1999 Survey of BLM-Managed Lands

Along the Snake River in Jackson Hole, Wyoming

for

Ute Ladies Tresses (*Spiranthes diluvialis*)

Report Prepared for the BLM Wyoming State Office

by

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ABSTRACT

The Ute ladies tresses (*Spiranthes diluvialis*), an orchid listed as Threatened under the Endangered Species Act, is known to occur along the Snake River in Idaho within approximately 60 river miles of Jackson Hole, Wyoming. During a cursory 1997 survey of the Snake River in Wyoming, Moseley identified potential habitat for the species in Jackson Hole. Also in 1997, Fertig conducted a botanical survey of the National Elk Refuge in Jackson Hole and failed to find *S. diluvialis* even though the Refuge contains habitat that seems suitable for the species. During the period August 29 through September 2, 1999, thirteen BLM-managed tracts along the Snake River in Jackson Hole were surveyed in the present project for *S. diluvialis*, but the plant was not found on any of them, even though the effort in this survey was focused on areas of likely habitat. Fertig's 1997 survey and this survey show that the closely-related *Spiranthes romanzoffiana* is common in Jackson Hole. These two surveys, combined with information about *S. diluvialis* and *S. romanzoffiana* throughout the western U.S., suggest that Jackson Hole is too high in elevation for *S. diluvialis*. Further survey work in the valley is unwarranted, but if contradictory information comes to light, survey work can be directed to particular BLM-managed tracts identified in this report.

ACKNOWLEDGEMENTS

I thank the following individuals for their assistance with this project: Jeff Carroll of BLM's Wyoming State Office advised me on maps; Walter Fertig, botanist at the Wyoming Natural Diversity Database, provided me with a large body of information about *S. diluvialis* and with valuable suggestions; Ron Hartman and Ernie Nelson provided access to the collections in the Rocky Mountain Herbarium; Mary A. MacLean gave me permission to cross private land; John Morgan discussed land ownership, the Snake River, and the history of the valley, and gave me permission to cross his lands; Bob Moseley of the Idaho Conservation Data Center discussed the results of his surveys in Idaho and Wyoming; William Resor provided particularly helpful information on land ownership and the biology of Jackson Hole, and gave me permission to cross his lands; Kellie Roadifer of BLM's Pinedale Field Office compiled and sent the maps of the BLM-managed lands and gave me names of land owners to contact; and the staff of the Teton County Clerk's Office patiently showed me how to use their geographic information system.

BACKGROUND

Spiranthes diluvialis (Ute ladies tresses), a perennial species in the orchid family (Orchidaceae), is listed as Threatened under the U.S. Endangered Species Act. *S. diluvialis* grows in riparian meadows, shrublands, and woodlands, and is known from the Snake River valley in eastern Idaho within approximately 60 river miles of Jackson Hole, Wyoming (Moseley 1997, Idaho Conservation Data Center 1997). As of August 1999, two surveys for *S. diluvialis* had been conducted in the Snake River drainage within Wyoming but the plant had not been found. In late July and early August 1997, Walter Fertig of the Wyoming Natural Diversity Database (WYNDD) conducted a survey of the National Elk Refuge in Jackson Hole (Fertig 1998), during which he found no *S. diluvialis* but did find the similar orchid, *Spiranthes romanzoffiana*. In early October 1997, Bob Moseley of the Idaho Conservation Data Center conducted a cursory survey for *S. diluvialis* along the Snake River from Palisades Reservoir upstream to South Park in Jackson Hole (Moseley 1997), during which he found no *Spiranthes* but did find what appeared to be potential habitat, particularly in South Park. Moseley noted that his survey was conducted too late in the season to find the plant, and he recommended intensive survey earlier in another growing season.

In September of 1998, the Bureau of Land Management's Wyoming State Office and the University of Wyoming entered a cooperative agreement for the University's Wyoming Natural Diversity Database to search for *S. diluvialis* on BLM-managed land along the Snake River in Jackson Hole (Figures 1a & 1b). George Jones of the WYNDD staff conducted the search from August 29 through September 2, 1999.

METHODS

PRIOR TO FIELD WORK

S. diluvialis can be positively identified only in flower, but collection of flowers is illegal because of the plant's Threatened status. To avoid the need for collecting flowers, the author consulted with Walter Fertig, WYNDD botanist, and reviewed selected reports. The species most likely to be confused in the field with *S. diluvialis* are the sympatric orchids *Spiranthes romanzoffiana* and *Habenaria* spp. A table and line drawings highlighting the distinguishing characteristics of the two *Spiranthes* spp. in Moseley (1998) were consulted while specimens of the two species were examined in the Rocky Mountain Herbarium. Copies of the table and drawings were also carried in the field. To reduce the chance of confusing *Spiranthes* with *Habenaria*, specimens of the two genera were compared, and dichotomous keys to the two genera (Dorn 1992, Hitchcock and Cronquist 1973) and a line drawing of a *Habenaria* flower (Hitchcock and Cronquist 1973) were examined.

On August 9, 1999, the author accompanied Walter Fertig to a site in Goshen County, southeastern Wyoming, known to contain a population of *S. diluvialis*. Plants were observed there in bud, in bloom, and past bloom, and the physical site and vegetation in which the *S. diluvialis* grows were studied.

Photocopies of 7.5' topographic maps showing the locations of the BLM-managed tracts to be surveyed were provided by Kellie Roadifer of the BLM's Pinedale Field

Office. Some of the tracts were accessible only by crossing private lands, and names of the land owners were ascertained from records in the Teton County Clerk's office. The author contacted the landowners by telephone, explained the nature of the survey, and asked permission to cross the private land.

FIELD WORK

In each of the tracts visited during the survey, the location of habitat likely to support *S. diluvialis* was ascertained from topographic maps and from reconnaissance of the tract. The judgement of what constituted suitable habitat was based on observations made at the Goshen County site, descriptions in Moseley (1998), and advice from Walter Fertig. Likely habitat was identified by the presence of moist soils; vegetation without a dense shrub layer or dense herbaceous layer taller than approximately 1 foot (either layer >80% canopy cover), in which *Agrostis stolonifera, Juncus* spp., and *Carex* spp. (other than *C. aquatilis* and *C. rostrata*) contributed a substantial amount of the canopy cover; and a location that appeared to be inundated or have a high water table part of the year but not severely scoured. This sort of habitat was found on surfaces up to approximately 2 feet above the river channel, in abandoned or overflow channels cut into higher surfaces, and along the edges of channels. Judged unsuitable were vegetation with dense shrub layers (i.e., shrub canopy with > 80% cover); dense herbaceous vegetation taller than 1 - 1.5 feet (such as smooth brome hay meadows); vegetation in which *Agrostis stolonifera, Juncus* spp., and *Carex* spp. contributed less cover than did other species; vegetation in which *Carex rostrata* dominated the vegetation; sites with standing water; and bare or nearly-bare gravel or cobble bars in the active floodplain that obviously are scoured by high water.

