agrostis stolonifera* and *Poa pratensis* dominate the sandbar willow/redtop and silverberry/redtop communities. In the first two status reports for Ute ladies tresses in Idaho (Moseley 1997a; 1998a), I characterized these communities as having a dense sward of redtop dominating the ground cover. Detailed sampling using the microplots revealed a somewhat different picture. *Agrostis stolonifera* does indeed have high cover (average 60-70%), but surprisingly so does *P. pratensis* (average 30%). The reason it was overlooked previously was that, unlike in adjacent cottonwood stands, *P. pratensis* has a cryptic, vegetative habit when it occurs in Ute ladies tresses habitat. No flowering culms were observed in any plots. *Agrostis stolonifera*, on the other hand, has an overwhelming aspect dominance because of the tall culms and reddish and brown inflorescences. So, what I thought was solely a dense turf of reproductive *A. stolonifera*, actually has a high cover of vegetative *P. pratensis* hidden low in the canopy.

This discussion of *A. stolonifera* and *P. pratensis* brings up the issue of the dominance of introduced species in Ute ladies tresses habitat. Non-native species comprise 3% cover in Plot 003C, which was recently buried by flood alluvium, but increase to 33% in the variegated scouring rush community, and 109% and 100% in the sandbar willow/redtop and silverberry/redtop communities, respectively (Figure 1). These are cumulative totals, which, with canopy overlap, can be greater than 100%. The relative contribution of forbs and graminoids to these totals is shown in Figure 1. While there are more introduced forb species (nine versus five graminoids; Table 2), it is the rhizomatous graminoids that comprise most of the cover. *Agrostis stolonifera* is the most prominent, occurring in all three communities, followed by *P. pratensis* in the two shrub types.

The effect of these sod-forming exotics on Ute ladies tresses population viability and habitat characteristics is unknown. Recent work by Gremmen et al. (1998) on redtop invasion of a sub-Antarctic island may be analogous to Ute ladies tresses habitat in Idaho. They monitored redtop invasion on the island between 1966 and 1995 and compared the composition and structure of

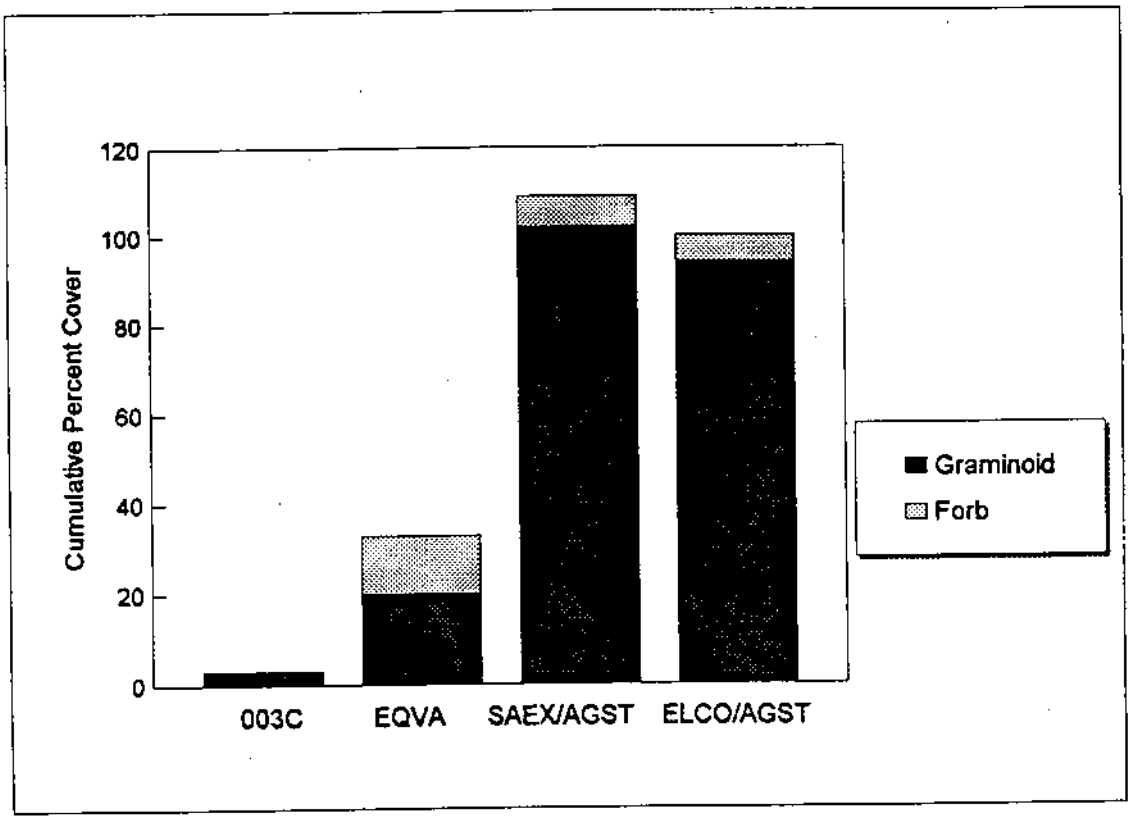
Table 2. Summary of species cover and constancy (in parentheses) data for Ute ladies tresses habitat arranged by community type and Plot 003C. No constancy values are given for Plot 003C because n = 1. Canopy cover is given in classes defined in the Methods section. Ground cover categories are also explained in Methods. Heights are in meters. * = introduced species.

