

**VEGETATION MONITORING
AT THE NATURE CONSERVANCY'S FLAT RANCH PRESERVE.
1996 RESULTS.**

by

Michael Mancuso
Conservation Data Center

December 1996



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

Prepared for:
The Nature Conservancy
Idaho Field Office

Abstract

Vegetation monitoring in meadow habitats was established at The Nature Conservancy's Flat Ranch Preserve in 1995. Monitoring was established to help The Nature Conservancy assess whether or not vegetation management goals are being met, especially in regards to the management plan guiding cattle grazing operations. The monitoring program was initiated as a cooperative project between The Nature Conservancy and the Idaho Department of Fish and Game's Conservation Data Center. Thirteen permanent monitoring plots were established and sampled during August 1995. A report detailing the vegetation monitoring program and summarizing the 1995 data was submitted to The Nature Conservancy in 1995. The plots were resampled in July 1996 to augment the 1995 dataset. The 1996 results are summarized in this second-year report.

Table of contents

Abstract i

Table of contents ii

List of figures ii

List of appendices ii

Introduction 1

Methods 1

Results 2

Recommendations 7

References 8

Acknowledgments 8

List of tables

Table 1. Additions to the vascular flora at the Flat Ranch Preserve 6

List of appendices

- Appendix 1. Copies of the 1996 Nested Plot Frequency Data data forms.
- Appendix 2. Data file summary for 1996 nested frequency plot data.

Introduction

Vegetation monitoring in meadow habitats was established at The Nature Conservancy's Flat Ranch Preserve (Preserve) in 1995. Monitoring was established to help The Nature Conservancy (TNC) assess whether or not vegetation management goals are being met, especially in regards to the management plan guiding cattle grazing operations. The monitoring program was initiated as a cooperative project between TNC and the Idaho Department of Fish and Game's Conservation Data Center. Thirteen permanent monitoring plots were established and sampled during August 1995. Data collected during 1995, along with sampling methods, plot locations, community type descriptions, and other information are detailed in a previous report (Mancuso 1995). A copy of the 1995 report is recommended to help interpret this second-year report. The plots were resampled in July 1996 to augment the 1995 dataset. The second-year sampling strengthens the baseline vegetation information, against which future sampling results will be compared, and provide a reference for the degree of variance often associated with year-to-year environmental differences. This report summarizes the results of sampling conducted in 1996.

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. The Henrys Fork supports an important fisheries, and its waters are extensively used by the recreating public and agricultural interests. Approximately 3.5 miles of the Henrys Fork flows through the Preserve. The Preserve is characterized by flat to gently undulating topography. A mosaic of wet and seasonally wet graminoid-dominated meadows cover most of the Preserve. Four meadow community types are included in the monitoring plan - *Deschampsia cespitosa* (tufted hairgrass) type, pasture grass type, mixed pasture grass/tufted hairgrass type, and riparian enclosure type. There are 13 permanent vegetation monitoring plots distributed across the Preserve. Twelve plots receive intensive sampling using a nested plot frequency protocol. One plot in a willow-carr habitat is sampled less intensively. Maps showing the locations of the 13 plots are included in the 1995 report. GPS location data are also included in the 1995 report. Each plot is identified using an unique alphanumeric code, 95FR001 through 95FR013. The monitoring plan has been designed to collect vegetation trend data. The objective of the vegetation monitoring plan is to enable TNC to assess changes to the vegetation at the Preserve, which is being managed as a working cattle operation.

Methods

Sampling methods, including site selection, plot establishment, and plot metrics and protocol were previously detailed (Mancuso 1995). The 1996 sampling differed in a couple of minor points:

(1) Instead of two photographs being taken along each transect, most had only a single picture taken. I felt a less intensive photo record was all that was needed this year. A labeled 1996 photo record is being submitted to TNC with this report.

(2) Western Heritage Task Force Form II (Community Survey Form) and Form III (Ocular Plant Species Data) were completed for each plot in 1995. This effort was not duplicated in 1996, because vegetation changes in these ecological plots was not great enough to visually detect between 1995 and 1996. It would have been redundant to simply fill out the forms again. Additional or revised data pertinent to Form III is listed in the next section of this report. These changes can be added to the appropriate data forms comprising Appendix 1 in the 1995 report (Mancuso 1995).

