

**ESTABLISHMENT OF VEGETATION MONITORING AT
THE NATURE CONSERVANCY'S FLAT RANCH PRESERVE,
FREMONT COUNTY, IDAHO**

by

Michael Mancuso
Conservation Data Center

December 1995



Idaho Department of Fish and Game
600 South Walnut, P.O. Box 25
Boise, ID 83707
Jerry M. Conley, Director

Abstract

Vegetation monitoring of graminoid-dominated meadow habitats was established at The Nature Conservancy's Flat Ranch Preserve in August 1995, and consists of 13 permanent plots. Establishment of this monitoring program was a cooperative effort between The Nature Conservancy and the Idaho Department of Fish and Game's Conservation Data Center. Together with greenline and stream monitoring already in place, this vegetation monitoring program is intended to help The Nature Conservancy assess whether or not vegetation management goals are being met, primarily as related to the management plan guiding cattle grazing operations within the Preserve. Sampling was stratified into four groups. Three groups, Tufted hairgrass type, Pasture grass type, and Mixed pasture grass/tufted hairgrass type, are located in areas open to livestock grazing. A fourth group of plots with vegetation similar to the Pasture grass type was established inside the livestock enclosure paralleling the Henrys Fork channel. The vegetation monitoring program is designed to collect trend data. The 1995 sampling represents the baseline vegetation data against which subsequent sampling results will be compared. Twelve plots were intensively sampled using the nested plot frequency technique. In addition, a complete vascular plant species list, location, topographic, ground cover, disturbance, and other general information was collected for each plot using protocol developed by the Western Heritage Task Force. One other plot was established in a willow carr community near the southern edge of the Preserve. Its less intensive sampling protocol does not include the collection of nested plot frequency data.

Table of Contents

Abstract i
Table of Contents ii
List of Tables ii
List of Figures ii
List of Appendices ii
Introduction 1
Objectives 1
Overview of Methods 1
Methods 5
Sampling Notes 8
Plot Information 9
Floristics 23
Recommendations 23
References 26
Acknowledgements 26

List of Figures

Figure 1. Location map for the Flat Ranch Preserve 2
Figure 2. Location of monitoring plots 95FR001 - 95FR013 on the Flat Ranch Preserve 3
Figure 3. Map of the livestock grazing pastures on the Flat Ranch Preserve 4

List of Tables

Table 1. Additions to the flora of Flat Ranch Preserve 23

List of Appendices

Appendix 1. Copies of 1995 data sheets.
Appendix 2. Data file summary for nested frequency plot data.
Appendix 3. GPS coordinates for plots 95FR001 - 95FR013.
Appendix 4. WHTF Form II - Community Survey Form.
Appendix 5. Illustration of nested plot frame.
Appendix 6. Nested Plot Frequency Data Sheet.
Appendix 7. WHTF Form III - Ocular Plant Species Data.

Introduction

Vegetation monitoring in graminoid-dominated meadow habitats was established at The Nature Conservancy's Flat Ranch Preserve (Preserve) in August 1995, and consists of 13 permanent plots. Establishment of this monitoring program was a cooperative effort between The Nature Conservancy (TNC) and the Idaho Department of Fish and Game's Conservation Data Center (CDC). Sampling was stratified into four groups. Three groups, Tufted hairgrass type, Pasture grass type, and Mixed pasture grass/tufted hairgrass type are located in areas open to livestock grazing. A fourth group of plots similar to the Pasture grass type was established inside the livestock enclosure paralleling the Henrys Fork channel. Each group is represented by three plot sites. These 12 plots were intensively sampled using the nested plot frequency technique. One additional plot was established in a willow carr community near the southern edge of the Preserve. It has a less intensive sampling protocol than the other plots.

The 1,659-acre Flat Ranch Preserve is located in the Island Park area, approximately four miles southeast of Henrys Lake, in Fremont County, Idaho (Figure 1 and Figure 2). The Preserve lies within the Henrys Lake Flat, an extensive wet meadow complex on alluvial sediments with springs, seeps and creeks contributing to the flow of the Henrys Fork. Approximately 3.5 miles of the Henrys Fork flows through the Preserve. Channel straightening and irrigation diversions have affected segments of the Henrys Fork and several tributary creeks in the area. TNC has divided the Preserve into 17 pastures (Figure 3). Pastures 13, 14 and 16 are enclosures protecting the Henrys Fork riparian corridor.

The Preserve is characterized by flat to very gently undulating swale topography. Elevations range from 6,460 to 6,410 feet. A mosaic of wet and seasonally wet graminoid-dominated meadows cover most of the Preserve. Much of this meadow system is flood irrigated during the growing season via an extensive ditch system. Large portions of the Preserve were converted to hay meadows in the past, and livestock grazing continues to be the main land use. As a result, introduced pasture grasses dominate the vegetation in many places. Upland communities characterized by mountain big sagebrush and bunchgrass vegetation are limited within the Preserve. Willow carrs occur along streambanks and are best developed in the southern portion of the Preserve. A brief and preliminary description of the vegetation within the Preserve is contained in a report by Elzinga (1993).

Objectives

The objective of the vegetation monitoring plan is to enable TNC to assess changes to the vegetation at the Flat Ranch Preserve, which is being managed as a working cattle operation. Based on species composition and relative abundance criteria, TNC wants to specifically ensure their management (1) does not adversely affect the quality of remnant native plant communities, and (2) improves the ecological condition of the extensive grazing-modified meadow habitats. These objectives are complementary to the greenline vegetation monitoring and stream monitoring already established at stations along the Henrys Fork channel in the Preserve.

Overview of Methods

The 1995 sampling represents the baseline vegetation data against which subsequent sampling results will be compared. Vegetation monitoring established at the Flat Ranch Preserve is designed to collect trend data. Trend data quantifies direction of change, if any, away from or towards specific

Figure 1

Figure 2

Figure 3

management objectives. Vegetation monitoring at the Preserve uses the nested plot frequency technique to measure frequency along permanently marked line transects at 12 sites (macroplots). Frequency is the indicator of trend with this method, and refers to the presence of a plant species or other measured attribute in a particular sample area. By comparing the frequency of plants in the same location at two different periods of time, it is possible to calculate whether a change has occurred. These changes are used to evaluate trend and changes in vegetation condition (Bureau of Land Management 1985).

A complete vascular plant species list, as well as, location, topographic, ground cover, disturbance, and other general information were collected for each macroplot using methods/field forms developed by the Western Heritage Task Force (Bourgeron *et al.* 1992). This method has widespread use by Natural Heritage Programs and Conservation Data Centers in the western United States, and is closely related to the U.S. Forest Service's ECODATA methodology. Copies of the original data sheets (Form II, Form III, Nested Plot Frequency Data Sheet) for each plot are contained in Appendix 1. The originals are archived at the CDC. Frequency data has been summarized in a spreadsheet format and is included in Appendix 2. Photographs were also taken along each transect.

Methods

Sample Site Selection

Sample sites were selected on a modified random stratified basis. A vegetation map for the Flat Ranch Preserve was produced by Mabel Jankovsky-Jones (1995), wetland ecologist with the CDC, in June, 1995. A copy of the vegetation map is on file at the CDC office in Boise and TNC 's office in Ketchum. This map recognizes 13 plant community types on the Preserve and was used to stratify the vegetation for sample site selection. Due to time and funding limitations, it was not possible to establish monitoring plots in each plant community type. Furthermore, this was not deemed necessary in light of monitoring objectives. To prioritize which plant communities to sample, several criteria were evaluated: (1) native wetland communities of conservation concern, (2) communities most sensitive to livestock grazing management changes, and (3) communities with a large aerial extent. When logistical limitations were superimposed over data analysis and statistical considerations, we decided it would be better to sample fewer community types at a minimum of three sites, rather than more types being sampled only once or twice.

Based on this set of criteria, four of the 13 plant community types were tentatively selected for intensive sampling - Mesic graminoid, *Deschampsia cespitosa*, *Juncus balticus*, and Dry meadows. Based on subsequent field reconnaissance, I revised this tentative list and the four final choices for intensive sampling included:

1) *Deschampsia cespitosa*- (tufted hairgrass) dominated communities where the associated vegetation is comprised mainly of native species. Historically (prior to beaver removal, channel straightening, *etc.*), tufted hairgrass communities were probably common throughout the meadows in the Preserve area. This type includes plots 95FR003, 95FR004 and 95FR009. These sites were mapped as the *Deschampsia cespitosa* community type on the vegetation map.