The survey then was focussed on areas of likely habitat. The author walked through this likely habitat at a rate of approximately 5 feet/second, scanning side to side for light-colored buds or blossoms or for wilted flowers. Limited areas of unlikely habitat were searched in a cursory manner during travel through the tract. Plants suspected to be *S. diluvialis* were photographed, and the flowers compared to the line drawings and descriptions.

RESULTS

The results from all of the tracts are summarized here. For more detail, see Appendix 1.

No plants suspected to be *S. diluvialis* were found during the survey. The very similar *S. romanzoffiana* was noted on five of the tracts surveyed (Table 1). In most cases, a comparison of these plants with the line drawings and written descriptions and with notes the author made during examination of *S. diluvialis* at the Goshen County site showed that they possessed the connate sepals and the obvious hood (formed by the sepals and petals) characteristic of *S. romanzoffiana*. The lack of distinct sepals when the inflorescence was viewed from above (i.e., down the axis of the inflorescence) was especially noticeable. At one location on tract SR-10, the plants were past flowering, and the wilted blossoms appeared to have distinct sepals. But *S. romanzoffiana* were noted

Table 1. Tracts on which *Spiranthes romanzoffiana* was noted.
See Appendix 1 for details.

SR-10: one location, plants past flower.
SR-11: one location, plants flowering.
SR-12: one location, plants flowering
SR-16: one location, plants flowering
SR-17: two locations, plants flowering.

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later the same day on tract SR-11 with inflorescences containing both open blossoms and wilted flowers, the latter looking the same as the problematic wilted blossoms at tract SR-10. *Habenaria* sp. was noted on seven tracts (SR-1, SR-7, SR-10, SR-11, SR-14, SR-16, SR-17), nearly always past flower, but even then the spur at the base of the flower was clearly seen through a hand lens.

Of the 18 tracts indicated on the maps provided by the BLM, 12 were surveyed. Significant proportions of each tract appeared to be unsuitable as habitat for *S. diluvialis* (either bare gravel and cobble bars, or dry grassland). On the tracts that include levees, nearly all of the likely habitat lies outside of the levee (that is, the likely habitat is separated by the levee from the active floodplain); the area on the channel side of the levee is mostly barren or sparsely vegetated bar scoured by high water, or within the river channel.

Six of the 18 tracts were not surveyed for the following reasons:
-- tract SR-4: the map suggested that the tract is mostly channel and scoured bars and the owner of the adjacent land was out of town;
-- tract SR-5: the map showed that the tract lies between the levees and is mostly channel and scoured bars, and the tract is very close to tract SR-3;
-- tract SR-6: the map and observations through binoculars from tract SR-7 less than ¼-mile away suggested that this tract is mostly channel and scoured bars, and contact could not be made with the owner of the adjacent land;
-- tract SR-12: records in the County Clerk's office showed (in contrast to the BLM map) that most of the tract in the riparian zone is in private ownership, and the topographic map showed that much of the tract is upland, out of the riparian zone;
-- tract SR-13: the owner of adjacent land explained that the tract is unprotected by a levee, and that the BLM-managed land is now "under water";
-- tract SR-18: observation through binoculars from the highway showed that the tract contains no likely habitat.

DISCUSSION

The BLM-managed tracts surveyed in this project contain habitat that appears to be suitable for *S. diluvialis*, and it is possible that the species is present and this search simply failed to find it. Perennial plants like *S. diluvialis* can remain dormant for extended periods and consequently do not necessarily bloom every year; even intensive survey would fail to find dormant plants. To maximize the chance of finding the species, this search was conducted at a time when *S. diluvialis* is known to bloom in Idaho (Moseley 1998) and was in bloom in eastern Wyoming. Furthermore, the survey in this project was concentrated in habitat that resembles in vegetation and physical parameters the habitat in which the species was observed in eastern Wyoming and that seems to match the descriptions of habitat in which the species is found in Idaho (Moseley 1997, 1998). If *S. diluvialis* is present, then it probably consists of very small numbers of scattered plants. The most likely places for *S. diluvialis* to be found are on tracts SR-7 and SR-17, both of which are large tracts with substantial amounts of likely habitat. Tracts SR-10, SR-11, and SR-16 are smaller but also contain likely habitat.

Despite the presence of likely habitat in Jackson Hole and the occurrence of *S. diluvialis* in Idaho, this survey and Fertig's survey of the National Elk Refuge (Fertig 1998) have failed to reveal the species in the valley. The absence of a species from a particular area is hard to explain because it can result from so many factors, but high elevation and the attendant short, cool growing season immediately come to mind as possible causes for the apparent absence of *S. diluvialis* from Jackson Hole. Although the occurrences of the species in Idaho are only 80 river miles away from, and at virtually the same latitude as, the southern end of Jackson Hole, they are all at least 650 feet lower in elevation: the Snake River at the mouth of Cache Creek at the southern (downstream) end of Jackson Hole is at an elevation of approximately 6,000 feet, and the farthest upstream (and the highest) Idaho occurrence is at an elevation of 5,315 feet (Idaho Conservation Data Center 1997).[1] In Idaho, *S. diluvialis* is known from the sagebrush-steppe zone and near lower treeline; in contrast, Jackson Hole is well within the elevation range of the lower part of the coniferous forest belt. (The valley floor is largely vegetated with sagebrush shrubland because of the substrate, not because of low elevation (Knight 1994); conifer forest occurs on moraines on the valley floor and along parts of the Snake River.)

Both this survey and Fertig's 1997 survey of the National Elk Refuge (Fertig 1998) revealed that *S. romanzoffiana* is common in Jackson Hole. *S. romanzoffiana* is a widespread montane (Arft and Ranker 1998) or boreal (Sheviak 1984) species that occurs at higher elevations than those from which *S. diluvialis* is known (Arft and Ranker 1998, Welsh et al. 1993). In Idaho, *S. romanzoffiana* and *S. diluvialis* appear to be distributed along an elevation gradient: *S. diluvialis* grows at the lowest elevation sites without *S. romanzoffiana*, the two species occur together at intermediate elevations, and the highest sites apparently contain only *S. romanzoffiana* (Moseley, personal communication).

The evidence to date suggests that *S. diluvialis* does not occur in Jackson Hole because the valley is too high, and further survey is unwarranted. If future work suggests

[1] Moseley (personal communication) reports that the orchids at this location (Idaho CDC EO# PMORC2B100.020) may be *S. romanzoffiana*, not *S. diluvialis*; if so, then the highest occurrence of *S. diluvialis* (Idaho CDC EO# PMORC2B100.019) is at an elevation of 5,270 feet.

that survey is needed in Jackson Hole, then it should focus on areas of likely habitat in tracts SR-7, SR-10, SR-11, SR-16, and SR-17.