Results

Vegetation monitoring at the Preserve uses the nested plot frequency technique to measure frequency along permanently marked transects at 12 macroplot sites (plot identification numbers 95FR001 to 95FR012). Copies of completed 1996 Nested Plot Frequency Data Forms for plots 95FR001 through 95FR012 are included with this report (Appendix 1). Plot 95FR0013 was revisited, but no frequency sampling was conducted and there are no 1996 data forms for this site. The original 1996 data forms are archived at the Conservation Data Center office in Boise. Frequency data are summarized in a spreadsheet (Lotus file) format (Appendix 2). The data are tabulated in a fashion to allow direct analysis from year to year. A Lotus spreadsheet file containing the 1995 and 1996 data is being submitted on diskette to TNC along with this report.

Analysis of the two year dataset was not one of our objectives this year. Frequency data collected in 1996 is meant to be a complement, not a comparison to the 1995 dataset. Vegetation trend analysis is premature at this time, and will begin after the next round of sampling in a couple of years. A casual review reveals that in most cases, the frequency summary data between 1995 and 1996 are similar. Some of the differences in the frequency data between the two years are likely due to sampling discrepancies. For example, in 1995, graminoid identification and tallying was difficult in several plots due to recent cattle grazing. The 1996 data are probably more accurate where I noted this problem in 1995 (see 1995 Sampling Notes section in Mancuso 1995). Plots were sampled about a month earlier in 1996 compared to the previous year. Plant phenology patterns for a number of early and late season forbs likely explains discrepancies noted for species such as *Camassia quamash* (common camas), *Polygonum bistortoides* (American bistort), *Perideridia gairdneri* (yampah), and *Aster occidentalis* (western aster). Phenological differences, and other year-to-year fluctuations were part of the impetus to sample consecutive years in establishing a vegetation baseline.

All of the original wooden or flimsy plastic plot center and transect stakes were replaced with sturdier, orange-colored marker stakes. These should last longer and be less prone to being kicked over or trampled by livestock. The permanent stake markers are labeled with the appropriate plot identification number and plot center or transect number. Unfortunately, at six plot sites (001, 002, 003, 007, 008, and 009), I inadvertently labeled the stakes using "MM" instead of "FR" in the plot identification code. For instance, the stakes for plot 95FR001 are labeled as 95MM001. Hopefully, this will not confuse people conducting future sampling. I did not have time to go back and correct this mistake in the field. Stakes at the other seven plots are labeled properly.

In 1995, all plot areas outside the exclosures were grazed by cattle at least once prior to sampling. With the exception of two plots (95FR002 and 95FR006), sampling in 1996 was conducted before livestock had the opportunity to graze the plots. This made plant identification easier for most species. With the help of one person recording the plot data, I was able to resample three plots in a long day. Two plots can be readily resampled in a shorter day. The weather during the week of sampling was mostly very warm, dry, and sunny.

Plant phenology

Sampling in 1996 took place more than one month earlier than in 1995. Forb species in flower at most plots included *Potentilla gracilis* (meadow cinquefoil), American bistort, *Achillea millefolium* (common yarrow), *Senecio dimorphophyllus* (Payson's groundsel), *Galium boreale* (northern bedstraw), and *Sisyrinchium angustifolium* (blue-eyed grass). A few early season forbs such as American bistort were totally overlooked in 1995, but recorded in 1996. *Wyethia helianthoides* (white-head mule's ears), *Taraxacum officinale*

(common dandelion), and common camas had completed flowering in nearly all cases. Most grass species were in flower, although florets were often still developing. Several taxa with a late season phenology such as *Aster* spp. (*Aster* species), and *Perideridia gairdneri* (yampah) were probably overlooked in some instances. This may account for reductions in the frequency of these species in several plots.

Insects and pathogens

Light to moderate grasshopper herbivory was observed on white-head mule's ears in plot 95FR002. A similar degree of grasshopper herbivory was noted on many forbs in plot FR95011. More than incidental insect damage was not observed in any of the other plots. No obvious signs of plant pathogens were observed in any of the plots.

Additions and revisions to plot information

This section summarizes plant species additions and revisions to the data collected in 1995, and outlines problems encountered during 1996. To facilitate future sampling and data analysis, TNC can use the additions and revisions to update the 1995 Form III data sheets. An unknown *Agropyron* sp. that occurs in a number of plots may be *A. caninum* (*A. trachycaulum*), but this identification needs confirmation.

Plot 95FR001

Fencepost flagging was replaced with a more permanent metal plot marker to help with future plot relocation. The Transect #3 stake was missing and had to be remeasured. All three transects are 11.5 m long, not 12 m as outlined in the methods. I do not know how this discrepancy occurred in the first place. This makes reading the last microplot along the transect a bit more difficult.

