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Ute Ladies Tresses (Spiranthes diluvialis) in Idaho: 1999 and 2000 Status Reports

by

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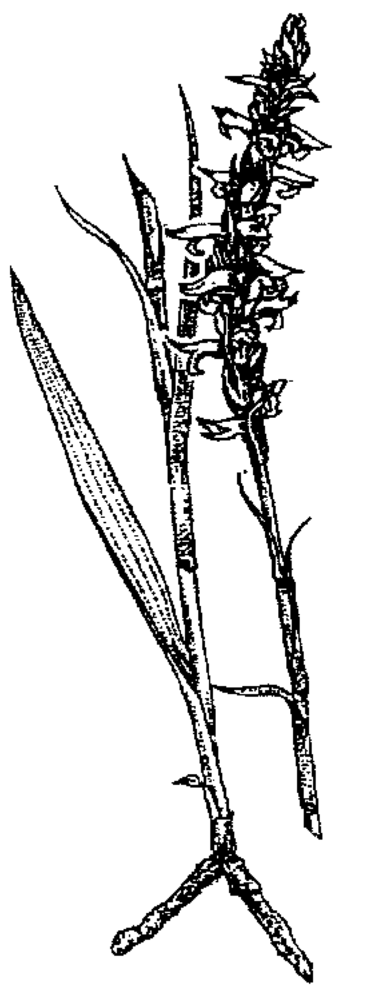

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UTE LADIES TRESSES (*SPIRANTHES DILUVIALIS*) IN IDAHO:
PART A: 1999 STATUS REPORT

by

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SUMMARY

This 1999 status report for Ute ladies tresses is meant to compliment the 1997 and 1998 reports (Moseley 1998a; 1998b) 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 previous reports, which should be consulted for information not covered here.

New findings reported here include:

- The discovery that eight occurrences on the upstream end of its distribution are mixed populations of *Spiranthes diluvialis* and *S. romanzoffiana*. We also recognize the distinct possibility that the upstream-most occurrence at Squaw Creek Islands may not contain any *S. diluvialis* at all. I discuss the reasons for these humbling discoveries.
- We permanently monumented the transect at the Warm Springs Bottom population that was extirpated during the 1997 flood. I review the two years of plant composition and structure data.
- We discovered one new occurrence along the Snake River, within the known distribution. The total number of occurrences in Idaho is now 22.
- We collected new plant composition and structure information in habitats at three sites.
- We characterized the substrate stratigraghy underlying Ute ladies tresses in 25 soil pits at 18 occurrences. I summarize the results.
- We surveyed 20 flood plain cross-sections through Ute ladies tresses and adjacent habitats. I provide a summary of the vertical relationships of the habitats in reference to river flows.
- Finally, I outline the Ute ladies tresses conservation work being planned for the Snake River populations in 2000, which will again focus on population and habitat monitoring, as well as continued research on the habitat-flood plain succession relationships.

ACKNOWLEDGMENTS

Funding was provided to the Conservation Data Center (CDC) for its 1999 Ute ladies tresses work by the Upper Snake River District of the Bureau of Land Management (BLM) and the Targhee National Forest. 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. Michael Mancuso and Chris Murphy of the CDC also helped with field sampling and inventory. Mike Williamson of the University of Montana provided valuable logistical and surveying support. Mike Merigliano continues to provide valuable insights into the flood plain ecology of the South Fork Snake River.

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TAXONOMY

No change from 1997 and 1998 status reports.

LEGAL OR OTHER FORMAL STATUS

No change from 1997 and 1998 status reports.

DESCRIPTION AND IDENTIFICATION

An exciting and somewhat confounding discovery during 1999 was that all of the upstream populations along the Snake River are mixtures of *Spiranthes diluvialis* and *S. romanzoffiana*. Karen Rice of the BLM and Rose Lehman of the Targhee National Forest were the first to discover this during August 1998, but solid evidence had disappeared by the time the CDC did surveys in September. This year, population surveys were done during mid-August. We found that the eight occurrences at the upstream end of its distribution are mixed, as follows (arranged downstream to upstream):

Gormer Canyon #4	013
Gormer Canyon	021
Pine Creek #5	014
Pine Creek #3 & #4	016
Lower Conant Valley	017
Upper Conant Valley	018
Lower Swan Valley	019
Falls Campground	004
Squaw Creek Islands	020 (see discussion below)

See Moseley (1999) for details about each occurrence. During the late August and September surveys in past years, we overlooked the *S. romanzoffiana* because it flowers much earlier and was in fruit or had virtually disappeared. During the mid-August surveys in 1999 (ca. August 16 to 20), some *S. romanzoffiana* plants were still in flower, although most were in fruit. The *S. diluvialis* was just beginning to flower at this time; in fact, during revisits to many of these sites during late August and September to do habitat research, there were clearly more flowering plants visible than the earlier visit. All populations below Gormer Canyon #4 appear to be pure Ute ladies tresses.

Most interesting of all is that the Squaw Creek Islands (020) occurrence may, in fact, not contain any *S. diluvialis*. After looking back at our field notes and other survey data, the following story emerged (see also Moseley 1999). In 1997 we counted 137 plants at a couple of sites, but all were in fruit. We assumed they were *S. diluvialis*, because they were within a couple of river miles of plants (Falls Campground 020) that were clearly identified as that species. In 1998, we found no plants at all at the island populations originally discovered the previous year. Klara Varga, Targhee National Forest, did find two plants on the north side of the river that she identified as *S. diluvialis*. Then, during several visits throughout the 1999 season, we found 81 *S. romanzoffiana* in flower and fruit and no *S. diluvialis*. One *S. romanzoffiana* was also found at the mainland site and no *S. diluvialis*.

We were initially confused, but quickly recovered and were able to count individuals of the two species in these mixed populations (Moseley 1999) based on the following characteristics:

1. *S. romanzoffiana* has a much earlier phenology and only a few plants overlap flowering with *S. diluvialis*. Most *S. romanzoffiana* is in fruit while *S. diluvialis* is just beginning to flower.

2. The characters used to distinguish the two species, outlined in Moseley (1998a), work well. The most obvious feature is that *S. romanzoffiana*, even in fruit, has a much tighter spiral to the inflorescence.

Mixed populations of *Spiranthes* species are rare but not unprecedented. At least one population in Utah has both *S. diluvialis* and *S. romanzoffiana*.

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In a recent review of John Coulter's collections from the Hayden Survey of 1873 (Hayden 1873, page 783), Mike Merigliano (personal communication) noted that he collected *S. romanzoffiana* from the "Snake River Valley" in July. The collection, probably deposited at the Academy of Natural Sciences in Philadelphia, should be verified.

DISTRIBUTION

Rangewide Distribution: No change from previous reports.

Idaho Distribution: The distribution of Ute ladies tresses in Idaho at the end of the 1999 field season is virtually the same as it was in 1997-1998. Only one new occurrence was discovered this year and several new populations were found at previously delineated occurrences. It is still only known from the Snake River flood plain in the far eastern part of Idaho, 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 22 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 1999 (Moseley 1999). Refer to the occurrence records for detailed location data on individual Idaho occurrences.

During the 1999 inventory season, one new occurrence was discovered on a small island complex across from the mouth of Black Canyon. This population is slightly up river and across the main channel from the Warm Springs Bottom (003) occurrence. The island is administered by the BLM.

Rose Lehman, Targhee National Forest, found a new population at the downstream end of the bar and island complex below Falls Campground. While considered part of occurrence 004, this small population is rather disjunct from the previously known site near the campground.

As noted previously, the Squaw Creek Island (020) occurrence may not contain any Ute ladies tresses. Surveys during 2000 should carefully reassess the situation and, if no Ute ladies tresses are found, delete this site from the records.

Extent of Surveys in Idaho: No change from previous reports.

HABITAT

Plant Communities: This year I'd like to straighten out the nomenclature for plant communities containing Ute ladies tresses. I've given varied and conflicting names in the past, although the descriptions and quantitative data still apply (Moseley 1997; 1998a; 1998b). Except for one, the following plant community names follow the catalog compiled for Idaho by Jankovsky-Jones et al. (1999; and see references therein).

Scientific Name	Common Name	Comment
Elaeagnus commutata	silverberry/redtop	Formerly *E. commutata/Agrostis stolonifera*
Salix exigua/Mesic graminoid	sandbar willow/mesic graminoid	Formerly *S. exigua/A. stolonifera*
Equisetum variegatum	variegated scouring rush	Not formerly described; not in Jankovsky-Jones et al. (1999)
Carex lanuginosa	woolly sedge	New this year, found at Kellys Island 001
Eleocharis rostellata	wandering spike-rush	No change

1999 Data Collection: During 1998, we collected composition and structure data for all but the last two plant communities in the above table (Moseley 1998b). In 1999, I sampled one plot in each in the *Carex lanuginosa* and *Eleocharis rostellata* communities at Kellys Island. I also sampled the new occurrence across from Black Canyon (022). Methods followed those described last year (Moseley 1998b).

Below is the species cover data for the three plots. Canopy cover classes are the same as last year. Heights are in meters and an asterisk (*) indicates an introduced species. Compare with composition and structure data reported last year (Moseley 1998b).

	***Equisetum variegatum* # 022**	***Carex lanuginosa* # 001**	***Eleocharis rostellata* # 001**
WOODY SPECIES			
Betula occidentalis	1		
Elaeagnus commutata		1	
Populus angustifolia	1		
Salix exigua	1		
GRAMINOIDS			
**Agrostis stolonifera*	1	30	
Calamagrostis neglecta		1	
Carex lanuginosa	1	70	
Carex nebraskensis	1		
Eleocharis rostellata		1	98
Juncus balticus		3	1
Juncus ensifolius	1		1
Juncus longistylis		1	
Muhlenbergia asperifolia		3	
Phalaris arundinacea	1		
**Poa pratensis*	1		
Scirpus pungens		3	
FORBS & PTERIDOPHYTES			
Aster ascendens	1	1	
Conyza canadensis	1		
Epilobium ciliatum	1		
Equisetum arvense	3		
Equisetum hyemale	50		

Equisetum laevigatum		10	
Equisetum variegatum	20		
Mentha arvense	1		
Potentilla anserina		1	
Potentilla rivularis	1		
**Sonchus arvense*		30	
Spiranthes diluvialis	1		
**Trifolium repens*	3		
Triglochin maritimum			1
Veronica anagalis-aquaticus	1		
TOTAL SPECIES	20	13	4
LIFE FORM DATA			
Woody Cover	1	1	0
Graminoid Cover	3	98	98
Forb Cover	70	40	0
GROUNDCOVER			
Soil	0	1	1
Gravel	0	0	0
Rock	3	0	0
Litter	0	90	90
Wood	1	1	9
Moss	90	0	0
Basal Vegetation	3	10	10

ASSESSING POTENTIAL HABITAT

No change from previous reports.

FLOOD PLAIN DYNAMICS IN RELATION TO UTE LADIES TRESSES HABITAT

1997 Flood Observations: In last year's report (Moseley 1998b), I made continued observations on two patches of Ute ladies tresses that were apparently extirpated by depositions from the June 1997 flood. These observations continued during 1999 and were greatly expanded on one occurrence.

Falls Campground (004) - Although its exact location was not known, the single plant seen in 1996 has not been seen since. The site remains under deep sand deposited during the 1997 flood.

Warm Springs Bottom (003) - Unlike the Falls Campground occurrence, flagging indicating the former location of ladies tresses plants in this patch remained on the shrubs after the flood. I also had photographs of the location from 1996 and 1997. During 1998, I sampled the composition and structure of the vegetation on the extirpated patch and took additional photographs. In 1999, we turned that information into baseline data by permanently marking a belt transect through the previously occupied habitat and retaking photos. Establishment of the permanent transect and photo-points and the results of the first year of monitoring are described below.

Michael Mancuso and I placed the permanent transect parallel to the orientation of this former population, which was a linear band between the reed canarygrass in the channel and the water birch at the edge of the channel. This is the same place I made species composition and cover estimates in 1998 (Moseley 1998b). The 10-meter long transect had ten 0.1 m^2 microplots placed at 1 m intervals along the transect. Methods for sampling are described in Moseley (1998b, page 4). The beginning and end of the transect are monumented with potato-digger bars painted orange on top. Here are some details:

Plot Number:	98SD03C
Azimuth of Transect:	17°, with 17° E declination
GPS Location:	N 43° 35.469
	W 111° 27.766

Below is a comparison of composition and cover estimates from 1998 and 1999. *Equisetum variegatum* was the first to invade the open sands in September 1997. It continues to increase in cover, now dominating the transect. *Agrostis stolonifera*, the dominant forb on the site before the flood, appears to be slowly increasing in cover. The widely scattered *Elaeagnus commutata* shrubs that occupied the site prior to the flood never resprouted and are dead. Species richness increased threefold and moss cover on the sand increased dramatically from 1998 to 1999.

	1998	1999
WOODY SPECIES		
Betula occidentalis		seedling
Elaeagnus commutata	dead stems	dead stems
Populus angustifolia	1	1
Salix exigua		3
Salix lutea	1	
GRAMINOIDS		
Agrostis stolonifera	3	10
Juncus ensifolius		1
Phalaris arundinacea		1
Poa pratensis		1
Unknown grass		1
FORBS & PTERIDOPHYTES		
Aster ascendens		1
Epilobium ciliatum		1
Equisetum variegatum	60	80
Medicago lupulina		3
Solidago missouriensis	1	3
Taraxacum officinale		1
Trifolium repens		3
unknown forb		1
TOTAL SPECIES	5	16
LIFE FORM DATA		
Woody Cover / Mean Ht. (m)	1 / 0.5	1 / 0.8
Graminoid Cover / Mean Ht. (m)	3 / 0.4	10 / 0.4
Forb Cover / Mean Ht. (m)	60 / 0.1	90 / 0.1

GROUND COVER		
Soil (sand)	70	60
Gravel	0	0
Rock	0	0
Litter	1	1
Wood	1	1
Moss	0	30
Basal Vegetation	30	10

We were able to formally retake a series of photos from the site taken during 1996, 1997, and 1998. Prior to 1999, no attempt had been made to repeat the previous year's photos. For the most part, the repeat photographs graphically illustrate the quantitative results from the transect, discussed above. Below is a list of the repeat photo sets archived at the CDC office in Boise.

Photo Number	First Taken	Repeat
96-1	1996	1999
97-1	1997	1999
97-2	1997	1999
97-3	1997	1999
98-1	1998	1999
98-2	1998	1999

A soil pit was dug near the beginning (upstream end) of the transect. The details are discussed in the next section, but we found that the June 1997 flood deposited 18 cm of sand on the site. Nine other pits we dug in extant populations had a deposition of 1997 sand visible on the surface. The average depth was 5.2 cm, with deepest deposition being 8 cm. Apparently there is a threshold of flood deposit depth, above which Ute ladies tresses can't deal with. This transect should continue to be monitored to see if the ladies tresses is persisting beneath the sand and needs more time to reach the surface.

Flood Plain and Vegetation Dynamics Research: As mentioned previously, I consider the Snake River populations of Ute ladies tresses to be a single metapopulation. Although it is a working hypothesis at this point, the underlying assumption is that the Snake River metapopulation consists of a set of local populations linked by dispersal. Although each patch supports its own breeding population, no single population is adequately large enough to ensure the long-term viability of the metapopulation. Therefore, multiple local patches of habitat must be maintained in order to conserve the metapopulation.

Along the Snake River, the greatest factor affecting the distribution and viability of habitat patches is the dynamics of the flood plain. Under pre-Palisades Dam flow regimes, suitable habitat patches were being destroyed and created by periodic flood events. This is significant because, if Ute ladies tresses is similar to cottonwood, habitat patches are only viable for a finite period of time. Eventually the habitat may become too dry because of channel degradation or encroached upon by dense shrubs through plant succession. Periodic high flows create new habitat and possibly also limit shrub encroachment. Merigliano (1996) found that, under post-Palisades river operations, cottonwood forests are not viable in the long term. Current river operations are also considered a long-term viability threat to Ute ladies tresses (Moseley 1998b).

Habitat Ecology Study - During 1999, we began a study of the habitat ecology of Ute ladies tresses focusing on the implications of flood plain dynamics and habitat succession on river and land management. CDC biologists worked in collaboration with river researchers from the University of Montana. This work will build on past (Merigliano 1996) and ongoing studies of the relationship between fluvial geomorphology, riparian community ecology, and river management.

The project goal is to relate flood plain dynamics and primary succession to long-term conservation of Ute ladies tresses on the Snake River. Below are the study objectives for three related areas: substrate age, primary succession, and flow regime. Results from each of these objectives contribute to meeting the goal stated above. Basically, we plan to look at the distribution of ladies tresses habitat in three dimensions: temporal distribution on the flood plain, horizontal distribution on the flood plain, and vertical distribution related to river stage. The objectives are:

1. Determine the age of the alluvial substrate supporting occupied Ute ladies tresses habitat. This will be inferred from (a) the flood plain mapping conducted by Merigliano (1996) above Heise, (b) supplemented with additional air photo interpretation both above and below Heise, and (c) measurements directly from ladies tresses habitat using decay rates for an isotope of lead.

2. Model development of plant communities along the primary successional gradient. It appears that we can use a combination of two different techniques to model this chronological sequence: (1) use time-series analysis of a site, that is, observed changes over time in Ute ladies tresses habitat and (2) infer the chrono-sequence from plots of different successional ages. The permanent transect, described above, is the only place where a time-series analysis can be done, and that is for an extirpated site. The model will include estimates of the rate of development along the primary successional pathways and the compositional and structural characteristics of these changes, including possibly the invasion of exotic turf-forming grasses that are sought after by cattle. The hypothesis is: Does the spatial sequence of community types described in Moseley (1998b, page 11) represent the primary (time) successional sequence of Ute ladies tresses habitat on the South Fork flood plain?

3. Determine the elevation Ute ladies tresses habitat on the flood plain and relate river flows. Related to this, we will characterize flow regime and depositional events responsible for creating new habitat and destroying old habitat. Ultimately, we will also try and answer the question of whether the flow regime predicted to restore cottonwood forests (Merigliano 1996) would suffice to maintain Ute ladies tresses habitat.

This project will continue through 2000, so here I will summarize the work done in 1999 toward meeting these objectives. Work was done in three areas: (1) substrate aging; (2) characterizing flood plain deposits underlying Ute ladies tresses populations; and (3) surveying flood plain cross sections through Ute ladies tresses populations and adjacent habitats.

Substrate Age - Work in this area during 1999 was preliminary. An important question that needed to be answered was whether there was enough organic matter in the sediments underlying *Spiranthes* populations to measure lead isotope (Pb^{210}) decay rates. Mike Merigliano collected samples from the Snake River flood plain and sent them to a laboratory in Ontario, Canada, for testing. The tests came back positive; there was enough organic matter in the sediments to estimate age of deposition. This avenue of research will be conducted during 2000.