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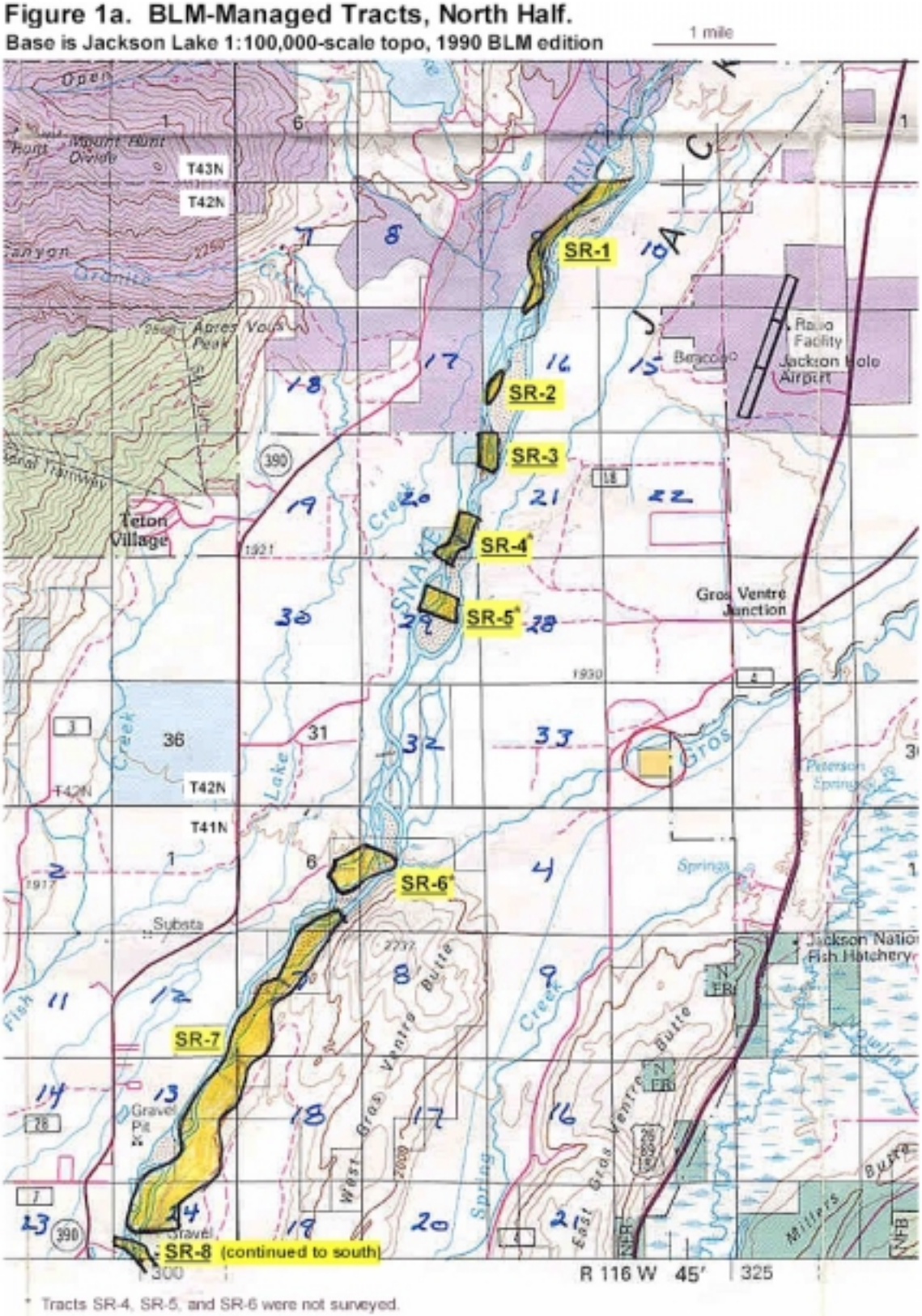
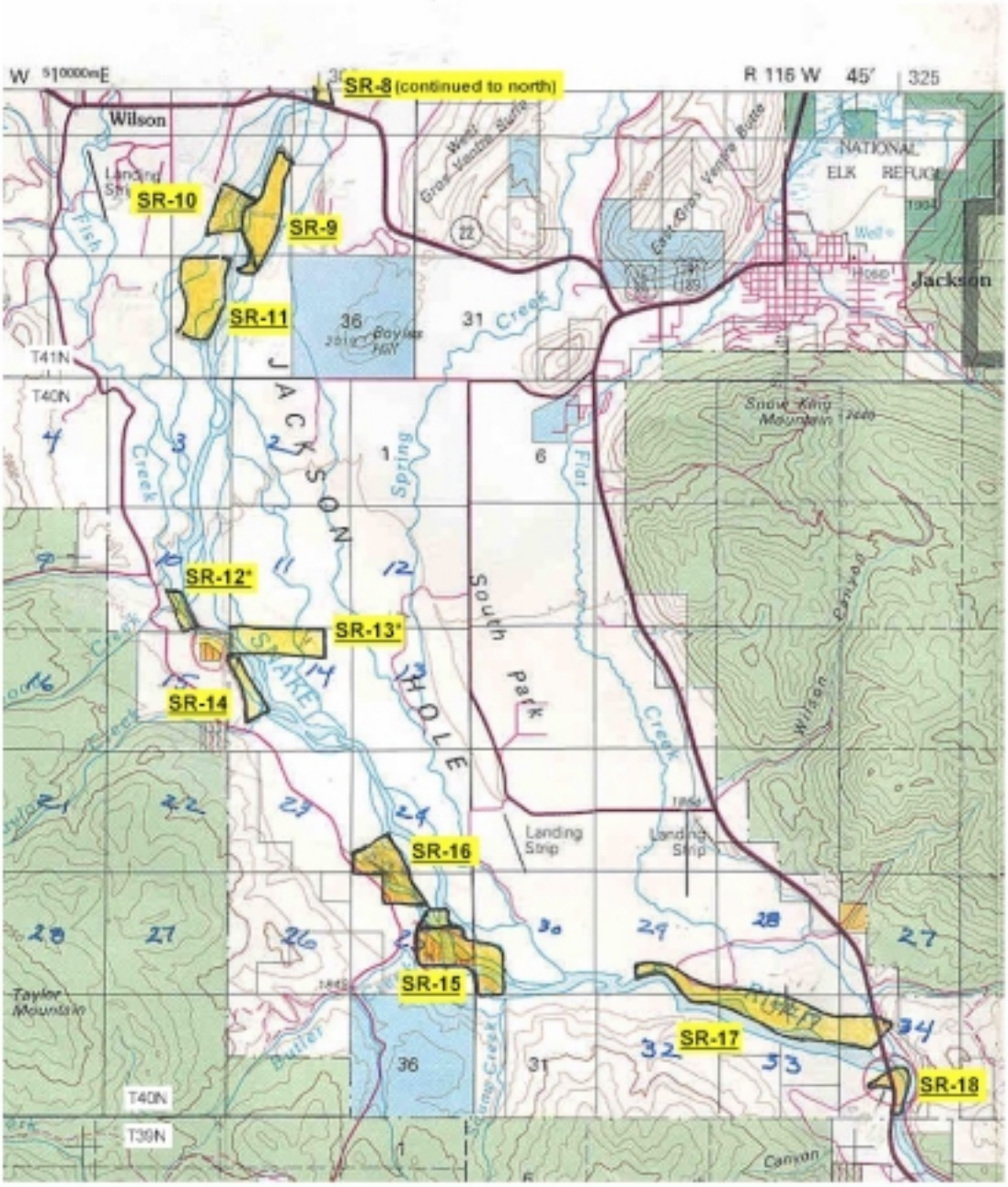
[2] This report has been published in: Moseley, Robert. 1998. Ute ladies tresses (*Spiranthes diluvialis*) in Idaho: 1997 and 1998 status reports. Technical Bulletin No. 98-16, Idaho Bureau of Land Management, Boise ID. December 1998.

