MONITORING OF SENSITIVE PLANTS IN THE STEEP CREEK TIMBER SALE, 1994 REPORT

North Fork Ranger District
Clearwater National Forest

by

Juanita Lichthardt
Conservation Data Center

March 1995

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

Challenge Cost-share Project
Clearwater National Forest
Idaho Department of Fish and Game

Purchase Order No. 43-0276-4-163

Introduction

This report documents data collection in 1992 and 1994, from permanent monitoring plots for sensitive plants in the Steep Creek timber sale, North Fork Ranger District (Figure A1). Plots were established in 1992 to detect trends in sensitive plant populations following timber harvest. Units of the sale were harvested in fall and winter of 1993. This report includes recommendations for interpreting monitoring results and proposes a monitoring schedule.

Background

The Steep Creek timber sale is located on lower slopes along Beaver Creek, just before it enters the North Fork Clearwater River (Figure A1). This area is part of the core coastal refugium of the North Fork canyon, an ecosystem characterized by rare and disjunct plants and plant communities (Lichthardt and Moseley 1994). During a 1992 survey the following Region 1 sensitive plant species were found within proposed cutting units: western starflower (*Trientalis latifolia*), crinkle-awn fescue (*Festuca subuliflora*), Henderson's sedge (*Carex hendersonii*), and clustered lady's-slipper orchid (*Cypripedium fasciculatum*). The first three are Pacific-coastal disjuncts. Crinkle-awn fescue has since been removed from the sensitive list.

Western starflower is common to abundant throughout the sale area occurring in all forest types present, especially in stands of pole and sapling grand fir and Douglas-fir where it is sometimes the dominant understory species. Crinkle-awn fescue is common but never very abundant, although several vigorous populations were found. Clustered lady's-slipper occurs in the lower portion of unit 5, where seven individuals were found within an approximately 1/4-acre area. Henderson's sedge is rare in the project area, occurring primarily on gently sloping alluvial fans along Beaver Creek where it is associated with fern-dominated understories of western redcedar. Small, localized populations occur near the lower boundaries of units 1, 4 and 6, and east of Beaver Creek in units 7 and 8.

Permanent plots were established, and baseline data gathered, in July of 1992 (Lichthardt 1992). Units of the sale were harvested in winter of 1993 using sky-line and helicopter. The population of clustered lady's slipper in unit 5 was protected with a 100-ft buffer of uncut trees. Post-harvest broadcast burning may not be accomplished until late in 1995. Silvicultural prescriptions for the units include heavy planting of western white pine (40-50%), western larch, and Douglas-fir.

Methods

In July of 1992, nine permanent plots were established within populations of western starflower, crinkle-awn fescue, Henderson's sedge, and clustered lady's-slipper orchid within the Steep Creek project area. Plots were placed in clearcuts, in clearcuts with leave-trees (shelterwood), and at the edge of cutting units. Control plots, one each for

Henderson's sedge and western starflower, were located outside of cutting units. The selection of plot locations for Henderson's sedge was severely limited by scarcity of the species. Previously established plots in Aquarius RNA, which adjoins the sale, can also serve as controls. Figure A1 shows plot locations. Species monitored and treatments are summarized, by plot, below.

Table 1. Species and treatment represented by each monitoring plot.

Plot No.	Species	Treatment
S01	Western starflower*	Edge of cutting unit
S06	Western starflower	Shelterwood cut
S08	Western starflower*	Shelterwood cut
S02	Western starflower	Control
S03	Henderson's sedge*	Clearcut
S04	Henderson's sedge	Clearcut
S07	Henderson's sedge	Edge
S05	Henderson's sedge	Control
S09	Clustered lady's slipper orchid	Control

* also crinkle-awn fescue

Each plot for Henderson's sedge encompasses most of a population. Western starflower is widely and continuously distributed making it difficult to distinguish individual populations. Since crinkle-awn fescue often occurs with one of the other species, and is usually distributed in small patches of only a few plants, it was sampled in the same plots as western starflower or Henderson's sedge when possible.