Substrate Characterization - I dug 25 soil pits in Ute ladies tresses habitat at 18 of the 22 occurrences along the Snake River. The depth of each layer and the water table, textural classes, and community types are reported in the table in Appendix 1. Most of these pits are also represented two-dimensionally on diagrams of the flood plain cross sections in Appendix 2. Some general interpretations of these data appear below.

Ute ladies tresses populations are underlain by varying amounts of fine-textured sediments overlying a deep cobble/pebble/sand layer. This cobble layer probably represents the major depositional event that formed the bar. These cobbles probably also represent the same surface on which the cottonwood forest became established higher portions of the bars, although the lower portions containing ladies tresses could have been reworked by the river to some extent. In any event, the cottonwood ages of the adjacent habitat, reported in Merigliano (1996) and summarize for ladies tresses by Moseley (1998a), at least represent the maximum age for the ladies tresses sites.

Following bar deposition, over-bank deposits of finer-textured material were deposited on these cobbles. The depth of these fine layers varied from site to site, but consisted of "unaltered" sands, sands that appeared to have organic matter incorporated in them (called loamy sand in Appendix 1 and 2), and in some places a surface layer of sand deposited during the June 1997 flood. Only one population (Black Canyon 022) lacked any fine layer. Mottles were only rarely present in the layers and occurred only in the *Equisetum variegatum* and *Eleocharis rostellata* communities. It is these over-bank deposits that we hope to age in 2000 using Pb^{210} decay rates.

The water table was encountered in most pits, where it ranged from 1 cm to 110 cm deep,averaging 60 cm (n = 17). If a water table was encountered, soils in pits were moist to the surface. I did not reach the water table in eight pits. A couple were dug in October, but five were from August and September, when the river levels were still fairly high. If no water table was reached, moist soil was usually encountered within 15-20 cm of the surface.

Flood Plain Cross Sections - In mid-October, Chris Murphy and I used a level to run traverses across the flood plain in the vicinity of the soil pits. We used these data to construct a cross section of the flood plain in the vicinity of Ute ladies tresses habitat and establish a vertical control from which to look at the relationship of river stage and the height of ladies tresses populations. The traverses started at the edge of the water along the main Snake River channel or a side channel. In one instance, it started in the lowest point in a dry channel. The traverses usually ran through the lower parts of the bar containing Ute ladies tresses, then up onto the highest part containing narrow-leaf cottonwood stands. In some instances, cottonwood was encountered first and the traverse ended in the ladies tresses habitat.

Appendix 2 contains 17 cross-sections through Ute ladies tresses habitat. Three additional cross-sections were surveyed, but not diagramed. Although not always indicated in the diagrams, Ute ladies tresses occurs at all soil pits indicated on the profiles. Using hydraulic geometry equations developed by Mike Merigliano (1994; 1996), and with Mike's help, we were able to estimate the stage (height) of the river for these cross-sections at various discharges. The stage equation we used was developed from the now-defunct Dry Canyon gage, because it represents reaches of the Snake River supporting extensive flood plain habitats. Existing gages at Irwin and Heise are along confined segments of the river and are not representative of reaches supporting Ute ladies tresses. The equation we used was:

$$\text{river depth} = 0.70\,(Q^{0.470})$$

where Q is the discharge of the Snake River measured by the Heise gage. The equation calculates river height in feet, so it must be converted to meters. In the discussion below, we adjusted the river height to our surveyed river elevation of 4,800 cfs, which was the river level during most of the October 12-14 period of the survey. The flow was 5,100 cfs on October 12, which only results in a 3-cm difference in the river depth at any of the profiles, a figure beyond the resolution of the diagrams.

On the diagrams in Appendix 2, I indicate two of these levels with a dotted line: (1) the ordinary post-Palisades Dam high flow in the spring, which is about 20,000 cfs (20K on the diagrams), and (2) the peak discharge of the June 1997 flood, about 43,000 cfs (43K on the diagrams). River depths at other discharges important in our 1999 sampling are listed below. The height of the river at a given flow can be estimated along the y axis in the diagrams in Appendix 2 using the river stage figures in the following table. It should be noted, however, that these are just estimates. The calculations are based on the flood plain geometry at the Dry Canyon gage site, but applied to all ladies tresses sites along the Snake. Also, these figures probably apply better to the main Snake River channel than to side channels. It is thought, however, that differences between estimated and actual river height are minor (Merigliano, personal communication).

Discharge at Heise Gage (cfs)	River Stage (m)	Comment
4,800	0.0	base of survey
7,500	0.27	discharge at water table observations
8,000	0.31	discharge at water table observations
8,800	0.38	discharge at water table observations
9,400	0.43	discharge at water table observations
9,700	0.45	discharge at water table observations
20,000	1.10	ordinary annual high flow; marked in App 2
24,500	1.32	post-Palisades BOR flood stage
30,000	1.57	
40,000	1.96	
43,000	2.07	peak discharge, June 1997 flood; marked in App 2

POPULATION BIOLOGY

Phenology: No change from previous reports.

Population Size and Condition: A total of 3,410 Ute ladies tresses plants were observed at the 22 occurrences in Idaho during 1999 (see table below), 800 more plants than counted last year. This may actually be an underestimate, because the comprehensive surveys were mostly done in mid-August and many Ute ladies tresses were just beginning to flower or were in bud. I noticed more plants at some sites during visits later in the year while conducting flood plain research. Annis Island is still the largest population, even with a probable underestimate (see Moseley 1999 for detailed information on each occurrence).

Occurrence Name	Occ. #	1996	1997	1998	1999
Annis Island	006	----	35	2,036	1917
Lorenzo Levee	008	----	1	----	----
Archer Powerline	015	----	145	----	----
Twin Bridges Island	007	----	160	108	99
Railroad Island	005	----	9	14	42
Kellys Island	001	12	22	30	30
Mud Creek Bar	009	----	9	32	71

Rattlesnake Point	002	15	4	23	26
TNC Island	010	----	9	9	118
Warm Springs Bottom	003	173	301	80	476
Black Canyon	022	----	----	----	50
Lufkin Bottom	011	----	61	96	224
Gormer Canyon #5	012	----	10	0	1
Gormer Canyon #4	013	----	10	11	12
Gormer Canyon #3	021	----	----	8	59
Pine Creek #5	014	----	6	14	30
Pine Creek #3 & #4	016	----	18	113	200
Lower Conant Valley	017	----	127	0	40
Upper Conant Valley	018	----	61	15	5
Lower Swan Valley	019	----	1	8	4
Falls Campground	004	1	14	5	6
Squaw Creek Islands	020	----	168	2	0

Population Genetics: No change from previous reports.

Reproductive Biology: No change from previous reports.

Competition: No change from previous reports.

Herbivory: No change from previous reports.

Land Ownership and Management Responsibility: The only change this year was discovery of a new occurrence on the island across from Black Canyon (occurrence 022). This island is managed by the BLM.

Land Use and Possible Threats: Documented for each occurrence in Moseley (1999). No real change from last year. A small exclosure was erected by the Targhee National Forest around the new Falls Campground population discovered this year.

ASSESSMENT AND RECOMMENDATIONS

General Assessment of Vigor, Trends, and Status: My assessment of the Idaho populations is similar to the last couple of years, that is, all Idaho populations have existing and potential threats and are vulnerable. Flow regime alteration by Palisades Dam represents the most significant long-term threat to species viability in the Snake River metapopulation. Impacts from cattle grazing are much reduced this year. Management actions implemented by the BLM and Forest Service in 1997 and 1998 have greatly reduced the threat of cattle grazing.

Recommendation to the U.S. Fish and Wildlife Service: No change from previous report.

Recommendations to the Other Federal Agencies: No change from previous report.

Recommendations to the Heritage Network: No change from previous report.

Recommendations Regarding Present or Anticipated Activities: No change from previous report.

CONSERVATION WORK FOR 2000

For the fifth year, surveys and research oriented toward Ute ladies tresses conservation will continue along the Snake River in 2000, funded by the BLM and Targhee National Forest. We will continue our collaboration with Mike Merigliano from the University of Montana (UM). Following is a list of tasks that will be accomplished, along with the party primarily responsible for carrying out the task (CDC or UM).

1. **CDC**. Continue to monitor population levels and habitat conditions of all known populations and compare with 1996-1999 data. Compile 2000 population and habitat data into the centralized databases at the CDC. Produce and distribute an annual report of occurrences soon after the field season.

2. **CDC**. Pay special attention to the *Spiranthes* at the Squaw Creek Islands occurrence. Hopefully, make decision on whether to continue tracking this population as *S. diluvialis*.

3. **CDC**. Request Colter's Hayden survey specimen of *S. romanzoffiana* from the Snake River and verify identification.

4. **CDC**. Dig soil pits at the two man-made sites, Annis Island (006) and Warm Springs Bottom (003), and compare with the soils at the natural flood plain sites described in this report. The ages of the disturbances that created these sites is known (see Moseley 1998b).

5. **CDC**. Reread the permanent monitoring transect and retake photos at the upper end of the Warm Springs Bottom occurrence.

6. **UM**. Determine the age of the alluvial substrate supporting occupied Ute ladies tresses habitat. This will be inferred from the flood plain mapping conducted by Merigliano (1996) above Heise, supplemented with additional air photo interpretation below Heise, and measurements directly from ladies tresses habitat using decay rates for an isotope of lead. Approximately $3,000 will be available for Pb^{210} analysis of the habitat substrate cores.

7. **UM**. Summarize the physical characteristics of the river and its flood plain in relation to the primary succession of habitats now occupied by Ute ladies tresses. Make recommendations as to whether the model developed for the cottonwood forest under current river operations is applicable to the long-term conservation of Ute ladies tresses. That is, will post-Palisades changes in flood plain morphology support suitable habitat patches for the Snake River metapopulation in space in time?

REFERENCES

Jankovsky-Jones, M., S.K. Rust, and R.K. Moseley. 1999. Riparian reference areas in Idaho: a catalog of plant associations and conservation sites. General Technical Report RMRS-GTR-20. USDA, Forest Service, Rocky Mountain Research Station. Ogden, UT. 141 p.

Hayden, F.G. 1873. Sixth annual report of the United States geological survey of the territories. Embracing portions of Montana, Idaho, Wyoming, and Utah: Being a report of progress of the explorations for the year 1872. U.S. Government Printing Office, Washington D.C. 844 p.

Merigliano, M.F. 1994. A natural history of the South Fork Snake River, eastern Idaho, emphasizing geomorphology, hydrology, and vegetation. M.S. Thesis. University of Montana, Missoula, MT. 278 p.

__________. 1996. Ecology and management of the South Fork Snake River cottonwood forest. Technical Bulletin 96-9. Idaho State Office, Bureau of Land Management, Boise, ID. 79 p., plus plates.

Merigliano, M., University of Montana, personal communication, 9 March 2000.

Moseley, R.K. 1997. Ute ladies tresses (*Spiranthes diluvialis*): preliminary status in Idaho. Unpublished report on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 33 p., plus appendices.

__________. 1998a. Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1997 status report. Unpublished report on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 35 p.

__________.1998b. Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1998 status report. Unpublished report on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 23 p., plus appendix.

___________.1999. 1999 Ute ladies tresses occurrences in Idaho. On file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID.

APPENDIX 1

Soil pit information from Ute ladies tresses populations
at 18 occurrences along the Snake River

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Notes on the tables:

Soil Pit - "Surveyed" pits refer to those in Appendix 2, where flood plain cross-sections have been surveyed and diagramed. These are arranged by occurrence from downstream to upstream. "Waiting for data" pits refer to those that have had the cross-section surveyed, but still waiting for survey data from Mike Williamson, University of Montana. "Unsurveyed" means that a soil pit was dug, but no flood plain cross-section was surveyed.

Numbered columns 1-6 - These represent the visible strata in the pit, i.e., layers. Each layer has a dominant textural class and depth. Depth is in centimeters, and textural class codes are as follows:

- o = organic
- ns = 1997 sand deposition
- s = sand
- ls = loamy sand (darker; some organic matter)
- c = cobble/pebble/sand mix (mostly cobbles)
- m = mottles (used as modifier for above classes)

Community Type - Community type containing Ute ladies tresses where pit was dug. Codes as follows:

- Eqva - *Equisetum variegatum*
- Cala - *Carex lanuginosa*
- Elro - *Eleocharis rostellata*
- Elco - *Elaeagnus commutata*
- Saex/MG - *Salix exigua*/Mesic graminoid

Plot Number - If applicable, number of plot used to collect plant composition and structure information in 1998 (Moseley 1998b) and 1999 (see text).

Soil Pit	1		2		3		4		5		6		Community Type	Plot #
	test.	depth	test.	depth	test.	depth	test.	depth	test.	depth	test.	depth		
surveyed														
007 #1	Is-m	5	o	7	c	47+							Eqva	98SD07A
007 #2	ns	3	ls	7	c	71+							Elco	
005	ns	4	ls	9	s-m	36	c	72+					Eqva	98SD05A
001 #1	ls	10	c	45+									Cala	99SD01A
001 #2	ls	27	s	41	c	46+							Elro	99SD01B
009	s	19	c	69+									Elco	
002 outer	ns	4	ls	30	c	77+							Saex/MG	98SD02B
002 inner	s	102	c	110+									Elco	98SD02A
010 outer	ls	32	c	67+									Elco	
010 inner	s	60	c	85+									Elco	
003 #1	ns	4	ls	14	c-m	44+							Eqva	98SD03B
003 #2	s	28	c	80+									Elco	
003	ns	18	ls	30	c	80+							Elco	98SD03C
011	ns	8	ls	14	s	22	c	68+					Elco	
013	ls	11	c	61+									Saex/MG	
021	ns	6	ls	19	c	38+							Elco	
016 #1	s	40	s-m	62	c	67+							Eqva	
016 #2	ns	6	ls	52	c	104+							Elco	98SD16A
019	o	7	s	17	c	52+							Elco	
004	ns	5	ls	19	s	45	c	55	s-m	74	c	75+	Elco	
020	ls	15	c	45+									Saex/MG	98SD20A
waiting for data														
022	c-m	25+											Eqva	99SD22A
014	ns	7	ls	20	c	77+							Elco	
017	ls	10	c	75+									Elco	98SD17A
unsurveyed														
018	ls	17	s	23	c	63+							Elco	

Soil Pit	Water Table Depth (cm)	River Discharge at Heise Gage (cfs)	Date (1999)
surveyed			
007 #1	40	9,400	8-27
007 #2	64	9,400	8-27
005	?	5,100	10-12
001 #1	40	9,400	8-27
001 #2	13	9,400	8-27
009	?	8,400	9-16
002 outer	87	8,400	9-16
002 inner	110	8,400	9-16
010 outer	?	8,400	9-13
010 inner	?	8,400	9-13
003 #1	41	8,400	9-16
003 #2	87	8,400	9-16
003	?	8,400	9-16
011	?	9,700	8-30
013	69	9,700	8-30
021	36	7,500	9-29
016 #1	67	9,700	8-30
016 #2	?	4,800	10-13
019	43	8,400	9-14
004	81	8,400	9-27
020	?	8,400	9-14
waiting for data			
022	25	9,700	8-30
014	75	9,700	8-30
017	75	9,700	8-30
unsurveyed			
018	60	8,400	9-13

APPENDIX 2

Diagrams for 17 flood plain cross-sections through Ute ladies tresses habitat along the Snake River. Location of ladies tresses populations is indicated by the soil pit(s) in each diagram.

<u>Notes on the diagrams</u>:

Soil Pits - Visible strata in the pit, i.e., layers, are delineated. See Appendix 1 for further information. Textural class codes are as follows:

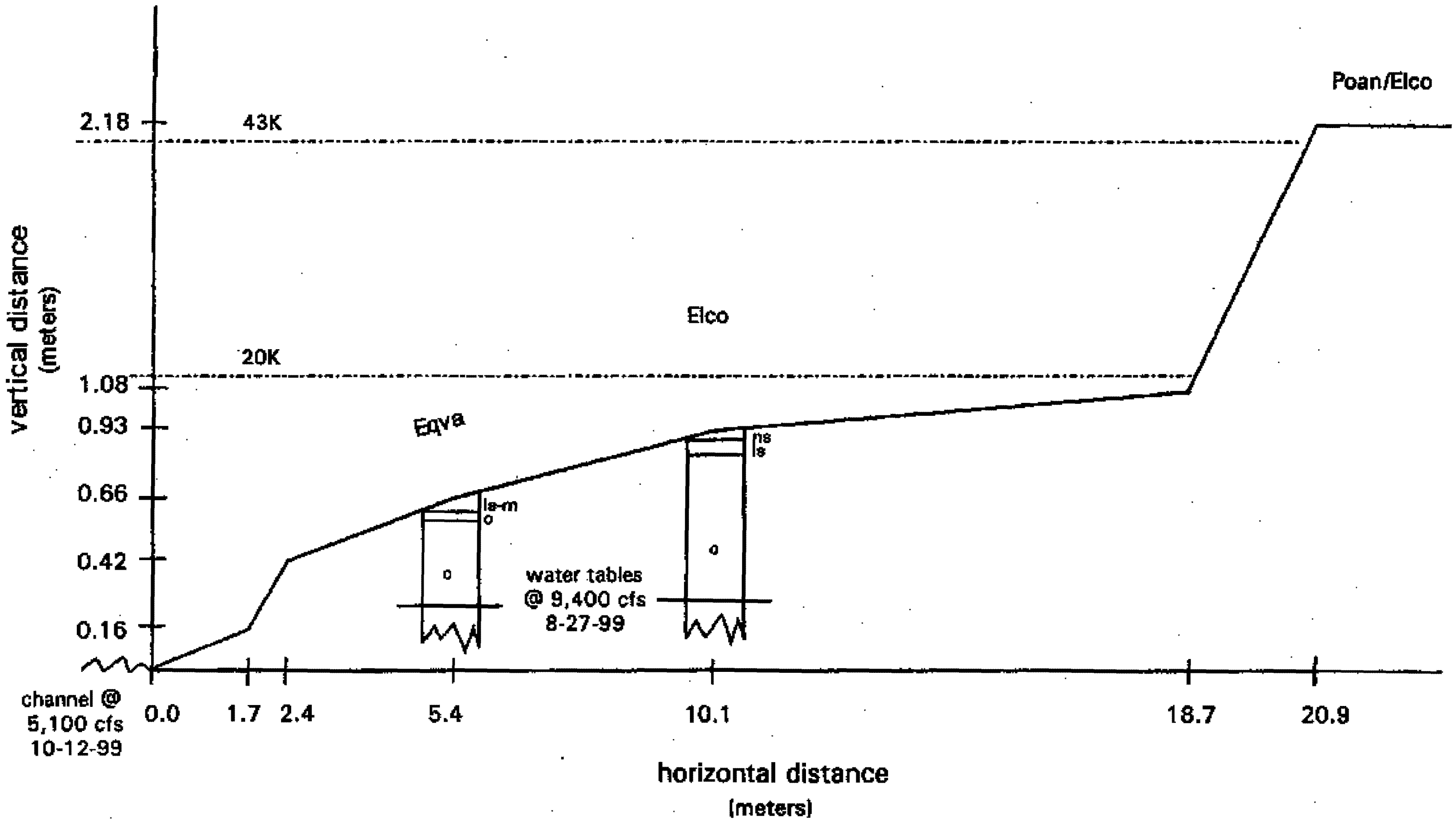
- o = organic
- ns = 1997 sand deposition
- s = sand
- ls = loamy sand (darker; some organic matter)
- c = cobble/pebble/sand mix (mostly cobbles)
- m = mottles (used as modifier for above classes)