Figure 1a. BLM-Managed Tracts, North Half.
Base is Jackson Lake 1:100,000-scale topo, 1990 BLM edition



* Tracts SR-4, SR-5, and SR-6 were not surveyed.

Figure 1b. BLM-Managed Tracts, South Half.
Base is Jackson 1:100,000-scale topo, 1988 BLM edition



*Neither tracts SR-12 nor SR-13 were surveyed.

APPENDIX 1: NOTES ON THE EIGHTEEN BLM-MANAGED TRACTS.

Maps of the tracts follow the text.

Tract SR-1

Surveyed August 29, 1999.

Area a. West of levee. A patchy shrub layer of *Crataegus*, *Cornus sericea*, *Salix* spp. was present, as were scattered *Pinus contorta*. The ground was dry. The herbaceous layer in the old channel was mainly *Agrostis stolonifera*; on the higher surface (much of the area), the common species were *Poa pratensis*, *Phleum pratense*, *Bromus* sp., *Fragaria virginiana*.

Area b. Old meander west of levee. Area searched includes: area of sparse (ca. 40% cover) *Agrostis stolonifera* and *Trifolium hybridum* and *T. pratense* on cobbles immediately next to standing water; area of dense (ca. 80% cover) *Phalaris arundinacea* on fines; area of dense (80-100% cover) *Agrostis stolonifera*, *Trifolium hybridum* and *T. pratense*, *Mimulus* sp. on fines; area of dense (80-100% cover) *Agrostis stolonifera* and *Carex rostrata* on fines. Each area covered several hundred square yards.

Area c. Mainly between channel and buck-and-pole fence, with some area west of the fence. Small area of old channel or overflow channel, dry at time of survey, with *Agrostis stolonifera* and *Carex rostrata*. Most of the area is a terrace approximately 5 feet above the channel (i.e., present water level): *Populus angustifolia* (ca. 40% canopy cover, patchy), *Crataegus* sp. (30-40% canopy cover); herbaceous undergrowth of *Agrostis stolonifera*, *Poa pratensis*, *Phleum pratense*, *Bromus* sp., *Trifolium* sp., *Medicago lupulina*, *Solidago gigantea* var. *serotina*, *Stipa* sp., *Elymus glaucus* var. *glaucus*. Soil was dry; Geomyidae burrows were common.

Area d. Cobble bars in active floodplain. Vegetation consisted of scattered patches of herbaceous growth, each < 50 square feet in area; the bars were essentially unvegetated.

Area e. The search was restricted to the area between the levees. To the east of the eastern levee were cobble bars and sand bars in the active floodplain, with scattered patches of dry vegetation. In the area searched, the vegetation consisted of scattered groves of *Populus angustifolia* on north-south trending bars, often with *Alnus* sp. growing on the edges of the bars; canopy cover was roughly 40% total. The herbaceous layer in the whole area was dominated or co-dominated by *Agrostis stolonifera*. On the bars, the common species were *Agrostis stolonifera*, *Poa pratensis*, and *Solidago gigantea* var. *serotina*, and the vegetation was dry. In old channels between and approximately 3 feet lower than the bars, the common species were *Agrostis stolonifera*, *Trifolium* sp., *Medicago lupulina*, *Myosotis scorpioides*; the plants were still green and most of the search was concentrated in these old channels. Surface soil in these channels was sand or finer and the canopy cover was 80-100%; in contrast, the large old channel along the western levee was cobble with sparse *Agrostis stolonifera*. Found four plants of *Habenaria* sp., 3 in fruit and 1 still blooming; spur was obvious on all.

Tract SR-2
Surveyed August 29, 1999.

Mostly sandy bars and groves of *Populus angustifolia* saplings with a *Poa pratensis* undergrowth (now dry). Search focussed on 3 old channels with fine sediments and green herbaceous vegetation of *Agrostis stolonifera, Trifolium* sp., *Myosotis scorpioides*; or with *Agrostis stolonifera, Eleocharis* sp., and *Carex rostrata*.

Tract SR-3
Surveyed August 29, 1999.

Mostly *Populus angustifolia*/*Poa pratensis* woodland, with *Bromus inermis* var. *inermis*. Search focussed on channel covering several hundred square yards, of *Agrostis stolonifera, Bromus inermis* var. *inermis, Carex* sp. New sediment, from last spring's high water, was present on soil surface.

Tract SR-4
Unsurveyed. According to the 7.5-minute topographic map, this tract was nearly all channel and sparsely vegetated bar. Surveys in tracts SR-1, SR-2, and SR-3 suggested that this sort of area contains virtually no likely habitat for *Spiranthes diluvialis*.

Tract SR-5
Unsurveyed. According to the 7.5-minute topographic map, this tract was channel and sparsely vegetated bars, both of which are unlikely to contain suitable habitat.

Tract SR-6
Unsurveyed. According to the 7.5-minute topographic map and to observations made through binoculars from the northern end of tract SR-7 < ¼ mile away , this tract was channel and sparsely vegetated bars, both of which are unlikely to contain suitable habitat.

Tract SR-7
Surveyed August 31, 1999.

Areas labeled "a" on map had lots of standing and running water and appeared to be old quarries. Thickets of *Salix* spp. and woodland of *Populus angustifolia* covered much of the area; openings had herbaceous vegetation of *Phalaris arundinacea* and *Bromus inermis* var. *inermis*.

Areas labeled "b" on map were patchy *Populus angustifolia* woodland. On old bars, the vegetation was mainly *Populus angustifolia* overstory with an undergrowth of *Poa pratensis* or *Agrostis stolonifera*. Old channels were present, without water, in which the vegetation was *Agrostis stolonifera, Juncus* spp., *Myosotis scorpioides*, and *Glyceria* sp.. *Elaeagnus commutatus* fringes, with *Cornus sericea* and *Alnus* sp., grew along the edges of the old channels, mainly along the top of the slope leading to the terrace. Found *S. romanzoffiana* on the side of one channel, in vegetation of *Agrostis stolonifera* and *Equisetum* sp. (*E. laevigatum* or *E. variegatum*); 3 plants in flower. If *Spiranthes diluvialis* is present in this tract, it most likely will be found in these areas.