	Plot 003C (extirpated) n = 1	**Equisetum variegatum** n = 5	**Salix exigua/ Agrostis stolonifera** n = 3	**Elaeagnus commutata/ Agrostis stolonifera** n = 5
WOODY SPECIES				
Betula occidentalis		1 (20)		1 (40)
Elaeagnus commutata				10 (100)
Populus angustifolia	1	3 (40)	3 (100)	1 (40)
Rosa woodsii				1 (20)
Salix bebbiana			3 (33)	
Salix exigua		3 (40)	10 (100)	
Salix lutea	1		3 (33)	
GRAMINOIDS				
**Agrostis stolonifera*	3	20 (100)	70 (100)	60 (100)
Calamagrostis neglecta			1 (33)	3 (20)
Carex lanuginosa		10 (100)	3 (100)	3 (40)
Carex nebraskensis		1 (40)		1 (40)
Carex sp.			1 (33)	
Eleocharis palustris		3 (40)	1 (33)	
**Festuca arundinacea*				3 (40)
Juncus balticus		1 (40)	1 (33)	3 (60)
Juncus ensifolius		3 (100)		1 (20)
Juncus longistylis		1 (40)		
Juncus tenuis		1 (40)	1 (33)	1 (20)
Muhlenbergia asperifolia		1 (20)		10 (40)

	Plot 003C	Eqva	Saex/Agst	Elco/Agst
Muhlenbergia richardsonis		10 (20)	3 (66)	3 (60)
Phalaris arundinacea			3 (33)	
**Phleum pratense*			1 (33)	1 (20)
**Poa palustris*			1 (33)	
**Poa pratensis*		1 (20)	30 (100)	30 (100)
Scirpus pungens				1 (20)
FORBS & PTERIDOPHYTES				
Aster ascendens		1 (40)	3 (100)	3 (40)
Aster hesperius		3 (40)		3 (40)
Cicuta douglasii		1 (20)		
**Cirsium vulgare*			1 (33)	1 (20)
Clematis ligusticifolia				1 (20)
Conyza canadensis		1 (20)		
Epilobium ciliatum		1 (20)		
Equisetum arvense		1 (20)		1 (20)
Equisetum laevigatum		1 (40)	3 (100)	10 (100)
Equisetum variegatum	60	60 (100)	3 (33)	3 (60)
Euthamia occidentalis		3 (20)	3 (33)	
Fragaria virginiana				1 (20)
Glycyrrhiza lepidota		3 (40)		3 (60)
Habenaria hyperborea				1 (20)
**Medicago lupulina*				1 (20)
Mentha arvense		3 (80)	1 (66)	1 (20)
**Myosotis scorpioides*		3 (40)	3 (66)	1 (20)
**Plantago major*		3 (60)	3 (33)	1 (40)
Potentilla anserina			1 (33)	
Prunella vulgaris		3 (40)	3 (66)	1 (20)