Community Type - Important community types along the cross-sections (see Jankovsky-Jones et al. 1999 for classification references). Codes as follows:

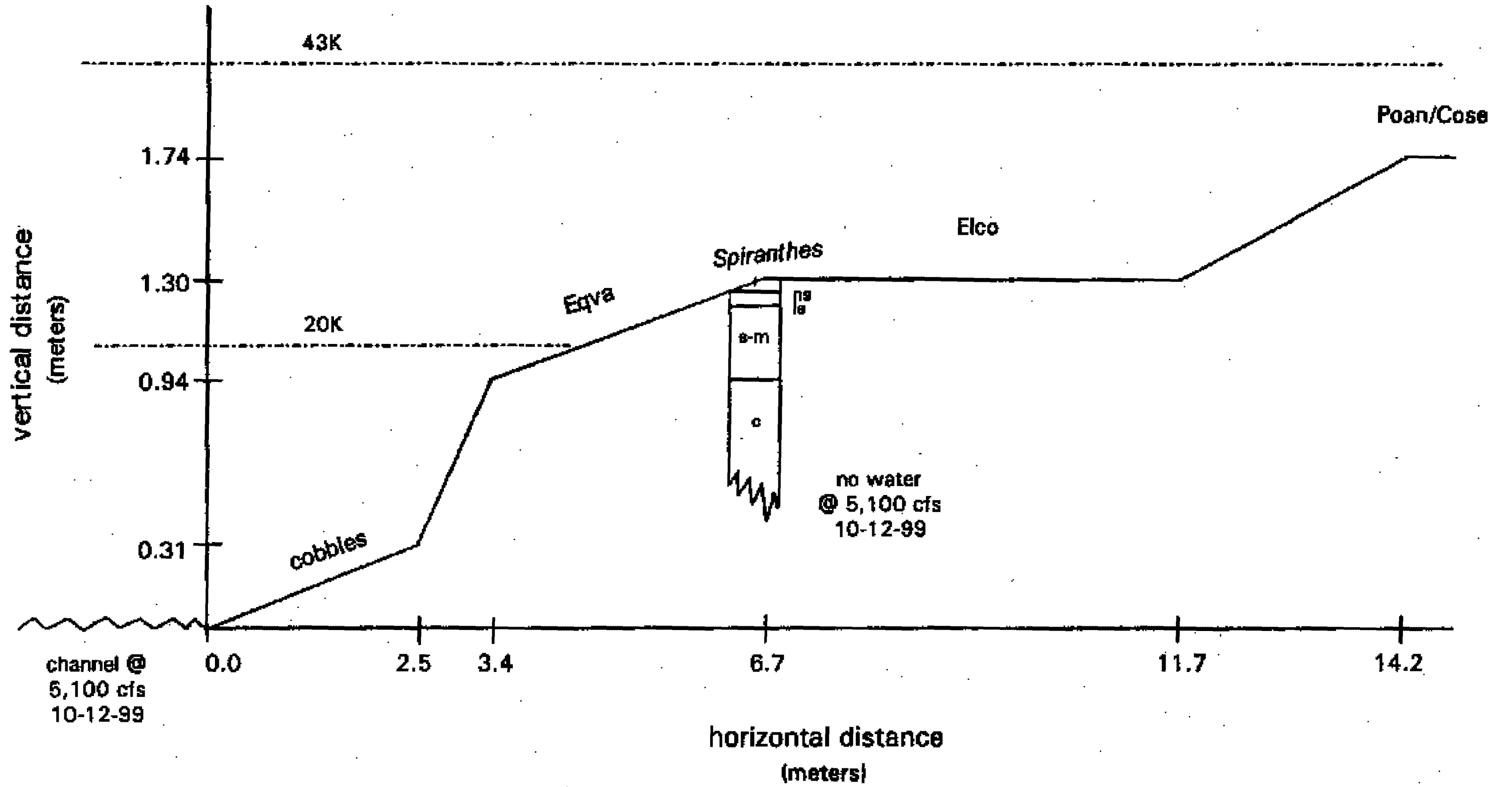
- Eqva - *Equisetum variegatum*
- Cala - *Carex lanuginosa*
- Elro - *Eleocharis rostellata*
- Elco - *Elaeagnus commutata*
- Saex/MG - *Salix exigua*/Mesic graminoid
- Poan/Elco - *Populus angustifolia/Elaeagnus commutata*
- Poan/Cose - *Populus angustifolia/Cornus sericea*
- Poan/Rhar - *Populus angustifolia/Rhus trilobata*
- Poan/Chvi - *Populus angustifolia/Chrysopsis villosa*
- Salu - *Salix lutea*
- Beoc/MG - *Betula occidentalis*/Mesic graminoid
- Beoc - *Betula occidentalis*
- Phar - *Phalaris arundinacea*
- Potr & Crdo - *Populus tremuloides* and *Crataegus douglasii*

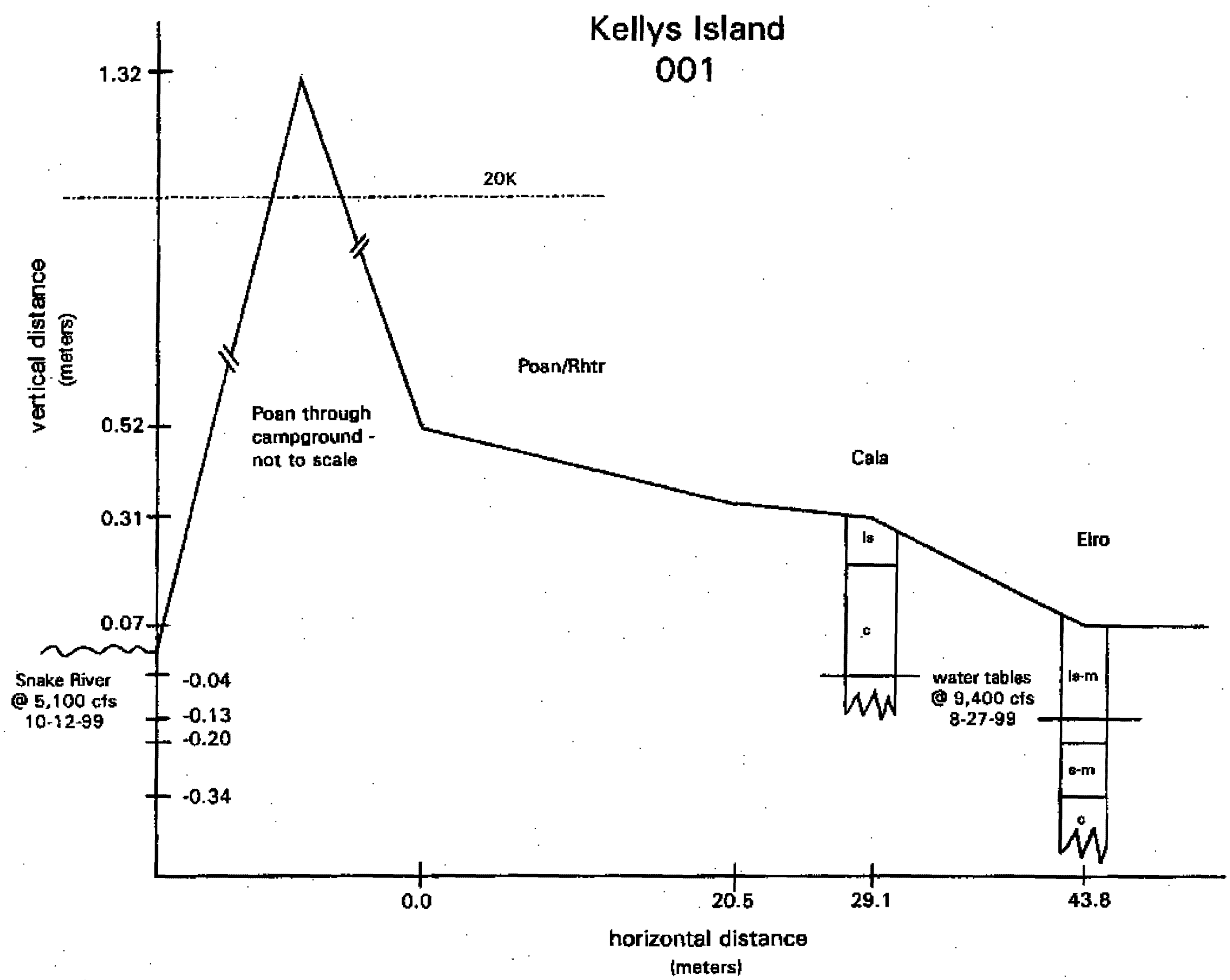
River Height - Two depths indicated: 43K = 43,000 cfs; 20K = 20,000 cfs. See text for explanation.

Twin Bridges Island
007

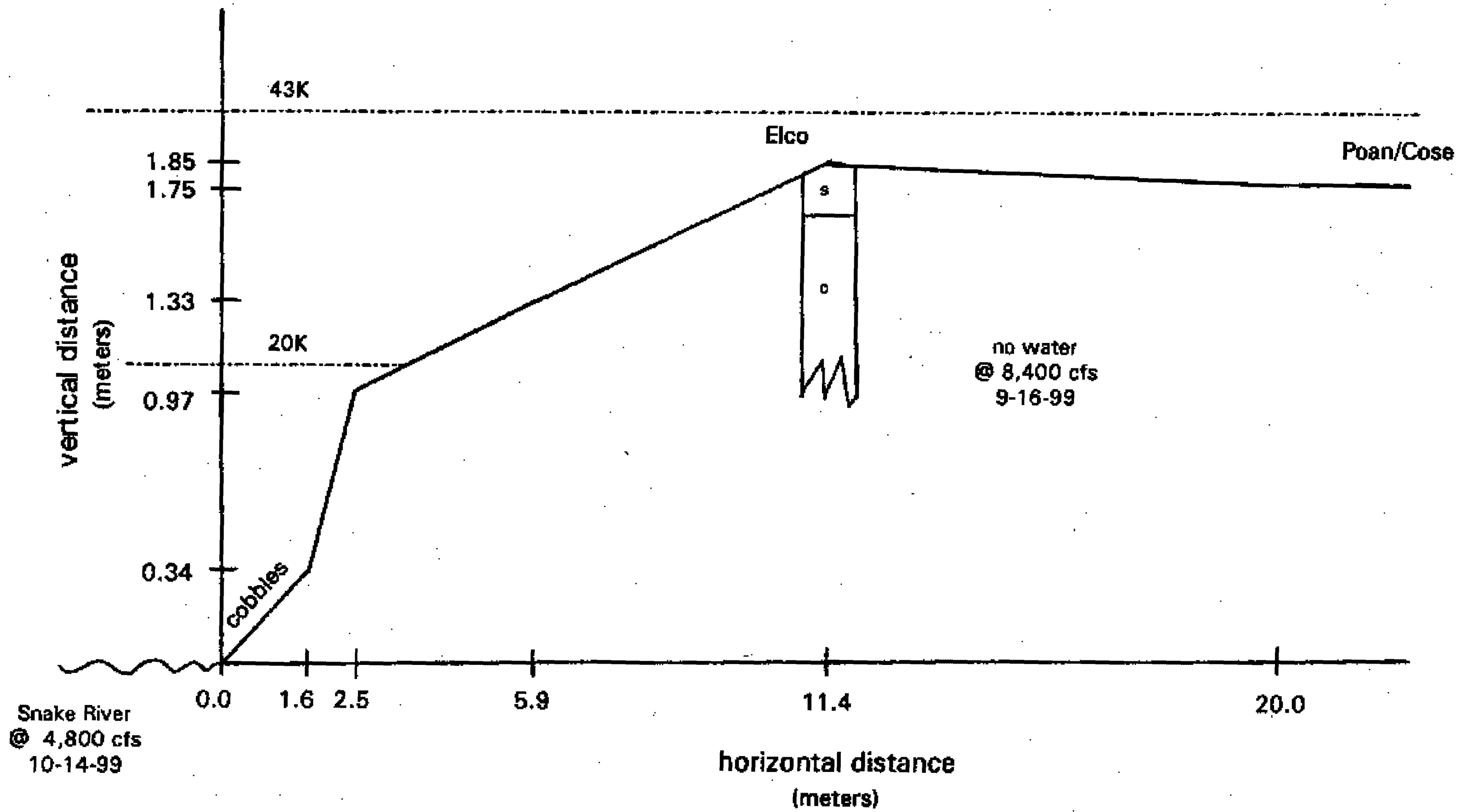


Railroad Island
005

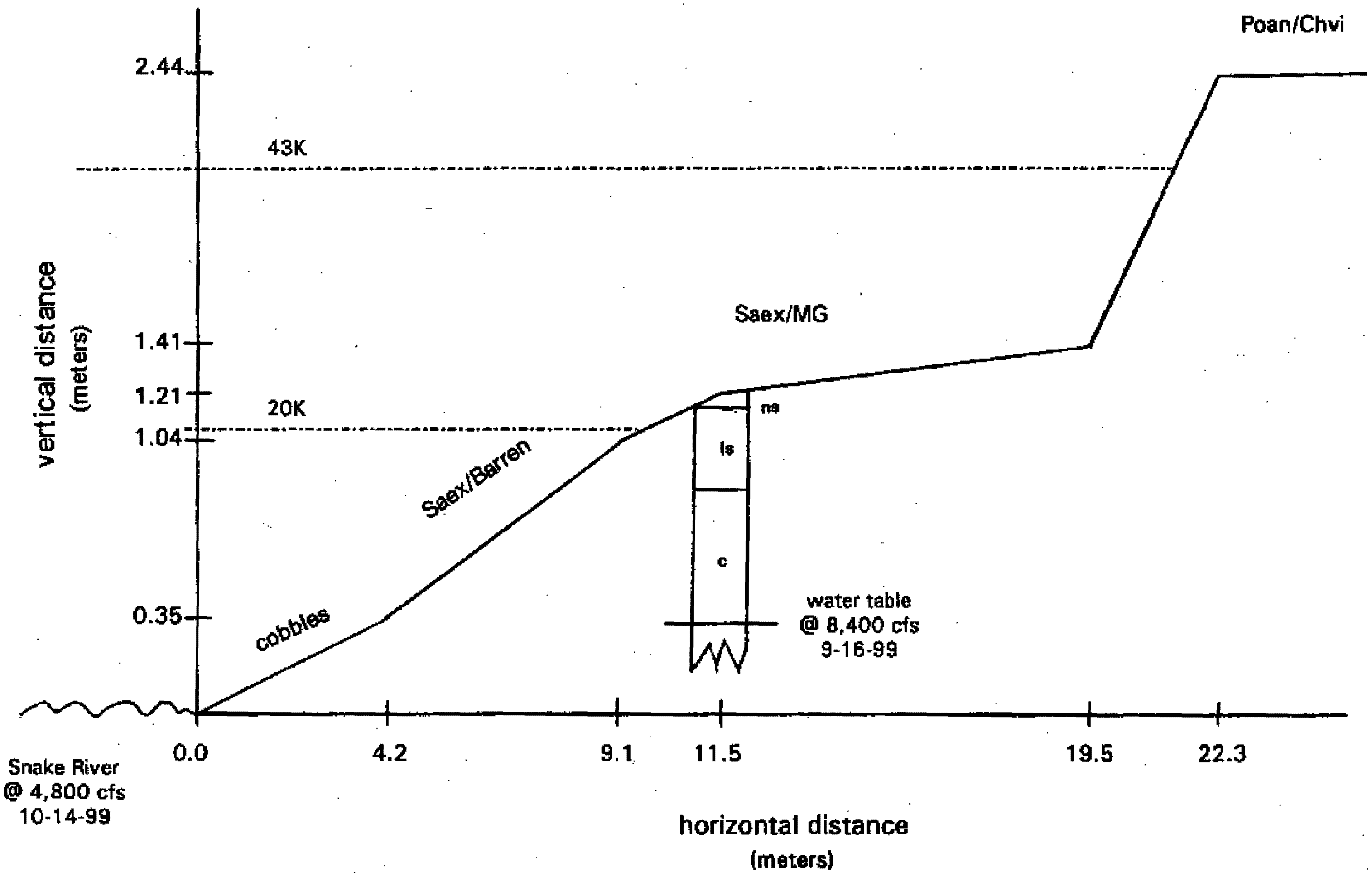



Kellys Island
001
1.32
0.52
0.31
0.07
-0.04
-0.13
-0.20
-0.34
vertical distance
(meters)
20K
Poan/Rhtr
Poan through
campground -
not to scale
Cala
Elro
ls
c
ls-m
s-m
c
Snake River
@ 5,100 cfs
10-12-99
water tables
@ 9,400 cfs
8-27-99
0.0
20.5
29.1
43.8
horizontal distance
(meters)