Areas labeled "c" on map were mostly channels and bars in the active floodplain. The substrate was sandy or cobbly alluvium, and the vegetation consisted of patches of

Populus angustifolia sprouts, *Agrostis stolonifera*, *Melilotus* sp., and *Poa pratensis*. Thickets of *Salix* spp., *Populus angustifolia* saplings, and *Elaeagnus commutatus* were present; the vegetation was dense. A bit of suitable *Spiranthes diluvialis* habitat (mesic herbaceous vegetation of *Agrostis stolonifera* and *Juncus* spp.) occurred along the edges of a few channels.

Tract SR-8

Surveyed August 31, 1999.

This tract contained virtually no likely habitat: it was either active floodplain with channels and sparsely vegetated bars, or dense thickets of *Salix* spp., *Elaeagnus commutatus*, and *Populus angustifolia*.

Tract SR-9

Surveyed September 2, 1999

The river had changed course markedly and eroded much of this tract since the map was published; the tract was mainly channels with isolated islands. The area searched was on the river side of the levee and contained little suitable habitat; it was mostly channel and bars, or old, high surfaces with dry *Populus angustifolia* woodland (undergrowth of *Poa pratensis, Agrostis stolonifera*, and *Glycyrrhiza lepidota*) or thickets of *Salix* spp. and *Populus angustifolia* seedlings and saplings. One *Spiranthes romanzoffiana* was noted along the edge of a channel, on the slope to the terrace above, in vegetation of *Agrostis stolonifera* and *Equisetum laevigatum* with *Salix* sp. seedlings. Such channel edges probably provide the most likely habitat for *Spiranthes diluvialis*, and they are very limited in extent.

Tract SR-10

Surveyed September 1, 1999

West of the levee (most of the tract), the substrate was sandy bars vegetated with a sparse *Populus angustifolia* woodland containing a sparse shrub layer of *Populus angustifolia* sprouts and *Elaeagnus commutatus*, and a sparse undergrowth of *Poa pratensis*. Areas with a denser undergrowth of *Poa pratensis* and *Melilotus* spp., or of *Bromus inermis* var. *inermis, Agrostis stolonifera*, and *Glycyrrhiza lepidota* also were present. Old channels ran through the woodland and were vegetated with *Agrostis stolonifera, Juncus* spp., *Carex lanuginosa*, and *Equisetum variegatum*; these appeared to be likely habitat for *Spiranthes diluvialis*. *Spiranthes romanzoffiana* was noted at one location: several plants had inflorescences of wilted flowers with sepals that appeared distinct, but other plants had inflorescences with blooms clearly of *S. romanzoffiana* and with wilted flowers that appeared to have distinct sepals.

The part of the tract east of the levee appeared to contain virtually no likely *S. diluvialis* habitat. This area was mostly thickets of *Populus angustifolia* saplings, *Populus angustifolia* sprouts, *Salix* spp., and *Elaeagnus commutatus*. Some *Populus angustifolia*/*Agrostis stolonifera* woodland was present.

Spiranthes romanzoffiana was noted at one location: several plants had inflorescences of wilted flowers with sepals that appeared distinct, but other plants had inflorescences with blooms clearly of *S. romanzoffiana* and with wilted flowers that appeared to have distinct sepals.

Tract SR-11

Surveyed September 1, 1999

Tract was mostly patchy *Populus angustifolia* woodland composed of scattered groves of trees growing on old bars. The undergrowth consisted mostly of *Poa pratensis*, *Phleum pratense*, and *Agrostis stolonifera*; patches of *Shepherdia canadensis* shrubs were present. Old channels were present: the driest supported *Poa pratensis - Agrostis stolonifera* vegetation; slightly wetter ones, *Agrostis stolonifera*, *Juncus* spp., *Equisetum laevigatum*, and *Carex* sp.; and the wettest; *Juncus balticus* and *Carex rostrata*. Suitable habitat in the channels of intermediate wetness appeared to exist throughout the woodland.

Spiranthes romanzoffiana was noted at three locations:

-- 3 plants in channel approximately 3 feet deep, with *Agrostis stolonifera*, *Equisetum* sp. (*E. variegatum* or *E. laevigatum*), *Myosotis scorpioides*, *Elaeagnus commutatus*, and *Habenaria* sp. The inflorescences on all three plants had buds on the distal ends, blooms in the middle, and wilted flowers at the proximal end; the wilted flowers appeared to have distinct sepals and were identical to the questionable flowers at location 12 in tract SR-10.

-- roughly 20 plants in wet soil approximately 1.5 feet above and 20 feet from a pool in an old channel, with vegetation of *Equisetum laevigatum* and *Agrostis stolonifera*. Most plants had inflorescences with distal flowers blooming and the proximal flowers past bloom; the latter looked like the problematic flowers at location 12 in tract SR-10.

-- Less than 10 plants on a surface approximately 1.5 feet above an old channel. Vegetation was *Agrostis stolonifera* and *Mentha arvensis*. *Habenaria* sp. was present. *Spiranthes romanzoffiana* had a few blooms at the distal ends of the inflorescences, or were past bloom.

East of the levee, the area was active floodplain with channels and bare bars. The vegetation consisted of patches of *Populus angustifolia* seedlings and saplings and thickets of *Salix* spp.

Tract SR-12

Unsurveyed. The records in the County Clerk's office showed (in contrast to the map provided by the BLM) that most of the tract in the riparian zone is in private ownership, and the topographic map showed that much of the tract is upland, out of the riparian zone.

Tract SR-13

Unsurveyed. The owner of the adjacent land explained that the tract is unprotected by a levee, and that the BLM-managed land is now "under water".

Tract SR-14
Surveyed September 1, 1999.

The tract contained little likely habitat. Most of the vegetation was thickets of *Salix* spp., *Alnus* sp., and *Elaeagnus commutatus*, or dense stands of *Phalaris arundinacea* and *Cirsium arvense*. Much of the tract was water-filled channel with mud banks or *Carex* spp. vegetation. Three areas of *Agrostis stolonifera - Juncus balticus - Poa pratensis* vegetation were examined; *Habenaria* sp. was found, but no *Spiranthes*.

Tract SR-15
Surveyed September 2, 1999

Most of this tract had been eroded away by the river, and only the western part of NW1/4 SW1/4 Section 25 remained. The tract contained little suitable habitat: most of it was a thicket of *Salix* spp., *Elaeagnus commutatus*, and *Populus angustifolia* saplings; or dense, tall herbaceous vegetation of *Phalaris arundinacea*, *Cirsium arvense*, and *Bromus inermis* var. *inermis*. Some *Agrostis stolonifera - Cirsium arvense* patches were present, but they were very dense and tall (ca. 2.5 feet). Beaver had flooded much of the area.