2) Sites dominated by pasture grasses, but also supporting some (but more than rare) tufted hairgrass. Weedy forbs are often common in these communities as well. This includes plots 95FR001, 95FR005 and 95FR006. These sites were delineated as either Mesic graminoid or *Deschampsia cespitosa* on the

vegetation map.

3) Vegetation dominated by pasture grasses. *Phleum pratense* (timothy) and to a lesser extent *Poa pratensis* (Kentucky bluegrass) are the usual dominant grasses. Weedy forb coverage also tends to be high. Tufted hairgrass has been extirpated or is rare in these communities. This vegetation type was sampled at plots 95FR002, 95FR007 and 95FR008. These sites were delineated as the Mesic graminoid plant community on the vegetation map. For purposes of comparison in this report, these three types have been differentiated as the Tufted hairgrass type, Mixed pasture grass/tufted hairgrass type, and Pasture grass type, respectively.

4) Sites supporting vegetation similar to #3, but located within the fenced livestock grazing exclosures paralleling the main channel of the Henrys Fork. These are plots 95FR010, 95FR011 and 95FR012. Vegetation sampled in the exclosures will either not be grazed, or only very lightly, as compared to all the other plot sites which are in pastures that will be grazed. Livestock grazing is scheduled to be equally distributed between the other pastures on the Preserve.

Subordinate to the vegetation, two additional considerations were part of the sample site stratification. One was to include as many of the 17 different pastures as possible. This would help ensure better north-south and east-west coverage within the Preserve. The second consideration was of practicality in being able to relocate the plots in a landscape without prominent natural landmarks. For this reason, all plots except two are located within 200 feet of a reference fence. Because livestock were using Pastures 5 and 6 during the two weeks sampling was being conducted, they were rejected from sample site selection. Field selecting sample sites ensured that the vegetation was locally homogenous, was not an ecotone and was not bisected by anthropogenic features, such as jeep roads and ditches.

Permanent vegetation monitoring plots using a less intensive protocol were proposed for additional community types. The establishment of these less intensively sampled monitoring plots was contingent on having time available after the other 12 were finished. As it turned out, only one additional plot was established (95FR013) in a *Salix boothii*/mesic graminoid community located near the southern boundary of the Preserve.

Plot Establishment

Sampling at the Preserve was conducted between August 15 and 23, 1995. Two levels of sampling were conducted. Twelve permanent plots were established (95FR001 - 012) using nested frequency plots to intensively sample the vegetation. Ecological sampling using methods developed by the Western Heritage Task Force (WHTF) and establishment of a photo record were also completed for each of the 12 plots. A less intensive level of monitoring was established at one other permanent plot (95FR013). All but the nested frequency sampling was conducted at this site. Copies of the original data sheets for each plot are contained in Appendix 1. Plot establishment protocol follows.

1. Using stratification based on the vegetation map, a perspective sampling area was surveyed to see if it met other selection criteria and constraints.
2. Once a sampling area was located, I walked to its approximate center. A plot center for the macroplot was randomly determined by closing my eyes, spinning around and tossing a stake. Its landing point was plot center. Macroplot size is 24 meters in diameter.

3. I permanently marked plot center using orange-colored plastic stakes. These were labelled with the appropriate plot identification code (95FR001 - 013).
4. Sketches of the plot, directions and other location notes were recorded. My field notebook is on file at the CDC office. GPS readings for all plot center stakes (except for 95FR004) were obtained by Trent Stumph of TNC after I completed field sampling (Appendix 3).
5. There are three transects per macroplot. Transects begin at plot center and are 12 meters long. Using a random numbers table, I chose an azimuth for each transect. The only constraint being that transects be separated by at least 40° to prevent walking on one transect while sampling another. Transect #1 is the lowest azimuth angle selected and so forth. All azimuths and other compass bearings use a declination set at 0° .
6. Ends of each transect were also permanently marked with another plastic stake and labeled. Several of these points also received GPS readings (Appendix 3).
7. There are ten microplots (nested frequency plot frame), 1 meter apart, placed along each transect, beginning at the 2 meter mark. Microplot data are, therefore, recorded at each meter tick between 2 and 11 along the transect tape. This results in a total of 30 microplots per macroplot.

Plot Metrics

For plots 95FR001 - 95FR012:

1. I recorded site characteristics using the WHTF Form II - Community Survey Form (Appendix 4). Notes regarding plant phenology, weather, insect damage and grazing were also recorded.
2. Frequency data were collected for each of the four plot sizes within the microplot nested plot frame (Appendix 5). The four sizes are 5 x 5 cm; 10 x 10 cm; 25 x 25 cm; and 25 x 50 cm. Special data sheets were prepared to record frequency data (Appendix 6).
3. To obtain frequency data, the plot frame is placed along the transect tape with the 5 x 5 cm corner flush with the appropriate meter tick mark on the tape. For each transect I randomly determined which side ("right or left") of the tape was to be sampled. A species or other measured attribute is tallied only for the smallest nested plot size in which it occurs at any particular transect point. Microplots are situated on either the left or right side of the transect tape. Left versus right side of transect tape (as noted in the Plot Information section) is determined by standing at the center stake (0,0 coordinates of transect) and facing the end (0,12 coordinate) of the transect.
4. Frequency data were collected for nearly all vascular plant species, litter, bare ground, gravel/rock, moss and soil lichens. Frequency data were not counted for plants both rare within the macroplot and that I could not identify due to their poor phenological condition. *Artemisia cana* (silver sage) was the only shrub encountered (in 95FR005), and its habit permitted sampling using the nested plot frequency method.
5. A total vascular plant species list and corresponding cover value estimates were compiled for each macroplot using WHTF Form III - Ocular Plant Species Data (Appendix 7). I was able to identify most plants to species, but in a few cases only to the genus or family level due to lack of flowers or other plant

parts necessary for positive identification.

6. Two wide-angle color slide photographs were taken looking along each transect. I used Kodachrome 64 slide film. A tripod was positioned at a height of 1 meter, 1 meter behind the center stake in line with the transect. One photo is a close-up focused at the 2-meter mark on the transect tape; another is set at infinity focus. One or more photos, giving an overall view of the plot, were also taken. The complete and labelled 1995 photo record is being submitted to TNC with this report.

7. Rules for nested plot frequency sampling - (a) Plants must be rooted in the plot to be counted; and (b) annual plants are counted whether green or dried.

For plot 95FR013:

This plot was less intensively sampled using steps 1 and 5 outlined above. Wide-angle photographs of the plot were taken at bearings of 0°, 90°, 180° and 270°, from a one-meter-high tripod centered over the plot center stake.

1995 Sampling Notes

Data Recording

Species listed on the Nested Plot Frequency Forms are denoted by a six letter code. This code corresponds to the six letter acronym for the first three letters of the genus name and the first three letters of the specific epithet. For example, *Phleum pratense* is recorded as PHLPRA. Most plots contain one or more unknown plant species. In most cases identification is at the genus level. Unknowns are recorded using the first five letters of the genus name followed by an "X". An unknown *Aster* sp. would therefore be recorded as ASTERX. Two unknowns encountered in a few plots were identified only to the family level. These are recorded as either CARYOX (for Caryophyllaceae) or POLYGX (for Polygonaceae). The ASTERX recorded for nearly all plots is most likely *Aster occidentalis*, but because plants usually consisted of only basal leaves, this identification needs verification.

Problems Encountered

Several factors made estimating species cover values for Form III (Ocular Plant Species Data) difficult for some plots:

1. The abundance of timothy sometimes made it difficult to differentiate other graminoids when inflorescences were missing due to either recent livestock grazing or spikelet dispersal (late phenology). In some plots, recent grazing left most plants reduced to basal leaves, making it easy to overlook the relatively uncommon grasses at a site. Furthermore, the spikelets on timothy, meadow barley and meadow foxtail are often shed as a unit, leaving only a bare stalk. Distinguishing these species requires care during microplot sampling and is problematic when trying to estimate coverages across an entire macroplot. Because of these problems, I may have underestimated some grass species and overestimated others while completing Form III, particularly in plots 95FR004, 95FR006, 95FR007, 95FR008 and 95FR009, where these problems were more acute.
2. Thickheaded sedge (*Carex pachystachya*) and short-beaked sedge (*Carex simulata*), two species

commonly encountered during sampling, are very difficult to distinguish without inflorescences. In plots 95FR009, 95FR010, 95FR011 and 95FR012, inflorescences were rare and made identification during sampling and cover estimates tentative. I am unsure if inflorescences were not produced or if they already had been shed.

3. Along these same lines, slimstem reedgrass (*Calamagrostis neglecta*) and northern reedgrass (*C. inexpansa*) look very similar and can be hard to distinguish in the field. While sampling, I recorded everything as slimstem reedgrass. In at least a few cases, I was probably really sampling northern reedgrass. These two grasses are much less common than the two sedges noted in #2.