	Plot 003C	Eqva	Saex/Agst	Elco/Agst
Ranunculus cymbalaria		3 (80)	1 (33)	
**Rumex crispus*			1 (33)	
Smilacina stellata				1 (33)
Solidago missouriensis	1	1 (20)	3 (66)	1 (20)
**Sonchus arvense*		3 (40)		
Spiranthes diluvialis		1 (60)		1 (20)
**Taraxacum officinale*		3 (80)	1 (33)	1 (60)
**Trifolium fragiferum*		3 (60)		1 (20)
**Trifolium repens*		1 (40)	1 (66)	1 (40)
Viola sp.		3 (80)	1 (33)	3 (60)
unknown forbs		3 (40)		1 (40)
TOTAL SPECIES (avg)	5.0	17.4	17.3	15.6
LIFE FORM DATA				
Woody Cover / Mean Ht.	1 / 0.5	3 / 0.5	10 / 1.6	10 / 1.4
Graminoid Cover / Mean Ht.	3 / 0.4	40 / 0.5	98 / 0.5	90 / 0.7
Forb Cover / Mean Ht.	60 / 0.1	80 / 0.2	10 / 0.1	20 / 0.1
GROUND COVER				
Soil	70	10	10	10
Gravel				
Rock		1		1
Litter	1	10	50	60
Wood	1	1		1
Moss	0	30	10	3
Basal Vegetation	30	50	30	30

Figure 1. Canopy cover of non-native species in plots from Ute ladies tresses habitat along the Snake River, Idaho. The X axis represents community types and Plot 003C (see text). EQVA = Equisetum variegatum community; SAEX/AGST = Salix exigua/Agrostis stolonifera community; ELCO/AGST = Elaeagnus commutata/Agrostis stolonifera community. The Y axis represents cumulative percent cover.



stands with and without redtop. It invaded communities whose position along the hydrologic gradient, as well as some other environmental and physical attributes, appear similar to ladies tresses habitat along the Snake. Redtop averaged 83% cover in invaded stands and reduced the cover and constancy of all native species of vascular plants, bryophytes, and a lichen. It also reduced native species richness in all stands. What had been a relatively diverse community dominated by a large forb and having high moss ground cover, became a dense redtop turf. Could a similar scenario have played out along the Snake a century ago? It's possible, but we'll never know for sure.

There is one major difference between Gremmen's study area and the Snake River. His communities do not experience the dynamic fluvial processes that are known to radically affect the flood plain habitat of Ute ladies tresses in Idaho. This brings us back to the composition and structure data collected this year in both extant and extirpated habitats. Plot 003C is treated separately in Table 2 because it represents habitat where Ute ladies tresses was observed in 1996, but was subsequently buried by sand in June 1997 and apparently extirpated (see detailed discussion in Flood Plain Dynamics section in Moseley 1998a). Given the dominance of *Equisetum variegatum* at this site it probably belongs in the *E. variegatum* community. Although no composition and structure data were collected in 1996, this was a silverberry/redtop community prior to the flood. The silverberry was killed and *E. variegatum* invaded the open sands during 1997 and 1998. These data and other observations give some insights into possible scenarios for primary succession in Ute ladies tresses habitat along the Snake River. Admittedly, this hypothesis is a relatively simplistic, Clementsian view of an orderly natural succession and does not account for the creation of and dispersal into new habitats. It should be treated as a working hypothesis that probably will be refined by further research in 1999 (see Conservation Work for 1999 section). Here are the key points of this hypothesis:

- It appears that Plot 003C represents the pioneering stage of the variegated scouring rush community, formed in deposition from a (pre-dam) 10-year flood event (Martin 1998; Moseley 1998a).

- The variegated scouring rush community may be an early sere of the silverberry/redtop community. Shrubs, redtop, and *Poa pratensis* increase in density over time.

- Shrub density eventually increases to the point where Ute laddies tresses is excluded from the stands if another flood does not deposit alluvium and start the cycle again.

ASSESSING POTENTIAL HABITAT

No change from 1997 status report.

FLOOD PLAIN DYNAMICS IN RELATION TO UTE LADIES TRESSES HABITAT

1997 flood observations: In last year's report (Moseley 1998a) I made several observations on the June 1997 flood in relation to the four Ute ladies tresses occurrences known at the time. My 1998 observations of flood effects on two of the four occurrences are worth mentioning here.

- Falls Campground (004) - Although its exact location was not known, the single plant seen in 1996 was not seen this year and none were observed in the vicinity. The site remains under deep sand deposited during the 1997 flood.