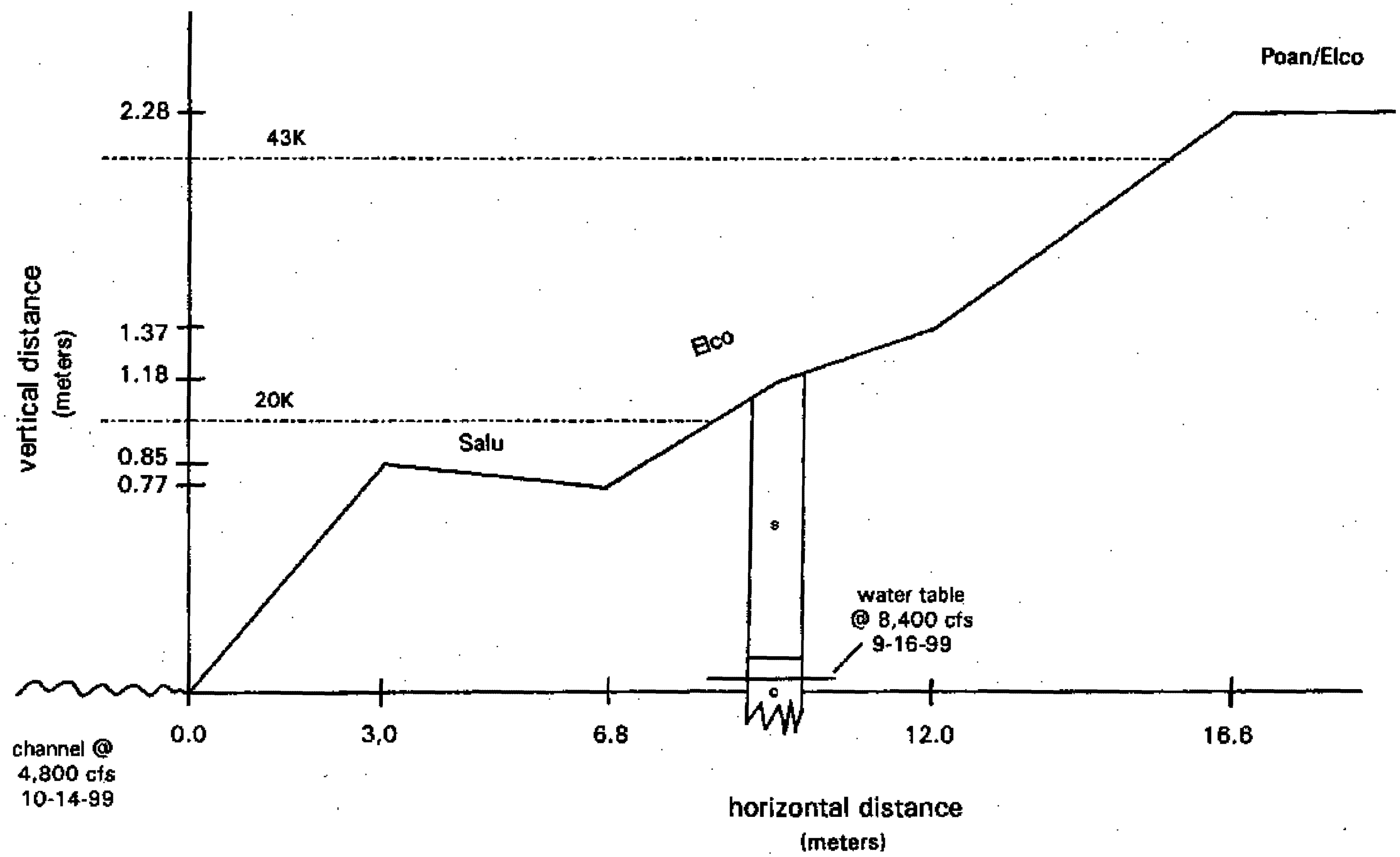
Mud Creek Bar
009



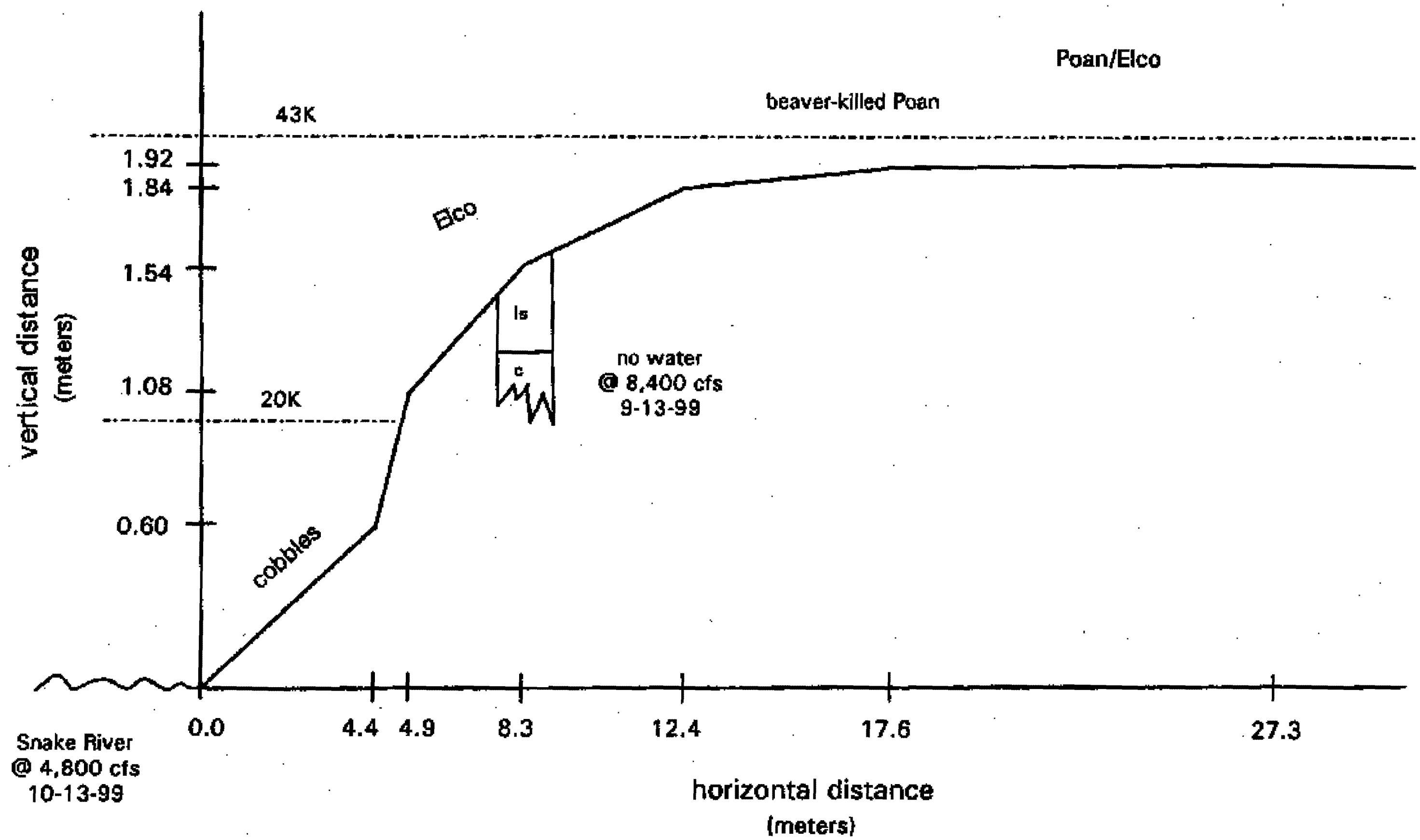
Rattlesnake Point
002 - Outer Channel



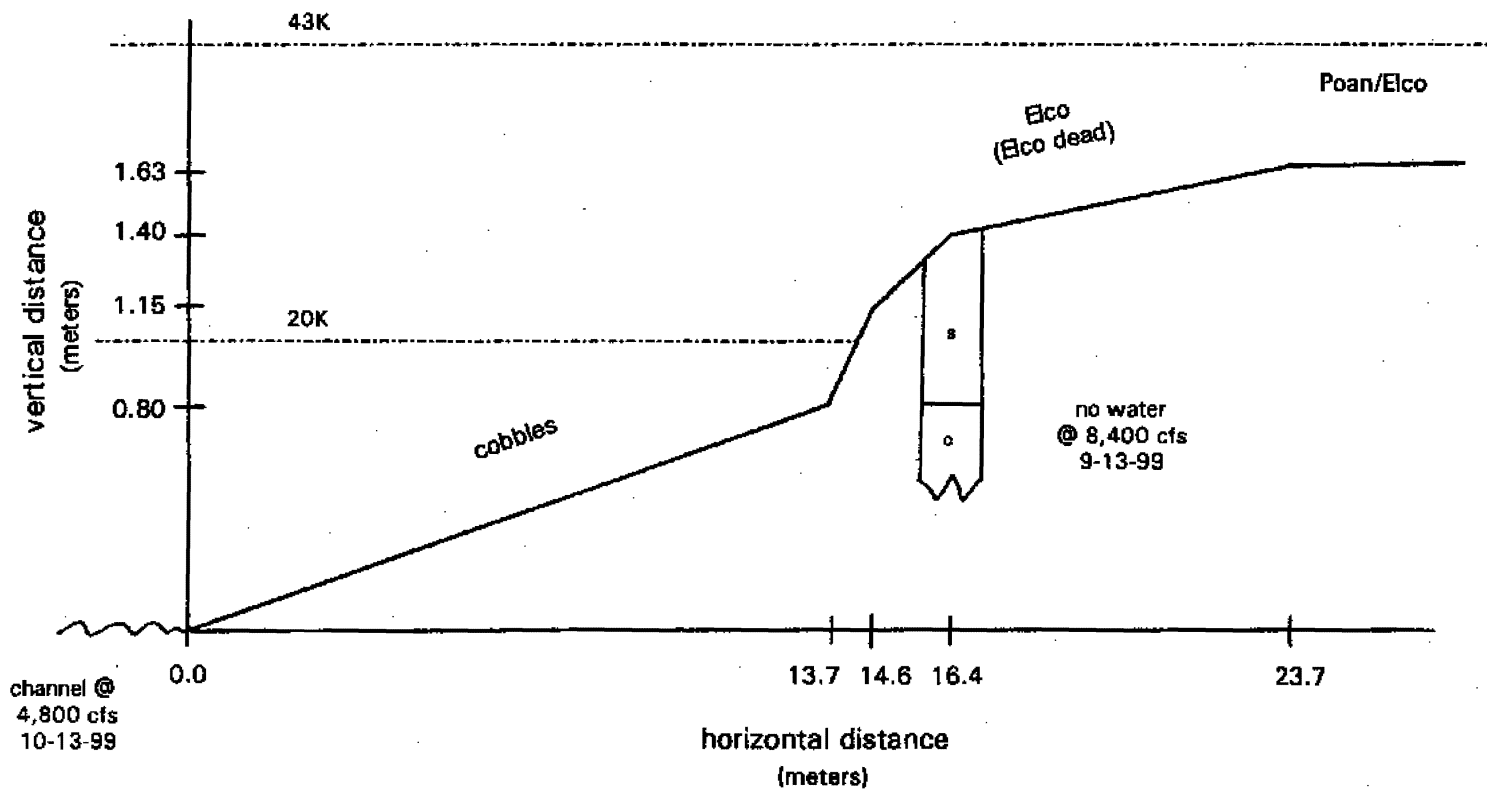
Rattlesnake Point
002 - Inner Channel

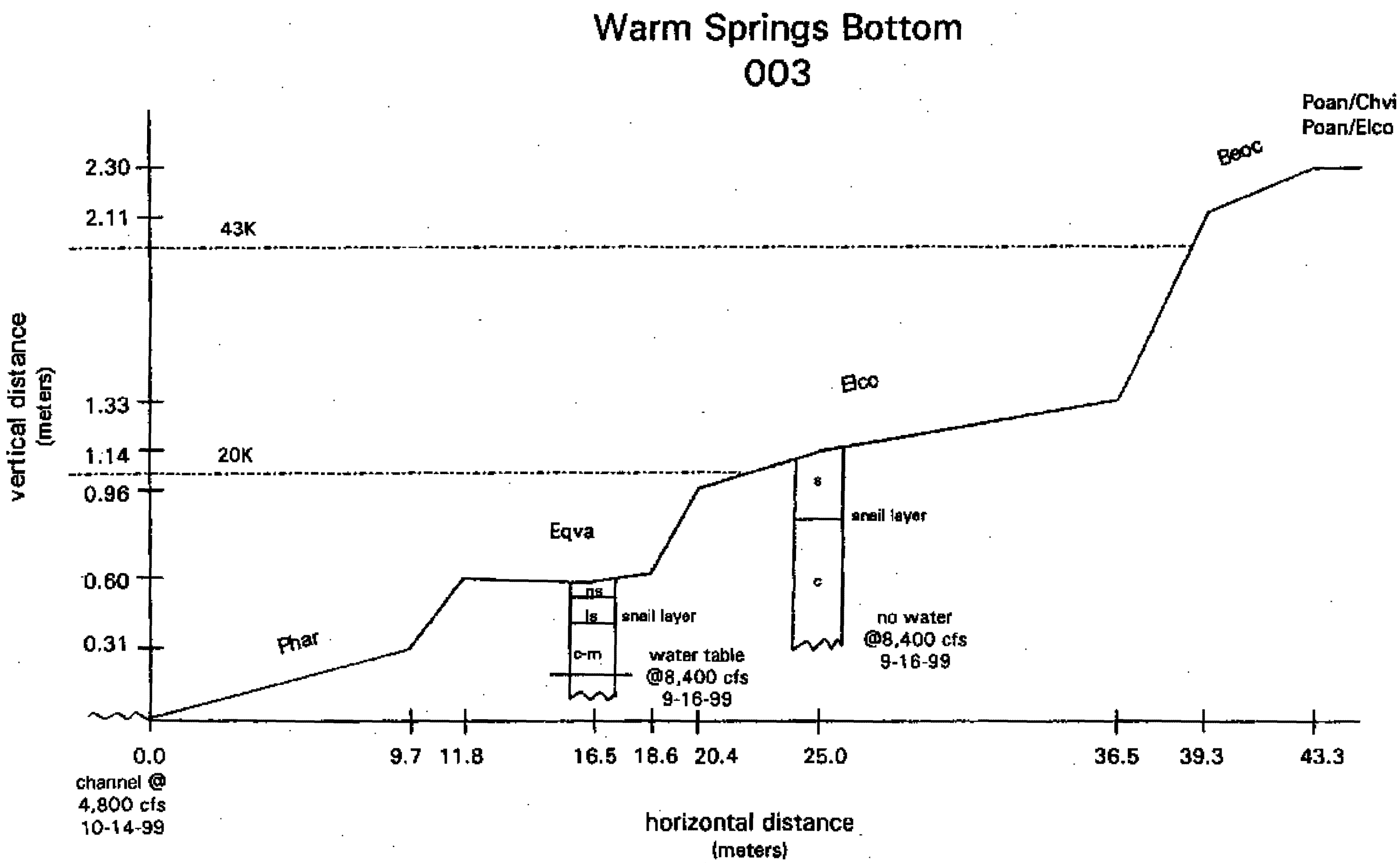


TNC Island
010 - Outside Channel

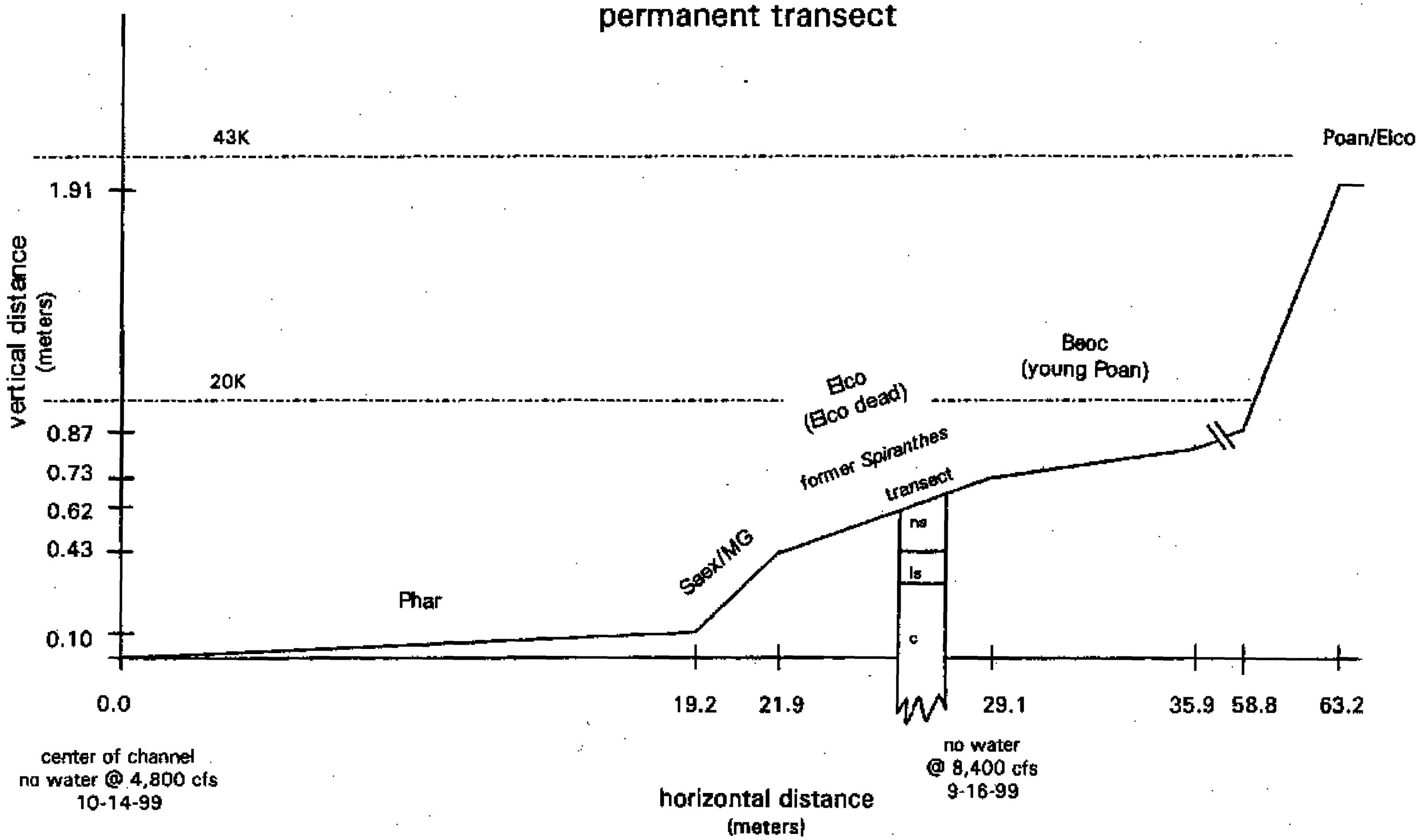


TNC Island
010 - Inside Channel

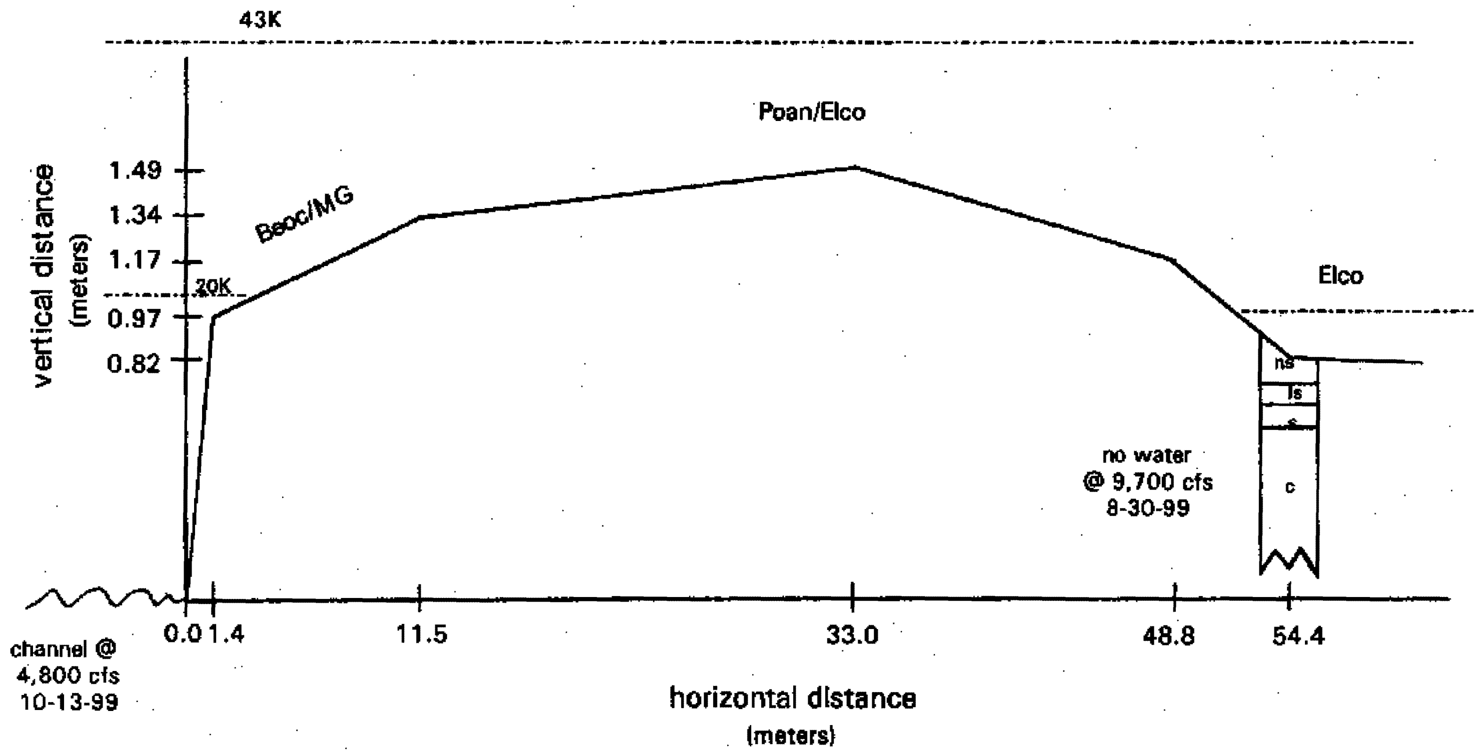



Warm Springs Bottom
003
Poan/Chvi
Poan/Elco
Beoc
2.30
2.11
43K
vertical distance
(meters)
Elco
1.33
1.14
20K
0.96
s
snail layer
Eqva
0.60
c
ns
ls
snail layer
no water
@8,400 cfs
9-16-99
0.31
Phar
c-m
water table
@8,400 cfs
9-16-99
0.0
9.7
11.8
16.5
18.6
20.4
25.0
36.5
39.3
43.3
channel @
4,800 cfs
10-14-99
horizontal distance
(meters)