4. Few forbs were in flower during the sampling period. This was due to either grazing or late phenology. This may have affected my cover value estimates (Form III).

Plant Phenology

Because sampling was not initiated until mid-August, only a few forb species were still flowering. *Aster occidentalis*, *Perideridia gairdneri* and *Gentiana affinis* were the only common forbs consistently in flower. Occasionally, a few clover (*Trifolium* spp.) plants were also in flower. Complicating field identification was the fact that old, upright flower or fruit stalks were uncommon or absent, with most plants consisting only of basal leaves. Except for the flowering species mentioned above, only low-lying fruit stalks (such as *Trifolium repens*) were consistently present. Common dandelion, which must have turned portions of the meadow complex a sea of yellow earlier in the season was relatively inconspicuous in its basal rosette condition. Timothy was the most common graminoid in flower, causing hay fever grief for people with allergies. Other graminoids were mostly past the flowering stage, and seed dispersal had begun, such as for meadow foxtail, meadow barley and Kentucky bluegrass. The time interval since the last grazing rotation varied from pasture to pasture and obviously affected the size of the grass plants and their phenological status.

Insects and Pathogens

More than incidental insect damage (foliage or seed/fruit herbivory) was not observed in any of the sample plots. No obvious signs of pathogens were observed either.

Plot Information

This section provides information concerning the location, layout and description of each plot. All azimuths and bearings are referenced with compass declination set at 0°. All plots have a witness marker to help with relocation. These red-painted markers are pieces of metal with a scribed plot identification number. They are nailed into a fencepost located near the plot. Plot center locations and other relocation references are made in relation to these markers in the plot sketches that follow. The markers are noted as "fencepost marker" in the sketch text. The sketches are not to scale. Plot locations are also noted in Figure 2, and this map should also be used to help relocate the plots. Additional location and description information are contained in the appropriate Form II (Appendix 1).

Plot 95FR001

Plot 95FR001 is located in the northeast corner of pasture 11. It is 0.12 mile from the marked fencepost to the fence corner depicted in the diagram below. From this corner it is about 0.5 mile to the fenceline gate separating Pastures 10 and 11. There is a small natural drainage channel lined with sedges that meanders between the plot and the fenceline with the marked post. There is also a minor cattle trail passing through the plot.

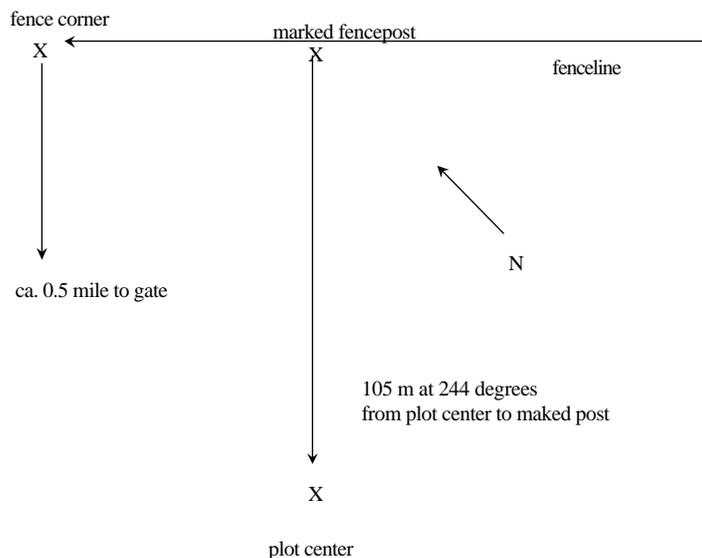
Transect # 1 azimuth = 66° ; read on left side of transect tape

Transect # 2 azimuth = 143° ; read on right side of transect tape

Transect # 3 azimuth = 351° ; read on right side of transect tape

Directions: From Highway 20, ca. 5 miles north of Macks Inn, turn east onto the Meadow Creek Road (USFS Road 060). Continue east for ca. 1.1 mile (a short distance past the bridge over Twin Creek), then turn ca. south onto a 2-track dirt road that leads through a barbwire gate. This road is presently not signed or marked. It is ca. 0.7 mile to the north boundary fence/gate of the Flat Ranch Preserve. Continue south for another 1.1 mile to the second permanent pasture fence/gate. A faint 2-track trail parallels the fence leading east and provides access to the plot vicinity.

Description: Plot is a graminoid-dominated meadow with tufted hairgrass subordinate to timothy. It represents one of the Mixed pasture grass/tufted hairgrass sample types. Forbs are dominated by native "increasers", such as cinquefoil and yarrow.



Plot 95FR002

Plot 95FR002 is located in the northeastern corner of Pasture 8, in the northern half of the Preserve, east of the Henrys Fork.

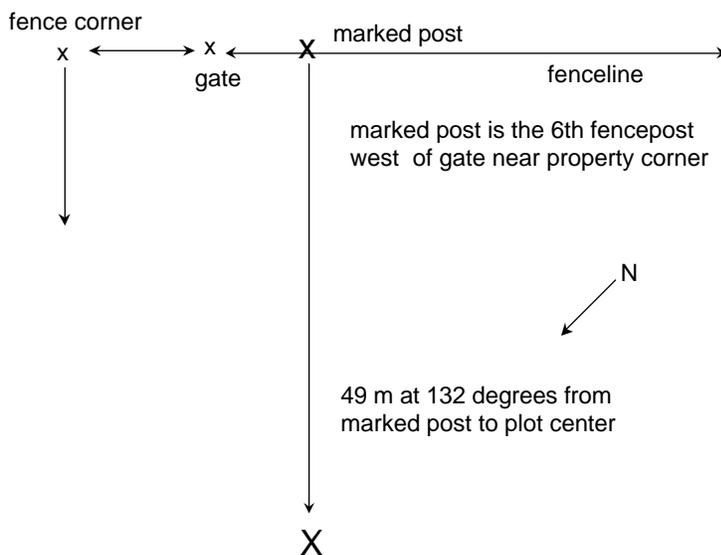
Transect # 1 azimuth = 95° ; read on left side of transect tape

Transect # 2 azimuth = 281° ; read on left side of transect tape

Transect # 3 azimuth = 339° ; read on left side of transect tape

Directions: The same as for Plot 95FR001, except from the Preserve's northern boundary fence, proceed south for only 0.5 mile, to the first permanent pasture gate/fence. The plot is reached by walking east, paralleling the fenceline for ca. 0.15 mile, to the pasture corner and plot area.

Description: Former hay meadow that is irrigated during the summer. The vegetation is dominated by timothy with lesser amounts of other pasture grasses. Tufted hairgrass is rare, with only a couple of plants observed. Forb diversity is low, common dandelion and whitehead mule's ears being the most common. Plot 95FR002 is one of the Pasture grass types sampled. There is more whitehead mule's ears in plot vicinity than adjacent areas supporting even greater cover of timothy. Gopher activity is evident in the plot.



Plot 95FR003

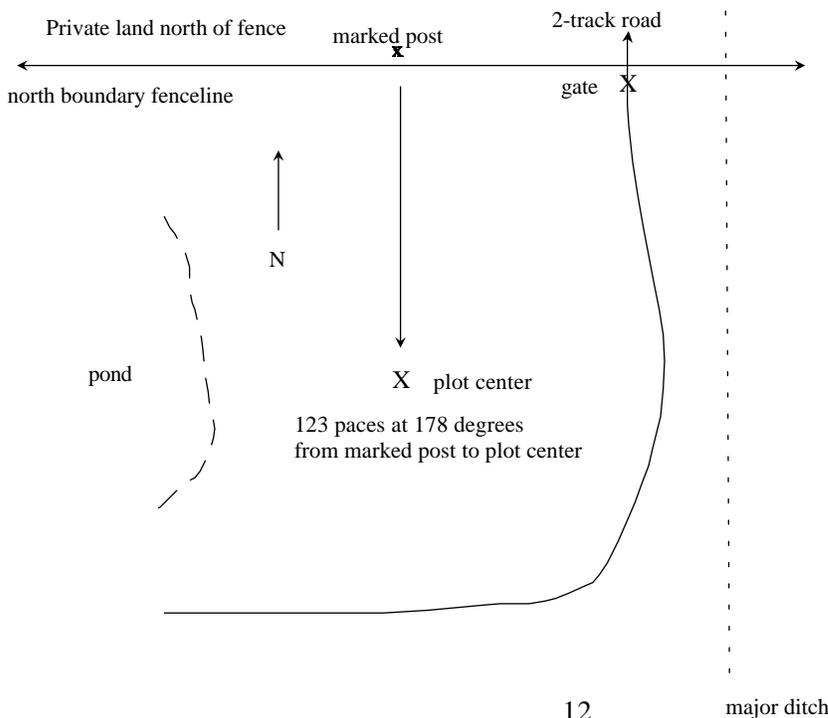
Plot 95FR003 is located in the northeastern quarter of Pasture 1, approximately 100 m south of the Preserve's northern boundary fence. It is just west of the 2-track road that continues north onto adjacent private land. It is 11.5 m at 270° bearing from plot center to the nearest edge of a sedge (mostly beaked sedge) strip bordering the nearby pond shown in the plot diagram. The nearest edge of the road is located 21.0 m at 90° from plot center. Plot is established in a local "island" of tufted hairgrass. Small portions of the macroplot's 12-m radius extends into the adjoining *Carex utriculata* (beaked sedge) community extending out from the nearby pond.

