

## APPENDIX M—Woody Species Use—Browse



**Figure 1—None to Slight.** Browse plants appear to have little or no use. Less than 10% of the available current year's leader growth is undisturbed. Mid-point is 5.



**Figure 2—Slight to Light.** There is obvious evidence of leader use. The available leaders appear cropped or browsed in patches and 60–89% of the available leader growth of browse plants remains intact. Mid-point is 25.

**APPENDIX M—Woody Species Use—Browse**



**Figure 3—Moderate.** Browse plants appear rather uniformly utilized, and 40–60% of available annual leader growth of the plants remains intact. Mid-point is 50.



**Figure 4—Moderate.** Browse plants appear rather uniformly utilized, and 40–60% of available annual leader growth of the plants remains intact. Mid-point is 50.

## APPENDIX M—Woody Species Use—Browse



**Figure 5—Heavy to Severe.** The use of the browse gives the appearance of complete search by grazing animals. The preferred browse plants are hedged and some clumps may be slightly broken. Only between 10 and 40% of the available leader growth remains intact. Mid-point is 75.



**Figure 6—Heavy to Severe.** The use of the browse gives the appearance of complete search by grazing animals. The preferred browse plants are hedged and some clumps may be slightly broken. Only between 10 and 40% of the available leader growth remains

## APPENDIX M—Woody Species Use—Browse



**Figure 7—Extreme.** There are indications of repeated grazing. There is not evidence of terminal buds. Some patches of second and third years' growth may be grazed. Hedging is readily apparent and browse plants are frequently broken. Repeated use at this level will produce a definitely hedged or armored growth form. Ten to 40% of the more accessible second and third years' growth of browse plants has been utilized. All browse plants have major portions broken. Mid-point is 95.



**Figure 8—Extreme.** There are indications of repeated grazing. There is not evidence of terminal buds. Some patches of second and third years' growth may be grazed. Hedging is readily apparent and browse plants are frequently broken. Repeated use at this level will produce a definitely hedged or armored growth form. Ten to 40% of the more accessible second and third years' growth of browse plants has been utilized. All browse plants have major portions broken. Mid-point is 95.

## APPENDIX N—Testing Precision and Accuracy

**Precision:** Precision denotes the amount of agreement between repeated measurements by the same observer and/or different observers. It reflects both the expertise of the observers and the rigor of the procedure. We tested precision by evaluating repeat samples at the same sites and at the same time. We tested repeatability among the same observers and between different observers on the same reaches of stream. Observers were instructed to complete a sample at the site, and then to repeat sampling at the same site. Because plots are located at random by pacing, the likelihood of the repeat sample plots being placed at exactly the same locations on the greenline as samples taken during the initial run is low. Therefore, spatial variation may represent some of the differences observed between initial and final samples (spatial variation is described in the section on Accuracy, below). The following summarizes the ranges of variability observed both among and between observers.

Indicator	Number of tests	Number of streams tested	Mean difference & range of differences among the same observers	Mean difference & range of differences between different observers
Stubble height	35	6	0.6 (0 – 1.5) inch	0.8 (0 – 4.5) inch
Bank alteration	35	6	4.8 (0 – 15)%	8.2 (0 – 44)%
Woody utilization (browse)	33	5	6.3 (0 – 40)%	11.1 (0 – 40)%
Bank stability	35	6	6.3 (0 – 19)%	12.4 (0 – 40)%
% Hydric vegetation	35	6	5.5 (0 – 18)%	9.3 (.5 – 31)%
Wetland rating	35	6	4.9 (0 – 22)	12.1 (1 – 53)
Greenline-greenline width	35	6	.29 (0 – 1.7) meters	.56 (.02 – 1.52) meters

**Accuracy:** Accuracy is the amount of agreement between the estimate from sampling and the true mean value, usually reflecting the number of samples collected and spatial variability at the site. Sample size estimates are used to evaluate accuracy. We estimated the number of samples needed using a standard power analysis to predict the mean based on the standard normal coefficient, the measured deviation from the mean, and a desired confidence interval width, as follows:

$$n = (Z\alpha)2(s)2 / (B)2$$

**Where:**

## APPENDIX N—Testing Precision and Accuracy

- n = The sample size needed to accurately predict the mean.  
 $Z_{\alpha}$  = The standard normal coefficient.  
s = The standard deviation.  
B = The desired confidence level expressed statistically as half of the maximum acceptable confidence interval width. This needs to be specified in absolute terms rather than as a percentage. For example, if the desired confidence interval width is to be within 30% of the sample mean and the expected mean = 10, then  $B = (0.30 \times 10) = 3.0$ .

The standard deviation and the confidence level representing a percentage of the mean value can be calculated from data as it is being collected in the field. Consequently, we have added this equation to the Data Entry Module, in Excel, so that users can input data and assess sample size needed as it is being collected in the field. The module contains a cell in the Header spreadsheet that allows users to modify the confidence level as they evaluate desired sample sizes from their data.

**Observed n values from test data:** Using the observed standard deviations from test data, the following describes the average sample size needed to predict the mean.

Sample size needed to predict the mean with 95% confidence (values in parentheses are the numbers of plots from which the standard deviation was calculated)

SITE	Bank Alteration	Bank Stability	Stubble Height	Greenline - Greenline Width	Woody Species Utilization
Marks Creek	64 (328)	78 (135)	92 (315)	102 (333)	38 (100)
Long Tom	79 (268)	45 (90)	51 (156)	73 (269)	32 (297)
Shoshone Cr	80 (326)	57 (125)	51 (129)	64 (323)	76 (146)
NF Humboldt	61 (355)	55 (86)	77 (206)	64 (361)	36 (80)
Big Elk Cr	76 (228)	54 (144)	31 (56)	24 (228)	137 (136)
Dixie Cr	9 (321)	73 (145)	25 (135)	85 (200)	53 (120)
<b>Average (range)</b>	<b>62 (9-80)</b>	<b>60 (45-78)</b>	<b>55 (25-92)</b>	<b>69 (24-102)</b>	<b>62 (32-137)</b>

## **APPENDIX N—Testing Precision and Accuracy**

These analyses suggest that in most cases, a sample size of 80 adequately predicts mean values for the quantitative variables, for the kinds of spatial variability observed at the test streams.

## APPENDIX O—Equipment List

The following equipment is needed to use the monitoring protocol.

- Monitoring frame described in Appendix D.
- Waders or wading shoes are useful. It is easier to monitor many streams by pacing in the stream rather than on the streambank.
- Laser range finder, measuring rod, or tape measure. The laser range finder is expensive (\$2,400.00 for one with a precision of  $\pm 0.03$  meters and about \$800.00 for one with a precision of  $\pm 0.3$  meters).
- Measuring rod or tape measure (metric preferred).
- Handheld computer (PDA) with Excel spreadsheet. Extra batteries or extended life batteries are required.
- Riparian monitoring data sheets (in lieu of PDA).
- Global Positioning Position (GPS) receiver with extra batteries (strongly encouraged).
- Appropriate plant identification keys for riparian plants.
- Gravelometer for substrate measurement (strongly encouraged), or ruler to measure median diameter of substrate particles.