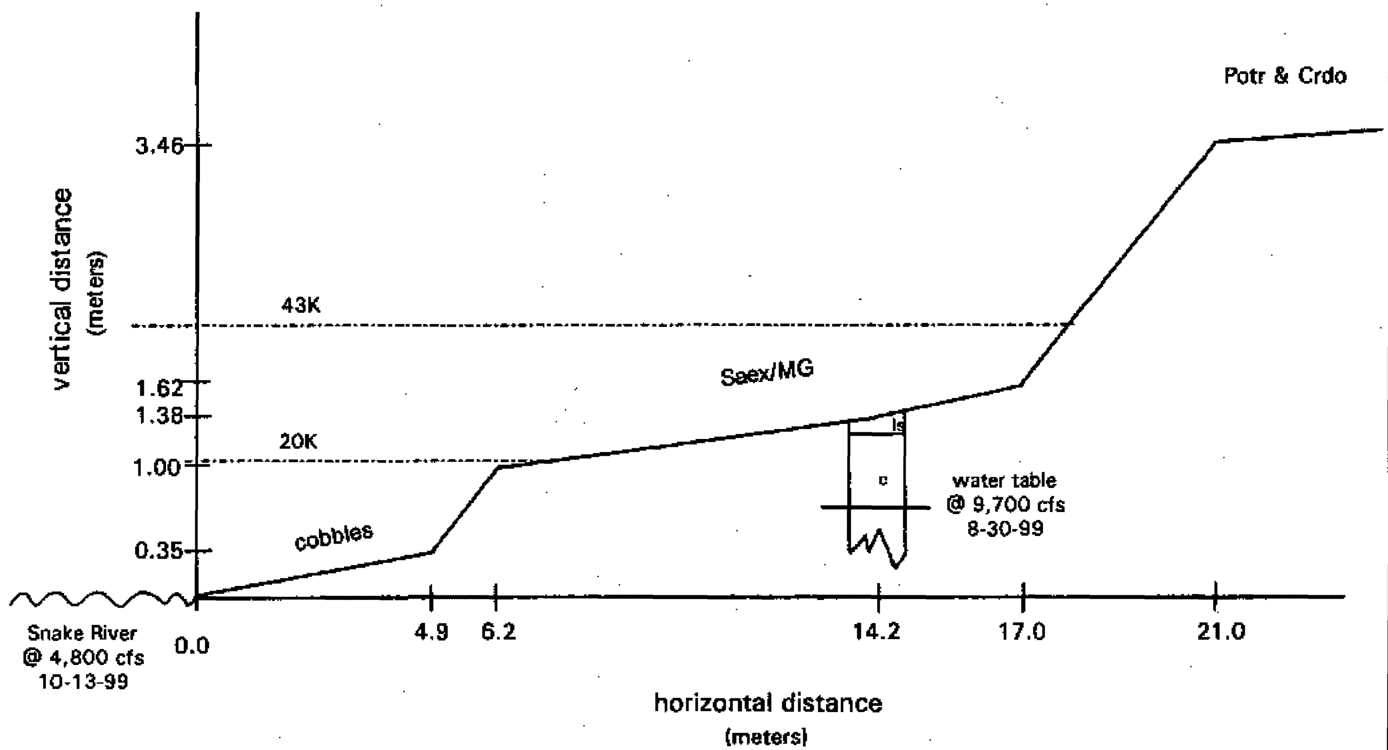
Warm Springs Bottom
003 - Extirpated Site
permanent transect