Tract SR-16
Surveyed September 2, 1999

The river had eroded about half of this tract, leaving the SW1/4 SW1/4 Section 24 and part of the NE1/4 NW1/4 Section 25. The vegetation was mainly *Populus angustifolia* woodland with an undergrowth of *Agrostis stolonifera*, *Poa pratensis*, and *Phleum pratense*. Old channels ran through the woodland: mesic vegetation of *Agrostis stolonifera, Equisetum variegatum*, and *Juncus* spp. grew in the shallower ones and on the side slopes of the deeper ones, and *Carex rostrata* (and, often, standing water) occurred in the bottoms of the deeper ones. *Spiranthes romanzoffiana* was common (over 100 plants) in this mesic vegetation in the northern part of the tract, labeled "a" on the map. For the most part, the inflorescences on these plants had flowers on the distal ends in full bloom and the lower flowers past bloom.

Tract SR-17
Surveyed August 30, 1999

From Flat Creek bridge, I walked west and south to the river, then west to the western end of the tract, checking *Agrostis stolonifera* areas north of the levee. Then I walked southeast between the northwest-southeast levee and the creek, checking *Agrostis stolonifera* areas to the east of that levee (i.e., between that levee and the creek). *Habenaria* sp. was present; spurs were obvious. I walked southeast (downstream) through the active floodplain.

Much of this tract was *Populus angustifolia* woodland with a herbaceous understory of *Bromus inermis* var. *inermis*, *Melilotus* spp., *Phleum pratense*, and *Glycyrrhiza lepidota*. The herbaceous vegetation grew to approximately 3 feet tall and had 80-100% canopy cover. Areas of *Poa pratensis*, *Phalaris arundinacea*, and *Agrostis stolonifera* were present. The most likely habitat for *Spiranthes diluvialis* appeared to be *Agrostis stolonifera - Juncus* spp. vegetation in old channels and in low spots on terraces. The channels were as much as 5 feet deep and up to 26 feet wide, and appeared to offer

suitable habitat. If deep enough, these channels and low spots had standing water and supported *Carex rostrata* and appeared too wet for *S. diluvialis*.

If *Spiranthes diluvialis* is present, it most likely is growing in area "a" on the map, which was *Populus angustifolia* woodland with old channels as described here. *Spiranthes romanzoffiana* was noted at two locations in this area:

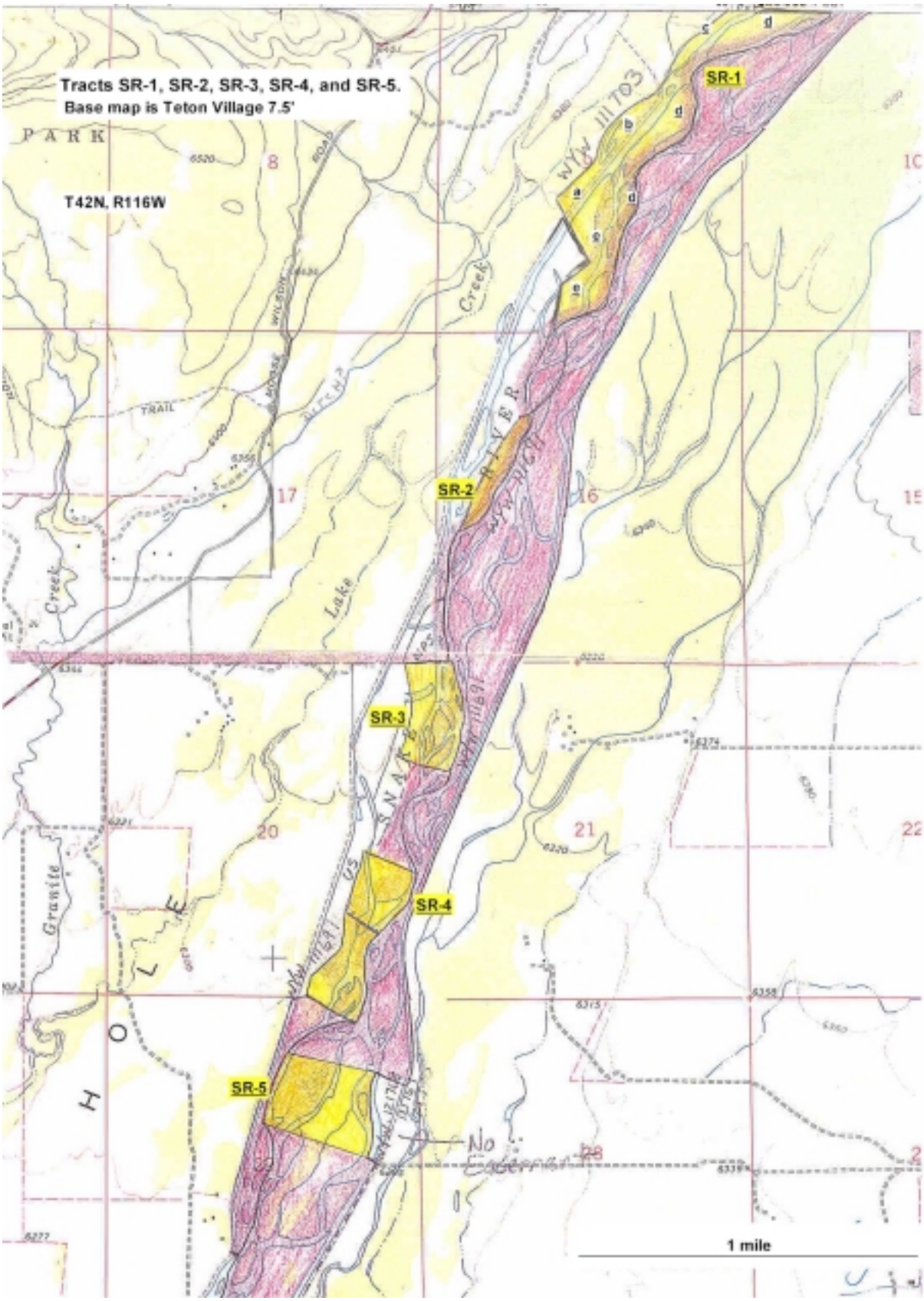
-- Location 10. 6 plants of *Spiranthes romanzoffiana* were noted; the sepals appeared to be free part of their length. The location was on a surface approximately 3 feet above a water-filled channel north of the levee. Vegetation was *Equisetum laevigatum, Agrostis stolonifera*, *Poa pratensis*, *Melilotus* sp., *Trifolium* sp., *Medicago lupulina, Solidago gigantea* var. *serotina*; canopy cover exceeded 75% and the canopy was 1.5 feet tall; litter cover was 100%. This was an opening in the *Populus angustifolia* woodland with an undergrowth of *Bromus inermis* var. *inermis* and *Solidago gigantea* var. *serotina*.