- Transect # 1 azimuth = 49°; read on right side of transect tape
- Transect # 2 azimuth = 122°; read on right side of transect tape
- Transect # 3 azimuth = 337°; read on left side of transect tape

Directions: With a 4-wheel drive vehicle it is possible to access the plot site via the 2-track road that spurs off of Highway 20 across (east) from the Aspen Estates development. This is the same spur leading to the Preserve's corrals seen near the Highway. From the corrals, the road descends to cross Crooked Creek and continues in a northeasterly direction. Follow this tract to near the northern boundary fence. I accessed the plot by directly walking from the corrals.

Description: This plot represents a Tufted hairgrass type. It is an inclusion within the more dry, pasture grass and weedy forb-dominated vegetation widespread in the area. Livestock had been rotated through Pasture 1 twice in 1995, prior to my sampling. Grazing evidence was minimal, and this tufted hairgrass

community does not appear to be grazed as intensively as adjacent drier vegetation.



Plot 95FR004

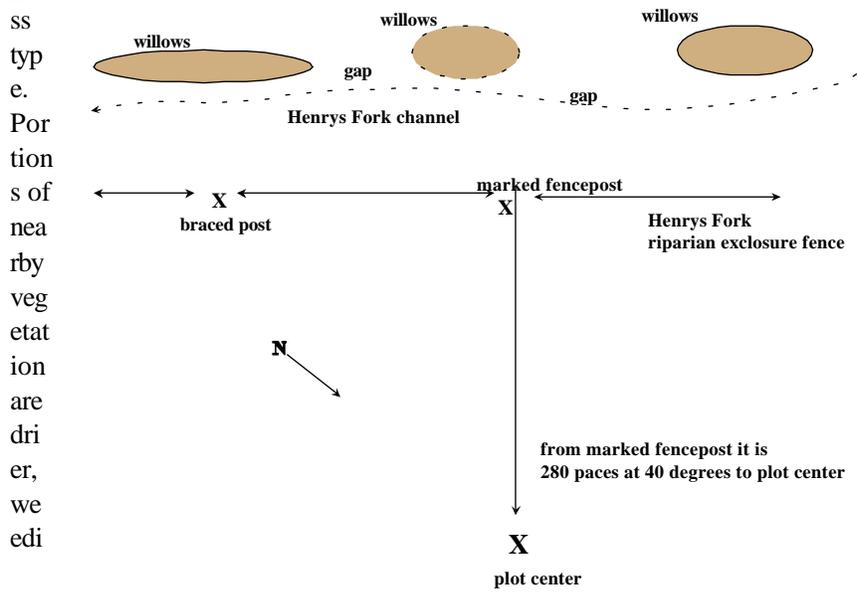
Plot 95FR004 is located in Pasture 12. This will probably be the most difficult plot to relocate. It was difficult to precisely place a location point on a topographic map. Several relocation tips are listed.

1. The plot is situated ca. 80 paces west of several Baltic rush- (*Juncus balticus*) dominated swales that stand out from the other adjacent vegetation. Open silver sage (*Artemisia cana*) communities occur to the north and south of these swales. The silver sage community on the north side peters out where it meets the Baltic rush swales.
2. Plot center is located 550 paces at a 290° bearing from the bridge that crosses Jones Creek in the southeastern corner of the pasture. One of my paces is slightly less than 1 m in length. One walks by the old lower Jones Creek homestead site.
3. Location azimuths regarding plot center are as follows: From plot center to radio tower atop Sawtell Peak = 262°; to the summit knob of Targhee Peak = 326°; to the summit of Bald Peak (Lionhead Point) = 336°; to the closest summit of Mount Two Top = 11°.
4. Regarding the diagram below - the marker post is the 30th fencepost NW of the braced post along the Henrys Fork riparian enclosure fence. Also, note the juxtaposition of the willow patches and gaps in relation to the marked fencepost.

Transect # 1 azimuth = 59°; read on left side of transect tape
 Transect # 2 azimuth = 126°; read on right side of transect tape
 Transect # 3 azimuth = 352°; read on left side of transect tape

Directions: Take the North Big Springs Loop Road, which turns off Highway 20 ca. 2 miles north of Macks Inn. Continue for 2.1 miles, to just past the bridge over the Henrys Fork. Turn left (north) onto a gravel road that winds north for 2.3 miles to the southeastern corner of the Preserve. Continue through the boundary gate for 0.9 mile to the bridge over Jones Creek channel. Access is via hiking from near this point.

Description: Tufted hairgrass is one of the co-dominant graminoids, and this plot represents a Tufted hairgrass type.



er and without tufted hairgrass.

Plot 95FR005

Plot 95FR005 is located in Pasture 17, in the southeastern portion of the Preserve.

Transect # 1 azimuth = 6° ; read on right side of transect tape

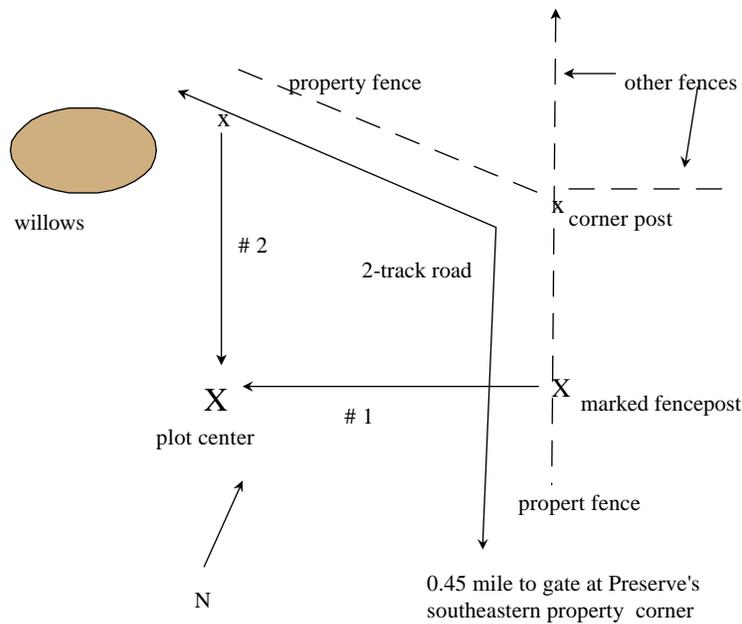
Transect # 2 azimuth = 183° ; read on left side of transect tape

Transect # 3 azimuth = 336° ; read on left side of transect tape

Directions: Same as for plot 95FR004 to the gate at the southeastern corner of the Preserve. From this gate continue north on the 2-track road for 0.45 mile to where the road curves to the west (prior to crossing Stephens Creek). The plot is located east of the curve. Look for the marked fencepost; it is the 12th post south of the fence corner along the Preserve's eastern boundary fence.

Description: Large meadow complex dominated by pasture grasses, especially timothy. Forb cover is variable in the area and dominated by "increasers" and exotics. This plot is one of the Mixed pasture grass/tufted hairgrass types sampled. The site's potential dominant grass may be tufted hairgrass. A swath

of willow associated with Stephens Creek passes to north and west of plot. I do not think this segment of the Preserve is presently irrigated.