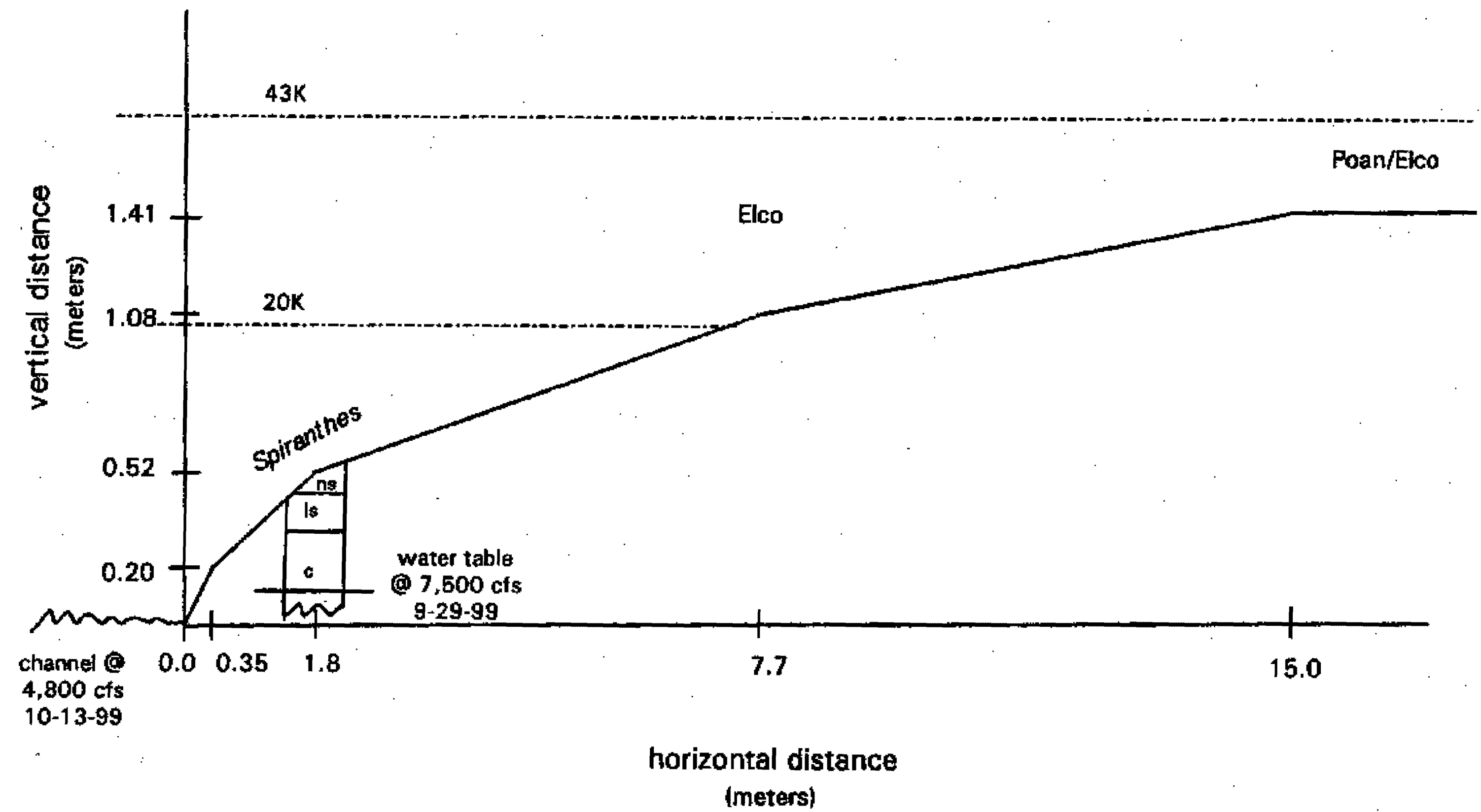
Lufkin Bottom
011



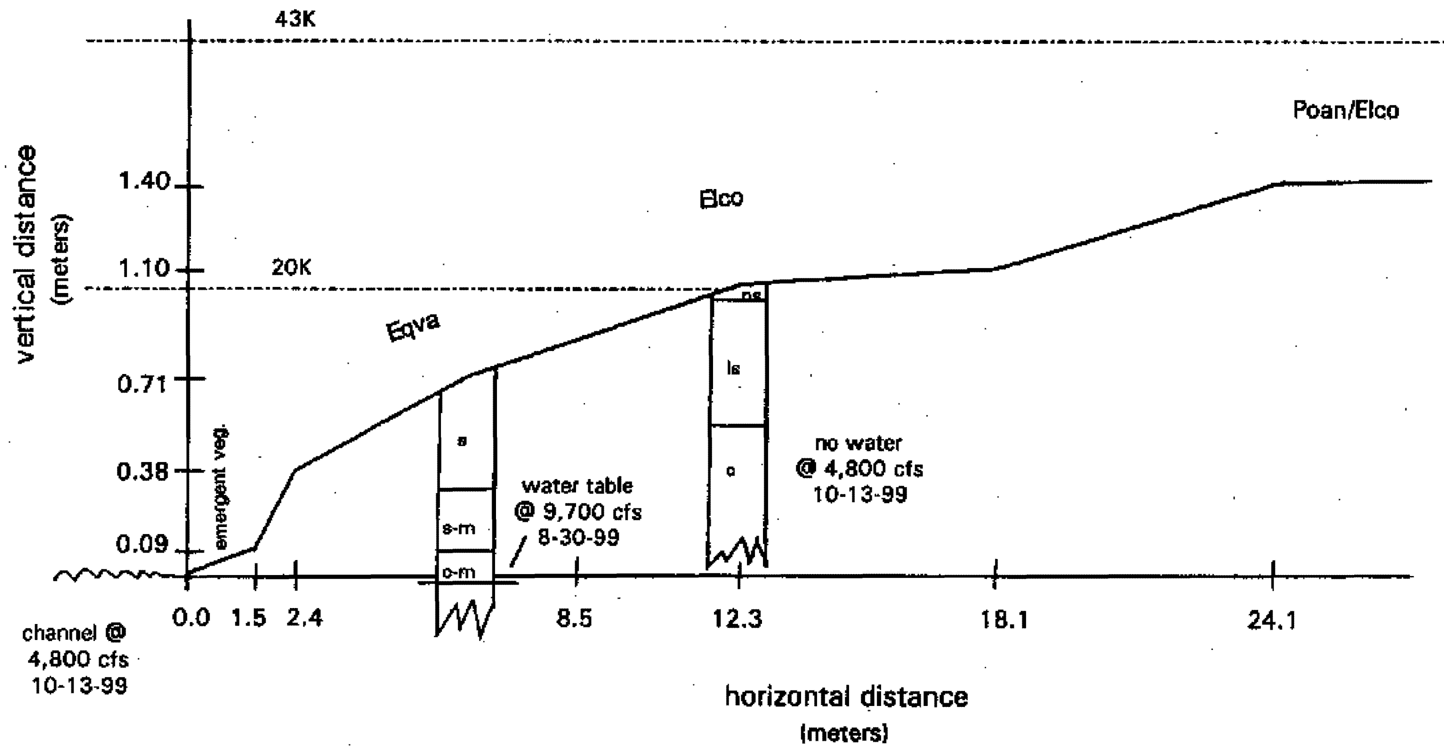
Gormer Canyon #4
013



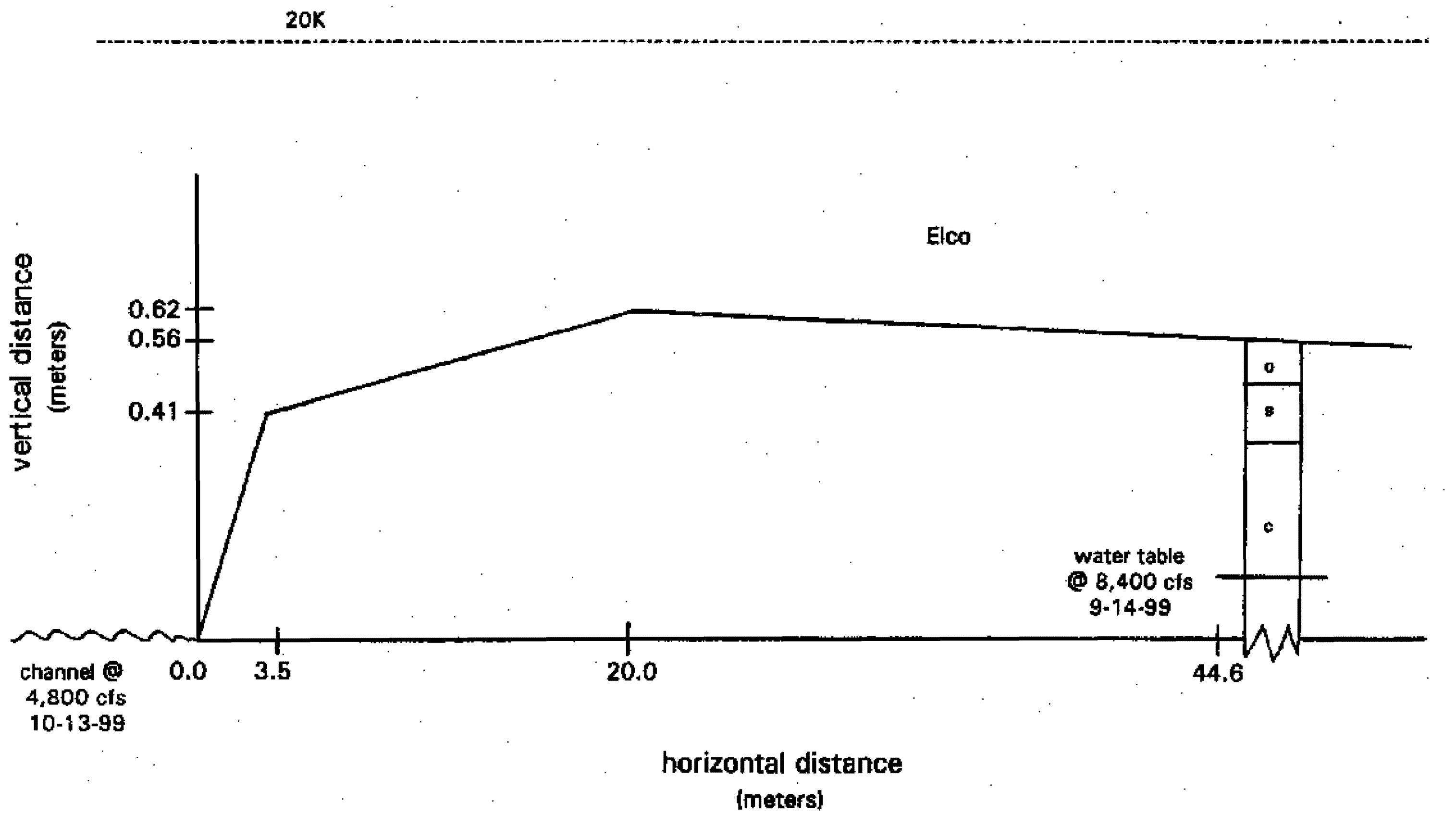
Gormer Canyon #3
021



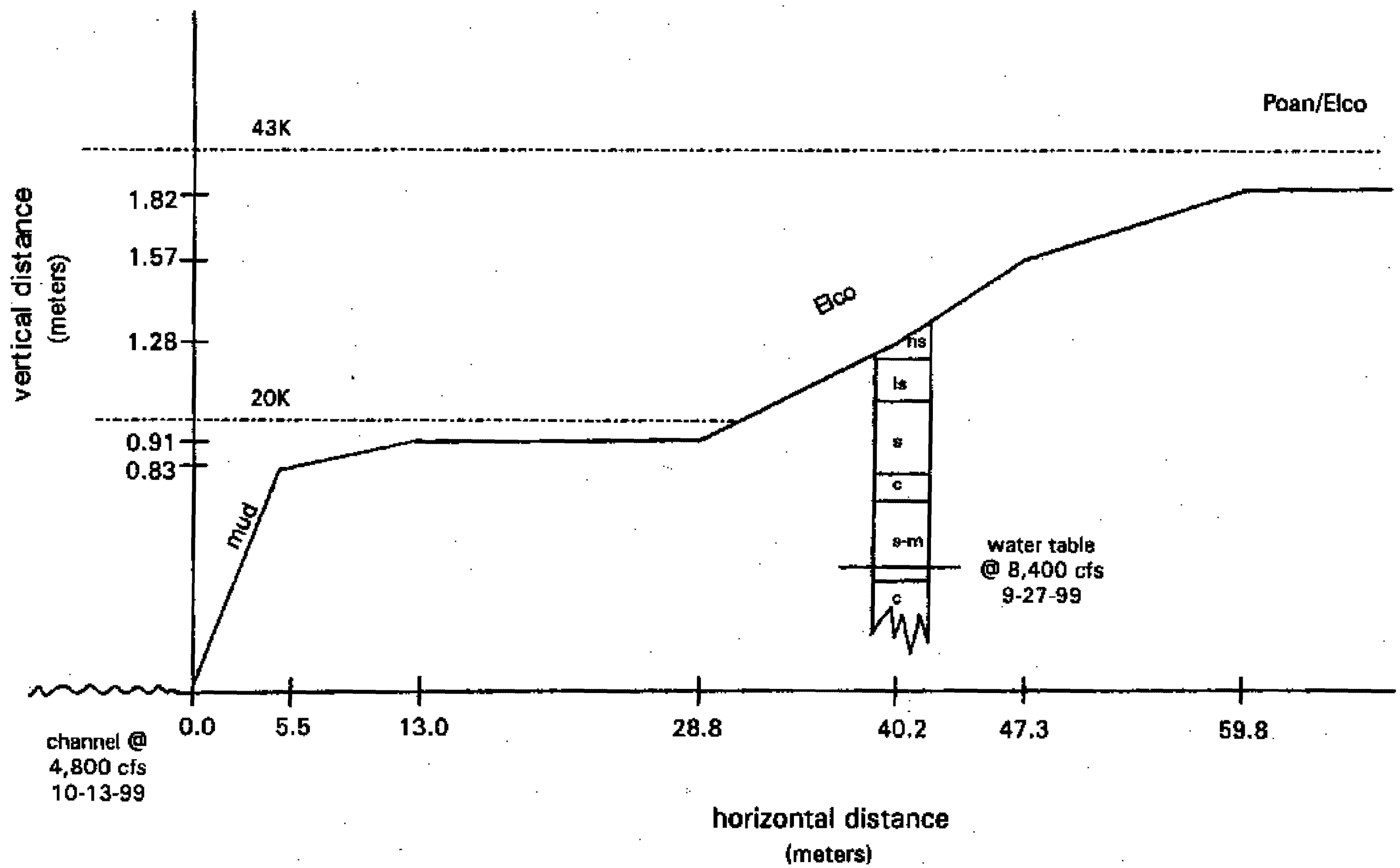
Pine Creek #3
016



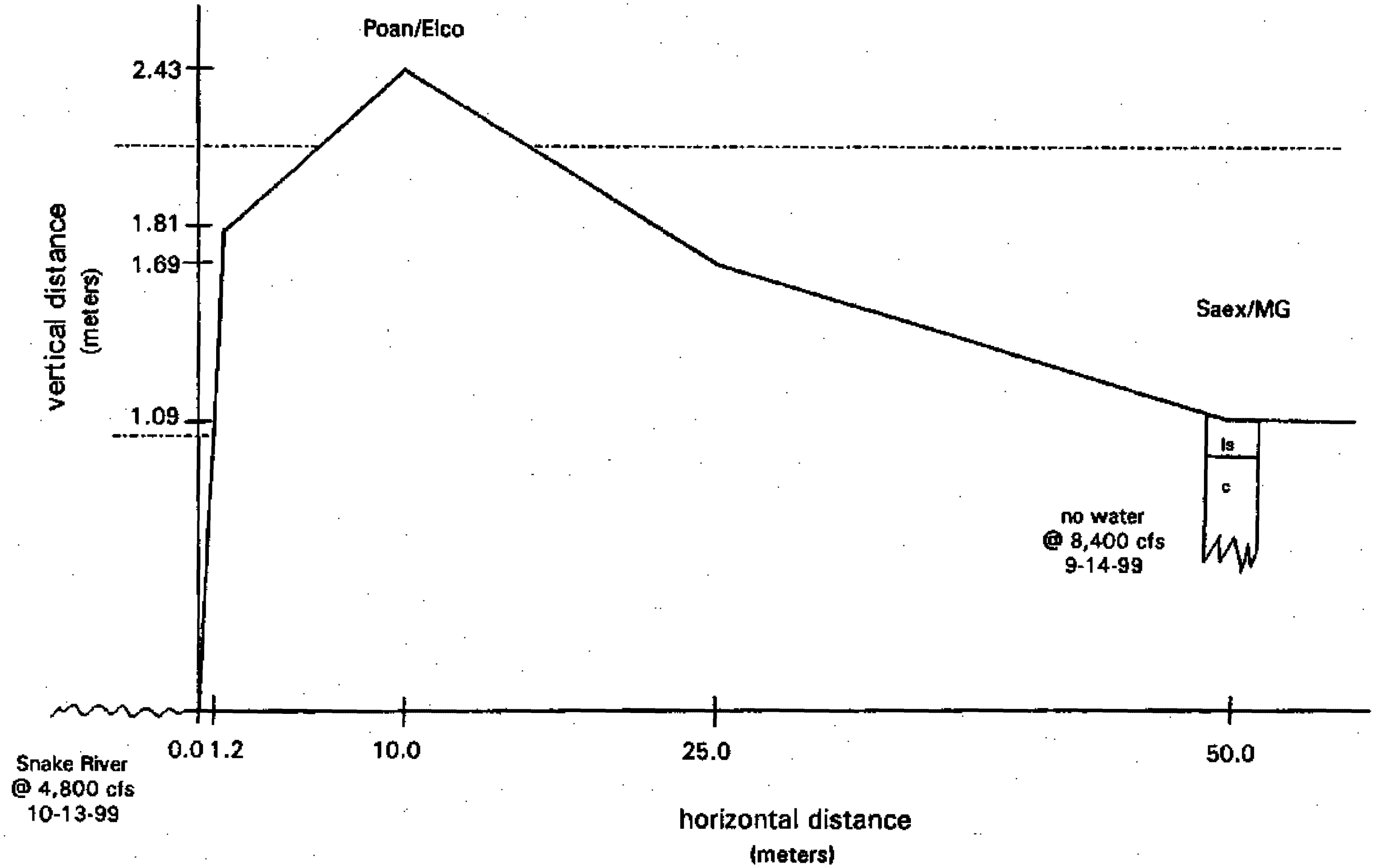
Lower Swan Valley
019



Falls Campground
004



Squaw Creek Islands
020



UTE LADIES TRESSES (SPIRANTHES DILUVIALIS) IN IDAHO:
PART B: 2000 STATUS REPORT

by

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December 2000

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Prepared for:
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and
Targhee National Forest, U.S. Forest Service
(15-CCS-99-20)

SUMMARY

The 2000 status report for Ute ladies tresses compliments the 1997 through 1999 status reports (Moseley 1998a; 1998b; 2000) and contains new or updated information about the species and its habitat in Idaho. The same format is used in this update as in the previous reports, which should be consulted for information not covered here (reports are found at the Conservation Data Center homepage: www2.state.id.us/FISHGAME/cdchome.htm). Major findings reported here include:

- For the third consecutive year there were no Ute ladies tresses observed at Squaw Creek Island (020). Since 1998, only *Spiranthes romanzoffiana* has been observed at this site.
- Historic aerial photos indicate that the Black Canyon (022) occurrence found in 1999 is the only one on the South Fork known from a fluvial landform created since the construction of Palisades Dam. Surveyors should broaden their view of potential Ute ladies tresses habitat.
- Portions of two other occurrences, Annis Island (006) and Warm Springs Bottom (003), also occur on recently deposited substrates. The sites, however, were created mostly by human activities. Pits revealed soil profiles that were not significantly different than those from occurrences on naturally created fluvial landforms.
- There was a drop in cover of herbs, *Salix exigua*, moss, and *Equisetum variegatum* from 1999
at the Warm Springs Bottom permanent monitoring transect. The site was grazed and very dry; plants were drying early due to summer heat and drought. Similar vegetation conditions and changes were documented at the Black Canyon (022) occurrence and elsewhere.
- As part of on-going habitat-flood plain modeling research, Mike Merigliano collected soil samples from all Ute ladies tresses occurrences on public land for lead isotope dating.
- Though there were 810 less Ute ladies tresses observed than last year, the total was virtually identical to the 1998 count. However, the Lufkin Bottom (011) and Warm Springs Bottom (003) occurrences approximately doubled in numbers of plants over 1999.
- A drop of nearly 1,200 plants was observed at Annis Island (006). At Rattlesnake Point no plants were observed. The main cause of these two significant decreases was heavy, late-season trespass livestock grazing. Noxious weed invasions and OHV use were also documented at several Ute ladies tresses occurrences.

ACKNOWLEDGMENTS

Funding was provided to the Conservation Data Center (CDC) for its 2000 Ute ladies tresses work by the Upper Snake River District of the Bureau of Land Management (BLM) and the Caribou-Targhee National Forest. Most field work was conducted by Karen Rice, Susan Murdock (we'll miss your help), Cleve Davis, Pam Druliner, Michelle Williams, and Monica Zimmerman of the BLM and Rose Lehman of the Caribou-Targhee National Forest; their information contributed greatly to this report. Mike Merigliano diligently collected soil samples and worked on habitat modeling, while also answering questions regarding flood plain ecology of the South Fork. Mabel Jankovsky-Jones and Terry Vernholm reviewed the manuscript. Finally, thanks to Bob Moseley for his contributions toward Ute ladies tresses research and conservation.

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TAXONOMY

No major changes from 1997-1999 status reports. See "Description and Identification" section below for a discussion of Ute ladies tresses (*Spiranthes diluvialis*) morphological variation.

LEGAL OR OTHER FORMAL STATUS

No change from 1997-1999 status reports.

DESCRIPTION AND IDENTIFICATION

No major changes from 1997-1999 status reports. However, there is a note of interest related to specimens collected from a recently discovered population on the Columbia River in Washington. C.J. Sheviak confirmed an apparent specimen of *Spiranthes romanzoffiana* collected within this *Spiranthes diluvialis* population, but, in Sheviak's words, "Because *S. diluvialis* is an allotetraploid derivative of *S. romanzoffiana* and *S. magnicamporum*, it of course varies some between the ancestral parental species. As a polyploid, this variation is generally suppressed and tends to cluster about the mean. On the other hand, chromosomal segregation can yield individuals with more chromosomes from one parent than from the other. These then can look very much more like one parent than normal" (Sheviak e-mail communication). In other words, surveyors must still trust their identification of *Spiranthes* based on current keys while knowing that nature may throw us an occasional curveball.

Spiranthes romanzoffiana occurs mixed within *Spiranthes diluvialis* populations on the South Fork of the Snake River from Warm Springs Bottom (003) upstream (Moseley 2000). This observation was confirmed again this year but *S. romanzoffiana* were not tallied at most sites since they were in seed (or gone) during periods of survey in late August. Mixed populations of *Spiranthes diluvialis* and *S. romanzoffiana* are rare but also known from Utah and Washington (Moseley 2000).

DISTRIBUTION

Rangewide Distribution: No change from 1997-1999 status reports.

Idaho Distribution: No change from 1997-1999 status reports. There were no Ute ladies tresses distribution changes discovered in 2000. It is still only known from the South Fork of the Snake River flood plain in Jefferson, Madison, and Bonneville counties of eastern Idaho. Populations are scattered along 49 river miles from near the confluence of the Henry's Fork, upstream to Swan Valley, 9 river miles below Palisades Dam.

Precise Occurrences in Idaho: No major changes from 1997-1999 status reports. In 2000, there were no new occurrences found or significant expansions or contractions of prior known occurrences. For the third consecutive year there were no Ute ladies tresses observed at Squaw Creek Island (020). As noted in previous status reports (Moseley 1998b; 2000), all *Spiranthes* observed at Squaw Creek Island since 1998 have been *Spiranthes romanzoffiana*. Due to unpredictable Ute ladies tresses phenology in 2000 and the potential for mis-timed surveying, one more year of careful searching for *S. diluvialis* should occur before this occurrence is removed from the database. There were no Ute ladies tresses observed at Gormer Canyon #5 (012), the case two out of the last three years. The Gormer Canyon #5 (012) occurrence may be on its way to extirpation because it is infested with spotted knapweed and contains only marginal habitat. Nevertheless, future surveys should occur at this site which once supported Ute ladies tresses individuals.

The Ute ladies tresses populations along the Snake River are generally considered one large meta-population, although 22 occurrences have been delineated in the CDC data base based on management and geographic considerations (Moseley 2000). The precise occurrence records, with detailed location data, for Idaho populations were updated in late November 2000 (Murphy and Stephens 2000).

Extent of Surveys in Idaho: No change from 1997-1999 status reports.

HABITAT

Plant Communities: No major changes from 1997-1999 status reports. See the "Flood Plain Dynamics, Vegetation Monitoring" section below for a discussion of 2000 habitat data collection.

ASSESSING POTENTIAL HABITAT

Evidence from historic aerial photos indicates that the Black Canyon (022) occurrence found in 1999 is the only one on the South Fork known on a fluvial landform (e.g., flood deposits) post-dating the construction of Palisades Dam in 1956 (Merigliano e-mail communication). Portions of two other occurrences, Annis Island (006) and Warm Springs Bottom (003), also occur on substrates deposited since Palisades Dam. These sites, however, were created mostly (or in-part) by human disturbance (Moseley 1998b). The Black Canyon (022) occurrence, in contrast, is on a
relatively young island (probably about 40 years old) with Ute ladies tresses growing on a cobble point-bar which has only been vegetated since about 1974 (Figure 1). Consequentially, the site has thin sandy soil forming a matrix between numerous cobbles and stones. The relatively sparse vegetation, described below in the "Flood Plain Dynamics, Vegetation Monitoring" section, reflects the cobble-dominated ground.

The importance of the Black Canyon (022) occurrence is that surveyors on the South Fork of the Snake River should broaden their view of potential Ute ladies tresses habitat. Recent fluvial landforms similar to the Black Canyon site exist along the river and should be more closely scrutinized for their potential to support Ute ladies tresses.

FLOOD PLAIN DYNAMICS IN RELATION TO UTE LADIES TRESSES HABITAT

Vegetation Monitoring: Currently, vegetation succession is monitored yearly at only two Ute ladies tresses populations. These were chosen because their habitat reveals much about the influence of floodplain dynamics on vegetation. The upstream portion of the Warm Springs Bottom (003) occurrence was heavily impacted by the June 1997 flood while the Black Canyon (022) occurrence is on an annually flooded, young fluvial landform (Figure 1).

Warm Springs Bottom (003) -For the past two years vegetation monitoring has occurred on a portion of the Warm Springs Bottom (003) occurrence (Figure I) that was apparently extirpated by June 1997 flood deposits (Moseley 1998b; 2000). The flood deposited 18 cm of sand on the site, apparently beyond the threshold depth that Ute ladies tresses can withstand (Moseley 1998b). It is unknown if Ute ladies tresses persist beneath the sand and need more time to reach the surface. During 1998, vegetation composition and structure was studied on the extirpated patch and additional photographs taken (Moseley 1998b). In 1999, a permanently marked (with orange potato-digger bars) belt transect was established and measured to provide baseline data for monitoring vegetation succession related to flood plain dynamics (Moseley 2000). Photo-points were also established. The transect (plot 98SD03C) has an azimuth of 17°, with 17° E declination, and a GPS location of N 43° 35.469, W 111° 27.766. The Warm Springs Bottom transect and photo-points were also monitored in 2000 (using methods of Moseley 1998b) and results are described below.

Vegetation Data:

Below is a comparison of composition and cover estimates from 1998-2000 (Table 1). *Equisetum variegatum* was the first species to invade the sands deposited by the June 1997 flood and it continued to increase in cover until it dominated the transect (Moseley 2000). By 1999, *Agrostis stolonifera*, the dominant herb on the site before the flood, also appeared to increase in cover. The *Elaeagnus commutata* shrubs on the site prior to the flood never resprouted (Moseley 2000). Both species richness and moss cover increased dramatically from 1998 to 1999.

On September 1, 2000 vegetation data was again collected at transect 98SD03C. Several factors made vegetation data difficult to collect and interpret this year. First, someone removed the orange potato-digger bars and the exact placement of the transect had to be relocated using last year's repeat photography. The potato-digger bars were replaced within about 20 cm or less of their original location. Second, trespass cattle had recently grazed the transect (as well as some wild ungulates) resulting in a significant drop in cover of total graminoids and forbs, *Salix exigua* (due to browsing), moss, and *Equisetum variegatum* (due to trampling) from 1999 (Table 1). Finally, the site was very dry and plants were drying early due to abnormally high summer heat and drought. As a result, litter cover was much higher and *Equisetum variegatum* cover much lower than in 1999. In general, the height and cover of woody species increased slightly with growth of a *Salix lasiandra* individual now along the transect. The cover of *Agrostis stolonifera* remained similar to 1999 but that of *Poa pratensis* increased. The cover of *Medicago lupulina*, a nitrogen-fixing, early-seral exotic species of both moist and dry sites, also increased notably. There was no significant change in species richness.

No *Spiranthes diluvialis* were observed along the transect which now appears as very dry , marginal habitat. However, one *Spiranthes diluvialis* was observed blooming only 8 m immediately down slope of the end of transect 98SD03C. It was growing in a *Salix exigua*/mesic graminoid community located on the margin of a moist flood channel dominated by *Phalaris arundinacea*. The transect will continue to be monitored in 2001.

Figure 1. Photo overlooking Black Canyon (022) occurrence and Warm Springs Bottom (003) permanent monitoring transect 98SD03C.

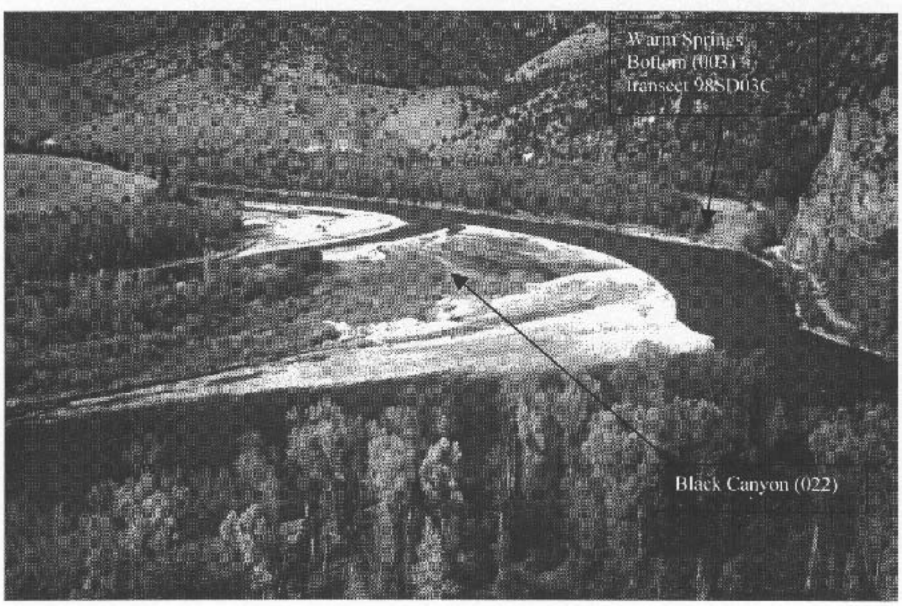

Table 1. Vegetation of the permanent monitoring transect 98SD03C at Warm Springs Bottom (003) for 1998-2000.

