Monitoring Program Exercise - Step Three
Select Indicators

Due Thursday 3/30

Purpose: Selecting indicators that give you the best information on how human activities are changing area conditions is the key to the success of a monitoring program. Selecting indicators that address all current and future area concerns increases the comprehensiveness of the monitoring program.

Assignment:

For five of the monitoring goals (which should reflect area concerns) you identified in Step Two, turn in a typed report that includes the following information:

1. Indicators you intend to use to monitor progress toward desired conditions. Select enough indicators to adequately monitor progress but not so many that the program will be impossible to implement due to time and cost. Refer to the material in your reading packet to help you identify indicators.

2. Justify why you selected each indicator. In your justifications, consider whether the indicator meets the following criteria:

a. Can the indicator be measured easily with simple equipment?
b. Can the indicator be measured reliably (i.e., do different observers obtain the same information when measuring the indicator)?
c. Does the indicator detect a change in conditions which is responsive to management control?
d. Can the indicator be measured quantitatively?
e. Do human activities cause the indicator to change?
f. Can the indicator detect a change in conditions within one season (i.e., is it sensitive to change)?
g. Does the indicator detect a change in conditions which persists for a long time (e.g., more than 5 years)?
h. Does the indicator detect a change in conditions which reduces the future desirability of the area to visitors (i.e., is it ecologically significant)?
i. Does the indicator act as an early warning alerting managers to deteriorating conditions before an unacceptable change has occurred (i.e., the indicator does not lag behind unacceptable changes)?

Cite any references you use.

Example of Step Three Assignment

Alaska Basin Zone - Jedediah Smith Wilderness, WY

Campsite Condition

1. The number and distribution of campsites (in relation to trails and lakeshores) indicates the areal extent of camping and the effectiveness of the minimum-impact education program. The indicator can be measured easily and reliably. The number of campsites can be measured quantitatively and is responsive to management control. Human activities (specifically recreational camping) causes the indicator to change. Since vegetation loss occurs rapidly, the indicator is sensitive to change.

2. Multiple-parameter campsite assessment which uses the following indicators: vegetation cover loss, exposed bare mineral soil, tree damage, exposed tree roots (or lichen lines). These indicators document the degree of impact on campsites with regard to vegetation damage and soil erosion. All can be measured simply, fairly reliably and quantitatively. The vegetation indicators are sensitive to change while exposed tree roots (or lichen lines) indicate soil loss which is likely to persist for a long time. Human activities (recreational camping) cause the indicators to change.

3. Number of firerings - indicates the effectiveness of minimum-impact education. It can be measured reliably and quantitatively.

Vegetation

1. Frequency of occurrence of exotic plant species along trails and in campsites - quantitative indicator to assess the presence and extent of exotics. Represents a long-term problem.

Trail Condition

1. Extent of erosion gullies more than 6" deep and muddiness (defined as mud which persists into August or trail width greater than 24") - indicates deteriorating trail conditions which reduce the future desirability of the trail to visitors.

2. Trail transect - indicates soil erosion and the development of parallel trails.

3. Length of multiple trail - indicates that the original trail has deteriorated to the point where visitors no longer will walk on it, thus are creating a parallel trail.

Water Quality

1. Fecal coliform/fecal streptococci ratio - indicates human fecal contamination of drinking water.

2. Relative abundance of macroinvertebrates - indicates the overall "health" of the aquatic ecosystem.

3. pH and alkalinity - indicates whether acid precipitation is impacting the aquatic ecosystem.

Fire

1. Whitebark pine seedling density - indicates whether whitebark pine continues to regenerate or whether subalpine fir is taking over the site. This indicator will have to be monitored for many years to separate natural variability in cone crops from the effects of fire suppression.

Wildlife

1. Bird species richness - indicates whether the presence of campsites is causing an unnatural abundance of species that are opportunistic feeders (e.g., Clark's nutcrackers).

2. Relative abundance of marmots - indicates whether the presence of campsites is causing an unnatural abundance of species that are opportunistic feeders (e.g., marmots).

3. Population trend for bighorn sheep - indicates whether the bighorn sheep population is continuing to decline or is improving. It will be difficult to separate natural factors from recreation harassment effects.

Air Quality

1. Visibility - indicates whether visitors are able to experience clear vistas, an important wilderness value. This indicator is legally mandated for Class I airsheds.

Wilderness Experience

1. Number of occupied campsites within sight or sound of another campsite - indicates whether visitors are able to experience campsite privacy.

2. Visitor perception of area's ability to provide solitude, challenge and self-reliance - indicates whether visitors' perceptions of their wilderness experience matches what managers are trying to provide. This indicator will be difficult to measure reliably.

3. Frequency of occurrence of unburied human fecal matter and/or toilet paper - indicates the effectiveness of the minimum-impact education program and may reflect drinking water quality.