**Plot
95FR006**

Plot 95FR006 is located in Pasture 7. In relocating this plot, the marked fencepost is the 25th post west of the

1 - it is 46.2 m at 70 degree bearing from plot center to marked fencepost; this fencepost is the 12th post south of the corner where two fencelines intersect on the curve in the road

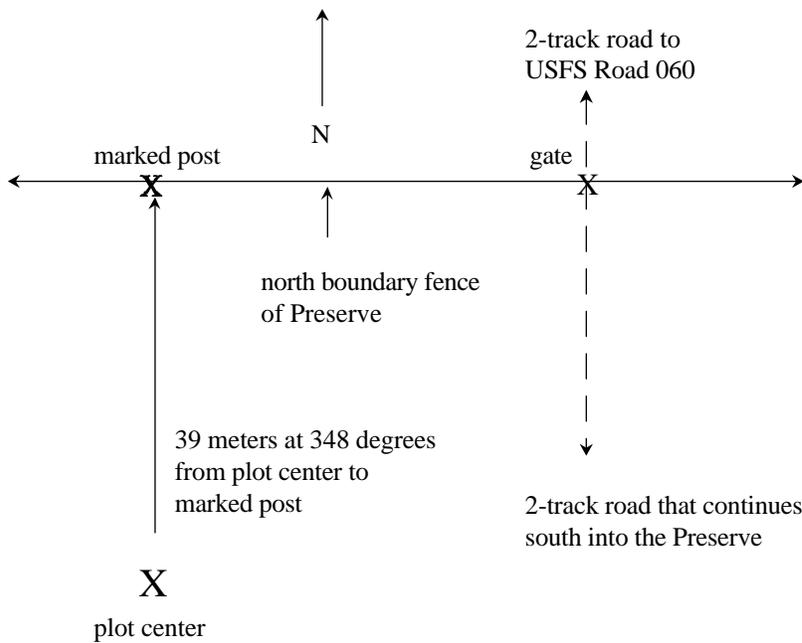
2 - it is 53 m at a bearing of 330 degrees from plot center to edge of 2-track road, at the point where a contiguous band of willows approach the road

gate (the gate through which the 2-track road passes) along the Preserve's northern boundary fenceline.

Transect # 1 azimuth = 13° ; read on left side of transect tape
Transect # 2 azimuth = 97° ; read on left side of transect tape
Transect # 3 azimuth = 208° ; read on right side of transect tape

Directions: Identical as for plot 95FR001 to the gate marking the northern perimeter of the Flat Ranch Preserve. Plot is located ca. 75 m west and 40 m south of this gate, a short walk from the road.

Description: Irrigated meadow dominated by timothy, but tufted hairgrass persists in the area. Forb cover and diversity is low, including weedy species. Plot site represents an example of the Mixed pasture grass/tufted hairgrass type.



Plot 95FR007

Plot 95FR007 is located in Pasture 1. There is no fencepost marker for this plot. Instead, a marker was nailed into the northeastern corner post of the corral just east of Highway 20, the logical starting point to access this plot. In the diagram below, the point where the 2-track spur road (already noted in the directions for plot 95FR003) crosses Crooked Creek serves as the reference for relocating the plot center stake. This was measured to the center of the channel. Future migration of this channel may necessitate a new relocation reference point.

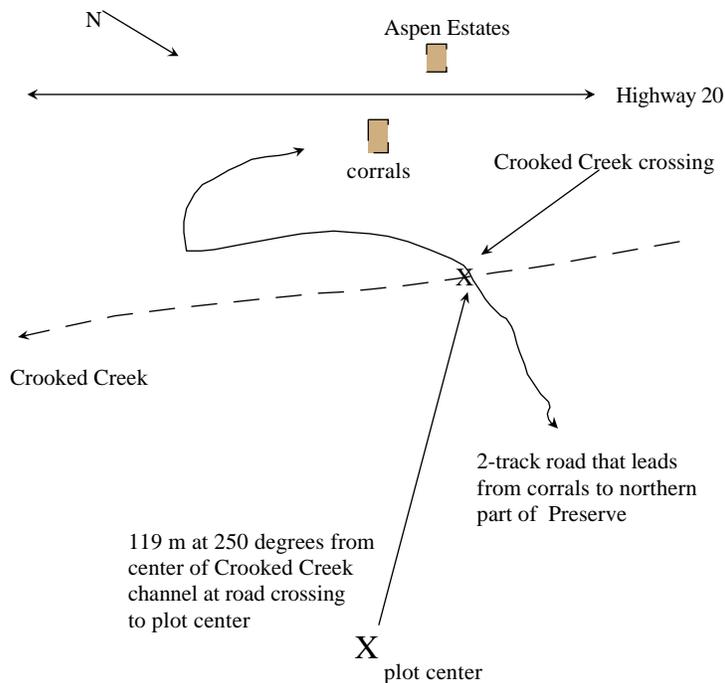
Transect # 1 azimuth = 103° ; read on right side of transect tape

Transect # 2 azimuth = 236° ; read on left side of transect tape

Transect # 3 azimuth = 300° ; read on left side of transect tape

Directions: Location of the corrals across from the Aspen Estates development has already been discussed for plot 95FR003. From the corrals, follow the 2-track road a short distance until it crosses Crooked Creek. Bear east from the crossing as noted in the plot diagram.

Description: The vegetation is dominated by pasture grasses and weedy forbs and represents one of the Pasture Types sampled. The vegetation appears typical for large areas in the northwestern segment of the Preserve. Sites are drier than inclusions (often associated with natural or man-made watercourses) supporting sedge, Baltic rush or tufted hairgrass communities, and represent slightly raised portions of the very gently undulating topography. Livestock had been rotated twice through Pasture 1 prior to sampling. Death camas (*Zigadenus venenosus*) is more abundant south of the plot.



Plot 95FR008

Plot 95FR008 is located in the northeastern part of Pasture 3. The plot is situated between two ditch channels. The larger ditch is located about 20 m west of plot center. There is a narrow, sedge-dominated swale meandering between the plot and the smaller ditch east of the plot. The fencepost marker is located one post south of where the temporary electric fence separating Pastures 2 and 3 meets the Henrys Fork riparian enclosure fence.

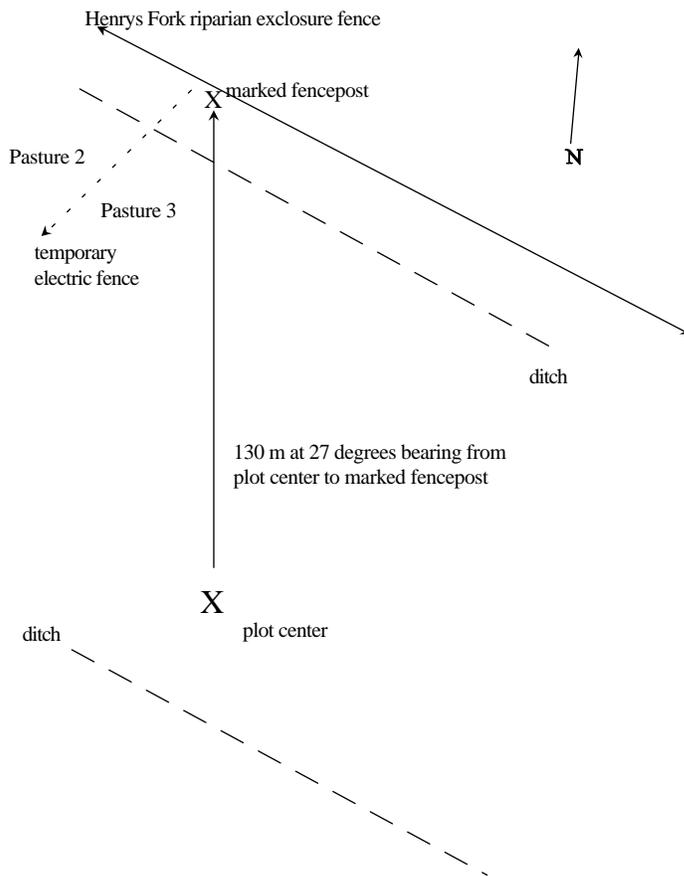
Transect # 1 azimuth = 19° ; read on right side of transect tape

Transect # 2 azimuth = 105° ; read on right side of transect tape

Transect # 3 azimuth = 250° ; read on left side of transect tape

Directions: From the Flat Ranch Preserve corrals across from the Aspen Lodge development, it is ca. a 0.7-mile hike to the plot. The easiest way to relocate the plot is probably heading SE until intersecting the electric fence wands delineating Pastures 2 and 3. Then follow these wands to the plot area. There is apparently also a way to drive near the plot.

Description: The vegetation is part of an extensive meadow complex dominated by pasture grasses and weedy forbs. The plot represents one of the Pasture grass types sampled. The vegetation appears similar to that inside the nearby riparian enclosure (see plot 95FR010).



Plot 95FR009

Plot 95FR009 is located in the northeastern corner of Pasture 10. A good reference for finding the plot is where the property boundary fence crosses from the west side to the east side of a main irrigation ditch paralleling the Preserve property line. The fencepost marker is located between this point and the fence corner to the south.