Plots consist of 30' x 3' belt transects divided into ten, 3' x 3' microplots (Figure A2). Transects were oriented to maximize the number of plants counted and to include crinkle-awn fescue if present. The standard procedure was to establish two ends of a transect, run a tape between these two points, then upslope 3 ft, perpendicular to this line, secure the tape and run a parallel line back, to a point 3 ft above the zero point. Only the two endpoints of the transect are permanently marked so it is important to read microplots on the upslope side of the baseline, or as specified for the particular plot (transects 3, 4 and 6 were not laid on the contour). Transects on the contour were read by standing on the downslope side and reading left to right. For transects not on the contour, see instructions on the data sheets (Appendix B). Orientation of each transect was measured as the azimuth from starting to ending point and recorded on the data sheet--**all compass readings were made with declination set to zero.**

Plants were counted within each microplot. For western starflower, a rhizomatous species, individual stems (ramets) were counted. For Henderson's sedge, numbers of plants with seedheads were also tallied. Data sheets are included in Appendix B.

The small population of clustered lady's-slipper in unit 5 was simply marked with yellow rebar 1 ft to the south of the main cluster of plants. Distance to the stake was then recorded for every genet within a 37-ft radius.

At each plot, slope, aspect, and tree canopy cover were recorded and a species list was made. During 1993 we had the opportunity to get more detailed plant composition data at plots S05 and S08 using Ecodata methods (Forms GF, LL, and PC; Appendix C).

Ecodata were collected for the remaining plots in 1994, thus only post-harvest data are available for plant species composition at S01, 3, 4, and 6.

Plots were marked and their locations documented as carefully as possible to facilitate relocation following logging and broadcast burning. Directions to each plot are included on the data sheet (Appendix B). Control plots (outside cutting units) were marked with a steel fence post at the beginning and a yellow rebar stake at the end. Plots within cutting units were marked at both ends with yellow, 4-ft rebar stakes pounded in until only 6-8 inches remained exposed. Bearing trees were marked, near the ground, with yellow paint and yellow metal tags. Specific bearing trees used at each location are also described on the data sheets.

Methods–1994

Plots were relocated in June of 1994, after harvest was complete but units had not been burned. A mixture of fine and coarse fuels created a nearly constant layer 1-3 ft thick. Plots in cutting units were relocated by using the written description along with the metal tags that had been nailed to the base of bearing trees. Some tags were lost. At most sites both rebar stakes were eventually found although they had often been displaced and had to be replaced using bearing trees. Fence posts were used to replace rebar at the zero ends of transects.

Plants were counted by microplot as in 1992 (Appendix B). During this process the logging slash covering plots was disturbed as little as possible. Branches, small boles and boughs were lifted and moved around to look for plants and were then replaced. In this way the plots will remain representative of the surrounding area. The population of clustered lady's slipper was not revisited in 1994.

For plots in cutting units (1, 3, 4, 6, 7, and 8), Ecodata forms GF, LL, and PC were completed to record the change in plant community (Appendix C). The zero end of the transect was used as the center of a circular, tenth-acre plot unless otherwise indicated on the data sheet.

Results

As would be expected, given that the units were not burned, understory species composition changed little in the growing season following logging. Likewise, sensitive plants were present in approximately the same abundance. Raw data are included in Appendix B. The large decrease in numbers of plants in the Henderson's sedge control plot (S06) may be due to a recording error. Shading of the plants will likely be much more severe than it was in the forest understory until fine debris begins to decompose or the slash is burned. Shelterwood and clearcut treatments are virtually the same with respect to the plots, which are not affected by leave-trees.