Vegetation Data for 98SD03C	1998 % cover	1999 % cover	2000 % cover
WOODY SPECIES			
Betula occidentalis		seedling	
Elaeagnus commutata	dead stems	dead stems	
Populus angustifolia	1	1	1
Salix exigua		3	1
Salix lasiandra			3
Salix lutea	1		1
GRAMINOIDS			
**Agrostis stolonifera*	3	10	10
Juncus ensifolius		1	
Juncus tenuis			1
**?Phalaris arundinacea*		1	
**Poa pratensis*		1	3
Unknown grass		1	
FORBS & PTERIDOPHYTES			
Aster ascendens		1	1
**Cirsium vulgare*			1
Epilobium ciliatum		1	
Equisetum variegatum	60	80	10
Geum macrophyllum			1
**Medicago lupulina*		3	10
Solidago missouriensis	1	3	3
**Taraxacum officinale*		1	

**Trifolium repens*		3	1
Viola sp.			1
Unknown forb		1	
TOTAL SPECIES	5	16	15
LIFE FORM DATA			
Woody Cover / Mean Ht. (m)	1 / 0.5	1 / 0.8	1 / 1.1
Graminoid Cover / Mean Ht. (m)	3 / 0.4	10 / 0.4	3 / 0.3
Forb Cover / Mean Ht. (m)	60 / 0.1	90 / 0.1	3 / 0.2
GROUND COVER			
Soil (sand)	70	60	30
Gravel	0	0	0
Rock	0	0	0
Litter	1	1	60
Wood	1	1	1
Moss	0	30	10
Basal Vegetation	30	10	10

* = exotic spp.

Repeat Photography:

Photos were re-taken on September 1 and again on September 6, 2000 at a series of photo-points established during 1996, 1997, and 1998 at 98SD03C (Moseley 2000). The decrease in total graminoid, *Equisetum variegatum*, and *Salix exigua* cover between 1999 and 2000 is obvious from the photos (Figure 2). Below is the list of repeat photo sets archived at the CDC (Table 2).

Figure 2. Repeat photos, 1999-2000, of photo-point 98-2 at Warm Springs Bottom (003) permanent monitoring transect 98SD03C. The arrows point to matching landmarks.

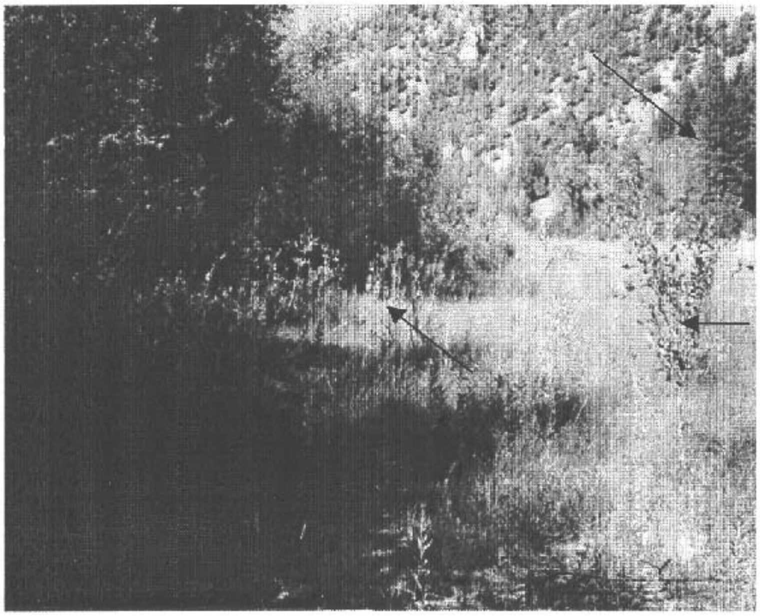

Photo-point 98-2 taken on August 16, 1999. Note the thick and tall grass.

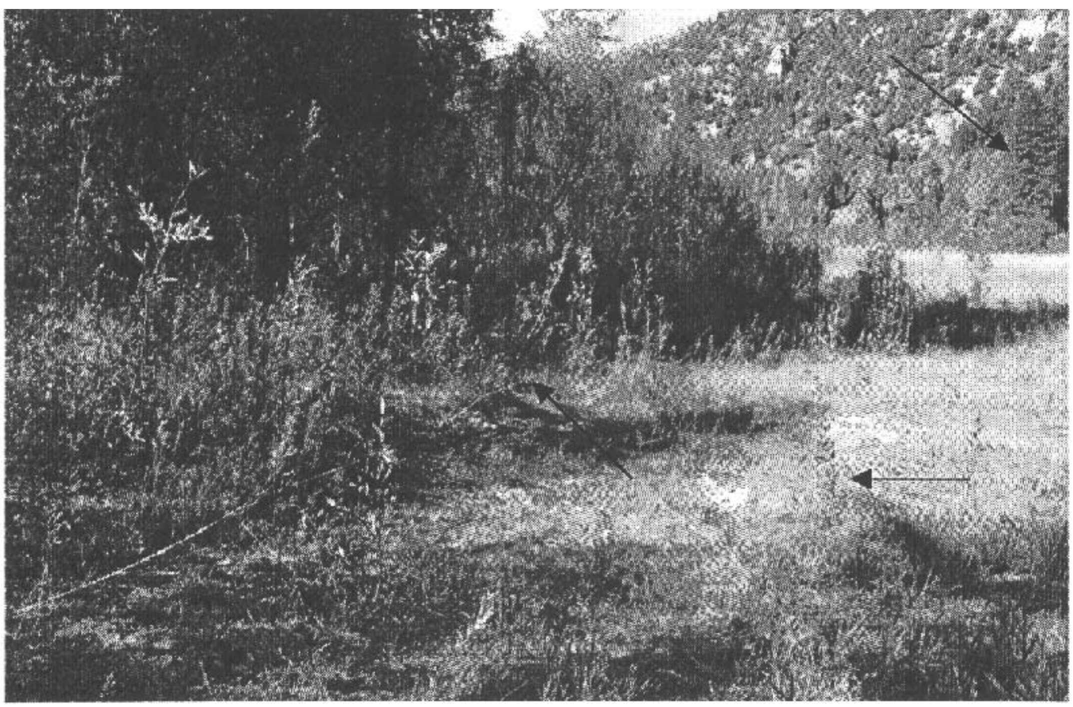

Photo-point 98-2 taken on September 6, 2000. Note the large amount of exposed sand and lower graminoid cover. The shrub in the lower-right of picture (arrow) is severely browsed.

Table 2. Record of photo-points and their archived photo sets at Warm Springs Bottom (003) permanent monitoring transect 98SD03C.

Photo Number	First Taken	Repeated		
96-1	1996	-	1999	2000
97-1	1997	1998	1999	2000
97-2	1997	1998	1999	2000
97-3	1997	1998	1999	2000
98-1	1998	-	1999	2000
98-2	1998	-	1999	2000

<u>Black Canyon (022)</u> - In 1999, Bob Moseley sampled the recently discovered occurrence at Black Canyon (022) (Figure 1) with methods described in the 1998 status report (Moseley 1998b). This year, we sampled the same Ute ladies tresses habitat on August 30, but due to time constraints, used a different, quicker method. We performed ocular estimates of every vascular plant species present within a 5x5 m plot located roughly in the center of the *Spiranthes diluvialis* population area. The area surveyed by this method is about 25 times larger than the area surveyed by Moseley. This likely explains why we documented 34 plant species versus only 20 found in 1999 (Table 3).

Vegetation data:

Though exact comparisons between 1999 and 2000 cannot be made, vegetation apparently changed in several ways (Table 3). First, the cover of woody species (especially *Populus angustifolia* seedlings) increased in response to annual growth since 1999. Second, the cover of both *Agrostis stolonifera* and *Phalaris arundinacea* were higher, resulting in higher total graminoid cover. Conversely, the cover of *Equisetum hyemale*, *E. variegatum*, and moss decreased dramatically (probably in response to increased competition and summer drought). However, the cover of weedy exotic species, especially *Trifolium repens*, *Myosotis scorpioides*, and *Medicago lupulina*, apparently increased.

Interestingly, this site was originally classified as an *Equisetum variegatum* community type. However, due to rapid succession on this annually flooded island point-bar, this community type may be short-lived. The data from 2000 may indicate a successional trend toward *Salix exigua*/mesic graminoid (which is adjacent) at this Ute ladies tresses population. This hypothesis should be tested, however, by establishing a permanent vegetation monitoring transect (01SD22A) with repeat photography at this site (using the same methods as that for 98SD03C; Moseley 1998b; 2000).

Below is the species cover data for the Black Canyon (022) plots (Table 3). Canopy cover classes are the same as prior years (1998b). Heights are in meters and an asterisk (*) indicates an introduced species.

Table 3. Vegetation of the Black Canyon (022) occurrence for 1999-2000.

Vegetation Data for Black Canyon (022) Occurrence	1999: % cover, sampled with ten 50x20 cm microplots on 10 m transect (Moseley 1998b; 1999)	2000: % cover, sampled with one 5 x 5 m plot
WOODY SPECIES		
Betula occidentalis	1	1
Cornus stolonifera		1
Populus angustifolia	1	10
Salix exigua	1	1
Salix lutea		1
GRAMINOIDS		
**Agrostis stolonifera*	1	10
Carex lanuginosa	1	1
Carex nebraskensis	1	1
Juncus ensifolius	1	1
Juncus tenuis		1
Muhlenbergia richardsonis		1
*? *Phalaris arundinacea*	1	3
**Poa pratensis*	1	1
FORBS & PTERIDOPHYTES		
Aster ascendens	1	1
**Cirsium arvense*		1
**Cirsium vulgare*		1
Conyza canadensis	1	1
Epilobium ciliatum	1	1
Equisetum arvense	3	1
Equisetum hyemale	50	30
Equisetum variegatum	20	1
Habenaria hyperborea		1

Geum macrophyllum		1
**Medicago lupulina*		3
**Melilotus alba*		1
Mentha arvense	1	1
**Myosotis scorpioides*		3
**Plantago major*		1
Potentilla rivularis	1	
Ranunculus sp.		1
Senecio hydrophilus		1
Solidago missouriensis		1
**Sonchus arvensis*		1
Spiranthes diluvialis	1	1
**Trifolium repens*	3	10
Veronica anagallis-aquaticus	1	
TOTAL SPECIES	20	34
LIFE FORM DATA		
Woody Cover (avg. ht)	1	10 (1.30 m)
Graminoid Cover (avg. ht.)	3	20 (0.40 m)
Forb Cover (avg. ht.)	70	60 (0.30 m)
GROUND COVER		
Soil	0	3
Gravel	0	1
Rock	3	30
Litter	0	20
Wood	1	1
Moss	90	40
Basal Vegetation	3	10

Flood Plain and Vegetation Dynamics Research—An Update: A complete description of flood plain and vegetation dynamics research methods and preliminary results appears in the 1999 status report (Moseley 2000). The results of the model were not available at the time this report was published. The basis for the research is best described in the following excerpt from Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1999 status report (Moseley 2000):

> "I consider the Snake River populations of Ute ladies tresses to be a single meta-population. Although it is a working hypothesis at this point, the underlying assumption is that the Snake River meta-population consists of a set of local populations linked by dispersal. Although each patch supports its own breeding population, no single population is adequately large enough to ensure the long-term viability of the meta-population. Therefore, multiple local patches of habitat must be maintained in order to conserve the meta-population.
>
> Along the Snake River, the greatest factor affecting the distribution and viability of habitat patches is the dynamics of the flood plain. Under pre-Palisades Dam flow regimes, suitable habitat patches were being destroyed and created by periodic flood events. This is significant because, if Ute ladies tresses is similar to cottonwood, habitat patches are only viable for a finite period of time. Eventually the habitat may become too dry because of channel degradation or encroached upon by dense shrubs through plant succession. Periodic high flows create new habitat and possibly also limit shrub encroachment. Merigliano (1996) found that, under post-Palisades river operations, cottonwood forests are not viable in the long term. Current river operations are also considered a long-term viability threat to Ute ladies tresses (Moseley 1998b)."

During 1999, a habitat ecology study began which related flood plain dynamics and primary habitat succession to long-term conservation of Ute ladies tresses on the Snake River (Moseley 2000). This work, to be completed in winter 2000-2001, builds on past (Merigliano 1996) and on-going studies of the relationship between fluvial geomorphology, riparian community ecology, and river management. In summary , research looked "at the distribution of Ute ladies tresses habitat in three dimensions: temporal distribution on the flood plain, horizontal distribution on the flood plain, and vertical distribution related to river stage" (Moseley 2000). To accomplish this, data were collected related to three categories: substrate age and characterization, primary succession, and flow regime:

***<u>Substrate Age and Characterization</u>* —Age:** The ages of the alluvial substrates supporting occupied Ute ladies tresses habitat were inferred from: 1) flood plain mapping conducted by Merigliano (1996) above Heise; 2) air photo interpretation both above and below Heise; and 3) measurements directly from Ute ladies tresses habitat using decay rates for an isotope of lead (Pb21[illegible]). Only preliminary work was done in 1999 (Moseley 2000). From August 30 to September 1, 2000, Mike Merigliano collected soil samples from nearly all Ute ladies tresses occurrences on public land for lead isotope dating.

Characterization: During 1999, 25 soil pits were dug at 18 Ute ladies tresses occurrences to better describe the alluvial substrate (Moseley 2000). This work mostly confirmed what is theorized about soil formation along the South Fork of the Snake River. Ute ladies tresses populations usually occur on soil with varying amounts of fine-textured sediments overlying a deep cobble/pebble/sand layer (Appendix 1; Moseley 2000). This cobble layer probably represents the major depositional event that formed the bar (Merigliano 1996; Moseley 2000). Following bar deposition, over-bank deposits of finer-textured material were deposited on these cobbles. The depth and texture (pure sand to loamy sand) of these fine layers varied from site to site, and some places had a surface layer of sand deposited during the June 1997 flood (Appendix 1; Moseley 2000). Only one population, Black Canyon (022), lacked any fine layer. Black Canyon (022) is the only known occurrence in Idaho on naturally formed fluvial landform deposited after Palisades Dam (see "Vegetation Monitoring" section above). For these reasons, this site is a true anomaly. The water table was encountered in most pits, where it ranged from 1 cm to 110 cm deep, averaging 57 cm (n = 20) (Appendix 1; Moseley 2000).

On August 31 and September 1, 2000, soil pits were dug at Annis Island (006) and Warm Springs Bottom (003) on substrates of human origin which post-dated the construction of Palisades Dam. The Warm Springs Bottom (003) soil pit was on a surface exposed by the blow-out of a small dam in the mid-1970s (Moseley 1998b). The Annis Island # 1 soil pit was on a surface probably created by dredging of material for levy building during the late 1950s (Moseley 1998b). These two soil pits had relatively shallow surface fine layers (Appendix 1). Annis Island #2 was on a surface possibly created by deposits of fill during levy construction in the late 1950s. As a result, it had a thicker surface fine layer (Appendix 1). Overall, there were no significant differences between these soil pits on human-created substrates and those at natural flood plain sites (Appendix 1; Moseley 2000). These sites, in general, had relatively shallow depths to water table and, thus, more soil mottling (and even gleying at Warm Springs Bottom (003)). At natural sites mottles were only rarely present in and occurred only in the *Equisetum variegatum* and *Eleocharis rostellata* communities (versus in *Salix exigua* and *Eleagnus commutata* on human-created sites).

Primary Succession - In winter 2000-2001, plant community development will be modeled along the primary successional gradient. There are two different techniques to model this chronological sequence: 1) the use of time-series analysis sites (e.g., changes over time in Ute ladies tresses habitat observed by monitoring the permanent transects); and 2) inferring the chrono-sequence from plots of different successional ages (Moseley 2000). The model will include estimates of the rate of development along the primary successional pathways as well as the compositional and structural characteristics of these changes (Moseley 2000).

Flow regime and Flood Plain Cross Sections - In 1999, the elevation of habitat on the flood plain was measured with a level sighted along a traverse from low water, through Ute ladies tresses habitat, to higher narrow-leaf cottonwood stands (Moseley 2000). Cross sections of the flood plain were constructed and various river stages were tied to different elevations, including elevations of Ute ladies tresses habitat (see Moseley 2000 for complete results). From this information the flow regime and depositional events responsible for creating new habitat and destroying old habitat may be inferred. In addition, the question of whether the flow regime predicted to restore cottonwood forests (Merigliano 1996) would suffice to maintain Ute ladies tresses habitat may be answered (Moseley 2000).

POPULATION BIOLOGY

Phenology: No change from 1997-1999 status reports. As reported below, timing our population surveys with the unpredictable and annually variable peak-flowering period of Ute ladies tresses remains an obstacle to accurate and meaningful long-term monitoring.

Population Size and Condition: A total of 2,600 Ute ladies tresses plants were observed at the 20 occurrences surveyed in Idaho during 2000 (Table 4). Though this was 810 less plants than counted last year, the total was virtually identical to the 1998 count. As with 1998 and 1999, the two occurrences located on private land were not surveyed. Comprehensive surveys of most sites were done from August 14-26, a week earlier than normal. Surveys were done at this time because reconnaissance visits indicated an apparent trend toward an early peak-flowering period (due possibly to hot temperatures and drought conditions). The Black Canyon (022), Railroad Island (005), Rattlesnake Point (002), and TNC Island (010) occurrences were surveyed from August 30 to September 1. Cursory follow-up surveys to other sites during these days were done to see if there was a late flush of flowering individuals. However, few new flowering plants were observed at most sites. Nevertheless, due to these late blooming plants, the total count is likely an underestimate. Refer to Murphy and Stephens (2000) for detailed data for each occurrence.

The overall decrease in observed flowering individuals this year was mainly due to a drop of nearly 1,200 plants at Annis Island (006) (Table 4). At Rattlesnake Point no plants were observed. The main cause of these two major decreases was heavy, late-season trespass livestock grazing (Figure 3). In addition, counts at Gormer Canyon #3 (021), Kelly's Island (001), Lower Conant Valley (017), Pine Creek #3 and #4 (016), Railroad Island, TNC Island, and Twin Bridges Island (007) dropped to about 50% of 1999 counts. Other reasons for declines may be poor growing conditions (e.g., too hot and dry), habitat problems (e.g., trampling, noxious weed invasion, OHV trailing), poor survey timing, or poorly understood demographics (e.g., prolonged dormancy). Two occurrences, Gormer Canyon #5 (012) and Squaw Creek Islands (020), each had their third consecutive year of nearly zero individuals. Gormer Canyon #5 is heavily infested with spotted knapweed (*Centaurea maculosa*) and Squaw Creek Islands may only be *Spiranthes romanzoffiana* (misidentified in the past) (Table 5). Though monitoring should continue at these sites, their long-term viability appears low. Interestingly, the Lufkin Bottom (011) and Warm Springs Bottom (003) occurrences approximately doubled in plants numbers over 1999 (Table 4). These historic high counts were observed despite increased human trampling at Lufkin Bottom and the presence of late season trespass cattle at Warm Springs Bottom (Table 5).

Table 4. Ute ladies tresses population counts at each occurrence for 1996-2000.