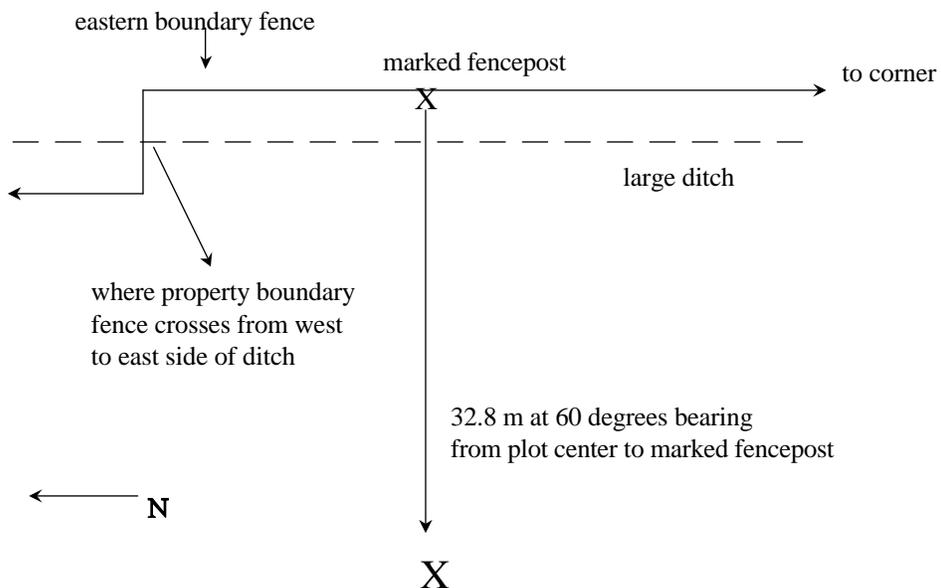
Transect # 1 azimuth = 118° ; read on right side of transect tape

Transect # 2 azimuth = 181° ; read on left side of transect tape

Transect # 3 azimuth = 348° ; read on left side of transect tape

Directions: Access from the north is the same as for plot 95FR001 as far as the gate/fence separating Pastures 8 and 9. From this point continue south along the 2-track road to within ca. 150 m of the gate/fence separating Pastures 10 and 11. Then walk in a northeasterly direction toward the eastern boundary fence to the plot vicinity.

Description: Vegetation is dominated by native species, although pasture grasses are also well represented. Plot 95FR009 is an example of the Tufted hairgrass type. This part of the meadow system is irrigated. Large portions of the adjacent meadow complex are dominated by pasture grasses and have high weedy forb cover.



Plot 95FR010

Plot 95FR010 is located in Pasture 13, inside the Henrys Fork riparian enclosure fence. It is near an old channel meander. The fencepost marker for this plot is on the same post as for 95FR008.

Transect # 1 azimuth = 131° ; read on right side of transect tape

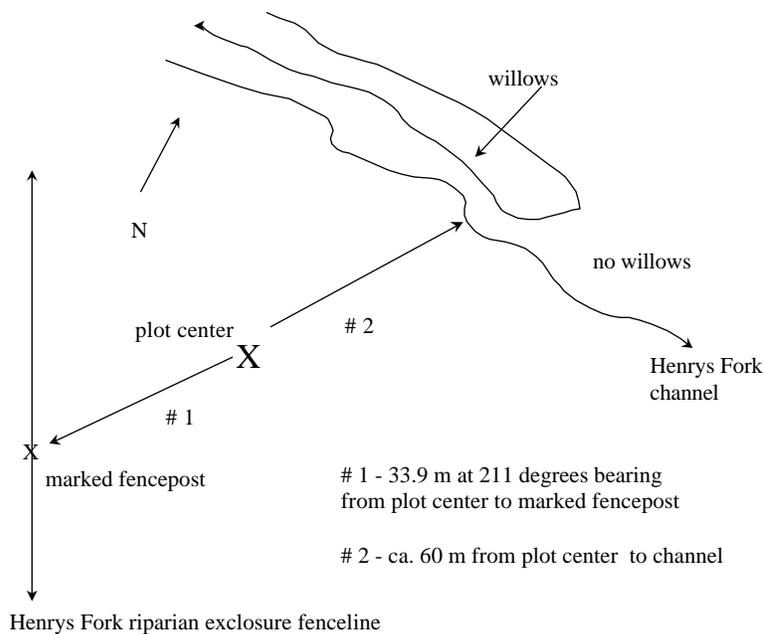
Transect # 2 azimuth = 191° ; read on right side of transect tape

Transect # 3 azimuth = 349° ; read on left side of transect tape

Directions: Access to plot is the same as for the nearby plot 95FR008. Cross the enclosure fence from plot 95FR008.

Description: Plot is within a riparian enclosure. The vegetation is strongly dominated by timothy and

Kentucky bluegrass, with common dandelion the primary forb and high bare ground cover. No tufted hairgrass was observed. The vegetation is similar to plot 95FR008.



Plot 95FR011

Plot 95FR011 is located in Pasture 14, one of the riparian exclosures. It is situated about 30 m from the channel of the Henrys Fork. There are no large willow stands in the area. Nearby meander scars support a mosaic of short-beak sedge, fowl bluegrass and Baltic rush vegetation between the Henrys Fork channel and the plot. The inside portion of the nearest meander supports timothy-dominated vegetation. The marked fencepost is the 31st post east of the corner noted in the plot diagram below.

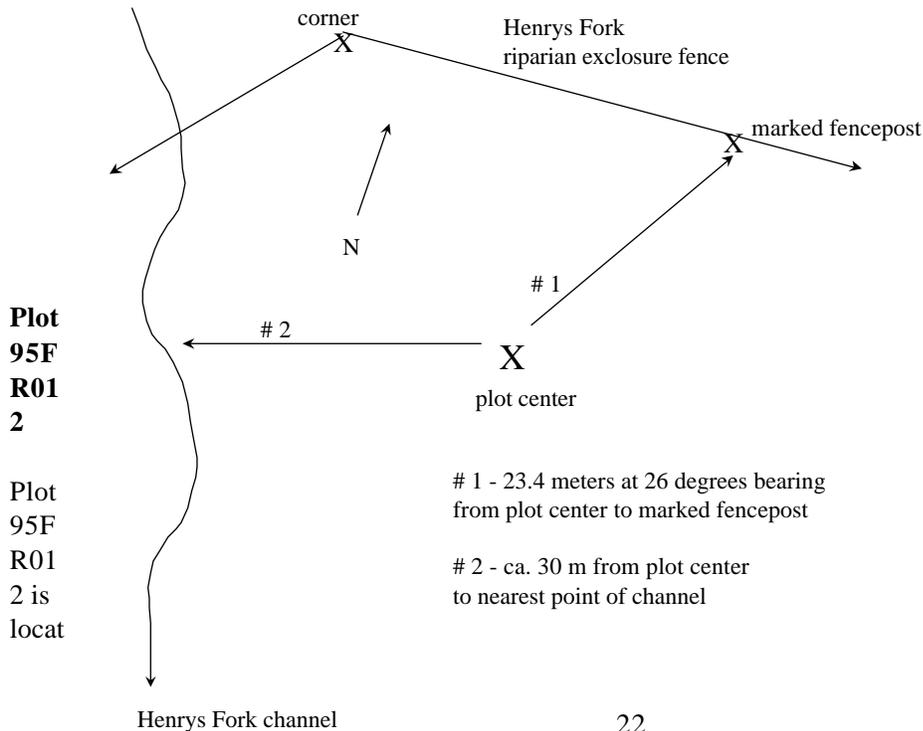
Transect # 1 azimuth = 9° ; read on right side of transect tape

Transect # 2 azimuth = 161° ; read on right side of transect tape

Transect # 3 azimuth = 233° ; read on left side of transect tape

Directions: Plot is most readily reached by the 4-wheel drive track that heads east from the corrals across the highway from Aspen Estates development. After crossing Crooked Creek, turn south when the track offers that option. Continue for ca. 0.5 mile, stopping ca 0.2 mile before reaching the southwest boundary fence. Hike east, cross the Henrys Fork channel and look for where the riparian exclosure fence crosses from the north to the south side of the channel. The plot is in this vicinity. Alternatively, the plot can be accessed via hiking from a convenient point along the north entry road. I did not attempt this route, but it would not require wading across the Henrys Fork. Crossing the channel in this area is no problem later in the season.

Description: The plot site appears typical of most of the drier vegetation within the pasture and extending east and west away from the channel. It is dominated by timothy and common dandelion is the principle forb. Native graminoids are rare.