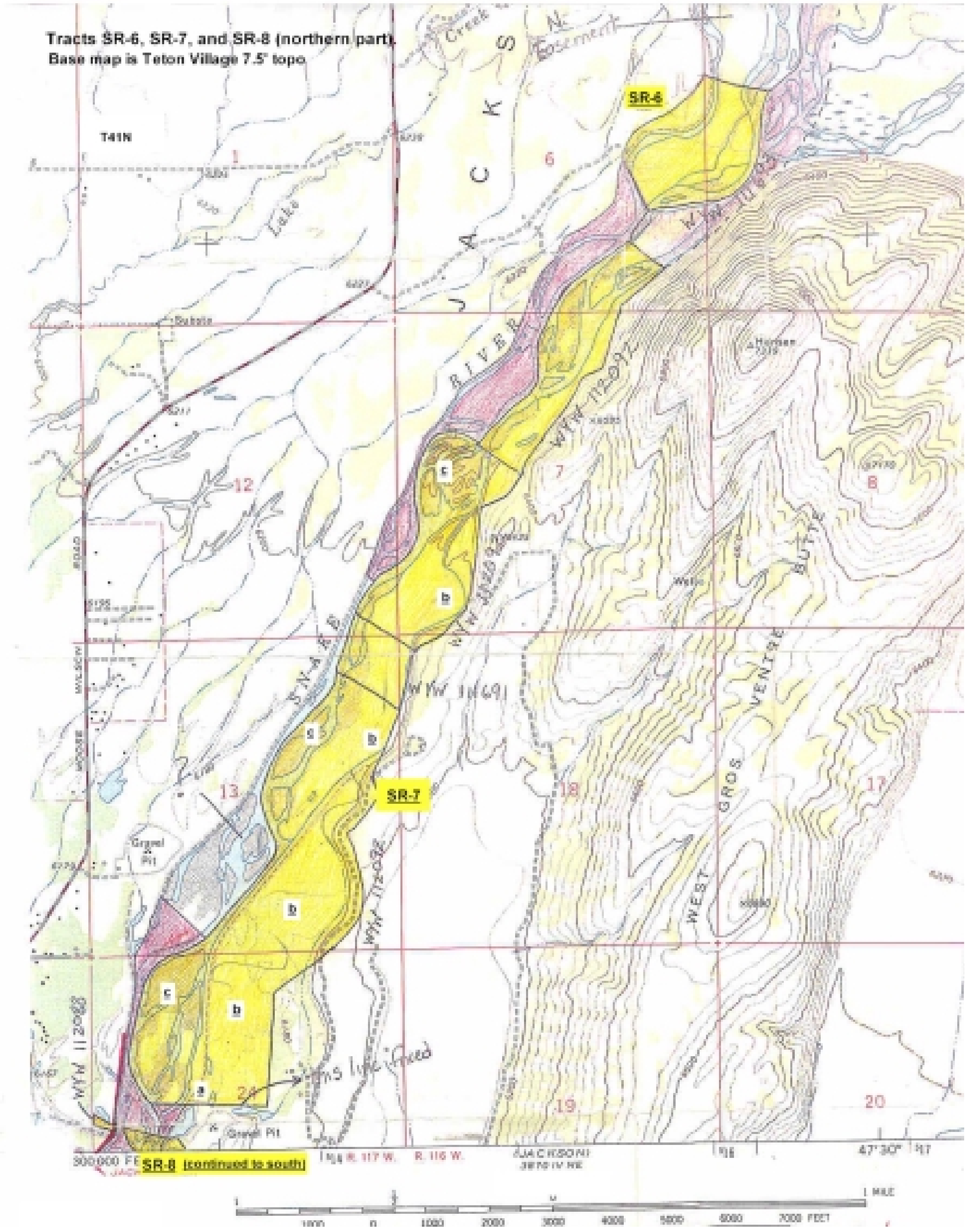
-- Location 11. Eleven flowering plants of *Spiranthes romanzoffiana* were noted. The location was the edge of an old channel, at the foot of the slope leading up to the terrace approximately 20 feet from and 1.5 feet above a channel with water. Vegetation was *Equisetum laevigatum, Agrostis stolonifera, Trifolium* sp., *Melilotus albus, Maianthemum stellatum*; *Elaeagnus commutatus* and *Salix* sprouts were present but rare. Canopy cover was roughly 60% and the canopy was approximately 1 foot tall. *Elaeagnus commutatus* grew in a fringe on the edge of the terrace above. This was an opening in the *Populus angustifolia* woodland.

