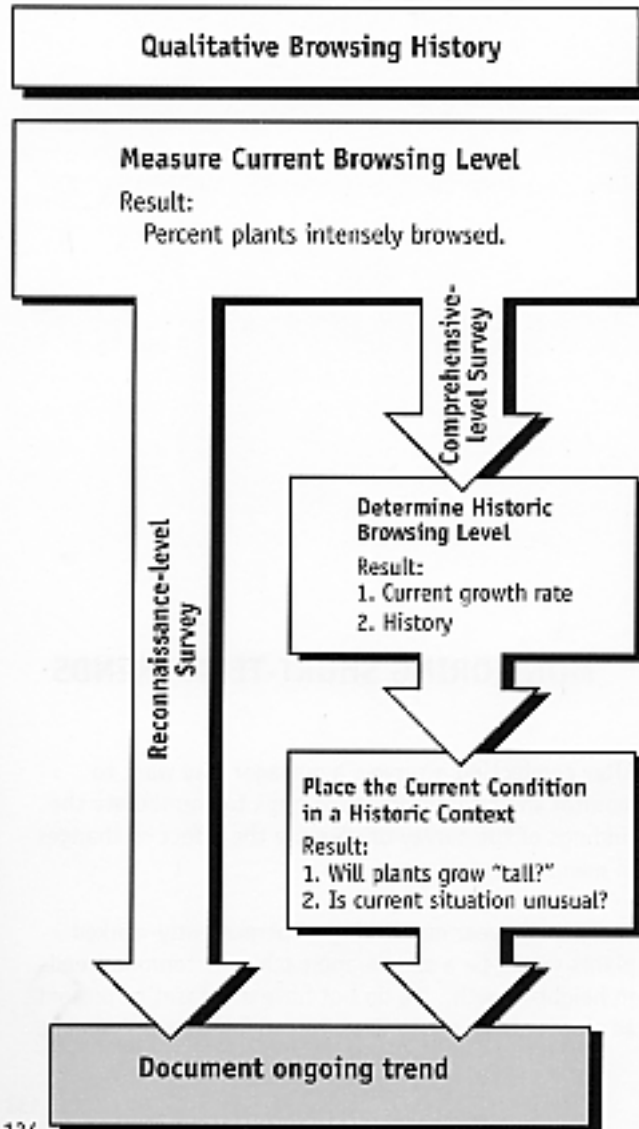


MONITORING SHORT-TERM TRENDS

After conducting a survey, a manager may want to monitor short-term trends, perhaps to corroborate the findings of the survey or measure the effect of changes in management.

The year-by-year monitoring of permanently-marked plants would be a simple approach to determine trends in height-growth. We do not have a dataset to present as a case study, so we describe a hypothetical example.

BROWSE SURVEY SEQUENCE



A Hypothetical Case Study

An area was surveyed in the year 2006 and, as a result, the stocking rate was reduced prior to the following growing season. The survey indicated that intense browsing began in the year 2000 and that the average NAGR from 2000 through the year 2006 was 4 cm / y.

Plants were measured for H_{ps} and permanently marked so they could be measured in subsequent years. As we are primarily interested in whether or not the plant is growing to typical stature, we would measure the tallest stem of the shrub. As a result, we may not measure the same stem each year.

Note that these are not the same stems that were classified during the survey. Those stems were cut and sectioned.

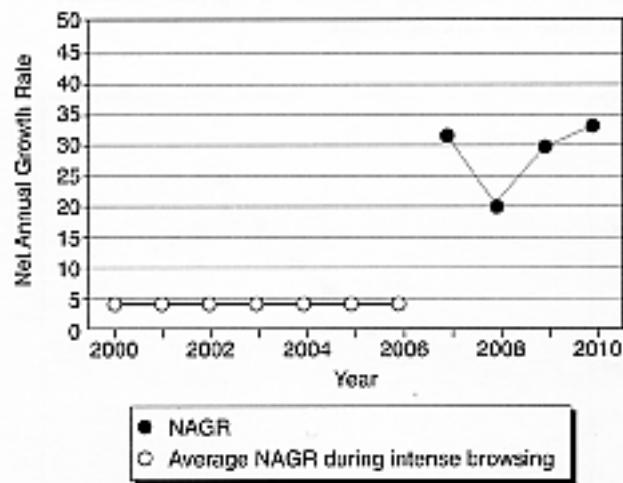
The hypothetical dataset is presented on the following page as it would appear in a spreadsheet. For the sake of clarity we limit the example to three plants; in practice one would use more samples.

The first column displays the year in which the data were taken. The next three columns labeled A, B, and C represent the plants from which the data were recorded. The next three columns were used to calculate the net annual growth rate (NAGR) for the respective plant. NAGR was calculated by subtracting the height in one year from the height in the preceding year. As a result, the year 2006 cells in the NAGR columns are blank. The right-most column was used to calculate an average NAGR for each year.

Year	PLANT HEIGHT			GROWTH RATE			Average NAGR
	A	B	C	A	B	C	
2006	75	120	170				
2007	100	150	210	25	30	40	32
2008	120	180	220	20	30	10	20
2009	140	210	260	20	30	40	30
2010	170	240	300	30	30	40	33

The growth rate data are presented in the graph on the adjacent page. The growth rate of 4 cm / y from the year 2000 - 2006 was the NAGR₁ determined during the comprehensive-level survey. The NAGR values from 2007 - 2010 were the annual average values measured during the short-term monitoring program.

From this graph it is apparent that the change in management affected growth rate. With values ranging between 20 and 30 cm, it seems quite likely that the shrubs in this stand would grow to typical stature.



Alternatively, one could plot the average height that was measured each year. Such a graph is shown below. However, height data will be biased by the plants that are selected. For example, if short plants (say 50 - 75 cm tall) had been selected for repeat monitoring, the corresponding average values would be lower. But the graph should still indicate whether or not the management is likely to result in the growth of trees and shrubs to typical stature.