Additions/revisions to species list for the plot (Form III) - Most of the grasses contained inflorescences at the time of sampling in 1996. Some of what I called *Phleum pratense* last year based on vegetative features is actually *Hordeum brachyantherum*. Cover canopy (CC) values for these two grasses should be revised to *Hordeum brachyantherum* (CC = 20), and *Phleum pratense* (CC = 20). Other revisions are *Camassia quamash* (CC = 3), and *Rumex crispus* (CC = 3). Most of the clover within the macroplot appears to be *Trifolium longipes*, with *T. repens* revised to CC = 1. The *Arabidopsis salsuginea* noted on the 1995 data sheet is a misidentification. The identification of this member of the mustard family (BRASSX in data file) is unknown. *Arabis hirsuta* also occurs within the plot (CC = 1).

Plot 95FR002

This site was grazed by livestock a few days prior to sampling and resulted in very few plants with flowers. The coverage for *Wyethia helianthoides* should be revised from CC = 20, to CC = 30.

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 1); and *Delphinium* sp. (CC = 1). *Poa nervosa* has also been tentatively identified (CC = 1).

Plot 95FR003

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 1); *Camassia*

quamash (CC = 1); *Carex hoodii* (CC = 1); and *Carex praegracilis* (CC = 1).

Plot 95FR004

We could not relocate the original marker stakes except for the transect #2 stake which was lying on the ground. The plot was reestablished using the location of the transect #2 stake, which appeared to be lying in approximately the right place based on my memory from 1995. The location of the reestablished macroplot is close to the original, but due to the missing stakes, is not exact. This is the most difficult plot to relocate, so we set a fencepost near plot center to help find it in the future. The original directions to the plot are still valid. This is the only plot without a GPS location. This was the only plot site irrigated prior to sampling this year.

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 1); annual *Epilobium* sp. (CC = 1); *Sisyrinchium angustifolium* (CC = 1); *Koeleria cristata* (CC = 1); *Agrostis stolonifera* (CC = 1); *Calamagrostis neglecta* (CC = 1); *Agropyron* sp. (CC = 1); *Carex microptera* (CC = 1); and an *Eleocharis* sp. (CC = 1), where the lack of mature plants precluded positive identification. The 1995 cover class value for *Phleum pratense* within the macroplot appears too high. My 1996 estimate is CC = 10, compared to last year's CC = 30. Some of the *Poa palustris* within the plot may actually be *Poa pratensis*.

Plot 95FR005

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 3); and *Koeleria cristata* (CC = 1). The amount of *Alopecurus pratensis* appears to be more like CC = 3, rather than CC = 1. Also, the coverage for *Taraxacum officinale* appeared to be less in 1996, with CC = 10, compared to CC = 20, in 1995. *Valeriana edulis* and *Agoseris glauca* look very similar when only the basal leaves are present. I believe *Agoseris glauca* was mistakenly called *Valeriana edulis* on last years data sheet.

Plot 95FR006

The pasture containing this plot was being grazed during the time of sampling, with livestock already passing through the plot area. *Phleum pratense* and *Poa pratensis* were preferentially grazed compared to the *Deschampsia cespitosa* during this initial pass. As in 1995, a small portion of what I scored *Carex pachystachya*, was likely one of the other *Carex* species present in small amounts within the plot. Because flowering material was missing, it was difficult to differentiate these sedge species from one another.

Additions/revisions to species list for the plot (Form III) - *Camassia quamash* (CC = 3); *Allium* sp. (CC = 1); *Cerastium nutans* (CC = 1); *Polygonum bistortoides* (CC = 1); *Agoseris glauca* (CC = 1); *Wyethia helianthoides* (CC = 1); *Carex microptera* (CC = 1); and *Carex praegracilis* (CC = 1). *Equisetum laevigatum* was mistakenly called *E. boreale* on the 1995 data sheet.

Plot 95FR007

Additions/revisions to species list for the plot (Form III) - *Carex hoodii* (CC = 1); *Bromus carinatus* (CC = 1); *Rumex pauciflorus* (CC = 1); *Trifolium repens* (CC = ?); *Astragalus* sp. (CC = 1); *Cerastium nutans* (CC = 1); *Agoseris glauca* (CC = 1).