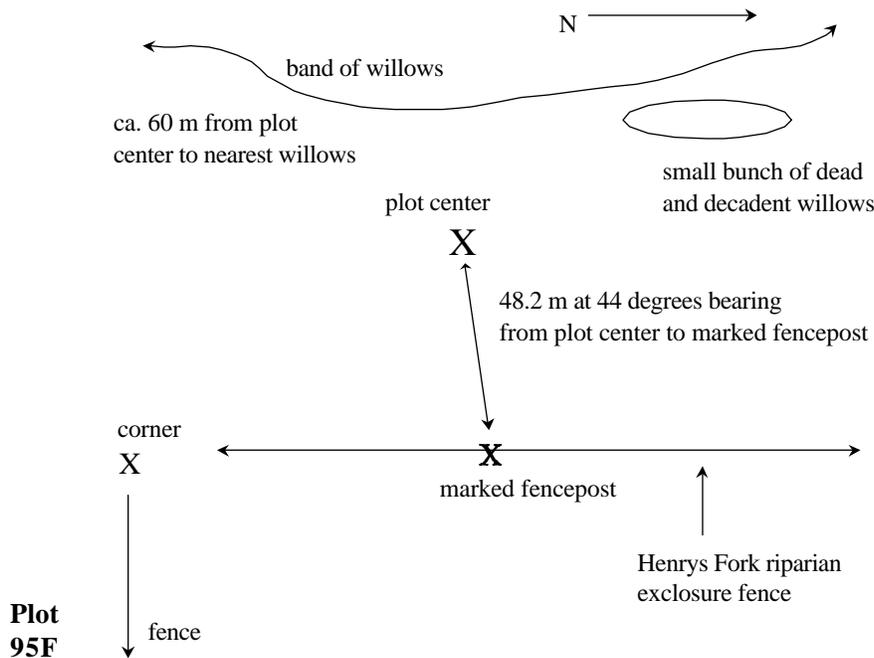


ed east of the Henrys Fork channel, in the southern part of Pasture 16, one of the riparian exclosures. The marked fencepost is the 61st post northwest of the corner depicted in the plot diagram below. The distance between fenceposts is slightly under 5 m, for a distance of roughly 300 m.

- Transect # 1 azimuth = 9° ; read on left side of transect tape
- Transect # 2 azimuth = 186° ; read on left side of transect tape
- Transect # 3 azimuth = 245° ; read on left side of transect tape

Directions: Access to the southeastern corner of the Preserve is the same as outlined for plot 95FR005. Continue north along the 2-track road over Jones Creek (the third wooden bridge crossing). Hike along the fenceline that trends southwest (separating Pastures 12 and 17) until it intersects the northwest-trending riparian exclosure fence. From this corner continue ca. 300 m northwest along the fence to the plot area.

Description: The plot is located in a lush meadow community. Timothy and other pasture grasses dominate the vegetation, but native graminoids are also common. Forbs are dominated by common dandelion, but several native species are common, too. A small tufted hairgrass community occurs nearby. Old meanders and other nearby low spots contain strips of sedge and baltic rush. A narrow band of willow follows an old meander west of the plot.

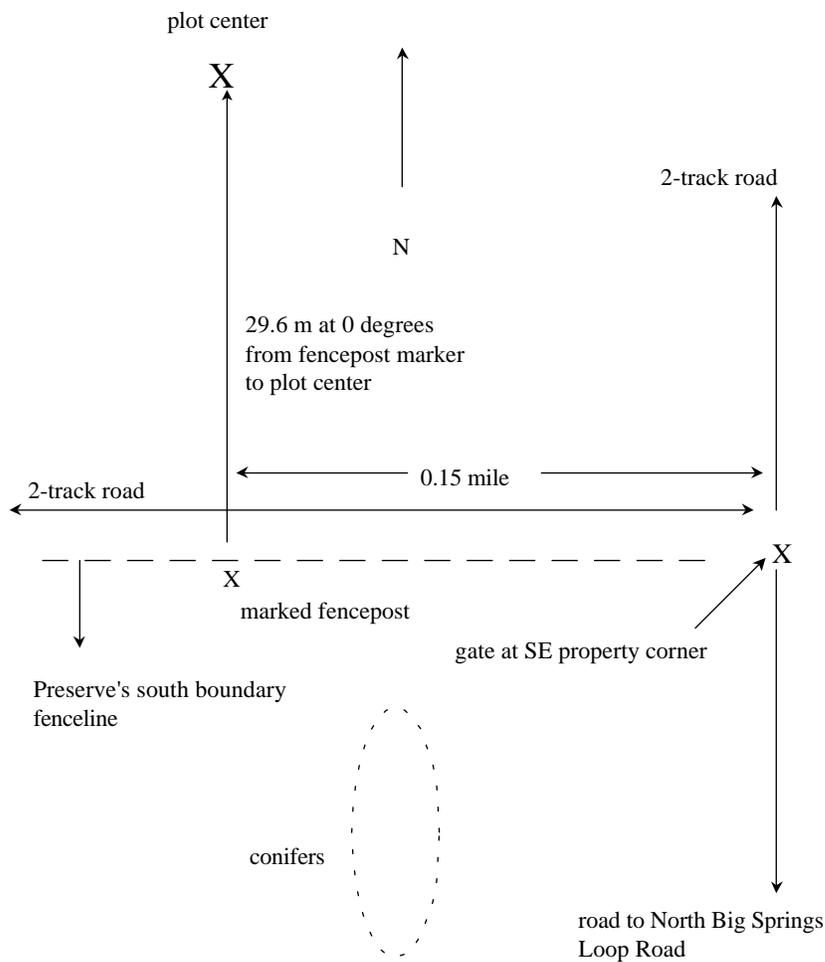


R013

Plot 95FR013 is located near the southeastern corner of Pasture 13. The fencepost marker is located along the fenceline that runs west, along the Preserve's southern boundary, from the southeastern property corner gate. The marker is nailed to the 49th post west of the gate, a distance of 0.15 mile. Plot center stake is positioned amongst some small dead willows. There are no transects associated with this plot.

Directions: Access to the southeastern corner gate of the Preserve is given for plot 95FR005. Inside the gate, take the 2-track road that leads west paralleling the southern boundary for 0.15 mile. Plot is just north of the band of willows lining the road.

Description: A mosaic of willow clumps with open areas dominated by timothy and several "increaser"-type forbs such as strawberry and cinquefoil. Nearby wetter openings are dominated by native sedges, especially beaked sedge.



Floristics

Elzinga (1993) produced a vascular plant checklist as part of her botanical survey at the Flat Ranch Preserve. Table 1 provides 28 additions to her list that I encountered while conducting this monitoring project. Two other species that probably occur are *Viola renifolia* and *Polygonum douglasii*, but no flowering or fruiting material was seen to confirm these identifications. Undoubtedly, additional plant species that flower early in the season also occur within the Preserve.

Table 1. Additions to the flora of the Flat Ranch Preserve. Plants are listed alphabetically, by family.

Family	Scientific name	Common name
Apiaceae	<i>Perideridia gairdneri</i>	Gairdner's yampah
Asteraceae	<i>Arnica chamissonis</i>	meadow arnica
	<i>Aster integrifolius</i>	thick-stemmed aster
	<i>Cirsium scariosum</i>	elk thistle
	<i>Senecio dimorphophyllus</i>	Payson's groundsel
Cyperaceae	<i>Carex aurea</i>	golden sedge
	<i>Carex microptera</i>	small-winged sedge
Equisetaceae	<i>Equisetum laevigatum</i>	smooth scouring-rush
Fabaceae	<i>Trifolium longipes</i>	long-stalked clover
Iridaceae	<i>Sisyrinchium angustifolium</i>	blue star
Juncaceae	<i>Juncus longistylis</i>	long-styled rush
Lamiaceae	<i>Prunella vulgaris</i>	self-heal
Liliaceae	<i>Allium schoenoprasum</i>	chives
	<i>Camassia quamash</i>	common camas
Poaceae	<i>Agropyron</i> sp.	wheatgrass
	<i>Bromus inermis</i>	smooth brome
	<i>Calamagrostis neglecta</i>	slimstem reedgrass
	<i>Danthonia californica</i>	California oatgrass
	<i>Holcus lanatus</i>	common velvet-grass
	<i>Poa compressa</i>	Canadian bluegrass
	<i>Stipa occidentalis</i>	needlegrass
Polygonaceae	<i>Rumex crispus</i>	curly dock
Ranunculaceae	<i>Thalictrum fendleri</i>	Fendler's meadowrue
Rosaceae	<i>Fragaria virginiana</i>	strawberry
Rubiaceae	<i>Galium multiflorum</i>	shrubby bedstraw
Scrophulariaceae	<i>Castilleja sulphurea</i>	sulphur paintbrush
Valerianaceae	<i>Valeriana edulis</i>	tobacco-root