Discussion and Recommendations

There is a need for clarification of the objectives of this monitoring study. Results will not be pertinent to the Steep Creek timber sale, which is already complete, but will have implications for other projects in the refugium ecosystem which supports these and several other rare plants. This study was not set up to provide statistical proof of an affect of logging on these sensitive plants. Such a research project would have required much more time and resources. Instead, the plots are expected to provide ample observational evidence of a directional trend in response to logging. Many factors will contribute to the fate of sensitive plants in the units, including the nature of the plant community that develops, the speed at which succession proceeds, the intensity of the burn, and microsite factors associated with the plot (aspect, downed wood, shade from nearby trees, etc.). Changes in populations of sensitive plants may be long-term and the data will be open to interpretation.

Since the results of monitoring cannot be analyzed statistically, and therefore objectively, some criteria should be established at the start in order to provide for objective interpretation. Also, our objectives should establish a time frame for drawing conclusions, i.e., how long do we wait to see an effect? For the current project I suggest the following results should constitute evidence that logging produced significant downward trends in sensitive plant populations:

- 50% or greater reduction in numbers of ramets (western starflower) or genets (Henderson's sedge and crinkle-awn fescue) in two or more of the logged plots (including edge treatments) relative to baseline data, provided none of the control plots exhibited a similar reduction over any time period, *or*

- a consistent downward trend in numbers over 3 years that is not paralleled in control plots.

(Control plots should include those in Aquarius RNA, data from which are available from the Forest RNA coordinator)

These criteria are obviously arbitrary, but they enable us to evaluate results of the monitoring and to make management decisions on the basis of its outcome. Five years should be allowed to test these criteria (following burning of the units). If these criteria are not met after five years, we should question our hypothesis that logging has an adverse effect on these plant species. However, results of the study can only be extrapolated to the harvest methods, unit sizes, and habitat types involved in this study. Also, I recommend revisiting the plots 10 years out as a test of the longer term effects, especially in light of the lack of such information.

The following monitoring schedule is proposed for the Steep Creek plots:

1992	Baseline data (complete)
1994	Post-harvest data (complete)
1996	Post-burn data and photographs
1998	Six year data, photographs, and short-term conclusions
2002	10-year data and mid-term conclusions

The following are recommendations for proceeding with the Steep Creek monitoring project:

- The silviculturist on the North Fork District should be made aware of plot locations so that markers are not disturbed during burning and planting operations.

- Plots should be revisited in 1996, following broadcast burning, at which time data will be collected and a photographic record made. Condition of plants should also be noted.

- Genets of Henderson's sedge should be mapped on a diagram of the plot to make counts more consistent from year to year, by showing what has been interpreted as a genet.

- Plots should be monitored again in 1998 and data summarized to see if the criteria outlined above are met. Six-year conclusions should be reported.

- Plots should remain in place for at least 10 years.

- In the future, monitoring plans should include a set of measurable criteria for determining whether monitoring objectives have been met. The District Ranger and Biologists from the District and Forest should then sign off on criteria that they accept.

References

Lichthardt, J. 1992. Monitoring Plan for US Forest Service Region 1 Sensitive Plants in the Steep Creek Timber Sale Area, North Fork Ranger District, Clearwater National Forest. Unpublished report for the Clearwater National Forest; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 6 pp plus appendices.

Lichthardt, J. and R.K. Moseley. 1994. Ecosystem analysis and conservation planning for the Clearwater refugium, Clearwater and Nez Perce National Forests. Unpublished report for the Nez Perce and Clearwater National Forests; on file at Idaho Department of Fish and Game, Conservation Data Center, Boise. 40 pp plus appendices.

APPENDICES NOT AVAILABLE ON WEB PAGE

CONTACT THE IDAHO DEPARTMENT OF FISH AND GAME, CONSERVATION DATA CENTER FOR THIS INFORMATION

APPENDIX A

Figure 1 Plot diagram
Figure 2 Map of transect locations

APPENDIX B

DATA SHEETS

APPENDIX C

COMPLETED ECODATA FORMS