Plot 95FR008

Additions/revisions to species list for the plot (Form III) - *Trifolium repens* (CC = 1); *Polygonum bistortoides* (CC = 1); *Sisyrinchium angustifolium* (CC = 1); *Castilleja sulfurea* (CC = 1); *Deschampsia cespitosa* (CC = 1); *Carex nebrascensis* (CC = 1?); *Carex praegracilis* (CC = ?); *Carex* 1 (CC = 3); *Carex* 2 (CC = 3). The total coverage for sedges as a class is estimated to be CC = 10. What was scored in 1995 as *Aster* sp. with crenulate leaves, is actually *Senecio dimorphophyllus* (CC = 3). In 1996, this was the driest site for the three Pasture grass community type plots sampled.

Plot 95FR009

Additions/revisions to species list for the plot (Form III) - *Penstemon rydbergii* (CC = 1); *Taraxacum officinale* (CC = 1); *Agoseris glauca* (CC = 1); *Trifolium repens* (CC = 1); *Polygonum bistortoides* (CC = 3); *Rumex pauciflorus* (CC = 1); *Danthonia californica* (CC = 1); *Carex praegracilis* (CC = 1); and what has tentatively been identified to be *Carex norvegica* (CC = 1). What was scored as *Carex* sp. in 1995, is apparently more *Carex nebrascensis*. Moss coverage may have been underestimated in 1996, because so much of it was brown (dormant) and easily overlooked or scored as litter.

Plot 95FR010

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 3); *Agoseris glauca* (CC = 1); *Cirsium scariosum* (CC = 1); *Erigeron glabellus* (CC = 1); *Danthonia intermedia* (CC = 1); and *Sisyrinchium angustifolium* (CC = 1). *Poa pratensis* is more common than *Phleum pratense* within the macroplot. There is no *Galium multiflorum* within the plot, only *G. boreale*. The primary sedge within the macroplot is *Carex pachystachya*, not *C. simulata* as indicated in 1995.

Plot 95FR011

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 1); *Rumex crispus* (CC = 1); *Penstemon rydbergii* (CC = 1); *Agoseris glauca* (CC = 1); *Carex microptera* (CC = 1); and *Danthonia intermedia* (CC = 1). The most common sedge appears to be *Carex pachystachya*, not *C. simulata* as noted on the 1995 data sheet. The cover class value for *Poa pratensis* should be increased from CC = 1, to CC = 10. What was called CARYOX (unknown Caryophyllaceae) in 1995, is *Cerastium nutans* (CC = 1).

Plot 95FR012

The tall, lush vegetation in the area makes relocating the plot center and transect stakes difficult. A mistake must have been last year, as the transect #1 stake is located only 11.3 m from plot center. There is a typographical error in the 1995 report, the azimuth of transect stake #1 is actually 99^o, and not 9^o.

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 3); *Arabis hirsuta* (CC = 1); *Hierochloa odorata* (CC = 1); *Carex lanuginosa* (CC = 1); *Carex microptera* (CC = 1); and *Carex aquatilis* (CC = 1). As was the case in 1995, most sedge plants were without reproductive parts, making it difficult to consistently differentiate between the various species of *Carex* along the transects. Most were tallied as *Carex pachystachya*, unless reproductive parts allowed another identification. It may be best to lump all the sedges when analysis is conducted. What was called CARYOX (unknown Caryophyllaceae) in

1995, is *Cerastium nutans* (CC = 1).

Plot 95FR013

Additions/revisions to species list for the plot (Form III) - *Polygonum bistortoides* (CC = 1); and *Rumex crispus* (CC = 1).

Floristics

A vascular plant list for the Preserve was begun by Elzinga (1993). Additions to the list are found in Mancuso (1995). One of these additions, *Galium multiflorum* is a mistake due to a misidentified specimen. Based on my 1996 field work, 21 new species for the Preserve are listed in Table 1. No rare plant populations were encountered in 1996.

Table 1. Additions to the vascular flora at the Flat Ranch Preserve¹.

<u>Family</u>	<u>Scientific name</u>	<u>Common name</u>
Asteraceae	<i>Crepis runcinata</i>	meadow hawkbeard
	<i>Erigeron glabellus</i>	smooth daisy
Boraginaceae	<i>Plagiobothrys scouleri</i>	Scouler's popcorn-flower
Brassicaceae	<i>Arabis hirsuta</i>	hairy rockcress
	<i>Lepidium virginicum</i>	tall peppergrass
Cyperaceae	<i>Carex aquatilis</i>	water sedge
	<i>Carex douglasii</i>	Douglas's sedge
	<i>Carex hoodii</i>	Hood's sedge
	<i>Carex norvegia</i> (?)	Scandinavian sedge
	<i>Carex praeegracilis</i>	clustered field sedge
Fabaceae	<i>Astragalus</i> sp.	milkvetch
	<i>Lupinus sericeus</i>	silky lupine
Liliaceae	<i>Allium</i> sp.	onion
Poaceae	<i>Bromus carinatus</i>	California brome
	<i>Hierochloa odorata</i>	sweetgrass
	<i>Koeleria cristata</i>	prairie Junegrass
	<i>Poa nervosa</i>	Wheeler's bluegrass
Polygonaceae	<i>Polygonum aviculare</i>	doorweed
	<i>Polygonum bistortoides</i>	American bistort
	<i>Rumex pauciflorus</i>	mountain sorrel
Scrophulariaceae	<i>Penstemon rydbergii</i>	Rydberg's penstemon