Recommendations

In a report that summarizes recommendations from individuals participating in an "interagency field trip" at the Flat Ranch Preserve, Ypsilantis (1995) recommended the installation of a monitoring station in a representative reach of the control pasture (livestock enclosure) to compare impacts with and without grazing. He also recommended the establishment of permanent transects in each permanent pasture to help

monitor vegetation changes. These two recommendations are largely met with establishment of the vegetation monitoring program reported here. Ypsilantis (1995) also recommended management objectives for what he called the Dry Meadow vegetation type. These included:

a) An increase in the percent cover of the sum of two or three beneficial key species an average of 10% along monitoring transects by the year 2000. I recommend tufted hairgrass be one of the beneficial species for all plots, including those presently not containing this species. Other key species for consideration can be: 95FR001 - meadow barley (*Hordeum brachyantherum*); 95FR002 - fowl bluegrass (*Poa palustris*) and thickheaded sedge; 95FR003 - meadow barley, short-beaked sedge; 95FR004 - meadow barley; 95FR005 - sedges (*Carex* spp.); 95FR006 - fowl bluegrass, meadow barley; 95FR007 - thickheaded sedge; 95FR008 - sedges; 95FR009 - meadow barley; 95FR010 - fowl bluegrass; 95FR011 - short-beaked sedge; 95FR012 - fowl bluegrass; 95FR013 - sedges.

b) A decrease in the percent cover of the sum of the three or four most common "increaser" species an average of 10% along monitoring transects by the year 2000. I recommend timothy (*Phleum pratense*) be one of the indicator species for each plot. Other possibilities are: 95FR001 - common dandelion (*Taraxacum officinale*) and cinquefoil (*Potentilla gracilis*); 95FR002 - common dandelion and whitehead mule's ears (*Wyethia helianthoides*); 95FR003 - common dandelion and aster (*Aster* sp.); 95FR004 - meadow foxtail (*Alopecurus pratensis*) and aster; 95FR005 - Kentucky bluegrass (*Poa pratensis*) and common dandelion; 95FR006 - Kentucky bluegrass; 95FR007 - common dandelion, *Fragaria vesca* (wood strawberry); 95FR008 - Kentucky bluegrass and common dandelion; 95FR009 - pussytoes (*Antennaria microphylla*); 95FR010 - common dandelion; 95FR011 - common dandelion; 95FR012 - Kentucky bluegrass and common dandelion; 95FR013 - strawberry (*Fragaria virginiana*).

I collected frequency data for all vascular plant species. To facilitate future resampling one goal may be to identify an appropriate subset of "key" or "indicator" species, to which trends in other species are correlated. These would include the species listed above, plus some selected additions. This subset should include species that tend to increase with livestock grazing ("increasers"), and those which tend to decrease with livestock grazing ("decreasers"). If, however, one future goal of TNC is to calculate species diversity indices, or compare sites by means of similarity indices, then all species need to be assessed (The Nature Conservancy 1994). In the Preserve's meadow habitats, I do not think a substantial amount of time will be saved by limiting sampling to a subset of species. This is because most time is expended evaluating the common species along a transect. These tend to be important species that will need to be resampled for trend and ecological status evaluation anyway.

Finally, plots 95FR001 and 95FR005 are located near the straightened channel of Jesse Creek. Restoration of Jesse Creek has been recommended by Ypsilantis (1995). This would entail returning a portion of the creek to its natural channel. These two plots provide important baseline vegetation information and will be useful in tracking any changes associated with restoration actions if they are adopted.

Specific recommendation concerning vegetation monitoring plots established during 1995 follow.

1. Replace the rather flimsy plastic plot center and transect end stakes with a more sturdy model. Another option is to use painted rebar. This should be a priority before cattle are introduced onto the Preserve next summer. Label the replacements. If it is not possible to replace all the stakes, the plot center stakes should receive priority. Plots 95FR001, 95FR002 and 95FR003 have wood stakes and these should also be replaced. Extra stakes should be kept on hand to replace those broken.

2. Maintain the painted metal markers nailed to fenceposts used to help relocate the plots. Plot 95FR001 has only pink flagging marking the location of the plot. This needs to be replaced with a labelled metal marker nailed to the fencepost, the same as all other plots.
3. Additions and revisions to Form III should be completed by visiting each plot site earlier in the summer. In light of several problems encountered during sampling (see the "1995 Sampling Notes" section of this report), this would serve as a check on the baseline cover value estimates. I know some earlier-flowering species were overlooked due to the relatively late sampling dates. This would also help identify at least some of the taxa presently tallied at the genus or family level on the nested plot data forms.
4. If in the future, willows or other shrubs begin to establish within the monitoring plots, they should be monitored by methods other than nested frequency, which is not really conducive to shrub sampling. I recommend using the line intercept canopy method (Bonham 1989). This method measures the amount (centimeters) of live canopy cover intercepted above or below the transect line, by species.
5. The establishment of additional vegetation monitoring plots may be necessary to assess specific management actions. If appropriate, these plots should use the same methods as outlined in this report.
6. Sampling is greatly facilitated by using two people, with one person as a data recorder. This increases the speed of sampling and probably the accuracy of recording. I recommend two people when resampling plots if at all possible.
7. I recommend all plots be resampled the same year. I recommend the plots be resampled in 1996, then, in 1998 and 2000. Afterwards, resampling can be scheduled once every three to five years. I also recommend any schedule be adaptable, to be increased or decreased as future sampling or management actions indicate. Middle July to middle of August would be a good time to sample during most years.

The resample schedule is recommended with several considerations in mind. It is usually preferable to have sample years initially close together to establish a good baseline and judge the degree of variance often associated with year-to-year climatic differences. Vegetation within the Preserve's meadow habitats may be less prone to large annual variances due to irrigation, but this is unknown. Because the growing season in the Island Park area is relatively short, rates of change in the meadow vegetation may be slower in response to management changes than if located in a warmer climatic regime (W. Clary, U.S. Forest Service, Intermountain Research Station, personal communication, 1995). TNC has not adopted a timetable for all of its proposed management actions. Now that the plots are established, two people should be able to complete two or three plots per day.

References

- Bonham, C.D. 1989. Measurements for terrestrial vegetation. John Wiley & Son Inc., New York, N.Y. 338 p.
- Bourgeron, P.S., R.L. DeVelice, L.D. Engelking, G. Jones, and E. Muldavin. 1992. WHTF site and community survey manual. Version 92B. Western Heritage Task Force, Boulder, CO. 24 p.
- Bureau of Land Management. 1985. Rangeland monitoring. Trend studies. Technical Reference 4400-4. Bureau of Land Management, Denver Service Center, Denver, CO. 130 p.
- Elzinga, C. 1993. Botanical Survey of the Flying R Ranch. Unpublished report on file at: The Nature Conservancy, Idaho Field Office, Ketchum, ID.
- Jankovsky-Jones, M. 1995. Vegetation map for The Nature Conservancy's Flat Ranch Preserve. Unpublished map on file at: The Nature Conservancy, Idaho Field Office, Ketchum, ID.
- The Nature Conservancy 1994. Vegetation monitoring in a management context.. Booklet accompanying workshop training. Workshop coordinated by The Nature Conservancy and the U.S. Forest Service. August 22-28, 1994, Flathead Lake Biological Station, MT.
- Ypsilantis, B. 1995. The Nature Conservancy's Flat Ranch Project. Recommended management objectives and monitoring techniques. Unpublished report by the Idaho Riparian Cooperative for The Nature Conservancy on file at: The Nature Conservancy, Idaho Field Office, Ketchum, ID.

Acknowledgements

I would like to thank Lou and Cindy Lunte for initiating this project. During their tenure with The Nature Conservancy in Idaho, this was just one of many projects they have been involved with concerning land conservation and stewardship throughout the state. Thanks are also due to Trent Stumph, Louise Kellogg and Mabel Jankovsky-Jones for their help with sampling and other logistics. TNC provided housing at their Lucky Dog Ranch while I was conducting this study.

Appendix 1

Copies of 1995 Community Survey Form (Form II), Ocular Plant Species Data (Form III) and Nested Plot Frequency Data Form, data forms.

Note

Pages of this large appendix are not included in all copies of this report.

Appendix 2

1995 data file summary of nested frequency plot data for
Flat Ranch Preserve vegetation monitoring plots 95FR001 - 012
(Lotus 1-2-3, Release 5 file).

Note

A Lotus file containing the 1995 data is being submitted on diskette to TNC along with this report.