- Warm Springs Bottom (003) - I saw no plants at the site of the alluvial deposition (Plot 003C mentioned above). The composition and structure of the habitat remains radically different from the pre-flood community, which was silverberry/redtop. The widely scattered silverberry shrubs that occupied the site prior to the flood never resprouted and are dead, and redtop occurs in very low cover.

Merigliano floodplain and vegetation dynamics research: In this section last year (Moseley 19988a) I used Merigliano's (1996) research to estimate the substrate age of selected Ute ladies tresses occurrences above Heise, which ranged from about 40 to 100 years old. What I didn't mention last year was that portions of two occurrences occur on man-made substrates that can also be dated

Annis Island (006) - Many of the populations that comprise this occurrence are on excavated or fill material resulting from construction of the nearby levees. Construction of the Snake River levee system began in the early 1950s, with the authorization of Palisades Dam by Congress, and continued through the early 1960s (K. Rice, personal communication, 1998). The exact time of levee construction on Annis Island is unknown.

Warm Springs Bottom (003) - In 1970, a small dam was constructed by Idaho Fish and Game along the spring-creeks on Warm Springs Bottom. We were going to use the resulting pond to raise fingerling trout, but the dam was built in an active channel and was blown out by floods in 1971. It was rebuilt the next year and lasted until either 1975 or 1976 when high water again washed it out. It was then never rebuilt (P. Jeppson, personal communication, 1998). The densest portion of the Warm Springs Bottom occurrence is on excavated or filled surfaces resulting from dam construction, making it the youngest-known surface supporting Ute ladies tresses along the Snake River.

POPULATION BIOLOGY

Refer to Heidel (1998) for a review of the population biology of Ute ladies tresses, in general, and Moseley (1998a) for observations and data pertaining to the Idaho populations. Below is updated information based on 1998 observations.

Phenology: Based on 1996 and 1997 observations, we thought Ute ladies tresses began flowering in mid-August. This year it started significantly earlier, probably around August 1. For example, the Upper Conant Valley (018) population was in full flower on August 13 this year, compared to the same phenological stage on September 17, 1997. Throughout the Idaho metapopulation, however, we observed many plants in full flower through the end of September 1998. In an update to last year's information, Karen Rice (personal communication, 1998) reported that some individuals were in flower through late October 1997. Similar to last year, flowering time can vary significantly among individuals within a population, with up to a four-week off-set.

There was one very surprising phenological finding this year. Like many orchids, Ute ladies tresses plants are known to have a prolonged dormancy, but I always assumed that at least some individuals in a population would be observable above ground every year. This appears not to be the case. No plants were seen at Gormer Canyon #5 (012), Lower Conant Valley (017), and that portion of the Squaw Creek (020) occurrence discovered in 1997. The Squaw Creek and Lower Conant Valley occurrences had relatively dense populations last year. No disturbances occurred at any of these sites during the intervening year. The implication of this is that you can never be sure that Ute ladies tresses is not present based on a single visit to potential habitat. It should be noted, however, that nearby populations were in full flower and that this was not a widespread phenomenon over a large segment of river.

Population size and condition: A total of 2,604 Ute ladies tresses plants were observed at the 21 occurrences in Idaho during 1998 (Table 3), an increase of 1,533 plants over 1997. The observed number of plants at most occurrences in 1998, was similar to 1997. A notable decrease took place at what were three large populations in 1997, Warm Springs Bottom (003), Lower Conant Valley (017), and Squaw Creek Islands (020). The latter two were discussed in the previous section and no major disturbances were observed at Warm Springs Bottom. So, these fluctuations in numbers of above-ground individuals appear to be natural variability. Most of the increase was a result of a thorough survey of Annis Island (006), which contains 78% of observed plants along the Snake River in 1998. Only a superficial inventory was conducted on Annis Island last year, largely because of heavy cattle grazing. This year the cows were taken off by late June. Five surveyors worked on the island over the course of two days in late August. A total of 2,036 individual plants were observed in 18 populations at the site.

Population genetics: Leaf tip samples were collected from Ute ladies tresses at various Idaho occurrences over the last three years. A summary of these activities is outlined below:

- 1996 - Upon discovery of Ute ladies tresses in Idaho, Moseley collected samples from the Rattlesnake Point (002) and Warm Springs Bottom [(003); voucher Moseley 3016 (S.P.)] occurrences. They were sent to Anna Arft, University of Colorado, who confirmed the species identification genetically, and compared the genetic structure of Idaho plants to previously-analyzed populations elsewhere.