¹ Plants are listed alphabetically by family. All names follow Hitchcock and Cronquist (1973).

Recommendations

Last year I made recommendations regarding the vegetation monitoring program (Mancuso 1995). The 1995 report should be consulted for recommendation regarding sampling frequency and vegetation trend targets. New or updated recommendations are listed below.

1. New plot center and transect marker stakes were hammered into the ground during the 1996 season (as recommended in 1995). It would probably be a good idea to visit a few plots in 1997 and check that the stakes withstood both cattle and weather. Problems are not anticipated, but if found, the hard plastic stakes may need to be replaced with metal ones.
2. If plot stakes are lost, resampling is still possible. Monitoring is designed to sample a subset of the vegetation in the plot area. As long as the approximate plot area can be located within the same vegetation type, then a new series of transects can be established and long-term monitoring continued. As long as the reference fencepost plot markers remain intact, relocating the plot areas should not be a problem. Ranch personnel should be aware of these reference markers before fences are repaired or other work is done.
3. Plot 95FR004 still has not received a GPS location. Because this is the most difficult plot to relocate, I recommend a GPS be obtained in 1997. All other plots were located using a GPS in 1995. This information is in the 1995 report (Mancuso 1995), and can be used to help relocate plots in the future if necessary.
4. I recommend a fencepost be placed inside the enclosure near plot 95FR012 to help relocate it in the future. The tall, lush vegetation characterizing the plot does a good job hiding the plot marker stakes.
5. It has been proposed that an off-site ungrazed mesic/wet meadow complex be found that could serve as a reference regarding the vegetation at the Preserve. This reference site would be used by Preserve managers to help them better judge any changes to the vegetation indicated by long-term monitoring results. I ran out of time to locate a suitable reference site in 1996. This is something that TNC may still wish to pursue.
6. I recommend plots be sampled prior to livestock grazing to facilitate plant identification.
7. Sampling in 1996 resulted in a few revisions and additions to WHTF Form III for all plots. To facilitate the next round of sampling, these changes should be transferred onto the appropriate form. A WHTF Form III for each plot is contained in Appendix 1 of the 1995 report (Mancuso 1995).
8. Minor updates to WHTF Forms II and III may be necessary in the future. I recommend field personnel use new forms for the updates to prevent confusion with, or the erasure of original information.
9. Vegetation trend data analysis can begin after the next round of sampling. At that time, TNC should make it clear who will be responsible for the analysis.
10. The Island Park area can have an incredible mosquito population some years. Sampling early in the summer, prior to a significant die-off to the population would be miserable at best, and should be avoided. The end of the mosquito season varies a bit from one year to the next, but generally not before mid-July. This recommendation may conflict with recommendation # 6 during certain years.

References

Elzinga, C. 1993. Botanical survey of the Flying R Ranch. Unpublished report prepared for The Nature Conservancy, Idaho Field Office, Ketchum, ID.

Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. 730 p.

Mancuso, M. 1995. Establishment of vegetation monitoring at The Nature Conservancy's Flat Ranch Preserve, Fremont County, Idaho. Unpublished report prepared for The Nature Conservancy, Idaho Field Office, Ketchum, ID. 26 p., plus appendices.

Acknowledgments

I owe a large thank you to Randy Ediger, Brain Kuck, and Louise Kellogg for their patient help in conducting the vegetation sampling. I also would like to thank Trent Stumph for all his help coordinating this monitoring program. TNC provided housing at their Lucky Dog Ranch while the field work was being done.

Appendix 1

Copies of the 1996 Nested Plot Frequency Data data forms.

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

Appendix 2

Data file summary for 1996 nested frequency plot data.
Flat Ranch Preserve vegetation monitoring plots 95FR001 through 95FR012
(Lotus 1-2-3, Release 5 file).

Note 1 - Pages of this large appendix are not included in all copies of this report.