Tract SR-18

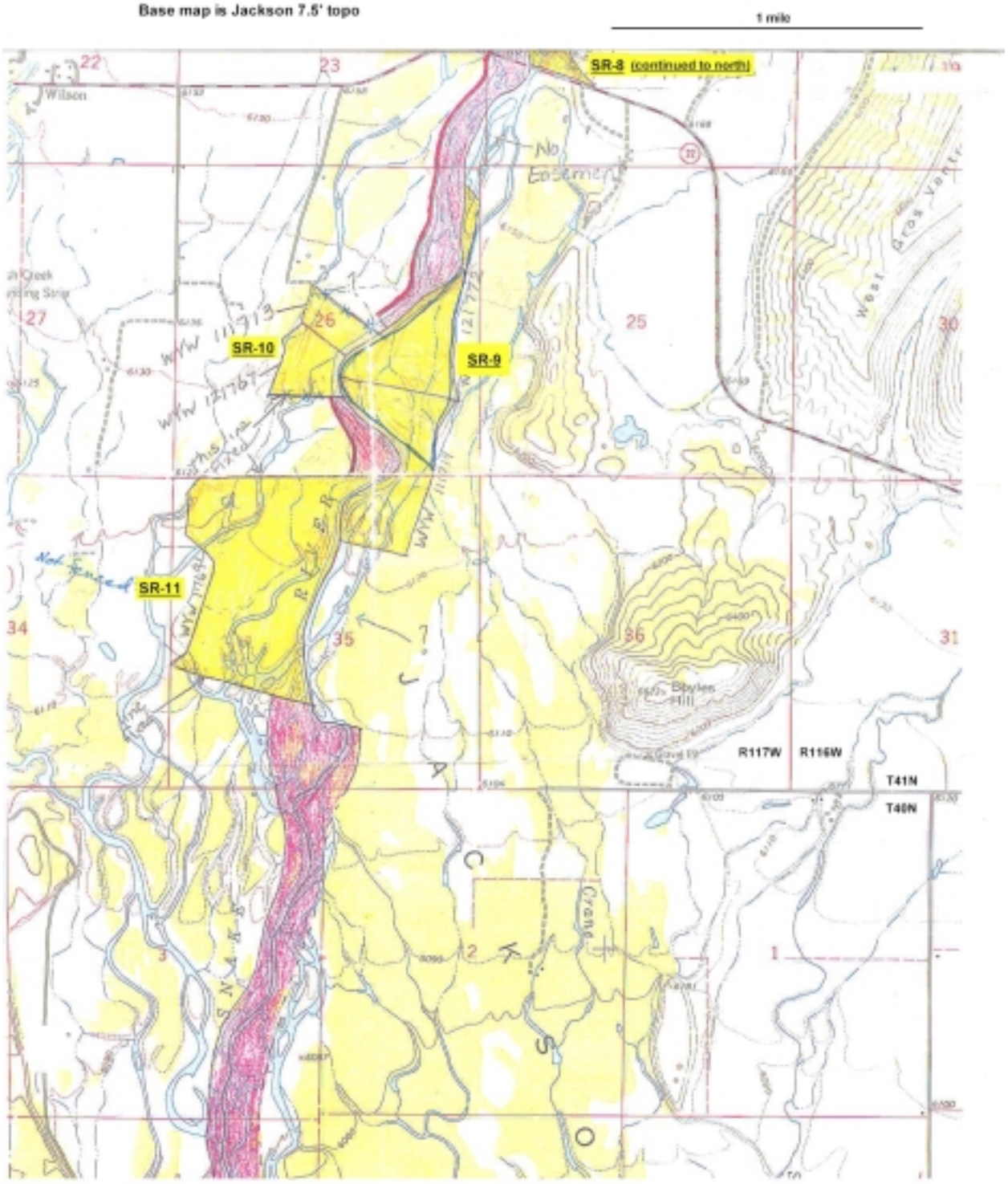
Unsurveyed

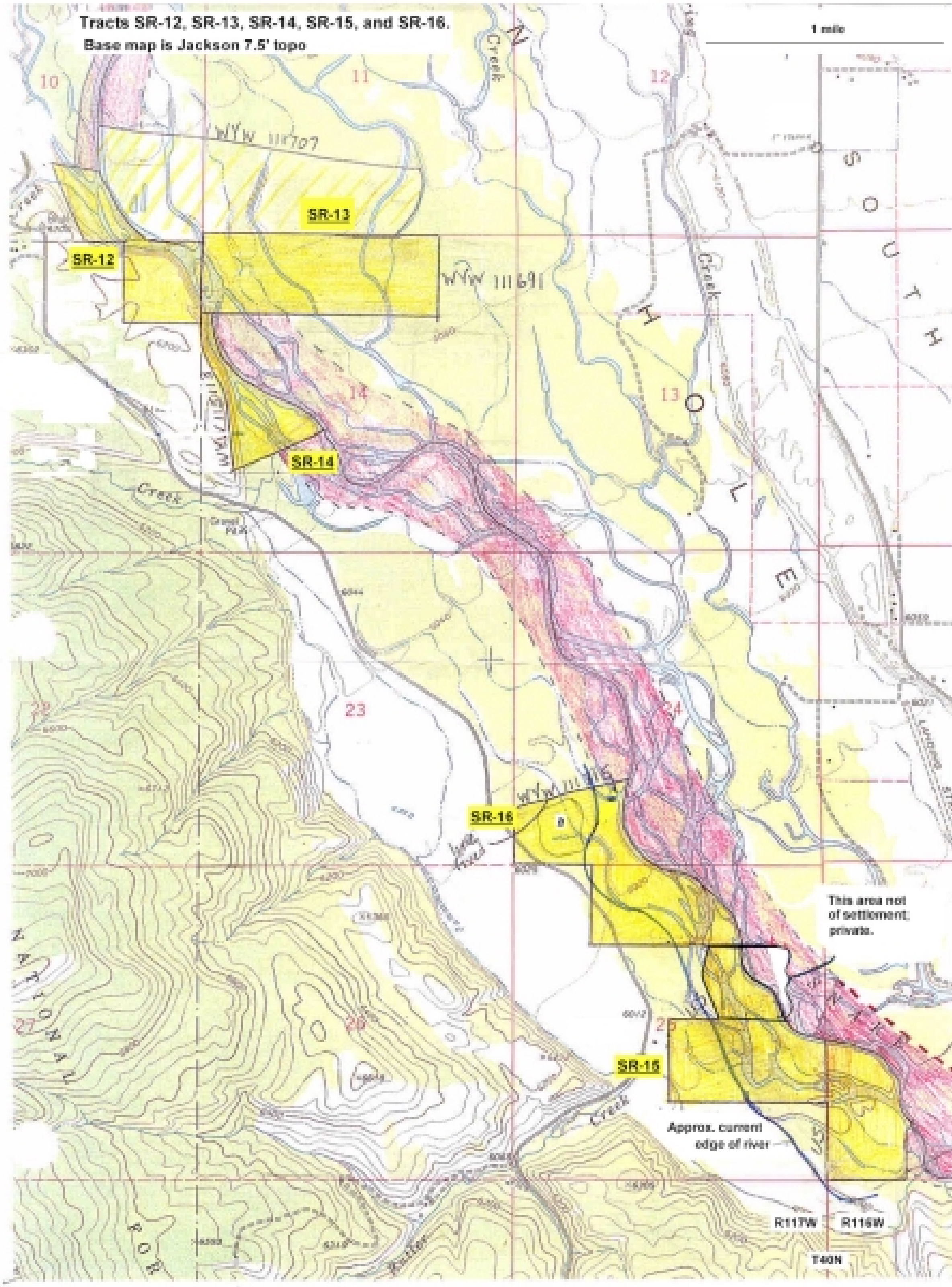
The tract was viewed through binoculars from the shoulder of the highway at the south end of the bridge on the northern boundary of the tract. Likely habitat was absent; the tract was either active floodplain with channels and cobble bars, or dry *Bromus inermis* var. *inermis* meadow.


Tracts SR-1, SR-2, SR-3, SR-4, and SR-5.
Base map is Teton Village 7.5'
T42N, R116W
SR-1
SR-2
SR-3
SR-4
SR-5
1 mile


Tracts SR-6, SR-7, and SR-8 (northern part).
Base map is Teton Village 7.5' topo
SR-6
SR-7
SR-8 (continued to south)
T41N
SNAKE RIVER
WEST GROS VENTRE BUTTE
Gravel Pit
R. 117 W.
R. 116 W.
WYW 112082
WYW 112092
WYW 111691
this line fixed

Tracts SR-8 (southern part), SR-9, SR-10, and SR-11.
Base map is Jackson 7.5' topo




Tracts SR-12, SR-13, SR-14, SR-15, and SR-16.
Base map is Jackson 7.5' topo
1 mile
SR-12
SR-13
SR-14
SR-15
SR-16
This area not of settlement; private.
Approx. current edge of river
R117W
R116W
T40N

Tracts SR-17 and SR-18.
Base maps are Jackson and Cache Cr. 7.5' topo

1 mile