Occurrence Name	Occ.#	1996	1997	1998	1999	2000
Annis Island	006	----	35	2,036	1,917	726
Lorenzo Levee	008	----	1	----	----	----
Archer Powerline	015	----	145	----	----	----
Twin Bridges Island	007	----	160	108	99	43
Railroad Island	005	----	9	14	42	17
Kelly's Island	001	12	22	30	30	51
Mud Creek Bar	009	----	9	32	71	63
Rattlesnake Point	002	15	4	23	26	0
TNC Island	010	----	9	9	118	21
Warm Springs Bottom	003	173	301	80	476	942
Black Canyon	022	----	----	----	50	42
Lufkin Bottom	011	----	61	96	224	494
Gormer Canyon #5	012	----	10	0	1	0
Gormer Canyon #4	013	----	10	11	12	7
Gormer Canyon #3	021	----	----	8	59	30
Pine Creek #5	014	----	6	14	30	47
Pine Creek #3 & #4	016	----	18	113	200	103
Lower Conant Valley	017	----	127	0	40	23
Upper Conant Valley	018	----	61	15	5	5
Lower Swan Valley	019	----	1	8	4	9
Falls Campground	004	1	14	5	6	13
Squaw Creek Islands	020	----	168	2	0	0
Total (Mean)	**----**	**201 (50)**	**1,171 (59)**	**2,604 (137)**	**3,410 (171)**	**2,600 (130)**

Population Genetics: No change from 1997-1999 status reports.

Reproductive Biology and Pollination Ecology: No major changes from 1997-1999 status reports. However, some observations regarding pollination ecology were made. In general, there is a need to know which associated plant species are flowering at the same time as Ute ladies tresses because they may provide additional pollen to pollinators. On August 23 *Aster ascendens*, *Melilotus alba*, and *Trifolium repens* were blooming and had visitation at Falls Campground (004). On August 30 *Aster hesparius*, *Medicago lupulina*, *Melilotus alba*, *Trifolium pratense*, and *Trifolium repens* were blooming with Ute ladies tresses at the Pine Creek
#3 and #4 (016) and Lufkin Bottom (011) occurrences. Only *Medicago lupulina* was observed blooming at Black Canyon (022) on this date. On August 31 *Aster ascendens* and *Melilotus alba* were concurrently blooming at TNC Island (010). On September 1 an unknown species of white butterfly (Pieridae family, *Pontia* sp. ?) was observed visiting a Ute ladies tresses flower at Warm Springs Bottom (003). *Tanacetum vulgare* was blooming nearby.

Competition: No major changes from 1997-1999 status reports. However, several previously undocumented or insignificant competitive exotic species are apparently expanding at several Ute ladies tresses occurrences and may soon become significant problems (Table 5). For example, *Phalaris arundinacea* is possibly expanding at Lufkin Bottom (011) (though a few Ute ladies tresses were observed blooming within gaps in the dense stands). At Rattlesnake Point (002) *Ranunculus repens* is a significant component of the *Agrostis stolonifera* turf and at Warm Springs Bottom (003), *Tanacetum vulgare* appears to be expanding into the *Spiranthes diluvialis* population. Generally, noxious weeds, including Canada thistle (*Cirsium arvense*), perennial sowthistle (*Sonchus arvensis*), spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), and leafy spurge (*Euphorbia esula*), are excellent competitors for light and nutrients with native plants. Their current expansion and competition with Ute ladies tresses at several occurrences is a concern (see "Land Use and Possible Threats" section below).

Herbivory: No change from 1997-1999 status reports.

Land Ownership and Management Responsibility: No change from 1997-1999 status reports.

Land Use and Possible Threats: Detailed information for each occurrence is found in Murphy and Stephens (2000) and in prior status reports (Moseley 1998a, 1998b, and 2000). Every visited occurrence except Lower Swan Valley (019) is still threatened in the short-term by localized human activities. The following summarizes habitat conditions, threats, and human activities observed in 2000 and the conservation action needed or planned to ameliorate the problems for each occurrence (Table 5).

Late-season trespass livestock grazing at Annis Island (006), Mud Creek Bar (009), Rattlesnake Point (002), and Warm Springs Bottom (003) was the most serious short-term threat to Ute ladies tresses observed this year (Table 5). This preventable problem likely resulted in sharply decreased seed production at Annis Island and Rattlesnake Point due to direct grazing and trampling of plants (Figure 3). The effects at Mud Creek Bar and Warm Springs Bar were negligible because cattle concentrated in areas currently not supporting Ute ladies tresses. Off - highway vehicle use (OHV) at Annis Island (006) (access via levies) and Mud Creek Bar (009) (access via a steep cattle trail from the Black Canyon road), previously not a problem at these sites, was the next most serious threat (Table 5). However, only Annis Island experienced OHV travel directly through a population area.

It was also apparently a good year for noxious weed expansion. Spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), and leafy spurge (*Euphorbia esula*) were previously documented as threats at several sites (Moseley 1998a, 1998b, 1999), but now leafy spurge is present at Twin Bridges (007) (Table 5). Apparently, herbicide spraying for leafy spurge occurred in roadside habitat (along access to old boat ramp in the Madison County part) which has supported *Spiranthes diluvialis* in the past. Two other noxious weeds, Canada thistle (*Cirsium arvense*) at Rattlesnake Point and perennial sowthistle (*Sonchus arvensis*) at Railroad Island (005), Kelly's Island (001), and Black Canyon (022), are also apparently expanding and may threaten populations in the future. Invasion by noxious weeds and other potentially competitive exotic species (especially tall forbs such as *Tanacetum vulgare*) are, of course, symptomatic of other soil disturbing activities such as excessive cattle grazing, OHV use, and human recreation. Thus, preventing the spread of noxious weeds and competitive exotic species in Ute ladies tresses populations must be holistic.

Figure 3. Photo showing cattle grazing impacts in Ute ladies tresses habitat at Rattlesnake Point (002). Note cattle trailing (right), heavily browsed willows (center), trampled banks (on left), and high utilization of grass.

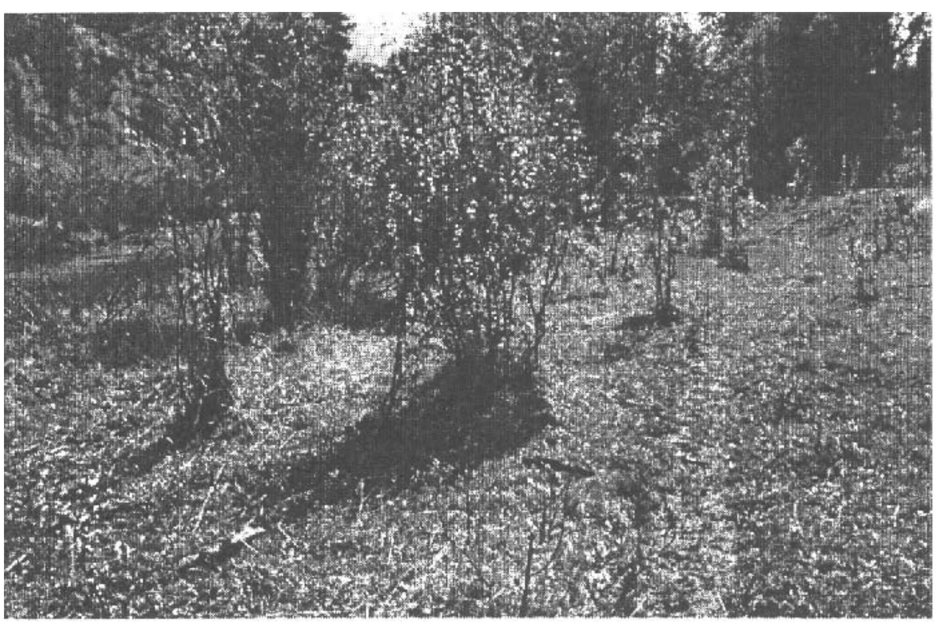

Table 5. Habitat conditions, threats, and conservation actions planned for 2001 at each Ute ladies tresses occurrence.

Occurrence	Habitat Conditions, Threats, and Human Activities	Conservation Actions Planned in 2001
Annis Island (006)	late season trespass livestock grazing, *Spiranthes diluvialis* trampled and spotted knapweed, diffuse knapweed, and leafy spurge in population area	inform allotment lessees of the importance of strict compliance with their authorized season-of-use; increase allotment compliance inspections
Lorenzo Levee (008)	not visited this year	
Archer Powerline (015)	not visited this year	
Twin Bridges Island (007)	human trampling; weed infestation threats	
Railroad Island (005)	*Sonchus arvensis* in population area; deer trail through population; dry conditions	
Kelly's Island (001)	area heavily used by wildlife; dry conditions; encroaching vegetation (entering new seral stage?); competition with *Sonchus arvensis*	
Mud Creek Bar (009)	recent OHV trails in *Spiranthes diluvialis* habitat; late season trespass cattle grazing observed at site; diffuse and spotted knapweed infestation in area	Mud Creek Bar is included in the Idaho Falls Field Office Proposed Area Closures; introduce knapweed biocontrol insects in 2001 if available
Rattlesnake Point (002)	late-season trespass cattle grazing observed in population area; heavy utilization of *Agrostis stolonifera*, probably including direct cropping of *Spiranthes diluvialis*; livestock trails through population area; damage to *Salix* spp.; river and backwater slough banks eroding from cattle trampling; Canada thistle and other exotic spp. in population area	construction of fence is planned (spring 2001 or 2002) to remove cattle use from the river bottom where occurrence is located; monitor Canada thistle invasion and control if necessary
TNC Island (010)	dispersed camping observed but sampling impacts minimal	initiate a River Use Study to address visitor use impacts and sanitation issues; increase sanitation education to river users
Warm Springs Bottom (003)	late season trespass cattle; effects were negligible because cattle concentrated in areas currently not supporting Ute ladies tresses; dry conditions	continue to have cattle off by July 1 (the FS began implementing this off-date in 1999--previous to 1999 the allotment as managed under rest-rotation); increase monitoring of pasture for late season trespass cattle

Black Canyon (022)	*Sonchus arvensis* in population area (currently trace cover); no other threats or activities observed	
Lufkin Bottom (011)	IMAX film crew on site; designated camping within habitat; direct trampling of *Spiranthes diluvialis* by film crew and campers; river user sanitary issues	IMAX film crew was only permitted for one day in 2000; initiate a River Use Study to address visitor use impacts and sanitation issues; increase sanitation education to river users
Gormer Canyon #5 (012)	spotted knapweed infestation not under control, possibly expanding	knapweed biocontrol insects released but not yet effective
Gormer Canyon #4 (013)	no new threats or activities	
Gormer Canyon #3 (021)	no new threats or activities	
Pine Creek #5 (014)	serious river user sanitary issues	initiate a River Use Study to address visitor use impacts and sanitation issues; increase sanitation education to river users
Pine Creek #3 & #4 (016)	grazed by livestock early; river user sanitary issues but overall minor recreationist impacts	initiate a River Use Study to address visitor use impacts and sanitation issues; increase sanitation education to river users
Lower Conant Valley (017)	no new threats or activities; dry conditions	
Upper Conant Valley (018)	no new threats or activities	
Lower Swan Valley (019)	no new threats or activities	
Falls Campground (004)	human trails through potential habitat adjacent to 1997 exclosures	
Squaw Creek Islands (020)	spotted knapweed present; dry conditions	introduce knapweed biocontrol insects in 2001 if available

ASSESSMENT AND RECOMMENDATIONS

General Assessment of Vigor, Trends, and Status: Assessment of the Idaho Ute ladies tresses populations is similar to previous status reports (Moseley 1998a, 1998b, and 2000). All Idaho populations have existing and potential threats and are considered vulnerable. Flow regime alteration by Palisades Dam represents the most significant long-term threat to species viability in the Snake River meta-population. Impacts from cattle grazing, though much reduced in 1999, still occur from trespass grazing. It is expected (hopefully) that the Rattlesnake Point (002) and Annis Island (006) occurrences will rebound next year from this year's grazing if protected. Additionally, formerly less significant or immediate threats (e.g., noxious weeds and OHV use) increased their magnitude in 2000. One population occurrence does not appear vigorous and is likely not viable in the long-term (Gormer Canyon #5 (012)). Another may not have any positively identified *Spiranthes diluvialis* (Squaw Creek Islands (020)). Fortunately, two occurrences were significantly more robust in numbers of plants this year (Lufkin Bottom (011) and Warm Springs Bottom (003)).

Recommendation to the U.S. Fish and Wildlife Service: No change from 1997-1999 status reports.

Recommendations to the Other Federal Agencies: No major changes from 1997-1999 status reports. However, due to the amount of trespass livestock grazing in 2000, both the USFS and BLM should inform allotment lessees of the importance of strict compliance with their authorized season-of -use and increase allotment compliance inspections. The release of biological control insects for spotted knapweed and leafy spurge should continue as needed and monitoring of their success or failure must occur. Other methods of noxious weed control should be explored and executed appropriately. In addition, OHV access to Annis Island (006) and Mud Creek Bar (009) should be blocked if possible. Agencies should continue their progress on improving management of designated and dispersed camping and associated human trailing and sanitary issues.

Recommendations to the Heritage Network: No change from 1997-1999 status reports.

Recommendations Regarding Present or Anticipated Activities: No change from 1997-1999 status reports.

MONITORING WORK FOR 2001

For the sixth year, habitat and population monitoring oriented toward Ute ladies tresses conservation will continue along the South Fork of the Snake River in 2001, funded by the BLM and Caribou-Targhee National Forest. In 2001, a new and expanded methodology for habitat monitoring will be developed. Due to the natural annual variability of Ute ladies tresses populations, and thus, the potential for mis-timed surveys, relying on plant counts is inadequate for determining long-term population trends. Habitat monitoring may yield more meaningful information. However, there is significant subjectivity in describing habitat conditions and our annual notations do not provide a good reference point from which to measure changes to habitat. For these reasons it was decided that a more systematic and objective method of habitat monitoring was needed.

The goal of the proposed 2001 project is to develop a systematic, easily repeatable method for objectively measuring changes and threats to the habitat of Ute ladies tresses. Methods will provide a reference point for annually measuring environmental change through the establishment of permanent monitoring stations at each population occurrence. A Habitat Integrity Index method will be used involving the measurement of habitat features reflecting changes to habitat quality. These measurements are then incorporated in a relative scale yielding a cumulative value representing habitat integrity. The index will integrate what we have learned about Ute ladies tresses habitat from prior vegetation sampling as well as current flood plain dynamics and vegetation succession modeling.

In combination with this method (to comply with the Biological Assessment), monitoring of Ute ladies tresses population levels will continue. As in prior years, the habitat conditions of all known populations will be described and compared with 1996-2000 data. The 2001 population and habitat data will be entered into the centralized databases at the CDC and an annual report will be produced and distributed after the field season.

In addition, the permanent monitoring transect will be read and photos retaken at Warm Springs Bottom (003). Another permanent monitoring transect with repeatable photo-points will be established and read at the Black Canyon (022) occurrence.

REFERENCES

Merigliano, M.F. 1996. Ecology and management of the South fork Snake River cottonwood forest. Technical Bulletin 96-9. Idaho State Office, Bureau of Land Management, Boise, ID. 79 p., plus plates.

Merigliano, M., University of Montana, e-mail communication. Duplication on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 9 March 2000.

Moseley, R.K. 1998a. Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1997 status report. Unpublished report on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 35 p.

__________. 1998b. Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1998 status report. Unpublished report on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 23 p., plus appendix.

__________. 2000. Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1999 status report. Unpublished report on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 16 p., plus appendices.

Murphy, C.J. and G.S. Stephens. 2000. 2000 Ute ladies tresses occurrences in Idaho. On file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID.

Sheviak, C.J., e-mail communication. Duplication on file at the Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. 31 July 2000.

APPENDIX I

Soil pit information from 19 Ute ladies tresses population occurrences along the South Fork of the Snake River, 1999-2000 data

Soil Pit – The first three soil pits, marked by '* (recent),' were dug on soil substrates which likely originated after the construction of Palisades Dam (Moseley 1998b). Warm Springs Bottom (003) was dug on September 1, 2000. The Annis Island (006 #1 & #2) pits were dug on August 31, 2000. Note that Black Canyon (022) is also denoted as 'recent.' Table includes data from the 1999 status report (Moseley 2000).

Numbered columns 1-6 – These represent the visible strata in the pit, i.e., layers. Each layer has a dominant textural class and depth. Depth is in centimeters, and textural class codes are as follows: o = organic; ns = 1997 new sand deposition; s = sand; ls = loamy sand (darker; some organic matter); c = cobble/pebble/sand mix (mostly cobbles); m = mottles (used as modifier for textural classes); g = gleying (used as modifier for textural classes).

Community Type – Community type containing Ute ladies tresses where pit was dug. Codes are as follows: Eqva - *Equisetum variegatum*; Cala - *Carex lanuginosa*; Elro - *Eleocharis rostellata*; Elco - *Elaeagnus commutata*; Saex/MG - *Salix exigua*/Mesic graminoid.

Plot Number – If applicable, number of plot used to collect plant composition and structure information in 1998 and 1999 (Moseley 1998b; 2000).

Soil Pit	1		2		3		4		5		6		Water Table Depth (cm)	Community Type	Plot #
	test.	depth	test.	depth	test.	depth	test.	depth	test.	depth	test.	depth			
*003 (recent)	Is-m	12	c-g	40+									52	Saex/MG	
*006 #1 (recent)	Is	10	c	13+									23	Saex/MG	
*006 #2 (recent)	Is-m	36		12=									48	Elco?	
007 #1	Is-m	5	o	7	c	47+							40	Eqva	98SD07A
007 #2	ns	3	ls	7	c	71+							64	Elco	
005	ns	4	ls	9	s-m	36	c	72+					?	Eqva	98SD05A
001 #1	ls	10	c	45+									40	Cala	99SD01A
001 #2	ls	27	s	41	c	46+							13	Elro	99SD01B
009	s	19	c	69+									?	Elco	
002 outer	ns	4	ls	30	c	77+							87	Saex/MG	98SD02B
002 inner	s	102	c	110+									110	Elco	98SD02A
010 outer	ls	32	c	67+									?	Elco	
010 inner	s	60	c	85+									?	Elco	
003 #1	ns	4	ls	14	c-m	44+							41	Eqva	98SD03B
003 #2	s	28	c	80+									87	Elco	
003	ns	18	ls	30	c	80+							?	Elco	98SD03C
011	ns	8	ls	14	s	22	c	68+					?	Elco	
013	ls	11	c	61+									69	Saex/MG	
021	ns	6	ls	19	c	38+							36	Elco	
016 #1	s	40	s-m	62	c	67+							67	Eqva	
016 #2	ns	6	ls	52	c	104+							?	Elco	98SD16A
019	o	7	s	17	c	52+							43	Elco	
004	ns	5	ls	19	s	45	c	55	s-m	74	c	75+	81	Elco	
020	ls	15	c	45+									?	Saex/MG	98SD20A
022 (recent)	c-m	25+											25	Eqva?	99SD22A
014	ns	7	ls	20	c	77+							75	Elco	
017	ls	10	c	75+									75	Elco	98SD17A
018	ls	17	s	23	c	63+							60	Elco	